Internet Applications in Micro and Small Enterprises: Evidence of Significance of the Emergents

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Introduction

Micro, Small and Medium Enterprises (MSMEs) have been contributing significantly to the economic development of India. These enterprises have been helping in employment generation for both urban and rural population and have been providing goods and services at competitive prices. They have also been performing well on export revenue generation for the economy. There are around 26 million MSME enterprises in India, contributing nearly 45% share of manufactured output, accounting for 40% of overall exports of the country and providing employment to about 59 million people (Annual Report MSME, 2009-10). This success story is influenced by several factors and adopting technology is one among them. The applications of advanced technologies such as internet, computer software and tools, computer controlled machine etc. are a few examples. Internet is a powerful tool used for easy access to information, reach people across the globe instantaneously, shrink the cycle time of the ordering process in business etc. The OECD (2000) reports that, "The adoption of the Internet by all the businesses has increased over the past three years. Across countries, Internet uptake is lower in small firms than in larger firms, although small firms are catching up quickly." Against this backdrop, a study on the factors that influence the MSME Sector to adopt Internet Applications in business was taken up. The study was carried out in urban industrial estates of Dakshina Kannada and Udupi Districts of Karnataka State. The Karnataka State in India is one of the industrially advanced States, also known as IT capital of India, contributing substantially to the GDP growth rate of the Nation.

Dakshina Kannada and Udupi Districts and MSME

Dakshina Kannada (D.K. District) and Udupi Districts are located in the South West coast of Karnataka State, and both the districts are well connected with a seaport, an airport and a national highway. The population of D.K. district is about 20, 83,625 and Udupi district has a population of 11,77, 908 people. A brief profile on D.K. District prepared by MSME Development Institute reports that, 18918 Micro and Small enterprises are registered with a total investment of Rs. 67,217 lakhs and employ 88,698 persons in the D.K. District in March 2012. Similarly, in Udupi District there are 9467 registered industrial enterprises with a total investment of Rs. 45,438 lakhs and employing about 64,634 people (MSMEDI, 2012)

Both thedistricts have Development Centres of IT major like Infosys, Robosoft, Manipal Technologies etc.and also many Small and Medium IT enterprises. All these contribute for a conducive atmosphere for internet applications in business and hence a study on the factors that influence internet applications in Micro and Small Enterprises in the twin districts was taken up. The Government of Karnataka, through an Industrial Policy Note in 2009, grouped the districts based on industrial backwardness for the purpose of offering incentives for industrial developments in the State. The taluks in the districts that are industrially most backward were identified as Zone 1 and taluks that are industrially more backward were recognized as Zone 2. The taluks that fall in Zone 3 are the industrially backward taluks and Zone 4 has the taluks industrially advanced. For the purpose of the study, manufacturing enterprises in industrially advanced locations (Zone 4) in D.K. district was considered. The enterprises situated in Mangalore City Corporation limits of Mangalore Taluk come under Zone 4, as per the Industrial Policy Note. It implies that the infrastructures required to run an enterprise are available in this region including the IT infrastructure. The enterprises in Baikampady and Yeyyadi industrial estates of Mangalore City Corporation limits and Shivalli industrial estate of Udupi district were considered for the study. These industrial estates have

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an extensive telephone network including a telephone exchange. Hence, access to internet infrastructure is not a limiting factor.

Objectives of the Study

In the current economic environment, enterprises world over reap benefits with Internet Applications for communication, business transactions such as buying and selling, efficient handling of the fund etc. Internet technology has the potential to alter almost every aspect of business operations (Parasuraman and Zinkhan, 2002). With the rise in internet use, distance and time are immaterial for business. Internet offers applications that facilitate network relationships, enabling firms to interact more widely and intimately with other actors, including customers, suppliers, and collaborators. (Prashantham and Berry, 2004) In other words, internet lowers the cost of accessing and leveraging network relationships, enhances the visibility, efficiency and intimacy of the enterprise with business associates. "SMEs are, therefore, under increasing pressure to employ IT/IS effectively in order not only to maintain their competitive positions but also simply to survive." (Montazemi, 2006) Therefore, in the changing circumstances, where adopting new technologies is normal, role of Internet is significant and hence a study on factors that influence internet applications in the Micro and Small enterprises in D.K. district was felt essential and taken up.

The objectives of the present study are:

- To understand different internet applications and find out to what extent Internet is used in business by the Micro and Small enterprises

- To study the variables that influence the Internet applications of Micro and Small enterprises

Sampling Method

Bailkampady, Yeyyadi and Shivalli industrial estates together have about 575 micro and small enterprises.(MSMEDI, 2012). As these enterprises are located in three different industrial estates and access to entrepreneurs is limited, Convenience Sampling Method was adopted. In order to get primary data 75 MSME enterprises (13% of the population) in Dakhina Kannada and Udupi Districts were approached with a structured questionnaire and data was collected.

Data Analysis

The responses were sought on internet applications adopted in the enterprise, variables that influence the enterprises to adopt internet in enterprise and period of use of internet etc. It was found that five of the enterprises among 75 do not use internet in their business operations and hence ignored. Data collected from the 70 enterprises were tabulated and data analysis was carried out.

For the purpose of the study eight Internet Applications were identified (dependent variables); namely, using email for the correspondence, web browsing to know the updates in the field with regards to sales, purchase, manufacturing or any other business related matter, E-commerce applications in business, fund transfer using internet to the suppliers, any other stakeholders, internet use for purchase transactions including sending purchase order, receiving order acknowledgement, follow up invoice etc. thereby bring down cost of purchase, sales transactions including generating enquiry, converting into prospects, sales and after sales support with the help of internet, government filings such as sales tax remittance, excise duty payment, income tax returns all carried out online and website update such as announcing launch of new products, achievements etc. These eight Internet Applications broadly cover the functions of an enterprise in the normal business cycle. The internet users are grouped as Extensive users and Limited users. Extensive users are those enterprises that use five or more internet applications in the business whereas limited users are the enterprises with a maximum of four internet applications used in the business.

The ten independent variables, namely, increased visibility; more enquiries; improved customer care; improved communication; quick response; transparency and authenticity; improved fund transfer; improved intra relationship; improved cost of purchase and other of Internet benefits in business were considered that would influence the Internet applications of these enterprises. These ten independent variables broadly cover the normal business performances of the enterprise and hence considered for the study. Using internet and website would help in getting a better visibility in the market and hence chances of more enquiries flowing are high.

Table 1: Rating on Variables by the Extensive Users and Limited Users of Internet

Variables	Internet users	Excellent	Very Good	Good	Satisfactory	Fair	Total
Increased visibility	Extensive users	11	17	11	1	0	40
	Limited users	3	6	1	1	1	12
More enquiries	Extensive users	12	16	9	2	0	39
	Limited users	2	7	1	1	1	12
Improved customer care	Extensive users	12	15	15	1	0	43
	Limited users	1	7	2	3	0	13
Improved communication	Extensive users	9	22	12	3	1	47
	Limited users	1	6	13	0	1	21
Quick response	Extensive users	9	27	7	2	0	45
	Limited users	2	6	9	2	2	21
Transparency and authenticity	Extensive users	5	19	22	1	0	47
	Limited users	1	1	14	4	1	21
Improved fund transfer	Extensive users	11	16	18	1	0	46
	Limited users	1	4	10	4	1	20
Improved intra relationship	Extensive users	4	23	14	3	0	44
	Limited use	1	5	5	4	3	18
Improved cost of purchase	Extensive users	2	10	14	11	2	39
	Limited users	0	3	4	1	5	13
Overall benefits	Extensive users	9	20	17	2	0	48
	Limited users	6	10	5	1	0	22

Confidence in using internet is explained by transparency and authenticity. As there is no need of duplication of the work as mails can be forwarded and also copied to all concerned the relationship within the organization also improves. Since many transactions are carried out using the internet the cost of purchase also drops significantly. The influence of these variables on Internet Applications of the enterprises were rated on a 5 point Likert's scale ranging from Excellent – Very Good – Good - Satisfactory – Fair. It is observed from the Table 1 all seventy enterprises do not consider all the variables listed as important. Hence number of total responses on influence of variables on internet applications range from 51 to a maximum of 70.

Factor Analysis

Factor analysis was carried out on the basis of response from all the users of internet. The appropriateness of applying Factor analysis was checked by observing Kaiser-Meyer-Olkin Index and significance of Chi Square in Barlett's test of Sphericity. The KMO index was 0.658 > 0.5, the Chi Square was 190.473 with degree of freedom as 45 and Significance of Chi square in Barlett's test of Sphericity was 0.000 < 0.05. The KMO and Barlett's test yielded good results and therefore Factor Analysis was considered appropriate to apply.

The initial Eigenvalues, Extraction sums of squared loadings and Rotation sums of squared loadings are explained in Table 3. It is observed from the Table 3 four extractions were possible. The percentage of variation explained by say Factor 1 is given by (Eigenvalue of Factor 1/No of variables)*100. Similarly for Factor 2, Factor 3 and Factor 4 the percentage of variation is explained in the column 3 of Table 3.

Table 2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.65
Bartlett's Test of Sphericity	Approx. Chi-Square	190.47
	Df	45.00
	Sig.	0.00

Table 3: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.765	37.648	37.648	3.765	37.648	37.648	2.649	26.493	26.493
2	1.643	16.425	54.073	1.643	16.425	54.073	1.836	18.357	44.850
3	1.426	14.258	68.331	1.426	14.258	68.331	1.766	17.661	62.510
4	1.003	10.034	78.365	1.003	10.034	78.365	1.585	15.855	78.365
5	0.657	6.572	84.937						
6	0.505	5.046	89.983						
7	0.381	3.811	93.794						
8	0.287	2.873	96.667						
9	0.208	2.076	98.743						
10	0.126	1.257	100.000						

Extraction Method: Principal Component Analysis.

Communality is the amount of variance in a variable explained by different factors. The initial and final communalities are presented in Table 4. The communality for each variable is the percentage variation in itself explained by the factors extracted. Initially, the number of factors is the same as number of variables, whereas finally only a subset of factors, having eigenvalue >1 were retained. Principal component analysis (PCA) using orthogonal rotation (VARIMAX) was performed to assess the underlying structure of the data. The PCA method is particularly suited to research issues that are concerned about prediction and determining the minimum number of factors to account for the maximum amount of variance in the data (Hair *et al.*, 1998).Therefore, for the variable, rate increased visibility, four factors emerged explained 85.1% of its variation. For the variable, rate more enquiries; four factors explained 88.3% of its variation and so on.

Table 4: Communalities

	Initial	Extraction
rate_ increased visibility	1.000	0.851
rate_ more enquiries	1.000	0.883
Rate _improved customer care	1.000	0.761
rate_ improved communication	1.000	0.904
rate_ quick response	1.000	0.763
rate_ transparency and authenticity	1.000	0.776
rate_ improved fund transfer	1.000	0.803
rate_ improved intra relationship	1.000	0.672
rate_ improved cost of purchase	1.000	0.775
rate_ other internet benefits	1.000	0.650

Extraction Method: Principal Component Analysis.

Table 5: Rotated Component Matrix

	Component			
	1	2	3	4
rate_ increased visibility	.885	-.011	.242	-.096
rate_ more enquiries	.882	.169	.274	.046
rate_ improved customer care	.733	.041	.030	.470
rate_ improved communication	-.045	.926	.145	-.152
rate quick response	.341	.764	-.001	.249
rate_ transparency and authenticity	-.012	.532	.242	.658
rate_ improved fund transfer	.172	-.168	.420	.755
rate_ improved relationship	.187	.150	.742	.252
rate_ improved cost of purchase	.095	.074	.868	.077
rate_ other internet benefits	.600	.151	-.268	.442

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 9 iterations.

A factor matrix gives the correlations between each factor and each variable and correlations are called factor loading. For a clear identification of factors, Varimax rotation is used. The rotated component matrix with factor loadings is shown in Table 5.

However, it is difficult to determine which variable loads heavily on which factor. Therefore, factor loadings less than 0.6 were suppressed in rotated component matrix. The resulting matrix is shown in Table 6.

In the Table 6 the factor loadings represent the simple correlations between each factor and each variable. The variables which have heavy loadings on a specific factor make up the factor. Therefore, the three factors with the heavy loading variables are as in Table VII.

Table 6: Rotated Component Matrix with Factors Loading Below 0.6 Suppressed

	Component			
	1	2	3	4
rate_ increased visibility	0.885			
rate_ more enquiries	0.882			
rate_ improved customer care	0.733			
rate_ improved communication		0.926		
rate_ quick response		0.764		
rate_ transparency and authenticity				0.658
rate_ improved fund transfer				0.755
rate_ improved intra relationship			0.742	
rate_ improved cost of purchase			0.868	
rate_ other internet benefits	0.600			

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 9 iterations.

Table 7: The Four Factors Derived

Factor 1	Factor 2	Factor 3	Factor 4
Increased visibility	Improved communication	Improved intra relationship	Transparency and authenticity
More enquiries	Quick response	Improved cost of purchase	Improved fund transfer
Increased customer care			
Other Internet benefits			

The appropriateness of applying Factor analysis was checked by observing Kaiser-Meyer-Olkin Index and significance of Chi Square in Barlett's test of Sphericity. The KMO index was 0.712 > 0.7(the case is stronger as KMO index is better than 0.7), the Chi Square in Barlett's test of Sphericity was 140.005 with degree of freedom of 45 and Significance of 0.000 < 0.05. The KMO and Barlett's test yielded good results and therefore Factor Analysis was considered appropriate

to apply. As in the previous case, the initial Eigenvalues, extraction sums of squared loadings and rotation sums of squared loadings were determined.

The initial and final communalities were obtained. The component matrix after Varimax rotation was developed. As it is difficult to determine which variable loads heavily on which factor, factor loadings less than 0.6 were suppressed. The resulting matrix is shown in Table 8.

Table 8: Component Matrix after Suppressing Factor Loadings<0.6 (a, b)

	Component			
	1	2	3	4
rate_ increased visibility	0.578			
rate_ more enquiries	0.767			
rate_ improved customer	0.799			
rate_ improved communication		0.794		
rate_ quick response	0.660			
rate_ transparency and authenticity	0.658			
rate_ improved fund transfer	0.658			
rate_ improved intra relationship	0.681			
rate_ improved cost of purchase				
rate_ other internet benefits	0.699			
Factors	Factor 1	Factor 2		

Extraction Method: Principal Component Analysis.
a 4 components extracted.
b Only cases for which Extensive Internet applications are used in the analysis phase.

From the Table 8 it is observed that only two factors have loading >0.6 and on other two factors loading is <0.6 and hence ignored. All variables are loading Factor 1 except improved communication which is loading the Factor 2.

Factor analysis based on the ratings given by the limited internet users

The responses were very small on some of the variables

from limited internet users and therefore, the correlation matrix could not be determined when all limited internet users were considered. Hence, only those cases where atleast 30% of the responses were from limited internet users were considered for the study. Five of the variables could be used for factor analysis. The appropriateness of applying Factor analysis was checked by observing Kaiser-Meyer-Olkin

Index and significance of Chi Square in Barlett's test of Sphericity. The KMO index was 0.5, the Chi Square in Barlett's test of Sphericity was 22.754 with degree of freedom of 10 and Significance of 0.012 < 0.05. The KMO and Barlett's test yielded good results and therefore Factor Analysis was considered appropriate to apply. The initial Eigenvalues, extraction sums of squared loadings and rotation sums of squared loadings were determined. The initial and final communalities were obtained. The component matrix after Varimax rotation was developed. As it is difficult to determine which variable loads heavily on which factor, factor loadings less than 0.6 were suppressed. The resulting matrix is shown in Table 9.

In this case three factors emerged and based on factor loading the factors are as shown in the Table 10.

Table 9: Rotated Component Matrix (a, b)

	Component		
	1	2	3
rate_ improved communication	0.895		
rate_ quick response	0.761		
rate_ transparency and authenticity	0.784		
rate_ improved fund transfer			0.944
rate_ other internet benefits		0.920	

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 20 iterations.
b Only cases for which limited internet users are used in the analysis phase.

Table 10: Factors Emerged for Limited Internet Users

Factor 1	Factor 2	Factor 3
Improved communication	Other internet benefits	Improved fund transfer
Quick response		
Transparency and authenticity		

Conclusion and Scope for Further Study

It is evident from the study that the factors emerged were different for each case. When all internet users were analysed, four factors emerged and it shrunk to three factors for limited internet users and two factors for extensive internet users. It is evident that when more internet applications were used in the enterprise the number of factors shrunk as in the case of extensive users of internet applications. This could be due to the extensive use of internet, confidence on internet applications rose among the users, and rapidly made the best use of it. However, when number of internet applications were limited, users had specific variables under consideration and therefore one may conclude their approach to internet use were cautious. Its impact was seen while attempting to test the factors for all internet users. The study throws light on improvement in business communication due to extensive use of internet as it emerged as a unique factor in the case of extensive internet users (Factor 2) while all other variables merged to one factor.

When all internet users were considered, following were the emrgents from the study

Factor 1 has components related to sales and marketing

Factor 2 speaks about improvement in business communication

Factor 3 turns out to be matter connected with purchase activities

Factor 4 deals with significance of transparency and authenticity while dealing with money.

In limited internet users' case, improvement in business communication emerged as a factor indicating they are still at the entry stage of using internet.

Table 11: Period Internet used * Internet Users * Use IT Cross tabulation

Use IT			Internet Users		Total
			Extensive	Limited	
Yes	Period Internet used	more than 10 years	18	7	25
		more than 5 and less than 10 yrs	7	8	15
		more than3 and less than 5 years	9	4	13
		less than 3 yrs	14	3	17
Total			48	22	70

From the Table 11 it can be inferred that nearly 69% of the enterprises were extensive users of the internet, among the enterprises that use IT and about 38% of these enterprises have been using internet for more than ten years. It can also be noted that more than 50% of the enterprises among extensive internet users have been using internet for more than five years (including the above). Therefore, one may hypothesise on emergents of longer period of extensive internet use in Small and Micro enterprises.

This study can also be extended further to understand the factors that influence the enterprises to adopt Information Technology and other computer applications in business.

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