Non-Technological Innovations and Performance

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Abstract

Paper aims at examining the factors that resulted in varying degree of performance that has been measured by the profitability of firms. The data for the study come from ICT SMEs in twenty-five member states of the European Union. The study is based on primary data collected from sample firms during October 2006 and March 2007. The focus of the paper is on the contribution and prioritisation of innovations in three areas, namely: process, organisational, and marketing. Findings of the study suggest that firms that concentrated their innovation activities on marketing and sales performed better than the rest. Results also suggest that preference of global markets followed the same trend as that of marketing innovations with regard to performance. The other factors that discriminated three group of firms categorised on the basis of performance were size of firms and networking with technology parks or incubators. Main source of better performance stems from the growth of demand in the target markets.

Keywords: ICT SMEs, Discriminant Analysis, Innovation Choice, Developed Countries

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1. INTRODUCTION

In recent times, innovations at the firm level and innovation policy at the government level have been cited as most critical factor in industrial dynamics. Innovations are considered as major driving force in industrial development. Although these arguments are true for developed as well as developing world, the types of innovation carried out are very different in both the worlds. Innovations that are new to local market and not necessarily to global market may have economic value in developing countries whereas innovations that are new to the global market are more valuable to firms in developed world. Innovations even at the firm level cannot be done in isolation. Firms need institutional support from governments in order to invest on innovation activities. The type of support from government is not uniform across all the sectors of economy.

In this context sector-specificity play a pivotal role. For instance innovations in semiconductor technology are doable with very little or no support from governments. On the other hand innovations in bio-technology are very complex and time consuming. And a greater level of uncertainty is associated with success of innovation in this sector. Hence it is virtually impossible for firms alone to venture on innovation activities in this sector. Firms, particularly large ones usually have enough financial resources to carry out innovation activities. Another factor that decides government involvement is the gestation period[2] of an innovation. Uncertainty of success of an innovation is also a factor that attracts government intervention.

The other major factors that have been cited in the literature as playing major role in innovation activities are size of operation and market share of firms. These factors can be considered as proxies of ability to appropriate benefits of innovations. In this context small and medium-sized enterprises (SMEs) are disadvantaged lot. Neither they possess enough resources at their disposal nor do they enjoy better appropriability conditions compared to large firms. Therefore, they are likely to be more dependent on government support to carry out innovations. But getting government support could be a problem for SMEs. In this context a study by Lal (2007) found that cost of getting support from government might be a major hindrance. This is more relevant for SMEs. Lal (2007) found that SMEs in Costa Rica did not prefer to take financial support from the government because of the heavy costs involved in the process.

A theoretical model suggested by Hitt et al. (1994) predicts that international diversification is positively related to both innovation and firm performance, and positively

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[2] The time required from inception of a new ideas to launching of a commercially viable product in the market.

moderates the relationship between product diversification and innovation and performance. The article develops theoretical arguments depicting the interactive effects of international and product diversification in a comprehensive model. The model is based on the central argument that innovation is generally facilitated by international diversification highlighting the role of market preference in the performance. Another study by Kleinschmidt and Cooper (2003) demonstrates that the relationship between product innovativeness and commercial success is not linear rather it is a U-shaped. Innovativeness has to be seen in the context of markets. In a developed country market highly innovative product, new to the world market, might lead to better performance while in a developing country market, less innovative product but new to the local market, might be more profitable than a product which is new to the world market. The study indirectly finds a relationship among innovation, performance, and market diversifications.

A study by Verhees and Meulenberg (2004) concludes that innovativeness of the owner of firm has a positive influence on market orientation, innovation, and performance. The findings of the study are based on 152 small firms. The results also show that customer market intelligence influences product innovation positively or negatively, depending on whether the innovativeness of the owner in the new product domain is weak or strong. Findings signify the role market-specific innovation in leading to positive or negative profitability. Another study by Lööf et al. (2001) suggests that country- and firm-specific factors led to different productivity levels which are by and large due to different innovation strategies adopted by firms located in Finland, Norway and Sweden. Findings of the study are based on Community Innovation Survey (CIS) data. The study examined two main issues, namely: (1) the determinants of innovation behavior at firm level, and (2) innovation as an important factor contributing to the economic growth. The authors conclude that although these countries enjoy a high degree of political, social and cultural similarities, they differ largely from one another in their productivity growth.

Yamin et al. (1999) examined relationships between organisational innovation and organisational performance in Australian Best Practice Companies. The data for the study came from 237 Australian manufacturers involved in the 1991 and 1992 Best Practice programs conducted by the Australian Manufacturing Council and the Department of Industrial Relations. The study concludes that although organisational innovations have an impact on organisational performance, our findings suggest that companies need not be high innovators in order to be good performers. The main reason for emerging a week relationship could be the measurement of organisational innovations which encompass administrative,

technical, and product innovation. More importantly marketing innovations that were not included in the analysis might have been the driving force of better performance.

Recent studies on innovation and development such as Cefis and Marsali (2006) and Chapman and Corso (2005) suggest that innovation activities are no more limited to product and process innovations. Rather other types of innovations such as management & organisational, and marketing are becoming very crucial in the era of globalisation. Unlike product and process innovations this type of innovations do not need much of the financial resources rather they depend on entrepreneurial characteristics of the owner or managing director of firm. In this study we have made an attempt to relate performance of firms with innovations choices made by them.

The remainder of the paper is organised as follows. In Section 2 hypotheses are formulated and theoretical framework is depicted while in Section 3 we discuss data and sample firm characteristics. Statistical analysis results are presented in Section 4. Finally Section 5 contains the summary and conclusion of the study.

2. HYPOTHESES AND THEORETICAL FRAMEWORK

Hypotheses are drawn from recent developments in industrial dynamics literature that highlights importance of networking and innovation in the performance of firms. Until a decade ago or so, SMEs were not affected by globalizations. Such effects were more visible on the conduct and performance of large corporations. But in recent times, SMEs' markets are no more protected. Even SMEs had to change the way they have been doing their business. The impact of globalization can be clearly seen on SMEs in developing and developed economies. A study by Parisi et al. (2006) suggests that main source of productivity gain in Italian firms stem from innovation at firm level. In view of the globalisation and consequent development in behaviour of firms it is expected that innovation strategies, networking preferences and choices, and market preferences are jointly influencing the performance of not only large firms but also small firms. Hence we formulate following three hypotheses to be tested in this study.

Hypothesis I: Networking of firms positively affects performance

Main purpose of networking is sharing business information with other partners. However, in the era of intense competitions firms may not like to share any business information with other firms who could be their competitors. In recent years empirical evidence (Lal, 2007; Cefis and Marsali, 2006) suggests that networking is preferred for innovation activities. In this context the networking with knowledge creating institutions such as universities and

public research institutions takes a pivotal role. In fact networking of SMEs with such institutions is more obvious because small firms cannot afford full fledged R&D departments. Therefore they need to develop networks with knowledge producing institution in order to be innovative, which is must for any firm located in any country across the globe. Given the fact that small firms are heavily dependent for innovation activities on agents outside the firm, we hypothesise that firms that developed networks with knowledge creating institutions performed better than the rest.

Hypothesis II: Choice of markets might influence performance

Until recently market preference was totally irrelevant for small firms as they were operating in local market and their market used to be fully protected. Sometime the protection was provided by governments in the form of making certain products reserved for small firms. That option is no more available to SMEs. This is also a consequence of globalisation. Firms are not only facing competition from domestic large firms but also from multinational corporations (MNCs). Small firms in developing countries are surviving by manufacturing products that are new to their local market while firms in developed worlds cannot survive by doing so because of global nature of large firms present in these countries. Products that are new to the local market are usually launched by large firms first in developed world. Small firms in developed countries also face severe competition from small firms from developing countries. Hence one of the ways for SMEs in developed world to survive is to look for global markets.

It might not be economically viable for SMEs in developing countries to do business in global markets independently due to lack of knowledge of markets. Moreover they may lack resources for Greenfield investments in global markets. However, SMEs can work as subsidiaries of MNCs in global market. MNCs might also prefer to take along trusted parts and components suppliers while expending their operations in international markets. In this process SMEs can also share the benefits of globalization and improve their performance. Emergence of a large number of small firms owned by foreign nationals in India is a case in point. In view of this consequence of globalisation, we hypothesize that firms those preferred other markets in addition to local markets are expected to perform better than the rest.

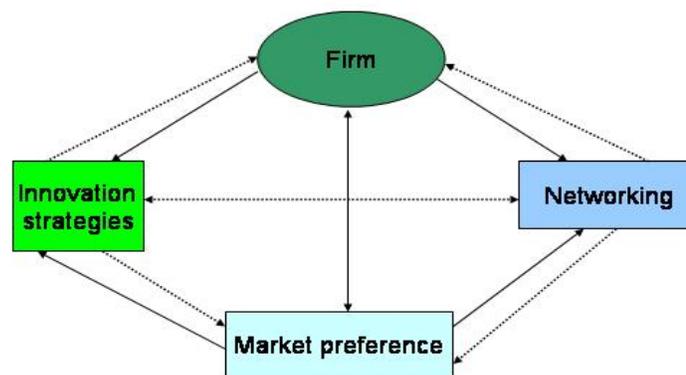*Hypothesis III: Market relevant innovations leads to better performance*

Association between performance and innovation is no longer needs to be investigated. Positive relationship is well established by empirical studies (Cefis and Marsali, 2006; and

Chapman and Corso, 2005). However, there are very few studies that have examined the kind of innovation and its impact on performance. As argued earlier, market information is very essential for doing business successfully in international markets. Moreover, product and process innovations may not be very relevant in certain markets particularly in developing countries. This is because of the fact that products that are old in markets in developed countries may be new for the consumers in markets in developing countries. Moreover consumer in developing may not like products with features that are irrelevant for them. And also gains of process innovation may not yield enough economic returns for firms operating in developing country markets.

On the other hand organizational and new marketing approaches might help firms in improving performance. Moreover these kinds of innovations are within reach of SMEs. Therefore we hypothesise that firms that preferred innovations in management practices and marketing approaches performed better than others. This argument is valid only for small firms located in developed world and operating in international markets particularly in developing countries. These kinds of innovations may not mean much to domestic small firms as they are fully aware of consumer behaviour.

Based on the above hypotheses the following framework connecting all the activities has been developed. It is depicted in Figure 1.

Figure1: Theoretical framework

It can be seen from Figure 1 that nodes of the theoretical framework are connected by continuous as well as dotted lines and the direction of arrows of continuous line is opposite to that of dotted lines. The direction of continuous lines depicts that there is definite influence is in the direction of arrow whereas the influence of node represented by dotted lines is not definite. For instance continuous line from "firm" to "innovation strategies" suggests that firm's decision will influence the choice of innovation while choice of innovation strategies may or may not result in better performance of firms. It is also shown in the framework that choice of markets and performance of firm mutually reinforces each other suggesting that choice of global markets is expected firms to perform better and better performance will in turn provide resources for further market diversification.

In this context it is important to note that choice of global markets alone may not be sufficient condition for better performance. Other prerequisites are also necessary. For instance, choice of global markets may require altering innovation strategies of firms. New strategies may need to be focused towards development of market-specific products or it may require different marking strategies. Similarly market preference might require stronger networking with knowledge creating institutions for producing market-specific products. Market specificity of products does not necessarily mean products with different feature but also production of related products that are necessary for smooth operation of main product. For instance in order to use information and communication technology equipment effectively firms needs to produce and supply "uninterrupted power supply"(UPS) so that main ICT equipment functions smoothly in case of power failure which is very common in developing countries and is totally irrelevant in developed countries.

3. SURVEY AND FIRM CHARACTERISTICS

Data used in this paper are obtained from the population of small and medium sized enterprises (SMEs) that are active in the ICT sectors in EU25 by means of an interview by Computer Assisted Telephonic Interview (CATI) method. Survey was conducted during October 2006 and March 2007. Sample consists of 1238 ICT SMEs in 25 Member States. The firms in the sample are all ICT SMEs, i.e. employ more than one and less than 250 employees and produce ICT hard- and/or software and services. All firms that are included in the sample also have invested (internally or externally) in R&D, and the majority (84%) of these firms introduced a least one product or service innovation new for the firm not necessarily for the market in the year 2005 preceding the year the interview was held. Sectoral classification of sample firms and their distribution by Members States are presented in Appendix Table I and II respectively.

Sample consists of 29.5 percent of micro units, i.e., employing less than 10 workers while 31.1 percent were small firms, i.e. firms employing workers between 10 and 49. Medium size of firms, i.e., with 50 to 249 workers constituted 39.4 percent. The other variables included in the analysis are profitability of firms, sales dynamics, market growth, target market, networking variables, and innovation choice variables. Sample firms were grouped into three categories based on their profitability for preceding three years from the survey year. Firms that experienced negative profitability were assigned lowest rank, i.e. 1 while firms that reported no change in profitability were assigned higher rank, i.e. 2. Positive profitability witnessing firms were assigned highest rank, i.e. 3. As far as the distribution of firms according to their profitability is concerned, 3.6 percent experienced negative profitability whereas 20.8 percent of firms reported no change in the profitability. On the other hand substantially large percentage of firms, i.e. 70.9 firms registered positive profitability while 4.7 percent preferred not to disclose their profitability.

Average sales dynamics of firms for three years preceding the survey year was measured on a seven point scale. Lowest rank, i.e. 1 was assigned to firms that experience more than 10 percent increase in sales while value 2 was assigned to firms that experienced increase in sales between 5 to 10 percent. Firms that experienced increase in sales up to 5 percent were assigned value 3 whereas value 4 was assigned to firms that recorded no change in sales. Values 5, 6, and 7 were assigned to firms that experienced negative sales in the range of up to 5 percent, 5 to 10 percent, and more than 10 percent respectively. Market growth was measured on a five point scale, i.e. values 1 and 2 were assigned to firms that experienced fast market growth and reasonable growth respectively while value 3 was assigned to firms that experienced stability in market growth. Values 4 and 5 were assigned to the firms that experienced decline and very fast decline in market growth respectively.

Five types of markets were considered in the study, namely: local, regional, national, EU, and global. This is a multi-response variable. The representative of firms was requested to choose one type of market where they had major operations. Depending on their responses, firm's market preference was quantified by assigning rank 1 to local and 5 to global markets. Three types of networking institutions, namely: universities, research institutions, and technology parks or incubators were included in the analysis. Variables that represent networking with these institutions were measured on a binary scale. During the survey it was noticed that substantial number of firms were engaged in innovation activities aimed at process, management and organizational, and marketing and sales. Hence three variables representing the choice of innovation were included in the analysis. All the innovation choice variables were measured on a binary scale.

4. STATISTICAL ANALYSIS

4.1 Results

The data were analysed in a multivariate framework. Results are presented in Table 1. A forward stepwise discriminat analysis was preferred over other multivariate models such as logit or probit. This is because discriminant analysis does not pre-assume causal relationship between the group identification variable and others. As depicted in theoretical framework, it is assumed that several factors reinforce causal relationship. Hence discriminant analysis was considered as the most appropriate technique to be used in this study. The procedure begins by selecting the individual variable that provides the greatest univariate discrimination (in terms of groups mean difference of F). It then pairs the first variable with each of the remaining variables to find out the combination that produces the greatest discrimination. The variable that contributes to the best pair is selected. In the third step, the procedure goes on to combine the first two with each of remaining variables to form triplets. The best triplet determines the third variable to be entered, and so on. It stops the procedure when groups mean difference F is less or equal to 1. Table 1 presents the summary of the stepwise procedure and the discriminants selected with their relative contribution to the discrimination.

It can be seen from the table that sales dynamics of three categories of firms (defined earlier), namely: Ne-Profit, Nc-Profit, and Po_Profit differes significantly (at 1 percent level). The average score of sales dynamics in Ne-Profit, Nc-Profit, and Po_Profit categories of firms is 4.40, 3.14, and 1.95 respectively. The average score of sales dynamics of negative profit making (Ne-Profit) is higher that positive profit making (Po-Profit) firms. This is because the way the responses were recorded. Highest value of 7 was assigned to the firm that experienced negative profitability in the range of more than 10 percent. Average score of 1.95 of Po-Profit type of firms suggest that most of the forms experienced positive profitability in the range of 5 to 10 percent.

Results presented in Table 1 also show that growth of market experienced by three groups of firms differs significantly (at 1 percent level). The average score of market growth follow the similar pattern to that of sales dynamics with regard to magnitude of means. The same explanation as that of sales dynamics is valid for highest average value of market growth of Ne-Profit category of firms. However, the variation in average score of market growth among three categories of firms is much less to that of sales dynamics. The average score is 2.12 for Po-profit type of firms while the average value is 2.81 for Ne-Profit type of firms. Another noticeable fact is that average score of market growth is less than three among all types of firms suggesting that all the sample firms experienced positive market growth. Po-

Profit type of firms experienced fast market growth while Ne-Profit type of firms experienced almost zero market growth.

Table 1: Test of equality of means of the variables

Variables		Mean (Std.)	Wilks' Lamda	F Stat.	Sig.
S_Dyna		2.30 (1.161)	.689	247.535	.000
	Ne_Profit	4.40 (1.433)			
	Nc_Profit	3.14 (1.180)			
	Po_Profit	1.95 (0.860)			
M_Growth		2.25 (0.795)	.922	46.371	.000
	Ne_Profit	2.81 (0.906)			
	Nc_Profit	2.58 (0.813)			
	Po_Profit	2.12 (0.741)			
Size		43.76 (52.319)	.992	4.592	.010
	Ne_Profit	40.51 (52.040)			
	Nc_Profit	34.92 (45.568)			
	Po_Profit	46.48 (53.892)			
T_Market		3.28 (1.285)	.995	2.585	.076
	Ne_Profit	2.88 (1.295)			
	Nc_Profit	3.23 (1.252)			
	Po_Profit	3.32 (1.292)			
Uni.		0.40 (0.489)	1.000	.223	.800
	Ne_Profit	0.42 (0.499)			
	Nc_Profit	0.41 (0.493)			
	Po_Profit	0.39 (0.488)			
R_Centre		0.36 (0.769)	.998	1.178	.308
	Ne_Profit	0.19 (0.588)			
	Nc_Profit	0.36 (0.767)			
	Po_Profit	0.37 (0.777)			
T_Park		0.42 (1.044)	.992	4.568	.011
	Ne_Profit	0.07 (0.457)			
	Nc_Profit	0.32 (0.925)			
	Po_Profit	0.47 (1.092)			
Proc_Inno		0.47 (0.499)	.996	2.372	.094
	Ne_Profit	0.44 (0.502)			
	Nc_Profit	0.41 (0.492)			
	Po_Profit	0.49 (0.500)			
Org_Inno		0.33 (0.942)	.994	3.277	.038
	Ne_Profit	0.28 (0.908)			
	Nc_Profit	0.26 (0.887)			
	Po_Profit	0.35 (0.956)			
Mar_Inno		0.39 (1.465)	.989	6.141	.002
	Ne_Profit	0.23 (1.282)			
	Nc_Profit	0.32 (1.405)			
	Po_Profit	0.42 (1.482)			

Results also show that size of firms differs significantly (at 1 percent level) among three type of firms. Average size of Ne-Profit type of firms is nearly 41 workers which is lower than Po_Profit type of firms (47 workers). Contrary to our expectation the average size

of workers in Nc-Profit type of firms (35 workers) is lowest among the other category of firms. Although average score of the choice of markets differs significantly among three categories of firms, the level of significance is merely 10 percent. Results suggest that the average score of target market of Ne-Profit group of firms has been 2.88 suggesting that such firms have been targeting only local and regional markets with few exceptions that ventured into national markets. On the other hand the average score of 3.23 of Nc-Profit group of firms suggest that they have been targeting up to national markets with few exceptions that targeted European markets. Highest average score of Po-Profit group of firms (3.23) suggest that in addition to their operation in domestic markets few of them have ventured into global markets.

As far as networking of sample firms with knowledge creating institutions is concerned, it presents different picture with regard to universities, research institutes and technology parks or incubators. Networking with universities did not differ significantly. Cutting across the profitability range, roughly 39 to 42 percent of firms had networking with universities. Scenario with regard to networking with research institutes is similar to that of universities. Roughly 19 to 37 percent of firms had networking with research institutions. However, networking with technology parks or incubators is significantly (at 5 percent level) differs among three groups of firms. Merely 7 percent of Ne-Profit group of firms has association with technology parks while 47 percent of Po-Profit group of firms had networking with such institutions. The results are according to our expectations.

Results presented in Table 1 suggest that average score of innovation activities differs significantly among various group of firms. Three types of innovation activities, namely; process innovation, management and organizational innovation, and marketing innovation were considered in the analysis. Results show that average score of process innovation activities differs significantly (at 10 percent level). Roughly 50 percent of firms in all the categories were engaged in process innovations. The results are very much according to our expectations. All the sample firms come from Europe and their operations were in European as well as international markets. To remain competitive in European market firms needed to focus their innovation activities on productivity augmenting tasks such as production processes.

Roughly one-third of sample firms were engaged in innovation activities aimed at management and organisational changes. The average score of management innovation activities differs at 5 percent level of significance among three groups of firms. Results show that 28 percent of firms were involved in this kind of innovation activities while percentage of Po-Profit type of firms that were engaged in similar innovation activities was 35 percent.

The level of significance of average score of marketing innovation was highest (at 1 percent level) among various groups of firms. Twenty-three percent of Ne-Profit type of firms aimed at such innovation activities while the percentage of Nc-Profit group of firms was 32 percent. Highest percentage (42 percent) of Po-Profit types of firms was focusing their energy on marketing innovations. We can infer from the results that firms that experienced positive profitability focused on all types of innovations.

Subsequently data were analysed in multivariate framework. Discriminant function is based on the variables presented in Table 1. Based on the composite score of the discriminant function, sample firms were reclassified into three groups. Reclassified and original group membership of firms is presented in Table 2.

Table 2: Classification results

Profitability Dynamics	Predicted Group Membership			
	Negative	No Change	Positive	Total
Negative	16 (37.2)	15	12	43
No Change	4	114 (48.3)	118	236
Positive	4	38	779 (94.9)	821

Note: Total classification power of the discriminant function is 82.6 %;
Figure in parentheses are percentages of correctly classified firms.

It can be seen from Table 2 that discriminant function based on above variables could classify 37.2 percent of Ne-Profit type of firms accurately while 48.3 percent accuracy can be achieved with regard to Nc-Profit type of firms. On the other hand discriminant function is capable of classifying Po-Profit group of firm with 94.9 percent accuracy. The average classification power of the function is 82.6 percent which is much beyond the accepted limit of 75 percent.

4.2 Discussion

The results presented in Table 1 suggest that higher profit making firms experienced positive sales dynamics. However, controlling for markets, the general perception is that profitability in percentages is expected to have negative relationship with the volume of turnover in the context of SMEs. Apparently positive relationship between profitability and sales dynamic has been possible because of choice of different markets. Profitability conditions may be better in certain markets in developing countries and might have helped firms to realise positive relationship between the variables. Same argument can be extended in explaining a strong positive relationship between market growth and profitability. Although market for products being manufactured by sample firms is growing in developing as well as developed countries, the rate of growth is expected to be much higher in developing countries. Hence

market preferences have also contributed to the positive relationship of market growth and profitability.

Results suggest that size was significantly different among three type of firms classified on the basis of profitability. Higher profit making firms were larger in size. Controlling for markets this is not expected because of stiff competition prevalent in any market. In fact the relationship is expected to be the other way round. Mutually reinforcing relationship between size and profitability could also be attributed to some extent to the market preferences. Firms with larger size initially have more resources at their disposal to spend in identifying new markets and investment in new markets might result in expansion of business in other markets. Moreover firms operating in developing countries are expected to use labour intensive technologies resulting in employment of more workers. Firms usually are inclined to do so because of cheap labour in developing countries compared to developed world. The emergence of "target market" variable as significant discriminant of three group of firms substantiate our argument that the firms operating in global markets were larger in size and experienced more positive sales dynamics and market growth than firms that were confined in local or national boundaries.

Non-significance role of universities and research institutions in differentiating three groups of firms is not surprising. This networking has to be seen in the context of innovation activities. Small firms usually do not have enough resources to engage in process and product innovation activities that are costly and gestation period of such innovations are usually very high. Therefore sample firms were not expected to gain much from networking with universities and public research institutions. Consequently cutting across the profitability brackets almost uniform percentage of firms preferred to collaborate with such knowledge creating institutions. On the other hand their networking with technology parks or incubators emerged as a significant discriminant. This behaviour of firms is quite expected because technology parks and incubators are in a better position to help SMEs than universities or research institutions. That could be reason for highest percentage (47 percent) of positive profitability firms had networking with technology parks.

Although three groups of firms were significantly different with respect to different innovation activities, variable representing marketing innovation activities emerged most significant discriminant. This is also very much according to our expectation as choice of innovation has to be seen in the broader perspective of conduct of firms. Firms that kept their operations limited to national or European markets might have focused on labour saving innovation activities while firms that had global presence might have preferred to explore different marketing strategies.

5. SUMMARY AND CONCLUSION

The study aims at identifying the role of innovation activities on performance of firms. The data for the study come from ICT SMEs in twenty-five Member States of the European Union. The study is based on primary data collected from sample firms during October 2006 and March 2007. Firms were grouped into three categories based on their profitability. Stepwise discriminant analysis was used to identify factors that discriminated three groups of firms.

Finding of the study suggest that firms that experienced higher profitability had better sales dynamics and also market growth of higher profit making firms was higher then the rest. Profitability was also found to be positively associated with the market preferences of firms. Firms that were operating in global markets performed better in terms of profitability. On the other hand firms that were operating within local and national boundaries experienced negative or less profitability compared to other firms. Findings of the study suggest that networking of firms with technology parks or incubators was significantly different among three groups of firms. Firms that preferred networking with technology parks realised more profitability than the rest. Sample firms were significantly different with respect to innovation activities. Firms that were operating in international markets preferred marketing innovation activities compared to process and managerial innovation activities though variables representing process and managerial innovation activities significantly discriminated various groups of firms classified on the basis of profitability.

Based on the findings of the study we recommend that the focus of innovation policy should be market-specific. What sells in one market may not sell in other markets. It might be more beneficial for European Commission and Governments of Member States in Europe to provide marketing and other support to small firms so that they can expand their markets beyond Europe. Although the findings are more relevant to SMEs in developed countries, small firms in developing countries can learn from the experience of SMEs in developed countries and focus their innovation activities appropriately. We have not been able to go into the details of marking innovation activities due to lack of information. More detailed case studies are expected to reveal the nature of innovation strategies that are needed for small firms to succeed in international markets.

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Appendix I: Distribution of firms by NACE classification

NACE Classification	Innovator Type				Total	Technological Area
	Occasional		Continuous			
	No.	Percent	No.	Percent		
Manufacturing						
300	25	36.23	44	63.77	69	Office, accounting and computing machinery
313	4	33.33	8	66.67	12	Insulated wire and cable
321	28	45.16	34	54.84	62	Electronic valves and tubes and other electronic components
322	3	18.75	13	81.25	16	Television and radio transmitters and apparatus for line telephony and line telegraphy
323	7	43.75	9	56.25	16	Television and radio receivers, sound or video recording or reproducing apparatus and associated goods
332	11	24.44	34	75.56	45	Instruments and appliances for measuring, checking, testing, navigating, and other purposes, except industrial process equipment
333	20	35.71	36	64.29	56	Industrial process equipment
Total Manufacturing					**276**	
Services						
642	44	36.36	77	63.64	121	Telecommunications
720	4	30.77	9	69.23	13	Computer and related activities
721	26	46.43	30	53.57	56	Hardware consultancy
722	115	35.11	261	69.41	376	Software consultancy and supply
723	17	32.08	36	67.92	53	Data Processing
724	7	33.33	14	66.67	21	Database activities
725	13	48.15	14	51.85	27	Maintenance and repair of office, accounting and computing machinery
726	84	43.30	110	56.70	194	Other computer related activities
Total Services					**861**	
Total	408	37.38	729	64.12	1137	

Appendix II: Member State distribution of firms

Member State	Firms	
	No.	Percent
Austria	51	4.12
Belgium	50	4.04
Cyprus	30	2.42
Czech	30	2.42
Denmark	50	4.04
Estonia	30	2.42
Finland	50	4.04
France	100	8.08
Germany	100	8.08
Greece	30	2.42
Hungary	30	2.42
Ireland	50	4.04
Italy	99	8.00
Latvia	30	2.42
Lithuania	30	2.42
Luxemburg	30	2.42
Malta	30	2.42
Netherlands	48	3.88
Poland	30	2.42
Portugal	30	2.42
Slovakia	30	2.42
Slovenia	30	2.42
Spain	100	8.08
Sweden	50	4.04
UK	100	8.08
Total	1238	100.00

Appendix Table III: Description of the variables

Variables	Description	Remark
S_Dyna	Sales dynamics for the last three years	Measured on a seven point scale, i.e., 1 "growth 10+%", 2 "growth 5-10%", 3 "up to 5 %", 4 "stationary", 5 "decline up to 5%", 6 "decline 5-10%", 7 "decline 10+%"
P_Dyna	Profitability dynamics for the last three years	Measured on a three point scale, i.e., 1 "negative growth", 2 "No growth", 3 "Positive growth"
M_Growth	Market growth	Measured on a five point scale, i.e. 1 "fast growth', 2 "growth", 3 "stability", 4 "decline", 5 "fast decline"
Size	Number of full time employees	
T_Market	Target market	Quantified as 1 "local", 2 "regional", 3 "national", 4 "EU", 5 "Global"
Networking institutions		Measured on a binary scale
Uni.	Universities	1 for yes and 0 otherwise
R_Centre	Research Centres	2 for yes and 0 otherwise
T_Park	Technology parks/Incubators	3 for yes and 0 otherwise
Choice of innovations		Measured on a binary scale
Proc_Inno	Process innovation	1 for yes and 0 otherwise
Org_Inno	Organisational innovation	2 for yes and 0 otherwise
Mar_Inno	Marketing innovation	3 for yes and 0 otherwise