Journal of Information Technology Management

ISSN #1042-1319

A Publication of the Association of Management

THE USAGE AND ADOPTION OF IT AMONG SMEs IN TURKEY: AN EXPLORATORY AND LONGITUDINAL STUDY

BİRGÜL KUTLU
BOĞAZİÇİ UNIVERSITY
birgul.kutlu@boun.edu.tr

MELTEM ÖZTURAN
BOĞAZİÇİ UNIVERSITY
meltem.ozturan@boun.edu.tr

ABSTRACT

This paper investigates the usage and adoption of IT in SMEs in Turkey through an exploratory and longitudinal study in two stages of three years apart. The survey used for this purpose is based on 160 companies in Stage 1 and 41 companies in Stage 2. Exploratory findings, consistent with previous researches, state that increased use of IT in SMEs is mainly for operational and routine tasks, development of internal IT skills and positive attitude of owners and managers produce high levels of success in IT adoption, and expected benefits of IT is one of the main factors for IT implementation decisions. Furthermore, longitudinal findings show that SMEs have started to use more sophisticated IT applications and hire more IT personnel indicating a higher level of IT adoption which leads to a market transform from national to international.

Keywords: information technology, adoption, small and medium enterprises, Turkey

INTRODUCTION

Information technology (IT) provides all enterprises with a lot of opportunities for their business activities. On the other hand small and medium sized enterprises (SMEs) have always been considered to be the major economic players and strong sources of economic growth. Therefore it is highly apparent that usage and adoption of IT in SMEs are very critical for the world economy.

Small businesses contribute more and more to the national and international economies throughout the world. OECD defines the economic contribution of SMEs briefly as follows: "SMEs play a very important role in economic growth by providing the source for most new jobs". Over 95% of OECD enterprises are small and medium-sized and they employ 60%-70% of total employment [22]. SMEs' problems in a technology-driven environment derive from lack of financing, difficulties in exploiting technology, managerial capability constraints, low productivity and regulatory burdens. SMEs, for this

reason, need to upgrade their management skills, their capacity to gather information and their technology base.

Similar to OECD, SMEs are also important for Turkish economy. About 98% of all enterprises are SMEs and they employ about 58% of total employment [12]. SMEs are believed to be the most important factor that will take Turkey out of the crisis and initiate the economic growth [31].

According to Lee and Baek [16] although there is no reason to believe IT is any more critical to large corporations than to small businesses, the challenges faced by small businesses are different from those of larger corporations. SMEs have to keep pace with technological changes if they want to keep a competitive edge. Technology is an important factor for the competitiveness of SMEs in several aspects: product and production techniques, management methods, firm organization and staff training. Benefits can take a number of forms, such as efficiency gains, increased management effectiveness and improved business performance [8].

SMEs are regarded "poor" in human, financial and material resources. IT can be used as a business tool to reduce costs, create stronger links with customers, innovate and facilitate niche marketing [9]. Estimates of small business use of computers have ranged from below 30% to about 80%, depending on the location, size and nature of the business [24]. While the trend appears to indicate an increased use of IT, this is mainly operational and administrative tasks, rather than for strategic and decision-making purposes [2, 9, 4]. Decision making tends to be short-term and intuitive, focusing on reaction rather than anticipation. IT suitable in such situations needs to be robust and available quickly, preferably as packages [8]. On the other hand, lack of in-house IT expertise and lack of resources have caused SMEs to rely more extensively on outside help.

The relative benefits of IT enables new technology to do better than the technology it supersedes, thereby creating greater operational efficiency and management effectiveness [8].

Organizational readiness is a major influence on IT in SMEs. Owners and managers have a dominant role in the organization and also in the IT adoption [1]. Owners' and managers' motivations, values, attitudes and abilities dominate organizational culture. For that reason they need both an awareness of the IT which is shaping the future of the firm and the courage to create changes in organizational culture required to support IT functions [5, 8]. According to Martin and Matlay [19], the intuitive nature of management and operation styles impact significantly on technology evaluation and implementation. Also owner-manager is described as an important source of information on the process, as is the other key staff participating in technology adoption and implementation [18]. Existing research suggests that business owners and managers with positive attitude are inclined to be more successful in adopting and implementing new technology [23, 32].

IT adoption is summarized as using some form of IT to support business operations and decision making [28]. It is commonly argued that the greater the adoption and use of IT, the more likely it is that a firm will embark on international activities [6, 10]. It has also been theorized that increased adoption and use of IT is likely to bestow firms with superior performance and competitive advantage over local and international competitors [7]. It has also been found that perceived benefits of internet such as market development, efficiency of sale and promotion, ease of accessibility and cost reduction were significant factors on SMEs willingness to adopt new technologies such as electronic commerce [13]. However, Ritchie and Brindley [27] point out that SME adoption of IT has a slow response and limited progression and lack of IT knowledge delays adoption. Furthermore, Caldeira and Ward [3] indicate that the development of internal IT skills combined with top management's knowledge and attitudes towards IT adoption produce the competences required to achieve higher levels of success with IT adoption.

Although the diffusion of IT to SMEs is rapidly increasing, there are still doubts about the proper usage and adoption of it in these enterprises. There have been numerous researches [8, 15, 17, 20, 25, 26] for identifying the factors affecting the usage and adoption of IT in SMEs where these factors can be mainly categorized as IT resources, top management's commitment and expected benefits of IT. On the other hand, few researches have been conducted in Turkey especially for Turkish SMEs. Thus, this longitudinal and exploratory study has been conducted to seek the usage and adoption of IT in Turkish SMEs in the context of the categorized factors.

To realize the above mentioned objective, this paper has been organized in four sections including this introduction. In Section 1, a brief review of the literature on usage and adoption of IT in SMEs is presented. Then in Section 2, research methodology is described. In Section 3, results and findings of the study are presented while in Section 4 concluding remarks, limitations of the study and further research directions are pointed out.

RESEARCH METHODOLOGY

The objective of this research was to determine the usage and adoption of IT in SMEs in Turkey. The

longitudinal study, based on this objective, was made up two stages carried out three years apart, between 2003 and 2006.

Stage 1

The first stage of the study was conducted during 2003 by means of a questionnaire. The purpose of this initial exploratory survey was to determine IT usage, adoption and strategy patterns of SMEs together with their business demographic profile. The questionnaire used was adapted, under his permission, from the one provided by Dr. Snehamay Banerjee with modifications to suit Turkey after a pilot study with five enterprises. One of the researchers was present during pilot testing to get their feedback as well as identify other key issues that might have been left out. Based on their responses the questionnaire was refined. The questionnaire included six sections: the first one contained 10 questions about the general characteristic of the enterprises and their positions in the business, the second involved 20 questions for their IT facilities and usage patterns, the third included 18 items related to the IT usage within the enterprise, the fourth consisted of 18 factors affecting IT implementation decisions, the next one listed out 8 IT areas that the enterprise made investments in and the final section provided 10 questions about the respondent.

Using the widely accepted definition of SMEs in Turkey as companies with 1-100 employees [11] but excluding micro firms with 1-9 employees [29] from this set and considering the database of the members of governmental Network of Small and Medium Sized Enterprises published on Internet [14], the population of the study was found to be 5503. There are 7 geographical regions in Turkey and total of 81 cities in these 7 regions. In order to collect adequate cross-sectional data for SMEs, the questionnaires were mailed as follows;

- To 10% of SMEs for the cities with more than or equal to 500 SMEs for all regions by systematic sampling.
- To 50 SMEs for the cities with more than or equal to 50 and less than 500 SMEs for all regions by systematic sampling.
- To all of the SMEs for the cities with more than or equal to 20 and less than 50 SMEs for the regions where there is no city with number of SMEs being equal to or greater than 50 SMEs.
- None to the cities with less than 20 SMEs for all regions.

In this way, total of 1207 questionnaires were mailed of which 108 were returned within three months. Telephone calls with the aim of increasing the return rate to 10% for each city, resulted in an additional 52 returns being received, giving an overall response of 160 questionnaires. These responses received represented an overall response rate of 13.9%. This was found to be encouraging due to the fact that it was very difficult to get responses from SMEs and to the fact that Turkey was in a financial crisis in those days. Also this sample size, using the formula given by Mindel [21], achieved a 7.6% sampling error for 95% confidence level. The composition of the sample according to the geographical region is presented in Table 1.

Table 1 : Distribution of the SMEs by Geographical Region (n=160)

Geographical Region	Frequency
Marmara	51
Ege (Aegean)	14
Akdeniz (Mediterranean)	10
Karadeniz (Black Sea)	15
İç Anadolu (Central Anatolia)	39
Doğu Anadolu (Eastern Anatolia)	17
Güney Doğu Anadolu (South Eastern Anatolia)	14

The 160 respondents to the questionnaire held various positions in their organization. 49% of the respondents were either the owner or the share holder of the organization whereas 13% were general manager, 13% were finance manager, 11% were IT manager and 14%

were others including assistant manager, marketing manager and production manager.

Stage 2

The second stage of the research was conducted during 2006 again by means of a questionnaire which was reconstructed by removing the last section and eliminating some of the questions of the other sections of the questionnaire used in Stage 1.

The purpose of this second questionnaire was to see the changes in the technology usage, adoption and strategy patterns of SMEs in the three year period and be able to determine the causes of these changes.

The sample for this survey included all the respondents from the initial exploratory survey. Total of 160 questionnaires were faxed of which 41 were returned constituting a 25.6% response rate. The composition of the respondents according to the geographical region is presented in Table 2.

Table 2 : Distribution of the SMEs by Geographical Region (n=41)

Geographical Region	**Frequency**
Marmara	15
Ege (Aegean)	5
Akdeniz (Mediterranean)	5
Karadeniz (Black Sea)	1
İç Anadolu (Central Anatolia)	7
Doğu Anadolu (Eastern Anatolia)	6
Güney Doğu Anadolu (South Eastern Anatolia)	2

RESULTS AND FINDINGS OF THE STUDY

Profiles of SMEs

Table 3 summarizes the employee and customer profiles of SMEs for the sample of Stage 1 (160 enterprises) and for the sample of Stage 2 (41 enterprises) for both stages.

Table 3: Employee and Customer Profiles of SMEs

	n=160		n=41			
	Stage 1		Stage 1		Stage 2	
	Frequency	%	Frequency	%	Frequency	%
Number of employees						
10 – 19	46	28.8	12	29.3	5	12.2
20 – 29	33	20.6	12	29.3	8	19.5
30 – 39	20	12.5	3	7.3	9	22.0
40 – 49	19	11.9	6	14.6	6	14.6
50 – 99	41	25.6	8	19.5	13	31.7
Missing	1	0.6	0	0.0	0	0.0
Number of regular customers						
< 10	17	10.6	2	4.9	2	4.9
11 – 100	50	31.3	13	31.7	10	24.4
101 – 200	25	15.6	8	19.5	6	14.6
201 – 300	11	6.9	2	4.9	2	4.9
> 300	41	25.6	12	29.3	14	34.1
Missing	16	10.0	4	9.8	7	17.1

In Stage 1 most of the organizations (50.6%) consisted of "limited companies", 43.2% of them were joint stock enterprises, and the rest were either partnerships (3.1%) or individual enterprises (3.1%) whereas 51.2% of the enterprises contributed to the second stage of the study were joint stock enterprises, 43.9% were "limited companies" and the rest were either partnerships (2.4%) or individual enterprises (2.4%). Comparison of the two stages for 41 enterprises shows that there was an increase in the number of employees and in the number of regular customers in three years. The reason for these increases can be the 61.9% increase in Gross National Product in that period [30].

Table 4 summarizes the business experiences of SMEs for the sample of Stage 1 (160 enterprises) and for the sample of Stage 2 (41 enterprises) for both stages. It can be seen that there were no major changes in main areas of business and answers given to "years of business" were consistent regarding the three years gap. This consistency increases the reliability of the survey.

Answers to the question about current market for the products/services of the enterprises revealed that out of 160 enterprises, 64 (40.0%) were national, 38 (23.8%) regional, 33 (20.1%) international, and 22 (13.8%) local. On the other hand when the answers given to those questions are compared for the two stages for 41 enterprises it is observed that out of 41 enterprises, 29.3% (12) changed its market from national to international in three years which can be accounted for higher IT adoption according to previous researches [10, 6]. According to the answers given in the second stage out of 41 enterprises 46.3% (19) of the organizations were international, 12.2% (5) were national, 29.3% (12) were regional and, 12.2% (5) were local whereas in the first stage 17.1% (7) were international, 41.5% (17) were national, 26.8% (11) were regional and 14.6% (6) local.

Table 4 : Business Experiences of SMEs

	n=160		n=41			
	Stage 1		Stage 1		Stage 2	
	Frequency	%	Frequency	%	Frequency	%
Main areas of business (mutually exclusive)						
Manufacturing	133	83.1	38	92.7	39	95.1
Distribution	118	73.8	13	31.7	15	36.6
Service	116	72.5	10	24.4	13	31.7
Marketing	59	36.8	18	43.9	23	56.1
Sales	89	55.6	24	58.5	25	61.0
Others	17	10.6	3	7.3	5	12.2
Years in business						
< 6	23	14.4	3	7.3	1	2.4
6 – 10	31	19.4	10	24.4	10	24.4
11 – 15	32	20.0	6	14.6	4	9.8
16 – 20	24	15.0	6	14.6	4	9.8
21 – 25	9	5.6	4	9.8	6	14.6
26 – 30	19	11.9	4	9.8	4	9.8
> 30	16	10.0	6	14.6	10	24.4
Missing	6	3.7	2	4.9	2	4.9

IT Resources and Usage Patterns of SMEs

The questions in the second part of the questionnaire provided necessary information to figure out the IT facilities and usage patterns of SMEs.

Table 5 summarizes the IT resources that SMEs owned for the sample of Stage 1 (n=160) and gives a comparative view for this information for the two stages of the sample of Stage 2 (n=41). Results given in Table 5 shows that most of the SMEs were using business packages and office software. Related to production applications, it can be stated that the usage was very low in Stage 1 (26.8%), but there is a considerable increase in Stage 2 (58.5%) which can be interpreted as an increase in adoption level. Parallel to that increase, there is also a significant increase ($\alpha = 0.093$) in the number of program developers in three years. The results support the previous research findings indicating that the development of internal IT skills produce high levels of success with IT adoption [3].

Table 6 shows the areas of major use of IT in SMEs according to the answers given in Stage 1 of the survey for 160 enterprises and again gives a comparative view for this information for the two stages of 41 enterprises of Stage 2. Findings given in the table are consistent with the previous studies stating that increased use of IT in SMEs is mainly for operational and administrative tasks [4, 9]. As it can be seen from Table 6, accounting was the area that was computerized by the majority of the SMEs. These findings are valid for both of the stages.

Table 5 : IT Resources of SMEs

	n=160		n=41			
	Stage 1		Stage 1		Stage 2	
	Frequency	%	Frequency	%	Frequency	%
Number of IT employees						
0	40	25.0	12	29.3	9	22.0
1	35	21.9	6	14.6	11	26.8
2	29	18.1	7	17.1	5	12.2
3	19	11.9	9	22.0	5	12.2
4	10	6.2	3	7.3	2	4.9
5	7	4.4	1	2.4	2	4.9
Missing	3	1.9	0	0.0	0	0.0
Number of program developers						
0	93	58.1	25	61.0	24	58.5
1	30	18.8	5	12.2	4	9.8
2	23	14.3	8	19.5	5	12.2
3	3	1.9	1	2.4	3	7.3
4	3	1.9	1	2.4	1	2.4
> 4	4	2.5	1	2.4	2	4.9
Missing	4	2.5	0	0.0	2	4.9
Software facilities (mutually exclusive)						
Office Software	137	85.6	34	82.9	40	97.6
Business Packages	147	91.9	41	100.0	41	100.0
Production	51	31.9	11	26.8	24	58.5

Answers for the question "existence of an IT project in the last three years" indicated that only 22.5% (36 out of 160) of the companies realized such projects in Stage 1. Among them 32 finished them in time, 26 within budget, and 32 with success. Related to the IT investments, results showed that owners or managers were the decision makers (149 out of 160), but only 11.3% (18 out of 160) of the companies had IT budgets. For the sample of Stage 2, regarding the existence of an IT project in the last three years, there was an increase in the number of projects from 28.8% (12 out of 41) to 39.0% (16 out of 41).

Answers given to the question related to the existence of a web site indicate that almost 67.5% (108 out of 160) of the SMEs had web sites. The next question related to the purpose of the web sites' usage revealed that 91.7% (99 out of 108) of them contained product/service information whereas 46.2% (50 out of 108) of them were doing e-business through their web sites. For the sample of Stage 2, the percentage of existence of a web site increased form 73.2 (30 out of 41) to 87.8 (36 out of 41), whereas there were no major changes in the usage purpose.

Table 6 : Areas of Major Use of IT in SMEs

	n=160		n=41			
	Stage 1		Stage 1		Stage 2	
	Frequency	%	Frequency	%	Frequency	%
Areas of Major Use						
Accounting	138	86.2	38	92.7	39	95.1
Sales	108	67.5	33	80.5	32	78.0
Billing	106	66.2	32	78.0	36	87.8
Personnel Records	105	65.6	31	75.6	32	78.0
Inventory Control	104	65.0	29	70.7	28	68.3
Payroll	93	58.1	29	70.7	32	78.0
Production	87	54.4	27	65.9	26	63.4
Purchasing	79	49.4	26	63.4	24	58.5
Costing	66	41.3	20	48.8	20	48.8
Marketing	60	37.5	20	48.8	22	53.7
Planning	50	31.3	13	31.7	16	39.0
Budgeting	45	28.1	16	39.0	15	36.6
Others	22	13.8	4	70.7	7	78.0

IT Usage of SMEs

The questions in the third part of the questionnaire provided necessary information to figure out the IT usage within the SMEs. In this part, the respondents were asked to indicate their agreement or disagreement on a five-point Likert-type scale ranging from (1) strongly disagree to (5) strongly agree about IT usage within the company by the use of 18 items. The Cronbach's alpha coefficient of 0.876 indicates that third part of the questionnaire was internally consistent.

The results for Stage 1, presented in Figure 1 as mean scores, show that IT usage in the enterprises reduced the overall work load, integrated different functions and were mostly used for automation of routine tasks. It can also be seen from the results that SMEs were not too much interested for the training of their employees for IT usage. Crosstab analysis between the items "the company encourages all employees to use IT at work" and "IT in the company is at the very initial stage of adoption" shows that among the SMEs that encouraged their employees for IT usage, only 36.3% (29 out of 80) of the them were positioned as being at the very initial stage of adoption whereas this percentage is 51.9 (14 out of 27) for the SMEs that were not encouraging their employees. This result is consistent with the previous researches indicating that business owners and managers with positive attitude are inclined to be more successful in adopting and implementing new technology [23, 32].

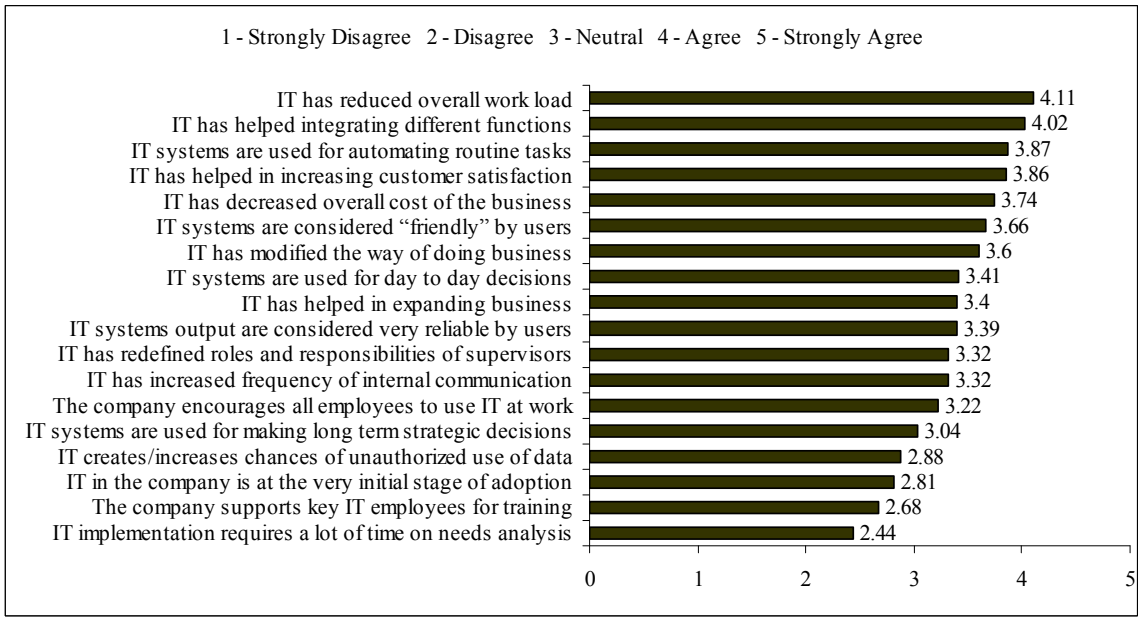

Figure 1 : IT Usage in SMEs (mean scores)

Paired-samples t-test applied to the first and second stages for 41 enterprises for 95% confidence level show that only the three items given in Table 7 are found to be significantly different. The findings show that there was an increase in the usage of IT for routine tasks and an increase in the level of trust for the reliability of IT systems.

Table 7 : Significant Changes in IT Usage

	Stage 1 (n varies from 33 to 35)	**Stage 2 (n varies from 37 to 41)**	**Significance Level**
IT implementation requires a lot of time on needs analysis	2.28	2.88	0.084
IT systems output are considered very reliable by users	3.36	3.98	0.070
IT systems are used for automating routine tasks	3.95	4.26	0.062

Factors Affecting IT Implementation Decisions in SMEs

In the fourth part of the questionnaire, the respondents were asked to indicate their opinions on a five-point Likert-type scale ranging from (1) major inhibitor to (5) major facilitator about the factors affecting IT implementation decisions within the company through 18 items. The Cronbach's alpha coefficient of 0.815 indicates that fourth part of the questionnaire was internally consistent.

The results for Stage 1, presented in Figure 2 as mean scores, indicate that expected increase in the accuracy of information, comfort level with technology and expected increase in the processing speed were the major factors affecting IT implementation decisions. On the other hand government support was found to have no effect on these decisions.

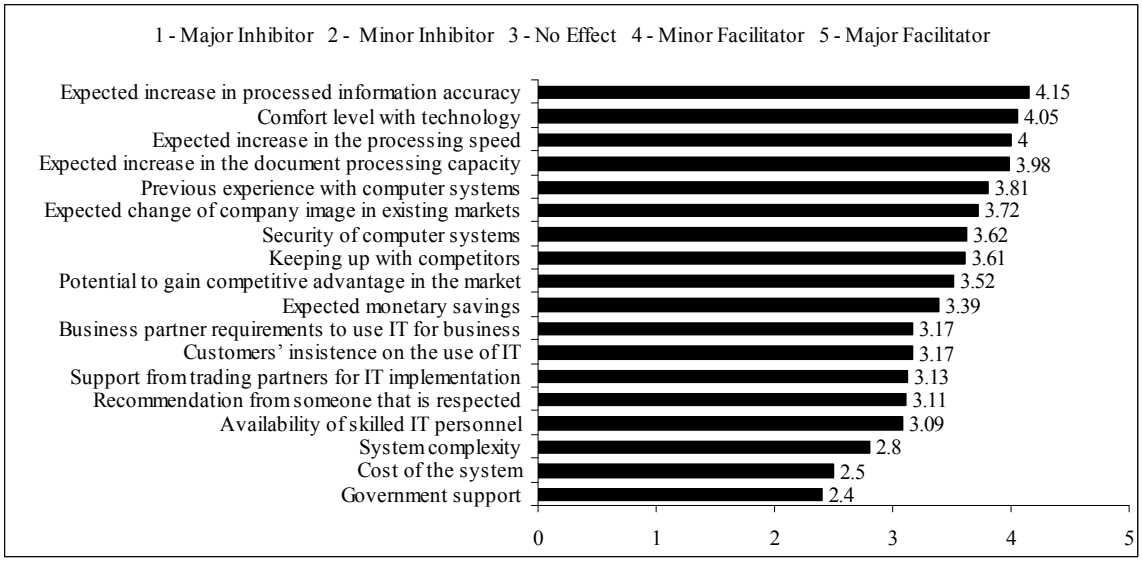

Figure 2 : Factors Affecting IT Implementation Decisions in SMEs (mean scores)

Paired-samples t-test applied to the first and second stages for 41 enterprises for 95% confidence level show that only the factor "cost of the system" is found to be significantly different ($\alpha = 0.018$), it was no more an inhibitor for IT implementation decisions. This can be due to the decrease in the prices of hardware, especially PCs that SMEs mostly use, in this period.

IT Investments in SMEs

In the fifth part of the questionnaire, the respondents were asked to indicate on a five-point Likert-type scale ranging from (1) none to (5) extensive about the extent of IT investments made within the company by means of 8 items. The Cronbach's alpha coefficient of 0.852 indicates that fifth part of the questionnaire was internally consistent.

The results for Stage 1, presented in Figure 3 as mean scores, show that IT investments in SMEs were very low and mainly were made for communication purposes.

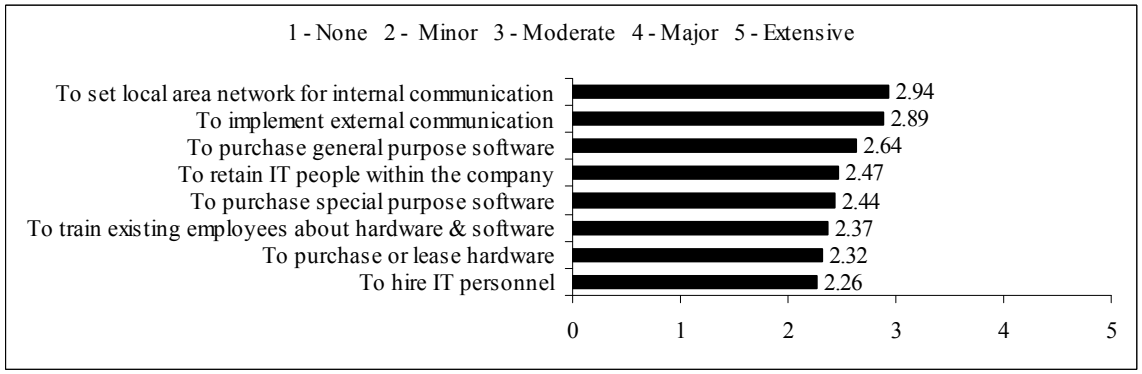

Figure 3 : IT Investments in SMEs (mean scores)

Paired-samples t-test applied for the first and second stages for 41 enterprises for 95% confidence level show that only the factor "to hire IT personnel" is found to be significantly different ($\alpha = 0.036$), there was an increase in IT personnel investments. This increases the reliability of the questionnaire since increase in the number of program developers was also found significant ($\alpha = 0.093$) in the results of the second part of the questionnaire.

DISCUSSION AND CONCLUSIONS

The objective of this study was to determine the usage and adoption of IT in SMEs in Turkey. For this purpose empirical data were gathered using a survey approach through a longitudinal study applied in two stages of three years apart.

The exploratory findings of this study indicate that many issues related to IT usage and adoption in SMEs is also valid for Turkey. Findings of the study support the views of the previous researches stating that:

- Increased use of IT in SMEs is mainly for operational and administrative tasks. Proof of this is the dominant use of accounting and office software.
- Development of internal IT skills produce high levels of success with IT adoption. Evidence for this is the increase in usage of production applications indicating a higher level of adoption in parallel with an increase in number of program developers.
- Business owners and managers with positive attitude are inclined to be more successful in adopting and implementing new technology. Verification of this is the positioning of SMEs in a higher level of adoption among the ones that encouraged their employees for IT usage.
- One of the factors affecting the usage and adoption of IT in SMEs is the expected benefits of IT. The findings of this study, which is an indication of this item, point out that, expected increase in the accuracy of information, comfort level with technology and expected increase in the processing speed are the major factors affecting IT implementation decisions.

The longitudinal findings of this study can be summarized as:

- SMEs have started to use more sophisticated IT applications and hire more IT personnel leading to a higher IT adoption.
- SMEs are changing their market from national to international as a result of increase in IT adoption level.
- There is an increase in the usage of IT for routine tasks and an increase in the level of trust for the reliability of IT systems in SMEs.
- SMEs no longer perceive the "cost of the system" as an inhibitor for IT implementation decisions.

There are certain limitations of this study that need to be taken into account while interpreting the findings. Relatively small sample size has revealed a good picture about IT usage and adoption in Turkish SMEs; yet, limiting the generalization of the findings. Cultural context of Turkey where the research was conducted has brought forth limitations as far as the generalization of the results is concerned.

The study has focused only on usage and adoption of IT in connection with the internal factors of the company. However, this limitation does not really weaken the validity of the findings and new research opportunities stem directly from that. Impact of IT on company performance and the affect of external factors such as vendors can be explored as further research.

REFERENCES

[1] Blackburn, R.and McClure, R. *The Use of Information and Communication Technologies in Small Business Service Sector Firms*, Kingston Business School Small Business Research Centre, London, 1998.

[2] Brock, J.K. "Information and Communication Technology in the Small Firm" in Jones-Evans, D. and Carter, S. (eds.), *Enterprise and Small Business: Principles, Practice and Policy*, FT-Prentice Hall, Harlow, UK, 2000, pp. 384-408.

[3] Caldeira, M.M., Ward, J.M. "Using Resource-Based Theory to Interpret the Successful Adoption and Use of Information Systems and Technology in Manufacturing Small and Medium-Sized Enterprises", *European Journal of Information Systems*, Volume 12, Number 2, 2003, pp.127-141.

[4] Chen, J. "The Impact of Microcomputer Systems on Small Businesses: England, 10 Years Later", *Journal of Small Business Management*, Volume 31, Number 3, 1993, pp.96-102.

[5] Culkin, N. and Smith, D. "An Emotional Business: A Guide to Understanding the Motivations of Small Business Decision Takers", *Qualitative Market Research – An International Journal*, Volume 3, Number 3, 2000, pp.145-157.

[6] Davis, P. and Harveston, P.D. "Internationalization and Organizational Growth: The Impact of Internet Usage and Technology Involvement among Entrepreneur-Led Family Businesses", *Family Business Review*, Volume 13, Number 2, 2000, pp.107-120.

[7] Dosi, G. "Technological Paradigms and Technological Trajectories", *Research Policy*, Volume 11, 1982, pp.147-162.

[8] Fink, D. "Guidelines for the Successful Adoption of Information Technology in Small and Medium Enterprises", *International Journal of Information Management*, Volume 18, Number 4, 1998, pp.243-253.

[9] Fuller, T. "Fulfilling IT Needs in Small Businesses; A Recursive Learning Model", *International Small Business Journal*, Volume 14, Number 4, 1996, pp.25-44.

[10] Gallo, M.A. and Pont, C.G. "Important Factors in Family Business Internationalization", *Family Business Review*, Volume 9, Number 1, 1996, pp.45-60.

[11] Gungen, T. "E-finance for SMEs in Turkey: Yapı Kredi Bank", **http://r0.unctad.org/ecommerce/event_docs/xmefinoct2001/gungen.pdf**, 2001.

[12] Kasap, G. C. "SMEs in Turkey and Barriers of the Customs Union", *Uludag University Faculty of Economics and Administrative Sciences Journal*, Volume 17, Number 1, 1999.

[13] Kaynak, E. and Tatoglu, E. "An Analysis of the Factors Affecting the Adoption of Electronic Commerce by SMEs", *International Marketing Review*, Volume 22, Number 6, 2005, pp.623-640.

[14] KOBINET. "SME Database", **http://www.kobinet.org.tr/kobinetuye.php**, 2002.

[15] Lawson, R., Alcock, C., Cooper, J. and Burgess, L. "Factors Affecting Adoption of e-Business Technologies by SMEs: An Australian Study", *First International Conference on Business Innovation in the Knowledge Economy*, Warwick, 2002.

[16] Lee, J. and Baek, S.I. "Adoption of Internet Technologies in Small Business", *International Journal of Digital Management*, Number 1, 2001, pp.1-14.

[17] Lertwongsatien, C. and Wongpinunwatana, N. "E-commerce Adoption in Thailand: An Empirical Study of Small and Medium Enterprises", *Journal of Global Information Technology Management*, Volume 6, Number 3, 2003, pp.67-83.

[18] Martin, L. "Internet Adoption and Use in Small Firms: Internal Processes, Organizational Culture and the Roles of the Owner-Manager and Key Staff", *New Technology, Work and Employment*, Volume 20, Number 3, 2005, pp.190-204.

[19] Martin, L.M. and Matlay, H. "Blanket Approaches to Small Firm ICT Adoption: Lessons from the UK DTI Adoption Ladder", *Internet Research: Electronic Networking Applications and Policy*, Volume 11, Number 5, 2001, pp.399-416.

[20] Mehrtens, J., Cragg, P.B. and Mills, A.M. "A Model of Internet Adoption by SMEs", *Information and Management*, Volume 39, Number 3, 2001, pp.165-176.

[21] Mindel, C.H. "Introduction to Research in Social Work Methods I: Lecture Notes", **http://www2.uta.edu/sswmindel**, 2003.

[22] OECD. "Small and Medium-sized Enterprises: Local Strength, Global Reach", **http://www.oecd.org/dataoecd/3/30/1918307.pdf**, 2000.

[23] Ogbonna, E. and Harris, L.C. "The Adoption and Use of Information Technology: A Longitudinal Study of a Mature Family Firm", *New Technology, Work and Employment*, Volume 20, Number 1, 2005, pp.2-18.

[24] Palvia, P.C. and Palvia, S.C. "An examination of the IT Satisfaction of Small-Business Users", *Information and Management*, Number 35, 1999, pp.127-137.

[25] Premkumar, G. "A Meta-analysis of Research on Information Technology Implementation in Small Business", *Journal of Organizational Computing and Electronic Commerce*, Volume 13, Number 2, 2003, pp.91-121.

[26] Riemenschneider, C.K., Harrison, D.A. and Mykytyn Jr., P.P. "Understanding IT Adoption Decisions in Small Business: Integrating Current Theories", *Information and Management*, Volume 40, Number 4, 2003, pp.269-285.

[27] Ritchie, B. and Brindley, C. "ICT Adoption by SMEs: Implications for Relationships and Management", *New Technology, Work and Employment*, Volume 20, Number 5, 2005, pp.205-217.

[28] Sarosa, S., Zowghi, D. "Strategy for Adopting Information Technology for SMEs: Experience in Adopting Email within an Indonesian Furniture Company", *Electronic Journal of Information*

Systems Evaluation, Volume 6, Number 2, 2003, pp.165-176.
[29] Storey, D. J. *Understanding the Small Business Sector*, International Thomson Business Press, London, 1994.
[30] Turkish Central Bank, "Statistics", **http://evds.tcmb.gov.tr**, 2007.
[31] Turkishtime. "99% of Enterprises are SMEs", **www.turkishtime.org**, 2002.
[32] Winston, E.R. and Dologite, D. "How Does Attribute Impact IT Implementation: A Study of Small Business Owners", *Journal of End User Computing*, Volume 14, Number 2, 2002, pp.16-29.

ACKNOWLEDGEMENTS

Authors would like to thank Dr. Snehamay Banerjee for his valuable input to this study and IBM Turk Ltd. for funding the project.

AUTHOR BIOGRAPHIES

Birgül Kutlu is currently a full time associate professor in the Department of Management Information Systems, Boğaziçi University, Turkey. She received her B.Sc. degree in Electrical Engineering from Boğaziçi University, M.Sc. degree in Electrical Engineering from Michigan Technological University and Ph.D. degree in Computer Engineering from Ege University. She coordinated and participated in many UNESCO, European Union and Boğaziçi University Research Fund projects. Her research interests include information systems, e-learning, neural networks and artificial intelligence.

Meltem Özturan is currently a full time professor in the Department of Management Information Systems, Boğaziçi University, Turkey. She received her B.Sc. degree in Industrial Engineering from Boğaziçi University, M.Sc. and Ph.D. degrees in Systems Analysis from İstanbul University. She coordinated many international and national research and application projects. Her research interests include systems analysis and design, project management, software development, neural network applications and information systems. She has published papers in Tourism Management, International Journal for Housing Science and Its Applications, Information Technology Journal, Anatolia: An International Journal of Tourism and Hospitality Research.