Resilience and competitiveness of small and medium size enterprises:
 an empirical research

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A small- or medium-sized enterprise (SME) is normally a company that employs about 50–200 people. Because of the globalisation of market and operations, and technological advances, the competition among SMEs has radically increased over the years, and their survival is increasingly dependent on a number of factors including resilience of SMEs to refocus some of their strategies and technologies. In this article, a review of selected literature has been undertaken on some of the SME characteristics and new strategies, techniques and technologies that can provide a competitive advantage and sustainability in the global market and operations. Based on the literature review, a framework has been developed with key factors/enablers that determine the resilience and competitiveness of SMEs. This framework has been empirically studied by collecting data from SMEs. It involves a sample of 40 SMEs in the Southcoast of Massachusetts and provides further insight into the key characteristics associated with resilience and competitiveness of SMEs that are influenced by advances in operations strategies, technology and globalisation. Finally, a detailed summary of findings and conclusions are presented.

Keywords: SMEs; resilience; competitiveness; globalisation; technology; empirical study; Massachusetts

1. Introduction

Small- or medium-sized enterprises (SMEs) are the backbone of economy in many countries and very often constitute more than 90% of all the companies or enterprises in some countries (Poon and Swatman 1999, Cull et al. 2006, Ozgulbas et al. 2006). But despite their prevalence, they are the most vulnerable and very susceptible to competition from likely structured companies and large corporations. Traditionally, SMEs have several advantages over a large company due to its size and flexibility in adapting to change. It has also been found that market and learning-oriented SMEs, facing strong competition, tend to be more innovative and resilient (Salavou et al. 2004). But in the modern global market, SMEs need to compete not only with traditional rivals, but also with overseas firms, which can market the same product more cheaply due to the
adequate political and economic conditions of their countries. Despite global economic meltdown, SMEs have demonstrated resilience in terms of sustainable business. In addition, competition and sustainability for SMEs involve factors such as changing market trends, changing technologies and emerging new management and organisational techniques.

Moreover, SMEs play a major role in successfully operating large-scale domestic and global supply chains. If large scale companies want to be competitive, then they have to select suitable partnering firms (suppliers) most of which are SMEs. With advances in information technology (IT)/information systems (IS), entrepreneurs are interested in developing a virtual enterprise with suitable strategic alliances that are based on core competencies. Also, a majority of SMEs are keen on adopting advanced ITs such as electronic data interchange (EDI), enterprise resource planning (ERP) and e-commerce with the objective of improving their own supply chain efficiency first and then the supply chain of their partners. For developing an efficient and sustainable supply chain, SMEs need to carefully revisit their strategies, techniques and technologies.

This paradigm shift for SMEs created a need to look into their core characteristics, which differentiate them from traditional big companies and play to their strengths while addressing their weaknesses. To remain competitive, the SMEs need to fine-tune their operation strategies, be ready to accept the new advances in science and technology and use it to their advantage before their competitors and be resilient to meet the changing global market needs. In this article, certain core characteristics and areas of improvement for SMEs are identified and a framework of enablers that will make them resilient and competitive in the global market is provided.

The role of SMEs in the global market and their readiness in accepting a more prominent role in the international market is discussed. Although studies conducted in the field have pointed out that more than 90% of the firms actually belong to SME category, there has been relatively limited research in the area involving characteristics of SMEs such as suitable organisational structure, technology, globalisation, supply chain and human resource management and their implications on SMEs’ resilience and competitiveness. This article aims to identify the key enablers that determine the resilience and competitiveness of SMEs and help them in identifying their strengths and weaknesses towards being a competitive entity in the business world.

The majority of the companies in the USA are SMEs. Small businesses continue to dominate as the core of economic growth and therefore, their resilience is critical to be competitive in the global market of the twenty-first century. Small businesses continue to drive employment. Small businesses with fewer than 500 employees accounted for all of the net new jobs. It has generated 1.86 million jobs since 2006, while large firms with 500 or more employees had a net loss of 181,000 jobs. More than 99% of American businesses are small, and the average small employer had one location and 10 employees, compared with 62 locations and 3313 employees for an average large business. Small firms employed 50.9% of the private sector workforce and generated 50.7% of the non-farm private gross domestic product. Despite the important role of SMEs in the national economy and employment opportunities, there is limited research focusing on the regional SMEs and their resilience and competitiveness. Understanding the importance of SMEs, an empirical study is conducted with SMEs in the Southcoast of Massachusetts. Some of the resilience strategies for SMEs are discussed at the end.

This article is organised as follows: the next section gives definitions of SMEs that help to provide insight into certain key characteristics of resilience and competitiveness that are
discussed in more detail in subsequent sections. Section 3 presents research methodology used for studying SME characteristics that includes an extensive literature review to develop a theoretical framework and a survey undertaken in the Southcoast of Massachusetts. Section 4 develops a theoretical framework that incorporates certain key characteristics impacting the resilience and competitiveness of SMEs. Section 5 presents the empirical results and analysis for the resilience and competitiveness of SMEs, using the framework presented in Section 4. Section 6 ends with conclusions and areas for future research.

2. Resilience and competitiveness of SMEs

Storey (1994) argued that there is no single, distinct and uniformly acceptable definition of a small firm. However, the Small Business Survey, UK (2004) defines businesses according to the number of employees, annual turnover and annual balance sheet total (Egbu et al. 2005). However, most of the SMEs face common problems and challenges in the global market and operations. Resilience could be viewed as adaptability, responsiveness, sustainability and competitiveness in evolving markets. It is critical for SMEs to succeed in the so called twenty-first century global market.

Before categorising factors influencing resilience and competitiveness of SMEs, a definition of SME is covered to gain further insight into certain key attributes. Defining a SME can be very challenging as generalised classifications cannot be properly applied. Even in the absence of universal norms that clearly define SMEs, they are discernible anywhere in the world. Litz (1995) developed a nine cell grid to capture a diverse range of possible alignment between the interests of ownership and management being individual, familial or widely held. The cells in the grid represent individual and familial ownership of the company with individual or familial managerial control clearly pointing to SME type of organisation.

According to Egbu et al. (2005), a major factor affecting SMEs, especially for family-owned businesses is the succession planning. It is, therefore, necessary for SMEs to identify and train potential successors well in advance. Levy et al. (2003) argue that SMEs are good as knowledge creators, but are poor at knowledge retention. Resilience of SMEs requires knowledge retention through a flexible workforce, strategic managerial thinking, top management support and technology. They need to be proactive in knowledge sharing arrangements to recognise that knowledge has value and the value added is derived from knowledge exchange. In SMEs, personal relationship has traditionally been a major contributor to success. Utilising these already existing bonds, coupled with a clear understanding of what the company wants to accomplish strategically, can become a sustainable competitive advantage that can lead to growth and increased profitability. This results in customer satisfaction and retention (Egbu et al. 2005).

Jorgensen and Knudsen (2006) discuss the resilience and competitiveness of SMEs in global markets. As markets for semi-manufactured goods become more global, SMEs are increasingly integrated into global value chains. If SMEs lack the ability to perform functions effectively in relation to sustainable supply chain management, then they may in time face rising barriers to entry into global value chains. SMEs are important as change agents in global value chains in order to ensure the pervasiveness of sustainability standards. Increasing numbers of SMEs trade in global business-to-business markets for semi-manufactured goods, it is therefore important that SMEs are able to perform
governance functions associated with sustainable production in global value chains (Jorgensen and Knudsen 2006).

Singh et al. (2008) present the importance of SMEs in selected countries in terms of industrial output, employment, export and GDP. SMEs are regularly facing new challenges with reference to cost, quality, delivery, flexibility and human resource development for their survival and growth in the context of a dynamic market scenario. A firm’s competitive strategy specifies the potential products and markets, long-term objectives and policies for achieving the objectives. Organisations should continuously review their manufacturing strategies to identify the aspects of market priority, product structure, manufacturing configuration and investment (Singh et al. 2008). Moreover, SMEs have started outsourcing activities such as legal representation and consultation, accounting, tax consultation, business and financial consultation, market research survey, training and compilation of loan applications, etc. This highlights the challenges of physically distributed enterprise environments and operations, and their integration through IT/IS with SMEs (Kadocsca 2006) and in turn the significance of resilient SMEs. According to a national survey, the following are some of the steps to be taken for SMEs to enhance their resilience and therefore to succeed in the global market: (1) enhance policy making at the government level; (2) simplify the legal and regulatory environment; (3) improve access to finance; (4) simplify taxation; (5) foster information and communication technology; (6) enhance science, technology and innovation for the development of SMEs; (7) encourage internationalisation; (8) improve business development services and (9) strengthen the public/private dialogue. Goncz et al. (2007) discusses the relationship between sustainability and complex dynamic development, balance between innovation and durability; they argue that sustainability can become operational only if consensus and balance is found in its conflicting constraints by means of optimised, win–win solutions, suitable for the cultural characteristics. Local and global solutions should support each other and the integration of new technology and academic research should be aligned with sustainability of SMEs.

Considering the importance of SMEs in the national economy and GDP and in the job opportunities, an attempt has been made in this article to study the current status of SMEs regarding their resilience and competitiveness. Also, the challenges faced by SMEs in the Southcoast have been studied with reference to general economic conditions and globalisation. In the past few years, trade liberalisation and globalisation processes have significantly increased customer expectations and competition between companies. Global markets have begun offering an abundance of opportunities for SMEs (Gradzol et al. 2005, Karaev et al. 2007). In order to compete in the global market, SMEs have to increase their individual competitiveness (Fassoula 2006) and take advantage of synergy effects created by entering into cooperative relations with other SMEs and related partner institutions. According to several empirical research reports on SMEs, there is a real challenge in collecting data from SMEs and the same is applicable in our empirical study as well. The following section outlines the research methods employed to collect data and analyse them.

3. Research methodology
The research methodology in this study consists of a comprehensive literature review to develop an understanding of the factors that determine a theoretical framework for the
resilience and competitiveness of SMEs, followed by an empirical study of the framework. Based on the literature review, major factors were identified that include organisational structure, people management, use of technology, nimbleness, generation of capital, gathering of information, networking ability, supply chain integration and flexibility, market knowledge, quality of production, marketing and distribution techniques used and ability to reassess its position in the supply chain. These key factors were categorised as internal, external and enabling factors in the theoretical framework using the literature review.

To identify and understand the area of opportunity related to the key factors or core characteristics of SMEs identified in the framework a survey was carried out. Based on the theoretical framework, a questionnaire\(^3\) was developed. The questionnaire has been categorised into five groups namely, organisational and managerial characteristics, technology, capital generation, globalisation and supply chain integration. Most items in the questionnaire used a Likert-scale format with five response options such as (1) never, (2) to a little extent, (3) to some extent, (4) to a great extent and (5) always. The questions were designed to obtain information about the identified SME characteristics such that weak areas can be isolated and some alternative techniques and concepts that are useful to enhance resilience and competitiveness can be suggested. As indicated earlier, the main objective of this survey is to explore the area of opportunity for SMEs with respect to the enabling factors that are known to be linked to resilience and competitiveness.

The questionnaires were mailed to SMEs in the Southcoast of Massachusetts to obtain their feedback. Among the questionnaires that were mailed to 400 companies, responses from 40 companies were retained after reviewing them for completeness and eligibility for a net response rate of 10%. The results obtained are discussed in Section 5.

4. A theoretical framework for the resilience and competitiveness of SMEs

In this section, a conceptual framework for resilience and competitiveness of SMEs is presented. The key factors that influence resilience and competitiveness of SMEs are grouped as internal, external and enabling factors as shown in Figure 1.

Organisational behaviour that is shaped by the long-term strategies, values and policies along with managerial characteristics determine the quality of goods or services produced by SMEs. These internal factors lay a strong foundation and place them in a position of strength to productively adopt the enabling factors and successfully make use of opportunities and face challenges emerging due to continually changing aspects of globalisation. Strength in the internal factors contributes significantly to the resilience and competitiveness of SMEs. Any weakness in the internal factors would result in ineffective and non-optimal utilisation of the enabling factors leading to frustration and waste.

Traditionally, the strength of an SME includes nimbleness, their responsiveness in making decisions and quality of product and innovation. But they are weak in areas like marketing, generating capital, technology and finance. Also for production, an SME needs to find a suitable organisational structure and get up-to-date with modern operations strategies, techniques and tools. Some of the key determinants of the SMEs resilience and competitiveness provided by researchers are discussed next.
Researchers have proposed several methods for classification of organisation behaviour of SMEs. According to Deeks (1973) the organisational and policy making structure of an SME can be of three types:

- **Monocratic**, where most of the decisions are made by the owner or the major shareholder of the enterprise and their presence is absolutely needed in the day to day functioning of the company.
- **Oligarchic**, where company policy is decided by two or three company managers or owners with each of them handling one specialised job or the other.
- **Patrician**, where the owner or the major stock holder and their family does not get involved with the day to day running of the company and its policy making.

Filley and Aldag (1978) proposed three patterns of an organisation namely, craft, promotion and administrative firms. Gils et al. (2004) studied the link between a family firm’s competitive strategy and the CEOs uncertainty perception that result in cost leadership strategy and differentiation behaviour. Lilly (2009) explains how design could be used to influence user behaviour towards more sustainable practices. One of the organisational characteristics, which give SMEs considerable advantage in the market, is its simple and innovative organisational structure as compared to large companies. This
advantage is due to the size of a company that makes it very agile. The decision making process followed in these companies are usually of the centralised kind where almost every decision goes through the owner manager or their trusted assistants. The relationship and interactions among the various departments in a SME also tends to be a lot more personal than in large corporations.

### 4.2 Managerial characteristics

The managerial characteristics of SMEs can also be quite diverse but there are some basic characteristics that determine their resilience and competitiveness. For example, managers in SMEs use strategies of multi-tasking by carrying out critical company roles single-handedly (Winch and Bianchi 2006). Entrialgo (2002) explored the impact of co-alignment between managerial characteristics and firm strategy on organisational success and obtained empirical results that support such linkage. Hausman (2005) suggests that innovativeness in SMEs is positively related to employing managers with relevant training and education. Von (2005) found that managers of SMEs have inadequate skills to reflect upon their companies strategically. Jones and Macpherson (2006) reported learning in SMEs is a result of external pressure that encourages adoption of more professional managerial practices.

### 4.3 Use of technology

Different types of technologies, which SMEs can use, include ERP, EDI, and Internet, for networking, data collection and consumer feedback. Stockdale and Standing (2004) argue that to effectively plan their participation and realise the benefits of e-marketplace environment, SMEs must recognise both benefits and barriers that firms face when entering the e-marketplace environment. Chong and Pervan (2007) indicate a lack of perceived relative advantage over current systems, lack of visible improvement or benefits, competitive pressure and insufficient sources of information for further deployment to be some of the barriers to technology deployment.

The Internet usage is another key factor. There are many models (B2B, B2C and B2A) suitable for small businesses. The adoption of technology is generally due to external pressure rather than perceived benefits by the managers. Hoyer et al. (2006) propose a novel e-Business architecture taking into account the specific needs of SMEs and highlight advantages such as reduced operating costs and improved gains, increased customer satisfaction and retention, faster and more efficient internal processes, improved supply chain integration and technological advancements.

### 4.4 Generation of capital

An important factor that determines the resilience and competitiveness of a small enterprise is generating enough capital for the business (Beck and Demirguc-Kunt 2006). In most of the SMEs, starting a company requires the owner to invest personal assets and it is very difficult to generate more funds when more investment needs arise. This is a key area, which determines the success of a SME. Government agencies can help offering guarantees for loans taken by the SMEs. Banks can then reduce and relax the norms by
which they lend money to small firms and thus help SMEs in generating the capital it needs for funding its various operations.

4.5 Globalisation

Fariselli et al. (1999) suggest that technology growth is one of the main factors that have fuelled globalisation. For SMEs that are strongly affected by globalisation, managers regard greater emphasis on acquiring technology as one of the important tactics for dealing with the forces of globalisation (Knight 2000). Lu and Beamish (2001) found that when SMEs begin foreign direct investment (FDI) activities, initially the profit declines, but greater levels of FDI are associated with higher SME performance. Singh et al. (2005) in an empirical study reveal that globalisation has led many SMEs to adopt multi-faceted strategy reflecting flexible nature of strategy development to sustain competitiveness. However, it has been observed that globalisation has resulted in both advantages and disadvantages for SMEs. On one hand, it offered more opportunities and a huge market for SMEs but on the other it brought fierce competition even from large firms (Etemad 2005). Sometimes SMEs get pulled overseas by being required to follow their clients (Prater and Ghosh 2005). Given the parameters under which they operate, the main disadvantage an SME faces is rapidly readjusting to cope with large orders. Executing large orders involves investment from the company, and since SMEs are not able to do so fast enough, they lose their edge to other companies.

4.6 Supply chain integration and flexibility

Supply chain can be defined as all the processes involved in the making of a product, right from the product design to the marketing and delivering of the final product. IT is an important aspect of supply chain management. Welker et al. (2008) investigate the influence of business conditions on internal and external information sharing and the role of IT in order processing, using a multi-case study among SMEs. Harland et al. (2007) highlight that the adoption of e-Business in supply chain has been slower than expected, particularly in SMEs. Barton and Thomas (2009) argue that SMEs do not currently utilise intelligent systems to manage supply chain relationships, and the majority of SMEs do not have sufficient capability, or experience, to embark on an AIS implementation with any confidence in success.

4.7 Location and marketing

Where to locate their business is one of the most important decisions the owner of a SME has to make. Since usually an SME is mainly dependent on the local economy and the business runs around them, the location of the SME is important from the marketing point of view too. Hollenstien (2005) found that probability and the degree of internationalisation is lower in the case of SMEs compared to larger firms and also pointed out that SMEs more often choose a contractual than equity based form of internationalisation. Keh et al. (2007) investigate the effects of entrepreneurial orientation and marketing information on the performance of SMEs. Gilmore et al. (2006) examines the networking activities of SME owner/managers within a food distribution channel, and considers them in relation to the marketing decisions made in an increasingly competitive marketplace.
Spillan and Parnell (2006) explore the link between marketing resources associated with customer orientation and performance. Morabito et al. (2005) report that ERP vendors’ marketing competencies are not extensively developed and leveraged. Bell (2000) explains the process of developing marketing patent information services to SMEs in Birmingham (UK). Chittoor et al. (2008) examine the strategic responses to institutional changes.

4.8 Quality
Ghobadian and Gallear (1996) examine the differences between the characteristics of SMEs that have been slow to adopt total quality management (TQM). Also, they analyse the differences in characteristics of SMEs and large organisations, the relationship between the size of the organisations and inherent characteristics of TQM. Kearney and Abdul-Nour (2004) presented a step-by-step approach to help SMEs reach better quality level in terms of quality management, quality assurance, quality control and continuous improvement processes, despite their area of operation and level of expertise in quality matter. These would contribute to SMEs resilience and competitiveness.

5. Empirical results and analysis
The model or framework developed for resilience and competitiveness of SMEs in the previous section has been validated with the help of empirical data collected from the Southcoast SMEs. The objective of this study is to present recommendations for enhancing the resilience and competitiveness of SMEs in the global market and operations. The results obtained from the survey and their analysis is discussed in the context of the framework.

5.1 Profile of respondent organisations
We start with looking at the profile of the organisations for which data were collected. The profile of respondent organisations is provided in Table 1. It can be seen from Table 1 that about 90% of the SMEs in the Southcoast of Massachusetts have operations within the state or within the USA. However, a small percentage of SMEs have operations outside the country, indicating the impact of globalisation. Almost half of the respondents have manufacturing units while remaining have a diverse industry type. More than half of the responding organisations have less than 50 employees. About three-fourths of the SMEs surveyed are ‘one-firm’ organisations.

5.2 Organisational characteristics
5.2.1 Type of organisations and policy making structures
The survey indicated that 57% of the SMEs have a monocratic type of policy making structure with the owner or the major shareholder being the main decision-maker whose presence in day-to-day functioning is a must for the smooth running of the company. Also, 28% of SMEs have an oligarchic type of structure where two people decide company policy or three company managers or owners with each of them handling one specialised job. Patrician type, where the owner or the major stock holder and his family does not get involved with the day to day running of the company and its policy making, accounts for
10% of the SMEs and the rest (5%) of the companies belong to the other category. It is critical that the owner or major shareholders of the company are aware of the impact of challenges brought up by the globalisation of the market and the advances in ITs.

5.2.2 Foundation of the company

It was found that about 65% of the respondent organisations were family owned, 28% of the firms are owned by entrepreneurs and 7% are by others. Family-owned businesses are mainly guided by the powerful people in the family. Resilience and competitiveness of family-owned SMEs need the support of such people in order to provide a strategic direction and generate adequate financial support for becoming more resilient and competitive. Since family-owned SMEs play a significant role in the national economy, the owners of the company should be engaged by the local chamber of commerce, university/vocational schools and government institutions to enhance their awareness of the emerging enterprise environment and strategies, including the implications of globalisation.

5.2.3 Formation of the company

The survey found that in more than 50% of the companies, the owner had special ability, training or experience in the field of operation of the firm. Another 10% of the SMEs were
formed due to sudden demand for a particular product and service. Entrepreneurship support provided by the general government policies and new market opportunities in a global market play a major role in the formation of a company. Business and professional conflicts need to be resolved to generate more qualified entrepreneurs.

5.2.4 Importance of missions/goals and objectives

The majority of respondent companies (93%) indicated goal, mission and objectives to be the most important factor in achieving customer satisfaction. However emerging market trends and competition were also considered important contributors for developing sound goals, missions and objectives. But only a few of the respondents think that advances in manufacturing technology and marketing are the main goal or mission of their companies (Figure 2a). This is due to the fact that the majority of the respondent companies are in service business. Service business required limited technology including IT/IS and a few other process related technologies. While customer satisfaction is critical for the success of SMEs, they also need to advance in terms of IT/IS to achieve multiple competitive performance objectives, such as cost, quality, flexibility, dependability and responsiveness. Technological innovation (such as radio-frequency identification (RFID) and Nanotechnology) and application of IT/IS are significant to compete in a global market. Customer expectations and requirements are like moving targets and therefore, appropriate strategic alliances based on core competencies and leveraging people and IT are essential for the resilience of SMEs.

5.2.5 Classification of organisation

The classification of respondent organisations with different departments and sections are shown in Figure 2(b). It can be seen that 88% of the respondents have a finance department, 68% have an accounting department, 60% have a production department, 33% have a marketing department, 23% have a quality management department and 13% have a human resource department. Note that a majority of the companies are in service business, which primarily focuses on the domestic market and customers. However, as indicated earlier the profile of the domestic market is changing because of globalisation and market. This in turn suggests that SMEs should be proactive in terms of evaluating themselves in terms of offering competitive products/services through strategic alliances, core competencies, networking, Internet-enabled supply chain, virtual enterprise, etc.

5.2.6 Interaction between departments in the company

The interaction between departments is mainly of a very personal nature (15%) and personal (45%) type. Some SMEs agree that they have somewhat formal interaction (22%) and interactions are recorded and filed (18%). Though the communications are of a very personal nature, this could be more effective when it is supported by IT/IS. Moreover, if SMEs decide to go for global operations through outsourcing, then IT/IS become inevitable. Even online chatting and traditional phone conservation could be used for establishing communication in SMEs. In order for SMEs to be resilient, they need to go for diversity of communication using IT/IS to sustain in the global market.
5.2.7 Prime concern to the top management in the firm

All the respondent SMEs indicated customer satisfaction to be the prime concern of the top management followed by financial independence and profits (Figure 2c).
Other concerns include innovation and quality, and technical efficiency of the firm. Since most SMEs are in close and direct contact with customers, their satisfaction has been considered as a primary objective. However, the priorities on how to satisfy the customers in the global and Internet-enabled market are also important. The resilience of SMEs is dependent upon the top management’s awareness of the globalisation and competitive forces. Therefore, suitable communication channels need to be established so that top management can be informed of the importance of flexibility and responsiveness and in turn strategic alliances and core competencies.

5.3 Managerial characteristics

5.3.1 Profile of respondents

The education level of the managers is mostly (52.5%) at bachelor’s degree level with 35% at post-secondary certificates/diplomas level and another 12.5% with master’s degree and above. This could be one of the reasons why the respondents are not fully aware of the costs and benefits of e-commerce technologies, and global market opportunities. In order for SMEs to succeed in the global market, the senior managers need to be educated and trained about the emerging enterprise environments including supply chain, virtual enterprise, network of firms, e-commerce, ERP and RFID in enhancing the resilience of SMEs in a competitive economy. Advanced managerial experience and education should be facilitated through attending workshops and conferences in emerging business management concepts and technologies.

5.3.2 Work experience of managers

Work experience among managers was approximately uniformly distributed (Figure 3a). However, most managers have up to 14 years of work experience and very few (2.5%) with more than 14 years of work experience. The profile of the managers looks like they graduated recently and have the latest experiences that mean advantages to SMEs to deploy new strategies, tactics and technologies to successfully compete in the global market. About 50% of the companies have 10 years of experience and this necessitates additional training/education in advanced business management strategies and tactics and to support the resilience of SMEs.

5.3.3 Managerial hierarchies in the firm

In this study, 72% of the organisations managerial hierarchies are limited to one where the owner decides the policies and has control over everything as shown in 3(b). Three percent of the companies had 15 or above managerial positions with formally structured department hierarchy. Sometimes more hierarchy brings conflicts that could be in the interest of the company having incorporated diverse opinion on the decisions made for the company. In fact, the structure of SMEs facilitates the structure of virtual enterprises having a few hierarchies in management and therefore, they offer scope for strategic alliances based on core competencies and in turn the resilience of SMEs.
5.4 Use of technology

5.4.1 Importance of the Internet

A majority of the organisations (42.5%) that responded to the survey consider that the Internet is important; however, a few still feel it is not considered important in their organisations (Figure 3c). This may be due to limited sources available and lack of
knowledge about the benefits both tangible and intangible by the adoption of IT/IS to integrated value chain activities. Agility requires leveraging IT to integrate the activities of a network of firms. Technological innovation is essential for flexibility and responsiveness and therefore, the resilience and competitiveness of SMEs.

5.4.2 Products purchased through the Internet

Products that are purchased through the Internet vary from maintenance items, raw material and office products (MRO) to electrical equipment. Mostly maintenance items are purchased through the Internet (34%) followed by raw material purchases (27%), and 25% of the respondent companies buy office products and 14% purchase electrical equipments. This indicates SMEs are using the IT/IS for mostly buying materials, but not for integrating the whole supply chain activities. However, this needs the support of other partnering firms along with the supply chain to adopt similar technologies so that integration is possible for an integrated business process. SMEs should see their operations from a supply chain perspective and this seems to be a major weakness. E-procurement results in enhanced quality of purchased products and reduced prices for customers (B2B) which means support for organisational competitiveness in the global market.

5.4.3 Perceived benefits of technology

Figure 3(d) indicates that a majority of the respondents believe that they use technology to improve customer–supplier relationship and for reduction in the processing time. About 30% of the respondents also believe that they get better information about the market with the use of technology, and reduction in operational tasks are perceived to be one of the top benefits of using technology in the organisations. However, some of the SMEs also attribute better utilisation of staff, increased market share, improved manufacturing efficiency and increased customer satisfaction to the benefits of technology. These would support knowledge management and business process improvement, and hence SMEs’ resilience and competitiveness.

5.4.4 Extent of the use of technology

There is a wide array of technologies that are used by the organisations (Figure 3e). The most popular technology used by the respondents is E-mail (77.5%), Internet (72.5%) and e-commerce (40%). The respondents also use technologies like fax, intranet, etc., which shows that very few SMEs are exposed to new technologies like ERP, EDI and extranet. This is due to lack of appreciation about global market opportunities, threats from companies in other emerging economies. However, the future of SMEs’ resilience depends upon their integration of activities with customer requirements and large scale supply chain operations.

5.4.5 Barriers of technology

Immaturity of technology (30%) is considered as the top barrier in the use of technology followed by the security concerns (22.5%) and insufficient financial support (20%) which is related to the lack of top management support (7.5%) (Figure 3f). A few respondent companies (5%) also fear change to a new system. This is again due to lack of support from government agencies and awareness of the various support services available for the
adoption of technologies including financial support. Also, SMEs do not like to take risks by experimenting with new technologies for which they are not sure about the outcome. The risk could be overcome by providing necessary technical and financial support by local universities, centres of excellence and various government agencies including SME consortium, and therefore ensure support for SMEs in their resilience and competitiveness.

5.5 Generation of capital

5.5.1 Mode of capital generation

Generation of capital is one of the major issues that SMEs face. The survey found that among the SMEs in the Southcoast of Massachusetts, bank loans (45%) and personal funds/savings (42.5%) are the top modes of generating capital for an organisation (Figure 4). Funds from a venture capitalist (22.5%) and state and federal government agencies (20%) also help to generate capital to some extent. But a very small percentage of respondents indicate their mode of capital generation to be financial institutions or similar sources. Resilience of SMEs requires support from sources other than just banks and government loans and support, and also relies on partnering firms including large scale companies and international financial agencies.

5.6 Globalisation

5.6.1 Effect of globalisation

The survey indicated that organisations perceive international market exposure to be a very positive effect of globalisation with no negative impact (Figure 5). Effect of globalisation on licensing of products seem to have very little positive impact, however with no negative impact. Effect of globalisation on outsourcing of work contracts and competition from international firms are also perceived to be substantially positive

Figure 4. Capital generation.
however accompanied with a little negative impact too. Effect of globalisation on sub-contracting of jobs is perceived to have both positive as well as negative impacts equally. Therefore, sustainability of SMEs should focus on expanding their international exposure and strategically outsourcing of work contracts and aligning with other small-to-medium and large-scale supply chains that have global operations with focus on the global market. Sub-contracting of jobs is not much welcomed by SMEs which may be due to control over business processes and in turn products and overall business. As pointed out earlier in this article, flexibility and responsiveness are the keys to succeed in the global market. The SMEs do not have a choice except to embrace these competitive performance objectives as the criteria for their resilience and accordingly make changes to their business processes.

5.6.2 Effects on competition in local markets
Globalisation has also effected the competition in local markets with 80% of the organisations accepting moderate to heavy competition and the remaining 20% believe that there is no change in competition. However, more and more SMEs have to face global competition because of the view that there are no more so called domestic markets as discussed earlier. This places a tremendous pressure on SMEs to learn how to compete in such a market by implementing new operations paradigms such as supply chain and 3PL, and technologies such as EDI, Internet, ERP and WWW. SMEs have entrepreneurial spirit which drives them to be innovative and flexible. However, they need to do things differently as discussed throughout this article in order to be resilient.

5.6.3 Supply chain management
The survey also studied aspects associated with supply chain management. It was found that about 22.5% of the companies surveyed operate part of a supply chain of a larger company. It is very disappointing to see lack of knowledge and awareness of supply chain in SMEs. However, SMEs misunderstand a supply chain to be a business relationship between large companies and small companies that is of course not true. A SME can do the process mapping of suppliers and buyers or customers and see them from an integrated business process perspective which is otherwise called a supply chain. The resilience and competitiveness of SMEs depend upon how well SMEs are prepared to develop an integrated business model by strategic alliances based on core competencies and leveraging people and IT.

Figure 5. Effect of globalisation.
6. Conclusions and future research directions

SMEs are known to contribute significantly to the economic development of the regions or countries where they exist. As a result, characteristics that influence their resilience and competitiveness are an interesting area of research. In this article, an attempt has been made to study the resilience of SMEs through appropriate theory and empirical analysis. The following are the major contributions of the paper towards the resilience of SMEs:

- In this article, we study certain general characteristics that determine the resilience and competitiveness of the SMEs.
- A survey of SMEs in the region covering Southcoast of Massachusetts is carried out to determine and understand factors influencing SME resilience and competitiveness.
- The paper also identifies areas where an SME would need external support to be resilient and competitive in the changing global scenario.
- In what way, the emergence of new strategies and technologies in different areas affect the growth of SMEs and how SMEs can use these to their resilience are discussed.
- The paper also discussed the effects of flawed public policy making and its influence on SMEs.
- In addition, the paper also talked about the positive and negative impact of globalisation and technology on various aspects associated with SMEs.
- Location and marketing together with quality are not viewed as competitive advantage by SMEs based on the responded companies, and this could be due to virtual enterprise environments. However, this could vary from the type of business the SMEs are in.
- Human resource development and knowledge management in SMEs need due attention and support in order to support their resilience.
- In addition, SMEs need help in having access to the market through different platforms and financial resources. SMEs should be provided resources on publicly available R&D facilities with the objective of supporting their resilience.
- SMEs need support to create new business and in exporting their products with suitable logistics resources.

This empirical research is based on a limited sample size, but based on a very comprehensive conceptual model. Therefore, the model can be experimented with a large sample size and responses with broad geographical and industrial representation to study the resilience of SMEs. The subject of greening and sustainability issues can be explored further and integrated as a part of the extension of the model. We made an attempt to develop a model for resilience of SMEs and validate it with help of data collected from a limited sample size of companies on the Southcoast of SMEs. Based on the theoretical framework and empirical study for resilience of SMEs, an attempt has been made to list some important hypotheses (see below) which can be explored in future through an empirical study using a large sample size:

- The organisational structure (monocratic, oligarchic and patrician) influences the resilience of SMEs.
- The managerial characteristics can influence the company’s innovation, global thinking and technological advances and in turn the resilience of SMEs.
Resilience of SMEs is positively influenced by IT and systems such as the EDI, Internet, e-commerce, WWW, ERP and RFID.

Since SMEs have limited opportunities for fund generation and if this can be expanded, then the ability to generate capital will significantly influence the resilience of SMEs.

Globalisation strategies for SMEs positively influence the resilience of SMEs.

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Notes
3. A copy of the questionnaire can be obtained from authors upon request.

References


