Chapter Two:
Literature Review
Literature review

Small and Medium-sized Enterprises (SMEs) are often the main driver for a country’s economic growth. However, as the number of SMEs increases, competition increases, which then results in a decrease in prices, customer base, or both. This in turn will erode existing profits, creating less incentive for people to start SMEs. This dynamic is captured by balancing feedback loops where the greater the number of SMEs, the greater the competition, resulting in a slower rate of growth for SMEs. To counter the increasing competition, firms can lower prices, increase promotion of their product, improve their product, add new distribution channels, and/or improve their internal processes. The challenge is to counter competition when the firm still has the financial resources to do so. Otherwise, once the pressure of competition sufficiently erodes the SME’s profits, it will no longer have resources to counter the competition and will have to exit the market.

Foreign firms in both the import and export markets further add to competitive pressures, especially if they react faster to improve their product, process, promotion, or distribution channels. This is the problem of the digital divide. When firms in developed countries adopt Information and Communication Technology (ICT), firms in developing countries will lose out on the competition. This in turn can slow the growth rate of SMEs and hurt the economy as a whole. ICT can thus play a very important role because it can help SMEs both create business opportunities and combat pressures from competition. Appropriate ICT can help SMEs cut costs by improving their internal processes, improving their product through faster communication with their customers, and better promoting and distributing their products through online presence. In fact, ICT has the potential to improve the core business of SMEs in every step of the business process.

Concepts of ICT & SMEs

According to Organisation for Economic Cooperation and Development (OECD) (2008), “ICT activities are those that “process, deliver, and display information electronically”. Hence, the ICT industries are those that produce the equipment, software and services that enable those activities. Each of the top 250 firms is classified by ICT industry sector: i) communication equipment and systems; ii) electronics; iii) specialist semiconductors; iv) IT equipment and systems; v) IT services; vi) software; vii)
Internet; and viii) telecommunication services. Broadcast and cable media and content are excluded.”

Beckinsale and Ram (2006) argued that ICT is defined as “any technology used to support information gathering, processing, distribution and use”.

Nicol (2003) classified ICT into information technologies, telecommunications technologies and networking technologies. This covers all forms of technologies such as computers, Internet, websites as well as fixed-line telephones, mobile phones and other wireless communications devices, networks, broadband and various specialised devices.

Schmid et al, (2001) argued the emergence of the Internet has allowed SMEs to compete effectively and efficiently in both domestic and international markets. According to OECD (2003), SMEs are companies employing less than 250 persons. Generally representing between 95% and 98% of companies worldwide and a relatively significant portion of most macro-economic indicators regardless of activity sector (industry or services), they play a major role in the economies of most countries.

Mutula and Van Brakel (2006) agreed that information is an important asset, giving SMEs a competitive advantage in the new economy. However they point out that access to information is a problem in developing countries due to lack of ICT infrastructure. Information access plays a critical role in the informed decision-making process, making it easy for SMEs to take good competitive decisions.

Mutula & Van Brakel (2006) found that the ability of SMEs to survive in an increasingly competitive global environment is largely predicated upon their capacity to leverage information as a resource.

Ritchie and Brindley (2005) defined ICT as “the array of primarily digital technologies designed to collect, organise, store, process and communicate information within and external to an organisation and SMEs”.

According to Moodley (2002), ICT is an enabler for global “networking” economy.

According to Fulantelli & Allegra (2003), “Information and Communication Technology (ICT) offer enterprises a wide range of possibilities for improving their competitiveness: they provide mechanisms for getting access to new market opportunities and specialised information services such as distance consulting, continuous training, new advisory modes, etc.”
Ritchie & Brindley (2005) argued ICT covers technologies like the simple telephone, point-of-sale systems, stand-alone PCs, networked environments, Internet, and credit card facilities.

Ritchie and Brindley (2005) define ICT as “the array of primarily digital technologies designed to collect, organise, store, process and communicate information within and external to an organisation and, in our case, SMEs.”

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According to Reserve Bank of India (2007), concept of SMEs is as “At present, a small scale industrial unit is an undertaking in which investment in plant and machinery, does not exceed Rs.1 crore, except in respect of certain specified items under hosiery, hand tools, drugs and pharmaceuticals, stationery items and sports goods, where this investment limit has been enhanced to Rs. 5 crore. A comprehensive legislation which would enable the paradigm shift from Small Scale Industry (SSI) to small and medium enterprises is under consideration of Parliament. Pending enactment of the above legislation, current SSI/ tiny industries definition may continue. Units with investment in plant and machinery in excess of SSI limit and up to Rs. 10 crore may be treated as Medium Enterprises (ME)”.

According to Southern and Tilley (2000), SMEs are businesses that employ 150 people or fewer and are not a subsidiary of a public limited company.

Mahemba and Bruijn (2003) cited the fact that SMEs make up more than 90% of all business establishments worldwide.

Authors such as Southern and Tilley (2000), Taylor and Murphy (2004), and Martin and Matlay (2001) agreed and acknowledged that SMEs are different and should be treated as such. There are many factors that make SMEs different, such as turnover, industry, number of employees, and format of the business. These factors need to be studied in more detail to establish how they influence the adoption process.

**ICT & Competitive Business Advantage**

From a domestic perspective, strategic ICT have been studied as competitive tools. ICT can help to gain competitive advantage and to re-engineer business
processes. Several studies built on porter's concepts (value chain, 5-forces model, 3 business strategies) (King and Grover 1989). A large number of studies have related the creation of value by means of IT with the gaining and maintenance of competitive advantage (Bharadwaj 2000, Powell/Dent-Micallef 1997). Several authors discuss the value of ICT as a strategic asset providing competitive advantages or even constituting a competitive advantage itself.

Jackson (2007) emphasised that emerging ICT technology, if used, is most likely to result in a competitive advantage. This competitive advantage is a result of the innovation and flexibility that ICT affords SMEs. This means it will be easier for SMEs to come up with new and creative products and services that are quick to implement, given the decision-making structure of SMEs as opposed to that of larger companies.

Del Águila et al, (2002) proposed that the resource-based view can serve as a basis from which to explain the competitive impact of IT over a period of time, an area with little empirical evidence so far.

Blaine/Bower (2000) observed that complementary ICT and human resources may constitute competitive advantages.

Manheim (1990) argued that the very dynamic of ICT works against it being a source of unique, competitive advantage for any single company.

According to Nachum, L. (2003), any advantage gained from IT appears almost by definition unsustainable but ICT (1) can win market share, (2) can be good for the industry, (3) can provide first mover advantage, and (4) innovations can continue.

M. Porter (1998) presented the intensity of competition varies from industry or form a strategic group to another, where it appears a good strategic industrialised segmentation. The intensity is determined by a number of factors that were be grouped by Michel Porter in a systematic model, called “Competitiveness’s Diamond”. The result of these factors will determine the potential performance potential of an industry, measured using the indicators of profitability, depending on resultant will be formulated certain strategies in an attempt to gain a more advantageous position in competition. Other economists have pointed out the modern concept of “knowledge” as the most recent new factor in competitiveness. (N. Negroponte, 1995)

Samii (2004) reflected the eclectic paradigm and thus typical competitive advantages in international business on the basis of the advances in ICT.

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competitive global environment is largely predicated upon their capacity to leverage information as a resource.

According to Samii (2004)

- The ownership advantage has particularly been challenged by ICT as the information transparency and speed of information flow has resulted in globalisation of innovation and technological knowhow. Lifecycles of invention and innovation have become shorter and global process benchmarking and reverse engineering have become more prevalent in the age of ICT.

- ICT has created transparencies, which have reduced ownership advantages. However, advantage has shifted to web presence and design, IT-trained work force, and the ability to leverage information for competitive advantage. ICT increase firms' ability to benefit from location advantages due to reduced cost and ease of communication. ICT also increase the ability to collect information on risk and regulatory environment. Communication technology facilitates the exploitation of location advantages through communication, e.g. offshore software development in India, call-centres in Ireland or outsourcing of services. ICT favour a greater geographic dispersion of business activities.

- ICT facilitate (1) a shorter duration of transactions, the simplification of procurement processes, (2) opportunities for an increase in trading, (3) a prospect for trade in services, and (4) the integration of activities of various affiliates. All these factors diminish internalisation advantages. In general, IT is lowering the advantage of internalisation. Transaction costs are reduced because of ICT, making internalisation less expensive while at the same time increasing control. It also helps firms to benefit from strategic alliances due to network externalities.

According to Schubert and Leimstoll (2007), there are two schools of thought with regard to the issue of ICT value. The one, known as porter’s theories, says that ICT adds value to SMEs and the other, known as Millar’s theories, believes that ICT does not really add any value since it is a commodity, just like electricity, available to everyone. In conclusion they agree that competitiveness of an SME depends on the ways in which ICT is used to support business processes. So having ICT implemented in a business does not necessarily give the business any competitive advantage, but having it linked to the business processes and strategy will most likely give a competitive advantage.

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SMEs a competitive advantage in the new economy. However they point out that access to information is a problem in developing countries, due to lack of ICT infrastructure. Information access plays a critical role in the informed decision-making process, making it easy for SMEs to take good competitive decisions.

Pavic et al, (2007) argued that SMEs have the opportunity to achieve a competitive advantage from advances in ICT through innovation, marketing, efficiency gains, better quality and customer responsiveness.

Levy and Powell (2000); Lin et al, (1993) argued the increasing emphasis on competitiveness in small business has led to a new focus on the competitive advantage promised by appropriate use of ICT.

V. Sethi and W.R. King (1994); T.K. Sung, (2004) argued the use of IT is a strategic necessity, enabling companies to reposition themselves in the competitive configuration within a market or to overcome their competitive disadvantages.

Porter (1980) proposed several frameworks in strategic competitive advantage, none of these frameworks have made real progress towards realising the potential that may exist for using information technology as competitive or strategic business weapons.

McFarlan (1984) adapted Porter’s (1980) model of competitive advantage and proposed five variables: new entrants and entry barrier, competitive rivalry, products and services, switching costs, and suppliers.

**ICT & Business Performance of SMEs**

In recent years, many authors have emphasised on the need to invest on sophisticated ICT to enhance organisational information processing capability and thus performance (e.g. Huber, 1990; Levy et al, 2001; Lesjak, 2001; Shin, 2001). The anecdotal argument is, the use of advanced ICT leads to more available information, and thus leads to increased information accessibility to support decision makings.

King and Grover (1989) argued that firms with extensive ICT resources may gain a competitive edge by deploying them in support of or to strengthen their business.

Although considerable emphasis has been placed on potential benefits of ICT applications to organisational performance, results from several empirical studies report insignificant relationships between ICT sophistication and performance (e.g. Cragg dan King, 1992; Raymond et al, 1995).

Raymond and Pare (1992) argued that use of different measures of ICT sophistication
makes it difficult to make comparisons between studies particularly its impact on performance. Other researchers called for a more indirect approach to measure the relationship between ICT and performance (Shin, 2001; Bergeron et al, 2001).

Shin (2001) argued that ICT is an essential tool, but not sufficient by itself, to be truly effective. Rather, ICT needs to be coupled with other factors such as business strategy to have an impact on performance (Cragg et al, 2002). These factors are often translated in terms of organisational information requirements (Chang and Jevons Lee, 1992).

Garsombke and Garsombke (1989) found computerisation to be a significant predictor of the performance of small manufacturing firms.

Duan et al, (1992) found SMEs with sophisticated ICT performed not better than SMEs with less sophisticated ICT.

Raymond et al, (1995) adopted a contingency approach to investigate the relationship between ICT sophistication and organisational structure and its impact on performance. The study found ICT management was positively related to structural sophistication, and ICT usage was positively related to performance.

Cragg et al, (2002) examined the alignment between ICT strategy and business strategy among SMEs. The study found the groups with high ICT alignment achieved better performance than firms with low ICT alignment.

Cragg et al, (2002) confirmed this argument when they found that the alignment of ICT strategy and business strategy has an impact on performance.

**ICT Usage & Profitability of SMEs**

Wolf (2001) mentioned that the focus on production processes might be too narrow and those ICTs might exert their influence through product-quality improvements and improved services. ICTs might additionally help SMEs in the administration of their businesses and enhance procurement and marketing processes.

Porter’s five forces model (1980) can be used to analyse an industry as a whole and, from the perspective of a single organisation, to formulate strategies to increase one’s performance and profitability within the industry.

Dominique Delpote-Vermeiren (2003) argued that use of ICT enables the expansion of relevant sets of service elements to include the existing database of elements, or the development of new service elements, e.g., using the Internet as an information channel instead of regular mail. Customer profitability is improved by either increasing gross
margins or reducing the costs of customer servicing. Ways to increase gross margins on products include (1) increasing revenues (sales) by enhancing coverage, increasing closure rates, or building repeat sales or (2) raising the percentage of margins by reconfiguring pricing/terms, focusing on profitable customers, or improving negotiation strength.

Paul Matthews (2006) argued that ICT is playing an important role in the growth of enterprises by contributing directly to profitability and by providing foundations for the evolution of operations from a micro to a medium level. A number of factors play a role in the successful deployment of ICT for growth and these form a complex system encompassing environmental, technical and human factors.

Koellinger (2006) argued the relationship between ICT usage and profitability is more complex and contingent upon firm- and market-specific factors such as the timing of the investment relative to competing firms and the reaction of competing firms in the market. Hence, no general relationship between ICT usage and profitability can be hypothesised because profitability crucially depends on the respective competitive environment of each individual firm and its ability to limit imitation by rivals.

Stoneman and Kwon (1996) argued that the competitive dynamics in a market showed that the profits of non-adopters of ICT are reduced as other firms adopt new ICT. Furthermore, the gross profit gains of ICT adoption are related to firm and industry characteristics and the number of other users of the technology.

Locke (2004) stated that increased profitability as a proxy for growth is most strongly correlated with ICT usage. Although focused on the link between adoption and economic growth, their results were not conclusive of a strong correlation between ICT usage and sales performance or market share.

MacGregor et al, (1998) suggested that very small businesses may be more likely to be motivated to use ICT if short-term profitability can be demonstrated.

Raman (1996), ICT can help small businesses develop their markets, increase sales turnover, raise profitability, secure their positions within their industries and gain a competitive edge.

Doukidis et al, (1992) attributed the following benefits to small businesses who use ICT: (1) improved productivity and performance within the enterprise; (2) greater internal control of operations; (3) the possibility of new ways of managing activities; (4) greater extension and penetration of markets; (5) the possibility of new organisational forms (for
example, networked organisations); (6) the delivery of a valued and high quality package of product and service; and (7) the redefinition of existing businesses or the spawning of whole new businesses.

Choo (2004) argued that SMEs cannot cede control over the ICT implemented to their consultant, as consultants may advise them to implement systems that they are not ready for, or that are not necessary. SMEs themselves are in the best position to decide how effective their ICT systems are in improving company productivity and profitability, and how much of their resources are available to adapt to another system.

S.-J. Yeon (2007); S.H. Hwang and M.S. Kim (2005), SMEs have been more actively investing in information, demonstrating a heightened awareness of the importance of ICT. Studies also report that SMEs that make extensive use of ICT perform better. Even with small investments, SMEs, provided they make active use of ICT, are able to improve their market shares or profitability or make progress in other performance areas.

**ICT & Employment Creation**

Kuznets (1972) investigated the growth effects vary for miscellaneous types of innovation. A common conceptual framework is to differentiate between product and process innovations. This conceptual framework can also be applied to study the impacts of ICT, because ICT investments can result in product or process innovations at the firm level. Product innovations can occur in goods or in services, while process innovations can be either technological or organisational, with varying implications for employment effects.

Katsoulacos (1986); Kuznets (1972); Edquist et al, (2001) argued that, if the new product does not satisfy a completely new kind of demand or does not serve an entirely new function, i.e. if it only functionally replaces an old one, there will also be a substitution effect. The net employment effect of such an innovation could be either negative or positive, depending on (1) whether the new demand for satisfying the function changes when the new product replaces the old one and (2) the labour intensity of the production technology of the new product compared to the old one. However, in most cases product innovations are employment creating even if substitution effects are taken into account.

Edquist et al, (2001) investigated the technological process innovations that replace labour by capital will have a stronger employment reducing effect than process innovations that lead to organisational changes. In fact, organisational process innovations might be either
labour saving or capital saving, while technological process innovations are primarily labour-saving.

Becker et al, (1996) argued that organisational innovations are also special in the sense that they can be viewed as investments into human capital by the provision of new knowledge through education, training and learning-by-doing. This constitutes a special kind of investment because it is durable, generates continuing returns and is embodied in “knowledge carriers”. Thus, if an employment reducing effect of organisational process innovations exists at all, it is likely to be much smaller than the employment reducing effect of technological process innovations. In addition to this static firm-level view on different kinds of innovation, a dynamic macro-level view emphasises that there are likely to be secondary effects of innovation because whether something is a process or a product innovation is essentially a matter of perspective. Some product innovations in one sector can turn out to be process innovations in another sector leading to secondary employment effects.

Edquist et al, (2001), differentiates the net-employment effect of product innovations according to three product categories consumer products, investment products and intermediate products. Only investment products can play the double role of employment generation in one sector and labour displacement in another. The net-employment effect of an investment product innovation hence depends both on the effect in the technology producing sector and the effects in the using sectors. ICT are an example of such an investment product, which makes the net employment effects of ICT more ambiguous. For consumer and intermediate goods innovation, there is usually only the primary (typically employment increasing) effect.

Pianta, (2001); Antonucci and Pianta (2002); Evangelista and Savona, (2003) argued that from a more aggregate perspective, empirical studies on the industry level show that the employment impact is positive in industries characterised by high demand growth and orientation towards product (or service) innovations, while process innovation tends to lead to job losses. Recent sectorial evidence for Europe suggests a prevalence of labour-saving process innovations. Slow growth on the demand side and increasing international competition has pushed many firms towards restructuring and process innovations. This leads to the well-known phenomenon of jobless productivity growth, which is currently being witnessed in many European countries. However, product innovation has confirmed its positive effects on output and jobs. The overall effect depends on the country and period being studied. The higher economic growth (total output and demand), the higher
is the positive impact of innovation, while technical change in stagnating or closed economies tends to be associated with serious employment losses.

**Pianta** (2004) suggested that institutional factors and macroeconomic conditions play an important role for the nature and the effect of technical change on employment at the macro level. The employment impact is generally more positive the higher is the ability to generate new products and to invest in new economic activities, and the stronger is the effect of price reduction, leading to increased demand. Aggregate studies generally point out the possibility of technological unemployment, which emerges when industries or countries see the prevalence of process innovations in contexts of weak demand.

**Van Ark et al,** (2004) investigated the firms innovating in both products and processes may be successful in expanding output and jobs regardless of economic context, but often at the expense of non-innovating firms. Yet, the long run trend has been towards simultaneous growth in per capita income, productivity and employment growth. In addition to the quantity impact of innovation on employment, there also exists a quality aspect. The question is “what kind of jobs are created or destroyed by innovation?”

**Acemoglu** (2002) found that technical change is biased towards skilled workers as it replaces unskilled labour and increases wage inequality and polarisation.

**Barriers of ICTs in SMEs**

**Zowghi and Sarosa** (2003) stated that research to data has concerned on identifying drives and barriers to adoption of ICT and there is still a lack of strategy, frameworks or models that actually guide SMEs in the adoption process.

**Iacovou et al,** (2005) found that the owner’s lack of awareness of the technology and perceived benefits is a major barrier to a take up of e-commerce. The lack of knowledge on how to use the technology and the low computer literacy are other contributory factors for not adopting e-commerce.

**Kapurubandara et al,** (2006) have categorised 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.

**Cloete et al,** (2002) argued that low use of e-commerce by customers and suppliers, concerns about security, concerns about legal and liability aspects, high costs of development and computer and networking technologies for e-commerce, limited knowledge of
e-commerce models and methodologies, and unconvincing benefits to the company are among some factors found in another study.

Duncombe et al, (2001) discussed the opportunities that ICT provides for SMEs in developing countries. SMEs, vital to the economy in any country, are very often recognised as an economy growth engine.

Anigan (1999); Bingi and J. Khamalah (2000); Marshall et al, (2000) argued the SME studies of electronic commerce issues in developed countries indicate that issues faced by SMEs in developed countries can be totally different from those experienced by SMEs in developing countries. Organisations adopting ICT and e-commerce in developing countries face a number of challenges that are specific to them and are more pronounced than would be the case in developed countries. Some of these are the lack of telecommunications infrastructure, lack of qualified staff to develop and support e-commerce sites, lack of skills among consumers needed in order to use the Internet, lack of timely and reliable systems for the delivery of physical goods, low bank account and credit card penetration, low income, and low computer and Internet penetration.

Brown et al, (2005) identified the problems that some SMEs face whilst engaging in on-line trading or collaboration with supply chain partners. They argued that the complexity of business operations as well as company size matter in respect of ICT adoption and use in SMEs.

Fathian, et al, (2008) reviewed the e-readiness assessment models proposed for countries at macro scale. They identified four critical factors for SMEs e-readiness (ESME), that is, organisational features, including skills and human resources, ICT management and policy, investment and financial support for ICT development, and revenue on electronic services; ICT infrastructure, including information infrastructure, network speed and quality, ICT services and support, and ICT employment opportunities; IT availability, including internet availability and affordability, ICT in workplace, and people and organisations online; and security and legal environment, including security and encryption and legal environment and regulation.

Ritchie and Brindley (2005) mainly look at the barriers or diffusion agents that prevent the SME from adopting ICT. They group them into the following areas:

- Strategic. This level addresses issues that impact on the direction of the business (business strategy), capital investments and networks in relation to ICT. SMEs should
formulate their own IT/ICT strategic objectives.

- **Technological.** This level deals with issues relating to the complexity of technology and professional support for the technology in relation to the production of goods and services. This level should underpin the above level of strategy, by implementing IT/ICT strategic plan in order to build a good IT/ICT architecture.

- **Organisational and behavioural.** This level deals with issues that relate to the personality, such as capacity and risk perceptions. These also underpin the strategic level but the focus is on supporting the business process.

**ICT & Organisational Productivity of SMEs**

**Morrison and Berndt** (1990) concluded that additional ICT investments contributed negatively to productivity, arguing that “estimated marginal benefits of investment in ICT are less than the estimated marginal costs”. Others, such as **Loveman** (1994) and **Barua et al**, (2000), said that there is no conclusive evidence to refute the hypothesis that ICT investment in inconsequential to productivity. Of late, researchers working with firm-level data have found significant contributions from ICT toward productivity (**Brynjolfsson and Hitt** 1996). Most of these firm-level studies have been restricted to the manufacturing sector, in large part owing to lack of firm-level data from the service sector.

**Wong et al**, (2004) declared that appropriate use of ICT in the companies increase the productivity by three ways:

- Increasing the volume of capital used per worker (capital deepening), when firms invest in ICT.
- A speedup of growth of Total Factor Productivity (TFP) in industries producing information technologies, thanks to technological progress.
- A speedup of growth of TFP in industries using information technologies.

**Oliner and Sichel** (2000); **Bailey and Lawrence** (2001) demonstrated an increasingly productive use of ICT in the user-sectors, and not only a productivity growth in the ICT producing sector itself.

**Harker**, P. (2000) concluded that the inability to demonstrate a positive correlation between ICT investments and improved productivity and increase the ICT investments in the companies was later defined as the productivity paradox and formed a baseline for many studies and discussions in subsequent years. The results were conflicting.
Dedrick et al., (2003) argued that many studies in the 1980s showed no correlation between ICT investments and productivity growth, whereas research based on subsequent data and new assumptions mainly showed a positive and significant effect on productivity and economic growth.

Brynjolfsson, (2003) investigated that various questions of measurement made it difficult to present distinct conclusions based on aggregate national or industry-level data, researchers turned to aggregate firm-level data when seeking explanations for the productivity paradox. This research indicates that organisations that have made ICT investments of equal scale show substantial differences in the development of their productivity.

Horzella, Asa (2005) claimed that inconsistent findings from ICT productivity research were due to interchanging terms between productivity and financial performance and also lack of adequate data. However, recent studies have claimed that ICT productivity paradox no longer exists and there is a positive correlation between appropriate use of ICT and economic growth.

Muller and Fallk (2001) found for Indian manufacturing SMEs those enterprises that use more advanced forms of ICT have on average a higher productivity and a higher growth rate.

Chowdhury and Wolf (2003) used modified Cobb-Douglas production functions to investigate labour productivity and returns for an SME survey conducted in Tanzania and Kenya. Their main finding is that ICT investments have no significant impact on the return on investment of SMEs.

Muller-Falke (2001) found for Indian manufacturing SMEs that enterprises that use more advanced forms of ICT have on average a higher labour productivity and a higher growth rate. In a survey of 59 electric and electronic manufacturing Indian SMEs mainly employing less than 50 people, Lal (1996) observed higher profit margins, skill intensity and export and import intensities for firms using ICT.

Pilat (2005), Van Ark (2002) investigated although measurement problems and a debate about the sustainability of ICT-enabled growth remain, there is now wide consensus that ICT does have positive effects on labour productivity and total factor productivity.

Brynjolfsson and Hitt (2000); David (1990); Greenwood and Jovanovic (1998); Malone and Rockart (1991) have also analysed the impact of ICT on firm-level productivity. It is usually stressed that ICT investments must be combined with
complementary investments in work practices, human capital and firm restructuring to have an impact on performance.

Bertschek and Kaiser (2004) argued that ICT has indirect effects on productivity by enabling workplace reorganisation and organisational change, stressing strong complementarities between these investments.

Summarising, ICT is indeed a relevant part of current technological change processes and an important factor that contributes towards growth. However, the magnitude of impact varies significantly between firms, sectors and countries and can either be hampered or promoted by external factors. Also, there is growing consensus that the link between ICT-usage and productivity growth is rather indirect and that a positive impact arises only if ICT investments are combined with complementary investments into innovation and human capital. Complementary investments to ICT are in most cases related to innovation. For example, organisational change or process-redesign is typical complementary investments to the adoption of new ICT that result in process innovation. Thus, whether firms conduct innovation or not is a proxy for whether they carry out complementary investments when adopting new ICT. Hence, if ICT adoption requires complementary investments to generate productivity gains, positive effects of ICT adoption on productivity should be more likely to occur in innovative firms.

Van Ark et al, (2003), Nordhaus (2002) argued that ICT-related productivity increases are primarily observed in those sectors that have invested heavily in the usage of ICT, including trade, financial services, business services, and the ICT manufacturing sectors themselves.

Brynjolfsson and Hitt (2003) investigated that there are various possible reasons for this empirical observation. For example, it could be that ICT generates more substantial possibilities for product, process, and service improvements in some sectors than in others. Thus, the technological opportunities could vary among sectors. This would justify why some sectors are more intensive users of ICT than others are, and it would rationalise why productivity growth is more likely to be observed in those sectors that have heavily invested. In addition, sectors that have already made substantial investments in ICT usually consist of many firms that were among the early users of new ICT solutions. Thus, these sectors started to use particular ICT before other sectors did. Since productivity gains due to ICT usually fully materialise with some significant time lag after the initial investment, it could be that the positive productivity effects of ICT are particularly noticeable in sectors that are already
advanced users of ICT because these early movers had more time to realise the positive effects of ICT-related investments. Thus, due to differences in technological opportunities across sectors and/or due to earlier investments and time gaps between investments and productivity increase, it is plausible to expect that ICT-related productivity gains are more likely to occur among advanced users of ICT. Proving the business value of ICT on organisational productivity has been a major concern of IS research. It has been a matter of much debate whether or not investment in ICT provides improvements in productivity and business efficiency.

Edquist et al, (2001) argued that process innovations usually also have both a compensation and a substitution effect, however, their net effect is less clear than for product innovations. Process innovations usually reduce the costs of production for a given unit of output; hence, they increase productivity per unit of input. In micro-economic models, this corresponds to an outward shift of an existing supply function. Depending on the price elasticity of demand, this outward shift of the supply function will lead to growth and lower equilibrium prices. This compensation effect is stronger for competitive industries and high price elasticity’s of demand. However, an increase in productivity implies that a given level of output can be produced by less amount of input. Thus, if demand and output remain constant, a process innovation will lead to a reduction of labour, ceteris paribus. While the compensation effect can mitigate job losses, they can only promote net employment gains when growth in production and demand outstrips productivity growth. This only happens when the price elasticity of demand is greater than zero, which is only rarely the case.

Summary of the Chapter

In this chapter, a comprehensive review of literature was presented covering a range of researches in the field of ICT and SMEs. The chapter started with the researches regarding the concepts of SMEs & ICT, then it continued with the ICT & Competitive business advantage, ICT usage & profitability of SMEs, ICT & employment creation, Barriers of ICTs in SMEs, and ICT & organisational productivity of SMEs.