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Rafi Ashrafi

*Sultan Qaboos University*, [rafi@squ.edu.om](mailto:rafi@squ.edu.om)

Muhammed Murtaza

*Sultan Qaboos University*, [muhd.murtaza@gmail.com](mailto:muhd.murtaza@gmail.com)

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# **86F. Usages and Effects of Information and Communication Technologies on Small and Medium Sized Enterprises in Oman**

Rafi Ashrafi  
Sultan Qaboos University  
rafi@squ.edu.om

Muhammed Murtaza  
Sultan Qaboos University  
muhd.murtaza@gmail.com

## ***Abstract***

This paper presents the results of an exploratory study carried out to learn about the usages and effects of Information and Communication Technologies (ICT) in Small and Medium Sized Enterprises (SMEs) in Oman. The study investigates ICT infrastructure, software used, driver for ICT investment, perceptions about business benefits of ICT and outsourcing trends of SMEs. The study provides an insight on the barriers for the adoption of ICT. Lack of internal capabilities, high cost of ICT and lack of relevant information about ICT solutions and implementation seems to be some of the major barriers in adopting ICT. The results of the study show that SMEs in Oman are gradually investing in and adopting ICT. The main driving forces for ICT investment are to provide better and faster service and to stay ahead of the competition. A majority of surveyed SMEs have reported a positive performance and other benefits by utilizing ICT in their businesses.

## ***Keywords***

Information and Communication Technologies (ICT), Small and Medium Sized Enterprises (SMEs), Developing Countries, Gulf Cooperative Council (GCC), Middle East, Oman

## **1. Introduction**

Today organizations of all types are utilizing Information and Communication Technologies (ICT) around the globe, not only for cutting costs and improving efficiency, but also for providing better customer service. Governments too, around the world are adopting ICT to provide better services to their citizens. The adoption of ICT by organizations requires a business environment encouraging open competition, trust and security, interoperability and standardization and the availability of finance for ICT (UNCTAD, 2004).

Most of the large and international organizations in Oman have effective computer systems to efficiently conduct business. A number of large organizations have spent huge amounts of money on installing computer systems to support their business processes. However, the situation has not been the same with SMEs - similar to other parts of the world for various reasons (Parker and Castelman, 2007, Shiels et al, 2003, Fink and Disterer, 2006).

The government of Oman has taken various measures to diversify the economy and provide employment. The adoption of ICT will have significant positive consequences on SMEs and consequently on the economy of Oman. There is a dearth of data and research about the size and contribution of SMEs towards Oman's economy. Therefore, through this research, we would like to shed light on the effects and usages of ICT on SMEs in Oman and their current and future perceptions towards ICT. This study is based on the Net Impact Canada 2006 (Illuminas, 2006). The findings of this research will provide a foundation for future researchers and will help policy makers in understanding the current state of affairs of the usage and impact of ICT on SMEs in Oman.

We arrived at the findings of this study after establishing criteria and a method to measure and evaluate the usages, affects and perceptions of SMEs based on the Net Impact Canada 2006 study (Illuminas, 2006). We gathered the necessary data through a survey of thirty six randomly selected SMEs in Muscat area (Capital of Oman) and computed simple statistics of the data.

**Definitions:** It is important to note that the term "ICT" in context of this research refers to the wide range of computerized information and communication technologies. These technologies include products and services such as desktop computers, laptops, handheld devices, wired or wireless intranet, business productivity software such as text editor and spreadsheet, enterprise software, data storage and security, network security and others.

**SME:** There is no official definition of SMEs available. In this research, we have adopted the following definitions of SMEs. Businesses with less than ten employees as a Micro Enterprise, between ten and forty nine as Small Enterprises, and between fifty to two hundred and fifty employees as Medium sized enterprises. This criterion is consistent with other similar studies (Kapurubandara et al, 2006) and was used to identify and qualify SMEs for the purpose of this research.

In the next section we review selected literature on the areas related to the topic, followed by objectives of the study and research design of the study. In the later sections we present findings of our study with conclusions, limitations and directions for future research.

## 2. Literature Review

**Importance of SMEs:** It has been widely recognized that small and medium enterprises (SMEs) not only play an important role in the economy of a country, but are crucial to the country's economic stability. In New Zealand SMEs make up more than 99% of all businesses and account for about 60% of employment. In the USA more than half of all the employment comes from firms with fewer than 500 employees (Baldwin, et al, 2001). In the UK, SMEs employ 67 % of the workforce (Lange, et al 2000). In most EU member states SMEs make up over 99% of enterprises, 67% of jobs and 59% of GDP. In most countries SMEs generate a substantial share of GDP and a key source of new jobs as well as a breeding ground for entrepreneurship and new business ideas. That is why most countries have begun paying special attention to SMEs. The United States of America, UK, Japan, Australia, New Zealand, Canada and other developed, as well as developing, countries are making policies to facilitate the growth of SMEs. Realizing the importance of ICT New Zealand spend about 10% of her GDP on ICT, making it the top ranking

country in the world (Clarke, 2004). Estimates from the World Bank indicate that SMEs have contributed over 55% percent of GDP in OECD countries and between 60 to 70 percent of GDP in middle-income and low income countries generating 60 to 70 percent employment (Oman Economic Review, 2008). The above facts show that SMEs play a very important role in the growth of economy of a country and Oman is no exception.

**ICT Diffusion in SMEs:** There are a number of studies that discuss adoption of Internet and e-business in SMEs in developed countries (Lucchetti and Sterlacchini, 2004, Love, et al, 2004, Schubert and Leimstoll, 2006 and 2007, Koellinger, 2006, Stroeken, 2001, Morikawa, 2002, Caldeira and Ward, 2002, Gregor et al, 2004, Doczi, 2000). Governments around the globe recognize the importance of adoption of ICT by SMEs and they have created special groups to study various aspects of ICT adoption in SMEs. Despite the importance of ICT and emphasis by various governments to encourage SMEs to adopt ICT, it has been reported that SMEs have been slow in adopting ICT for various reasons (Houghton and Winklhofer, 2004; Smallbone et al, 2001; Dawn et al., 2002, Lawson et al, 2003). We wanted to find out reasons for the slow adoption of ICT in Oman.

**Financial Performance of SMEs:** A number of studies have provided insight on improving financial performance of SMEs (e.g. Bakker, 2000, Falk, 2001). Johnston et al (2007) in a survey of 1666 organizations in Europe and North America found that Internet Business Solution adoption has resulted in tangible financial benefits for SMEs in all the nations studied. A New Zealand study found that SMEs with comparatively better practices in place and linking them to operational outcomes report a higher return on investment and growth in productivity, net cash flow, profitability and market share (Statistics NZ, 2002). In a recent survey in the UK, 90% of the respondents reported that IT has delivered the benefits expected of it (British Computer Society, 2007). Love et al have analyzed the benefits, costs and risks of IT investment in 126 SMEs in Australian Construction industry. Clarke (2004) has shown a strong correlation ICT usage and increased profitability and growth in SMEs in New Zealand. ICT Know-how and awareness are strongly rooted in management of SMEs. Schubert (2006) found that Swiss SMEs are universally using ICT and have gained competitive advantage from the deployment of ICT. In order to encourage SMEs for the adoption of ICT in Oman we need to show the benefits SMEs around the globe have gained by adopting and utilizing ICT.

**Barriers to ICT Adoption:** Large organizations have enough resources to adopt ICT while on the other hand SMEs have limited financial and human resources to adopt ICT. Duan et al (2002) identified lack of ICT skills and knowledge in SMEs as one of the major challenges faced by all European countries, particularly in the UK, Poland and Portugal, in their study. Houghton and Winklhofer (2004) relating SME adoption of ICT have reported a slow response and limited progression. Shiels et al (2003) found that characteristics of the firm and industry sector are contributory factors to the extent of adoption and exploitation of ICTs by SMEs, to support business processes. Kapurubandara et al ((2006) have categorized internal and external barriers that impede adoption of ICT by SMEs in a developing country. The internal barriers include owner manager characteristics, firm characteristics, cost and return on investment, and external barriers include: infrastructure, social, cultural, political, legal and regulatory.

**ICT Diffusion in developing countries:** There are very few studies about ICT adoption in developing countries (Temtime et al, 2003, Mutula et al 2006, Yeh et al, 2007, Ssewanyana et al, 2007, Kapurubandara et al 2006 ). Lal (2007) investigating adoption of ICT in Nigerian SMEs, found that one of the major factors inhibiting ICT diffusion and intensive utilization is poor physical infrastructure. In developing countries some of the ICT adoption challenges include legal and regulatory issues, weak ICT strategies, lack of R& D, excessive reliance on foreign technology and ongoing weaknesses in ICT implementation ( Dutta et al, 2006).

**ICT in Gulf Cooperation Council (GCC) countries and Oman:** A recent market survey shows that GCC countries' current IT spending are \$4.94 billion annually and are expected to be doubled by 2010. Oman is emerging as one of the region's strong and fast growing markets. Oman's IT market is expected to grow from \$230 million in 2005 to over \$400 million by 2010 (GulfBase, 2008, Inno Vest Group). Realizing the importance of ICT for the economic development of the country, Oman's government has placed a great emphasis upon creating a digital economy as key drivers for the sustainable growth of the country. Oman is heavily investing in ICT as one of the building blocks to diversify the economy. In September 2003 Oman established Knowledge Oasis Muscat (KOM), a technology park as one of the initiatives taken to help develop a knowledge-driven economy, attract investment, and to serve as an incubator for local start up companies in the ICT sector. Also, in 2006 the government of Oman created an Information Technology Authority (ITA) for developing a national IT strategy, help facilitating and implementing an ICT infrastructure and overseeing the implementation of Oman's digital strategy. The government has encouraged private sector to open universities and technical colleges in order to increase ICT literacy in the country. Also, there are a number of other initiatives in place in order to transform Oman into a digital society.

According to HSBC Middle East Bank there are only 15,000 to 20,000 SMEs in Oman generating 10-20% employment (Oman Economic Review, 2008). These estimates show that there is a significant potential for the SMEs in Oman to grow in terms of contribution to GDP and employment, and to be competitive at regional and international levels. This study has focused on the impact of ICT as it relates to financial performance and productivity improvement of SMEs in Oman.

### **3. Objectives of the Study:**

Realizing the importance of SMEs for the economy in Oman and the impact of ICT on improving the performance of SMEs, data was collected on various aspects of ICT usage and utilization. The investigation took place during December 2007 and January 2008 and is the first step towards an exploratory study on the topic in Oman. Through this study we aim to find out:

1. What is the ICT Infrastructure of the SMEs?
2. What Enterprise software SMEs used?
3. What are the drivers for ICT Investment?
4. What are the barriers towards to ICT Investment?
5. What are perceptions about business benefits of ICT implementation?
6. What are out-sourcing trends?
7. What internal capabilities and processes SMEs have in place for managing ICT?

## 4. Research Design

We performed the following tasks to conduct the research and determine the usages and effects of information and communication technologies in SMEs in Oman:

1. A questionnaire was prepared based on the Net Impact Canada 2006 study (Illumines, 2006) to determine the usages, effects and perceptions of Omani SMEs towards ICT. Specifically to know about the present technological infrastructure, the reasons behind ICT investment, the restrictions and barriers for adoption of ICT, and the implementation methods and general results of ICT investments. These aspects essentially formed the basis of our research. The Survey Questionnaire is included in Appendix.
2. After the preparation of the questionnaire it was distributed to a number of SMEs in Oman. The questionnaires were filled by the founder, general manager or accounts manager because of their ability and understanding of the issues investigated in the questionnaire. In very few cases more than one individual representing the enterprise filled out the questionnaire - this actually ensured preciseness.
3. Based on the collected data through questionnaires, simple statistics were carried and logical inferences were made to determine the general usages and effects of ICT on SMEs in Oman. The general conditions and perceptions of the business people thriving in the Omani market were also uncovered with regards to information and communication technologies. It helped us understand some of the major barriers and stimuli for ICT investment in these firms.

## 5. Research Findings

In this section we present the findings of our research based on the simple statistical analysis of the collected data through a survey of thirty six SMEs in the Muscat area in Oman during December 2007 and January 2008. Out of these, 36% can be classified as Micro Enterprises, 42% as Small Enterprises and 22% Medium sized Enterprises.

### 5.1. ICT Usage

We investigated IT infrastructure, Internet connection type, IT staff, usage of enterprise software, and types of website used as a measure for ICT usage.

#### 5.1.1 ICT Infrastructure

**ICT Infrastructure:** It seems that the ICT infrastructure in most of the large organizations in Oman is not very different from large organizations elsewhere. As opposed to the ICT infrastructure of large and international organizations in Oman, which include networking hardware and software, network and data security solutions and enterprise software solutions, the

situation in most SMEs in Oman was found to be little different from SMEs in developed countries but very similar to SMEs in the GCC countries.

Analysis of the collected data (Figure 1) reveals that desktop, laptop or handheld computers are universally used by 100% of the SMEs surveyed. Business productivity software, such as Microsoft Word, Excel and PowerPoint were used in three quarters (75%) of the surveyed firms. About 58% of the firms use enterprise software such as CRM, Inventory Management, E-Commerce or ERP. Wired computer network solutions such as servers, routers and firewall were utilized in 50% of the SMEs. Data storage and security solutions (such as file servers, storage area network or web-based storage) were used by 36% of the surveyed firms, and wireless networking technologies (such as access points and wireless routers) and network security solutions by 19% of the organizations.

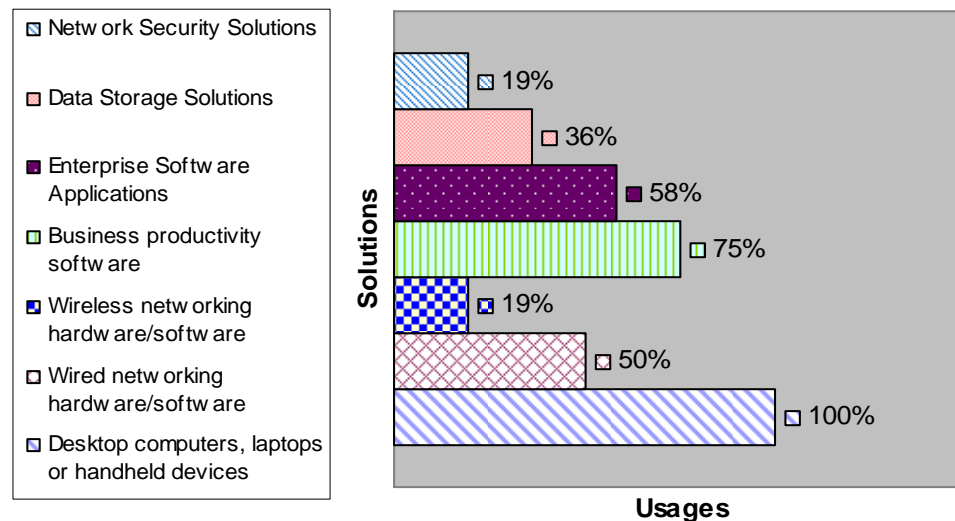


Figure 1: ICT Infrastructure

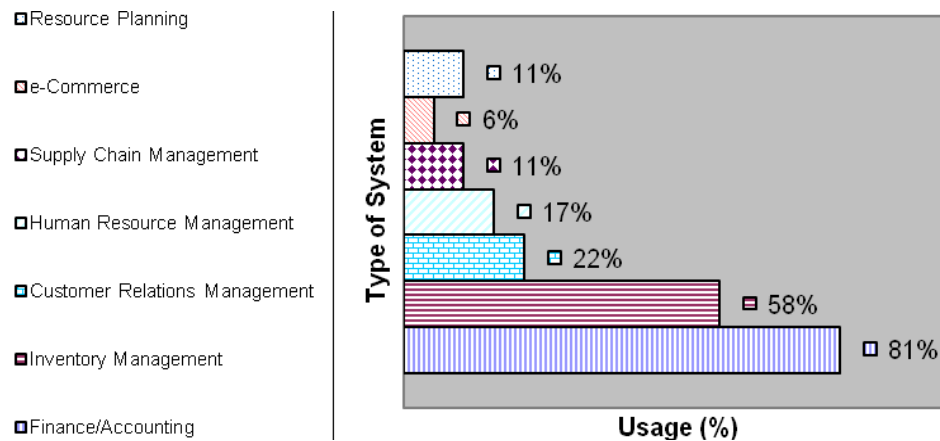
This shows that ICT usage within SMEs in Oman is relatively high in common technologies (such as desktop, laptop, productivity software etc), but limited in the more sophisticated technologies such as wireless, data storage and network security solutions. The pattern seems to be very similar to SMEs in Canada (Illuminas, 2006).

**Internet Connection Type:** The type of internet connection in organizations largely indicates the required bandwidth and frequency or purpose of usage. In Oman the SMEs have shown no reluctance in subscribing high-speed broadband internet connection. This might be because of the relatively lower costs and higher speeds as compared to the dial-up, but nevertheless, business heavily used internet as indicated by the surveyed enterprises. About 53% of the respondents use High Speed broadband (ISDN, ADSL, DSL), 31% use Dial up connection, 3% use Satellite and 17% have no Internet connection.

**IT staff:** One may assume that small and medium sized enterprises often lack the supporting workforce needed, such as IT staff, for the quality and quantity of the required support; the expertise from such staff are too little and basic. However some do have a special IT department with multiple supporting staff. The decisive factors that determine the existence of such staff in SMEs around the world are the size of the firm and more importantly the relative complexity of the adapted ICT solutions. The same is the case with SMEs in Oman as around 56% of the surveyed firms do not have full-time IT staff (compared to 63% SMEs in Canada), and 44% of the firms have IT/IS departments with full-time IT staff.

### 5.1.2 Usage of Enterprise Software

Investment in ICT infrastructure enables businesses to take advantage of the large number of different technologies available in the market. No matter how small the business and how basic the infrastructure, businesses always look to automate and computerize the essential business functions to save costs and time and to eliminate the need for support staff. Almost 81% of the surveyed firms use finance and accounting enterprise software such as Tally and Peachtree. It was found that even some of the smallest family run businesses used such software. Inventory management software is being used by 58% of the firms and 22% of the enterprises use customer relationship management (CRM) software as illustrated by Figure 2.



**Figure 2:** Enterprise System Usage

It was observed that organizations that invested in enterprise software are of Medium size, in terms of the size of workforce or annual turnover within the SME category, or they are Micro Enterprises. For example, one small retail business run by a single person (owner) used enterprise software for automating accounting, inventory and customer related business processes. Figure 2 shows that a majority of SMEs in Oman are utilizing basic Enterprise software such as finance/accounting and inventory management in their businesses.



### *5.1.3 Types of Website Used*

Unlike SMEs in developed countries, the SMEs in Oman have not managed to utilize and use commercial websites. Only 3% of the firms run commercial websites which helps them reach new customers. As for informational websites, 36% of the surveyed enterprises run websites which simply introduce the business and publish their contact information. About 64% of the businesses had no website, the main reason was lack of internal staff and high maintenance costs in the long term.

The data on IT infrastructure, Internet connection type, IT staff, usage of enterprise software and types of website used show that penetration of key technologies within Omani SMEs is reasonably moderate.

## **5.2. Investments in ICT**

Many of the decision makers in small and medium firms are not always aware of relevant ICT that could revolutionize their business. This in itself is a barrier to ICT investment. As for those enterprises that have already invested and are willing to continue, what really encourages them to do so? And what is the proportion of their investment? Also, what is the nature and true reason behind their investments? We have used amount of budget dedicated to ICT, drivers for ICT Investment, number of competitors, long term ICT investment goals and organization's strategy for competitive advantage as key elements to learn about reasons for ICT investment.

**IT Budget:** Analysis of the gathered data show that 61% of the SMEs assign less than 10% of their annual budget to ICT investment, 25% of the firms invest between 10% and 20%, and only 11% of the surveyed firms assign greater than 40% of their budgets to ICT. These results are logical as the size and resources of small and medium businesses around the world are restricted. Because of this enhancement and development of business processes is slow and gradual.

**ICT Investment Drivers:** Regardless of the relative proportion of budget invested in ICT certain stimuli exist that encourage and push decision makers in SMEs to invest in ICT. The main driving force for ICT Investment is to provide better and faster customer service (72%), followed by to stay ahead of competition (56%), following the strategy set by top management (56%) and demand of stakeholders (31%). Figure 3 shows stimuli for ICT investments in SMEs.

**Number of Competitors:** Most of the business decisions are based on the competition in the market. About 49% of the enterprises (as compared to 26% enterprises in Canada) have more than twenty direct competitors. About 17% of SMEs have between ten and nineteen competitors, 11% between five to nine competitors and 17% have between one to four competitors. This shows that there is reasonably strong competition among SMEs in Oman, and perhaps that is one of the main reason that SMEs would like to be more competitive by adopting ICT.

**Long term goals for ICT investment:** Most of the surveyed firms' long-term plan with regards to their ICT investment was to increase their market share, grow their sales revenue and cut costs

and expenses. About 86% of the firms expect to increase sales revenue, 67% expect to increase their market share and about 56% expect to cut costs.

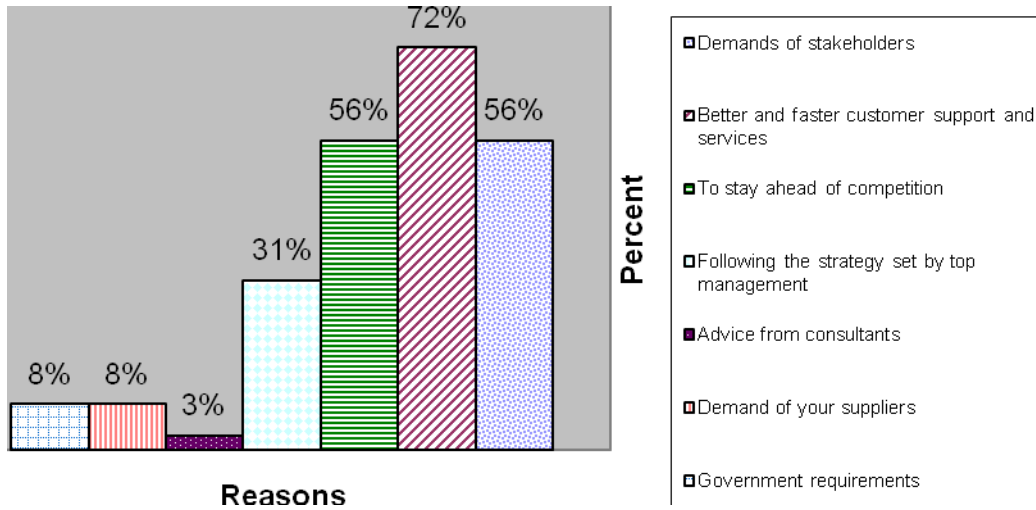


Figure 3: What Encourages ICT Investment?

**Approaches to Achieve Competitive Differentiation:** A common way of achieving business goals is to differentiate one's business from the competition. The surveyed SMEs have chosen the approach of providing the highest quality products and services (72%) to their customers as the principal method for differentiating as well as establishing long-term relationships with customers (56%), as illustrated in Figure 4.

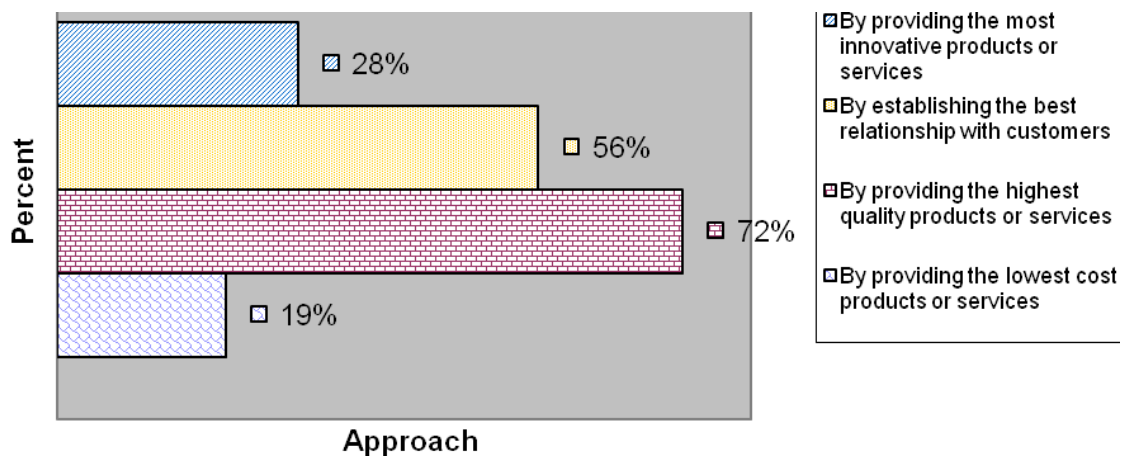


Figure 4: Approaches to Achieve Competitive Differentiation

The above results show that Omani SMEs have strong competition and are devoting a significant percentage of their budget to ICT in order to provide better and faster customer service. Also to realize benefits of ICT investment, SMEs expect to increase sales revenue and market share as well to reduce costs. Most of the SMEs aim to provide highest quality products and services to their customers as well as establishing long term relationships with customers.

### 5.3 Barriers to ICT Investment

While SMEs in Oman are clearly aware of ICT and its benefits, there exist certain restrictions and barriers to ICT investment. Figure 5 shows that 67% of the firms feel that a lack of necessary internal skills is a major barrier. This is consistent with other studies as SMEs do not have enough human resources. There has been a recent increase in technological colleges and the general investment by the Omani government in the ICT industry to overcome shortage of IT staff. About 58% feel that the monetary costs of implementation are too high. The reasons could be high cost of ICT solutions or shortage of available funds to SMEs. Almost 56% of the decision-makers within the surveyed firms feel that there is not enough information available at their disposal about relevant and effective technologies. This shows that there is a need for free advice and relevant information for SMEs. There is 42% that feel they simply have no time to implement the projects. About 42% of the firms are uncertain about retaining their ICT investment and 19% of the managers feel there is not enough support from the top-management in the firms. Other barriers identified include: government regulations and requirements (8%), and bad experiences in the past (11%). A few of the firms also complained about lack of infrastructure in certain areas in the country. One business specifically complained about the unavailability of internet access in some of the areas far away from Muscat, the capital of Oman. Figure 5 shows some of the main barriers to ICT adoption of SMEs in Oman.

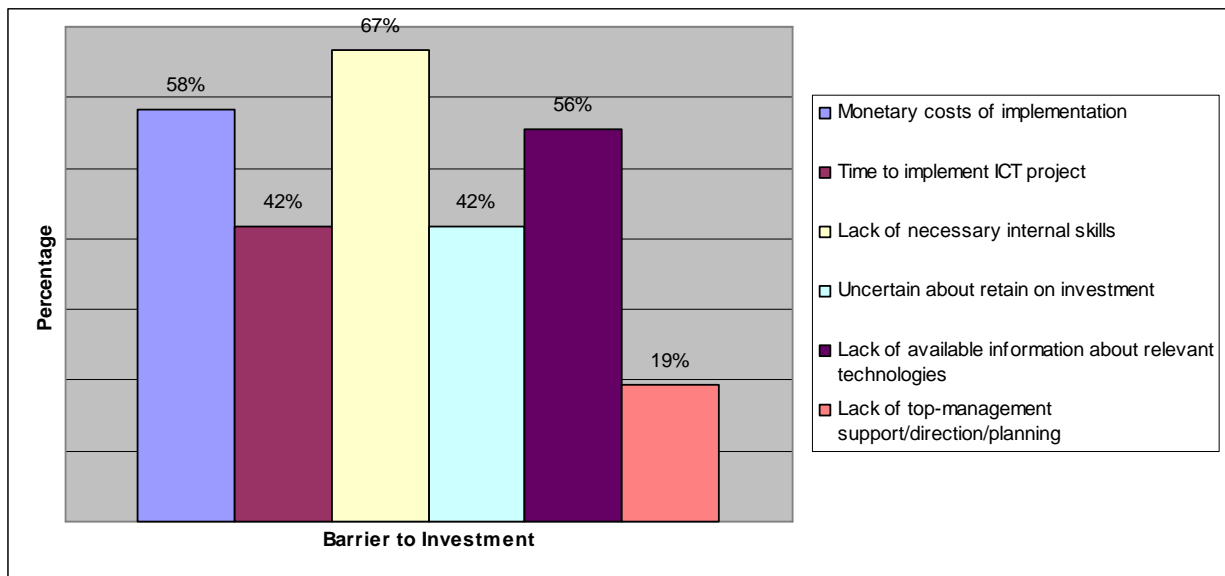


Figure 5: Barriers to ICT Investment

## 5.4 Improvements in Business Performance

The general consensus among the surveyed enterprises indicated positive results and optimistic expectations. About 59% of respondents have reported that ICT investment and implementations have resulted in improving the business performance in terms of reaching customers beyond their area. They also reported an increase in revenue and growth of the company, better relationships with customers and a reduction in cost of operations. The remaining 41% did not notice improvement in performance in these areas. The expectations and predictions of the business performance due to use of ICT by people in the surveyed firms are quite optimistic. Almost 67% of participants expect more improvement in business performance, whereas 33% do not expect improvement.

## 5.5. ICT Implementation and Outsourcing

One of the solutions to solve the problem of unavailability of internal skills many organizations have the option of “outsourcing” their ICT related work. Therefore, what we know as outsourcing has become one of the most common practices performed by almost all organizations, both private and public, small and large, in order to remain competent within their fields of business or work.

**Proportion of Activities Outsourced:** Majority of the SMEs that participated in this research outsourced a portion of their ICT activities and work. Figure 6 shows that 47% of SMEs outsourced more than 50% of their activities, 19% outsourced between 10 and 25 percent of their activities, and 19% outsourced less than 10% of their ICT activities.

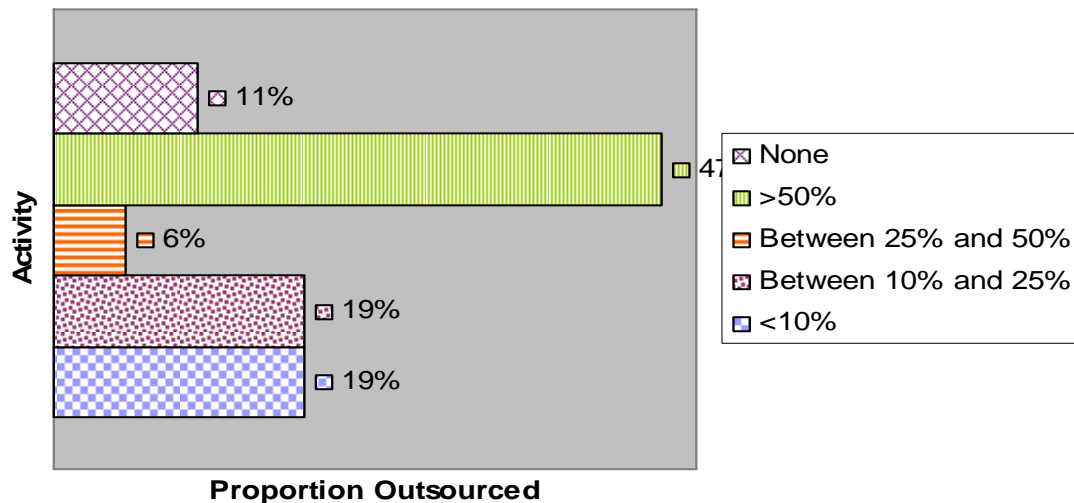
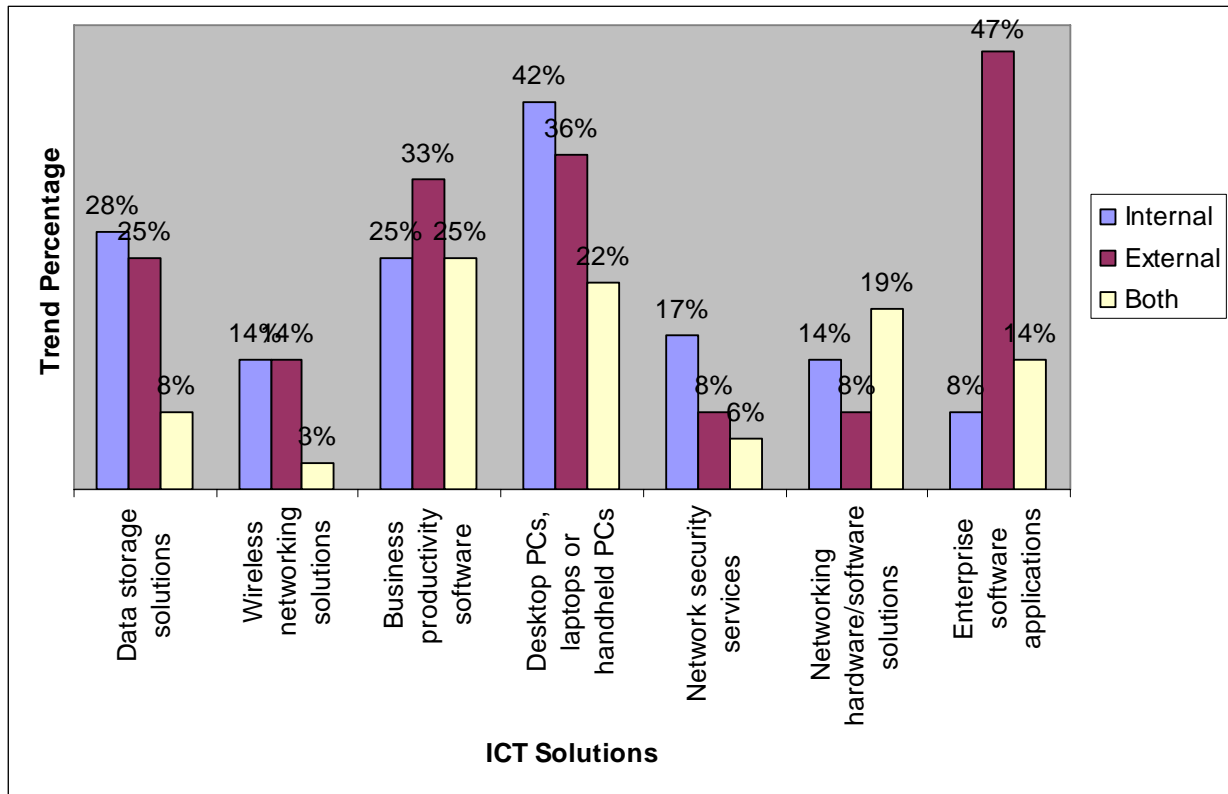


Figure 6: Proportion of ICT Activities Outsourced

**Resources Used for ICT Implementation:** It is important to know what ICTs were adopted and used within SMEs, but it is also important to know which internal or external resources were used to implement these technologies. Most of the enterprises surveyed used internal resources to implement basic technologies such as the installation and setup of desktop or laptop computers, data storage hardware or business productivity software. As the technologies become more sophisticated, like the use of enterprise software applications, wireless networking or the use of mobile phone applications, the firms tended to use external resources. Figure 7 shows that 42% organizations used internal resources for Desktop or laptops, as well as 28% for data storage solutions and 25% for business productivity software. About 47% of the SMEs outsourced more sophisticated technologies such as enterprise software applications. Also, it seems that some of the organizations lack internal capacity for basic technologies such as Desktop or laptops (36%), business productivity software (33%) and data storage (25%), as they used outsourcing for these activities

A number of firms use both internal and external resources to implement some of the technologies. It was observed that SMEs often use external resources to initially implement the technology, and then tend to use internal resources to maintain and upgrade the implemented technologies.



**Figure 7:** Resourcing Trends – Internal vs. External

## 6. Conclusions

We found that ICT usage within SMEs in Oman is relatively high in common technologies, but limited in the more sophisticated technologies such as wireless, data storage and network security solutions. The pattern seems to be very similar to SMEs in Canada (Illuminas, 2006). It was noticed that Omani SMEs are taking a comprehensive approach to their ICT investment. The results of our study show that Omani SMEs are making significant investment in ICT. Nearly half of the SMEs have more than twenty direct competitors, this may be one of the major driving force for increased ICT adoption for those SMEs. About 11% of SMEs assign more than 40% of their budget to ICT, a quarter of organizations invest between 10% and 20% of their budget and more than half respondents spend less than 10% of their budget to ICT. This is quite common considering the heterogeneity of SMEs. The main driving force for ICT investment was to provide better and faster customer service, to stay ahead of competition and following top management strategy. The differentiation strategy for the majority of SMEs was to provide high quality products and services to their customers and to establish long term relationships with customers. Nearly half of the respondents have realized business benefits of ICT adoption such as reaching new customers, better customer relationships, increase in revenue and in reducing costs. Two thirds of the respondents are very positive about increasing their business performance in the future.

With regard to barriers to ICT investment, two thirds of the firms feel that a lack of necessary internal skills is a major barrier. This is consistent with other studies. More than half of the respondents feel that the costs of implementation are too high and there is not enough information available about relevant and effective technologies. Other barriers include SMEs having no time to implement ICT projects, lack of top management support, bad experience in the past and government regulations and requirements.

A number of organizations around the globe are using outsourcing as a means to reduce costs of ICT implementation. Nearly half of the participants outsourced over 50% of their activities and one fifth respondents outsourced between 10 and 25 percent of their activities. Also half of the participants used outsourcing for ERP implementation, whereas approximately one third used outsourcing for desktop and laptops, and one quarter outsourced data storage solutions. About half of the SMEs have in-house capability for PCs, laptops, management and business productivity software.

Overall, it seems that a small number of SMEs in Oman are aware of the benefits of ICT adoption and are using it for the benefit of their businesses. However, there is a need for more focus and concerted efforts on increasing awareness among SMEs on the benefits of ICT adoption in order SMEs to be more productive and competitive. Also, there is a need for providing affordable ICT solutions and relevant guidance for SMEs. The findings of this research will provide a foundation for future researchers and will help policy makers in understanding the current state of affairs of the usage and impact of ICT on SMEs in Oman.

## 7. Limitations of the Research and Directions for Future Research

This study was a preliminary exploratory study to learn about some aspects of ICT adoption in a GCC country, Oman. There are number of issues such as legal, regulatory, interventions from the government, just to name a few, in the adoption of ICT that needs further investigation. This study focuses on a few aspects of the ICT adoption. A more detailed study can take a more comprehensive approach considering a wide range of areas of ICT adoption. These results are based on a small sample, only thirty six SMEs from Oman. Although it shows a general trend of the SMEs in Oman, the results should be interpreted or used cautiously. A larger sample is needed to further validate these trends.

### *Acknowledgements*

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## Appendix: Survey Questionnaire

### Effects of Information and Communication Technologies on SMEs in Oman

1- What is the size your organization's workforce?

A  <10      B  Between 10 and 50      C  Between 50 and 100      D  >100

2- What is the proportion (percentage) of your budget that is invested in Information and Communicational Technology?

A  <10%      B  Between 10% and 20%      C  Between 20% and 40%      D  >40%

3- Please tick below on the solutions used within your organization:

- A  Desktop computers, laptops or handheld devices (PDA or Smart Phones)
- B  Wired networking hardware/software (such as servers, routers and firewalls)
- C  Wireless networking hardware/software (such as access points and wireless routers)
- D  Business productivity software (such as Word, Excel, PowerPoint or Outlook)
- E  Enterprise Software Applications (eCommerce, Customer Relations Management, Inventory Management or ERP)
- F  Data Storage Solutions (such as file servers, storage area network or web-based storage)
- G  Network Security Solutions
- H  Other, please mention \_\_\_\_\_

4- Please tick below on types of enterprise software used within your organization:

- A  Finance/Accounting
- B  Inventory Management
- C  Customer Relations Management
- D  Human Resource Management
- E  Supply Chain Management
- F  eCommerce
- G  Resource Planning
- H  Other, please mention \_\_\_\_\_

5- If your company has a website, what is its type?

A  Informational      B  Commercial (online sales)      C  Both      D  No website

Website Address: \_\_\_\_\_

6- What type of internet connection does your company have?

- A  Dial Up (less than 56 Kbps)      B  High-Speed Broadband (ISDN, ADSL or DSL)  
C  Very High Speed (T1, T2...etc)      D  Satellite Connection      E  No Internet

7- Please tick below on what drives your organization's ICT investment:

- A  Demands of customers, business partners or other stakeholders  
B  Better and faster customer support and services  
C  To stay ahead of competition  
D  Following the strategy set by top management  
E  Advice from consultants (to become more efficient and effective)  
F  Demand of your suppliers (electronic supply chain management)  
G  Government requirements  
H  Other, please mention \_\_\_\_\_

8- How many direct competitors you have (excluding the government)?

- A  1-4      B  5-9      C  10-19      D  20+      E  None      F  Don't know

9- What is your organization's long term plan?

- A  Growth of sales revenue      B  Increase market share      C  Cutting costs  
D  All of the above      E  Other, please mention \_\_\_\_\_

10- Rank in order of importance your firm's approach to differentiate your business from your competitors:

- A  By providing the lowest cost products or services  
B  By providing the highest quality products or services  
C  By establishing the best relationship with customers  
D  By providing the most innovative products or services  
E  Other, please mention \_\_\_\_\_

11- Has your ICT investment helped reach customers beyond your area so far (e-commerce website)?

- A  Yes      B  No

12- Do you expect your ICT investments to help you reach new customers beyond your area?

- A  Yes      B  No

13- Has your ICT investment resulted in cutting costs so far?

- A  Yes      B  No

14- Do you expect your ICT investment will result in cutting costs?

A  Yes                      B  No

15- Has your ICT investment resulted in increase in revenue/growth so far?

A  Yes                      B  No

16- Do you expect your ICT investment to increase revenue/growth of your company?

A  Yes                      B  No

17- Has your ICT investment helped build better relationships with customers so far?

A  Yes                      B  No

18- Do you expect your ICT investment to help build better relationships with customers?

A  Yes                      B  No

19- Please tick below on what you consider as a barrier to ICT investment/adaptation:

A  Monetary costs of implementation

B  Time to implement ICT project

C  Lack of necessary internal skills

D  Uncertain about return on investment in ICT solutions

E  Lack of available information about effective and relevant technologies

F  Bad experience in the past

G  Lack of top-management support/direction/planning

H  Government regulations and requirements

I  Other, please mention \_\_\_\_\_

20- Does your organization have a full-time IT staff?

A  Yes                      B  No

If yes, how many employees: \_\_\_\_\_

21- What proportion (percentage) of your ICT related activities are outsourced?

A  <10%    B  Between 10% and 25%    C  Between 25% and 50%    D  >50%

E  None

22- Please write "I" (internal), "E" (external) or "B" (both) to indicate the resources used to implement the following ICT technologies:

A  Data storage solutions

- B  Wireless networking solutions
- C  Business productivity software
- D  Desktop PCs, laptops or handheld PCs
- E  Network security services
- F  Networking hardware/software solutions
- G  Call center technologies
- H  Enterprise software applications
- I  Advanced telecommunications services
- J  Wireless or cellular phones using advanced applications