How to Promote Competitive Advantages for SMEs: Issues, Ideas and Innovation

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Abstract

Information and Communication Technologies (ICTs) have become an integral part of today’s economy. Small and Medium-sized Enterprises (SMEs) have been increasingly enjoying the benefits of e-business. ICT introduces both opportunities and threats to the SME. The general consensus of opinion is that SMEs that have traditionally been restrained from international trade because of resource limitations are now able to present themselves and their products globally.

Despite these benefits, the uptake of e-business by SMEs is still low. There are still many issues that should be addressed before SMEs can be convinced to embrace ICT. For SMEs to remain competitive in a rapidly changing world, they need to take up the adoption of new technologies. This paper attempts to discuss the issues, ideas and innovations that are important to help SMEs to remain competitive.

Introduction

The European Commission has recently defined an SME as a company of fewer than 250 employees and a turnover below €50 million (EC 2003). There are many millions of SMEs all over the world. In Europe it is estimated that the 19 million SMEs make up over 95% of the enterprises. SMEs generate a huge share of the GDP and are a key resource of new jobs as well as current employment. They are also a breeding ground for entrepreneurship and new business ideas. The European Commission (EU Report 1998) has recognised the importance of SMEs in society. SMEs are acknowledged as the largest group of businesses in Europe. This is because two-thirds of all European employment is provided by companies with less than 250 employees. Despite being smaller in size, it is believed by researchers that SMEs tend to create the innovation that drives most of the economy (USHER 2006). The EU is not the only organisation that recognises the importance of SMEs in contributing to the economy. Nations worldwide are increasingly depending on SMEs for their economies.

A new economy has emerged around the world in the last two decades of the twentieth century. This phenomenon is characterised by two interconnected events: the globalisation of markets, firms and activities, and the diffusion of information and communication technologies (ICTs) and the Internet. This technological infrastructure allows for unprecedented speed and complexity in the management of the economy (Piscitello & Sgobbi 2003). The internet-based business applications have reduced the costs of information-intensive activities, such as communications management and sales and marketing. These opportunities especially favour small and medium enterprises (SMEs). The advantages provided by ICTs’ compression of space-time distances and reduced role of economies of scale in information intensive processes downsize some competitive barriers that historically affected smaller companies as compared to the larger ones.

Currently SMEs are experiencing a complex mix of opportunities and threats
posed by both the diffusion of the Information Society and the globalisation of markets. The emergence of online trading has created new opportunities for substitute products and services (USHER 2006). Internet trading allows product and service differentiation, cost reduction and development of substitute services. It also means that dramatic changes in product and service offerings are possible with minimal loss of time or investment in marketing materials and activities. ICTs have revolutionised and transformed the way modern businesses are conducted through the quick and cheap exchange of information. We are currently in a knowledge economy age where ICT enables us to closely connect to a virtual network regardless of geographical location, gender and race. ICTs can benefit SMEs in three main ways (APDIP 2005):

1. Increase productivity in the production processes;
2. Increase efficiency of internal business operation and
3. Connect SMEs more easily and cheaply to external contacts whether locally or globally.

The use of ICT also makes management of supply chains more efficient. Real-time communication and B2B transactions can reduce information asymmetries between buyers and sellers, and help bind closer relationships among trading partners. The Internet provides an effective tool for communication between B2C transactions by providing consumers with better services and allowing their needs to be monitored more accurately, as well as facilitating new product development.

The dynamics of SME business markets are determined by four key factors (USHER 2006). These include suppliers, buyers, products and services. E-business offers several benefits to the above four factors. For the suppliers, entrants to online trading by SMEs helps them reach new markets, reduce the supply chain, improve processes and corporate/brand image, reduce costs and differentiate their products and services against competitors. On the buyers side for SMEs, cost reductions are common in Internet trading and are generally paid for through savings in infrastructure such as shortening of the delivery chain, reduction of expensive shop/outlet, as well as an increase in sales throughput. SMEs benefit forms the lowering of entry barriers to markets as a consequence of e-business. E-business is often cited as the SMEs’ gateway to global business and markets.

Despite the obvious benefits ICTs can bring to SMEs, many countries, especially developing countries have been slow to adopt them. In order for SMEs to have a competitiveness advantage, SMEs must be encouraged to embrace e-business. This paper begins with a brief review of the issues facing SMEs in e-business. It is followed by discussion of the different ideas that have been proposed by the EU to help SMEs to remain competitive. The author then discusses how SMEs can be helped to be innovative. The paper concludes with suggestions for SMEs to stimulate competitiveness advantages.

**Issues facing SMEs**

Organisations today are faced with massive globalisation, demanding customers with rapidly changing desires, shrinking response time, shrinking product lifecycles and demanding employees. This requires organisations to become fast, flexible, participative and focused on customers, competition, teams, time and process (Sussan & Johnson 2003). To respond to these forces, it is important to adopt a market oriented approach. The market oriented approach, proposed by Kohli & Jaworski (1993) can be described in three parts: customer orientation, integrated effort, and profit. It proposes that the business focuses on consumer’s needs and desires. Kohli and Jaworski (1993) define market orientation as the organisation-wide generation of market intelligence pertaining to current and future customer needs, dissemination of the intelligence across departments, and organisation-wide responsiveness to it.

**Globalisation for SMEs**

To remain competitive, SMEs must globalise. SMEs’ globalisation processes include a range of cross-border activities, such as trade, international investment, and participation in strategic alliances, partnerships and networking arrangements affecting a variety of business functions ranging from research and product development to distribution (OCED 2004). SMEs with high-growth potential
require early access to international markets to ensure their development and growth. Although SMEs have made contributions to local and national economies, overall they remain under-represented in the international economy and change in this respect is slow to happen. According to the OCED Report (2004), while SMEs typically contribute around 50% of GDP, and 60% of employment in national or local economies, most evidence suggests they contribute only about 30% of exports, and even less of international investment.

The 2004 OCED Report suggested that increased levels of globalisation can impact on SMEs in two main ways. On the one hand they open up opportunities. For example, SMEs that can grow quickly, that are niche exporters, or are able to tie in with global supply chains are all able to take advantage of opportunities created by globalisation. On the other hand, globalisation poses an increased threat for SMEs that are unable or unwilling to compete. Given that labour is still less “globalised” than other factors, this poses political and social challenges for governments.

Despite the fact the SMEs make up more than 95% of market participants, and contribute around 50% of direct value added or production, they are still relatively under represented in the global economy. SMEs only contribute between one quarter and one third of manufactured exports and account for a very small share, usually less than 10%, of foreign direct investment (FDI) (Hall 2002; Sakai 2002).

The main reason attributed to the smaller SMEs being globally inactive is that international activities expose SMEs to a more complex and risky business environment, for which, compared to larger firms, SMEs are relatively unprepared and less well-resourced.

OCED (2004) listed the following points as the barriers to SMEs taking a global role in competitiveness:

- Competition policy, legislative and regulatory frameworks, telecommunications infrastructure, research and education policy all contribute to SME preparedness or lack of preparedness for globalisation.
- Barriers can concern inter alia, intellectual property rights; political risks; corruption and rule of law issues. They can relate to the entire range of business operations, having implications for business and organisation models, managerial and technological capability; and innovative capacity.

**Integration**

Technologies help organisations to better manage their supply chains. Supply chain management applications built on technology platforms have enhanced the ability of organisations to integrate their processes through collaborative information sharing and planning (Charles et al 2001). The use of integration technologies such as EAI and Web Service help to support the integration of supply chains. Companies can anticipate customers’ desires and meet their demands with supply chain integration. A company’s competitive advantage depends in large measure on the adaptability and agility of its supply chain (Chen et al 2004).

Integration is an important issue for SMEs. Enterprises are seeking ways to integrate their applications at both intra and inter-organisational level. (Chen et al 2004). SMEs are not only seeking ways to integrate the disparate systems within the organisation, they also moved to extend the whole domain beyond the boundaries of the organisation to include their suppliers, trading partners and customers (Charlesworth et al 2002). Integrating SMEs’ systems with their customers and trading partners will give SMEs greater competitive advantages to compete with the larger companies or their competitors (Chen et al 2004). The emergence of supply chain integration is therefore undoubtedly a critical component to strengthen competitive advantage of both suppliers and their customers.

To be competitive, a firm must have the ability to acquire the goods and services it needs just when and where it needs them, at a favourable price, and with acceptable payment and delivery terms. The firm also needs to directly manage the flow of goods through its distribution networks in a cost-effective manner. This can be achieved through integrating their supply chains. There are several benefits of implementing supply chain integration (Chen et al 2004):
• It can lower the costs of labour, increase flexibility, achieve faster response times and cut down the occurrence of errors on paper based operations, reduce unauthorised buying outside preferred supplier agreements, and reduce stocking, hence achieving competitive advantage
• Automating processes also can shorten the cycle time from ordering to distribution, thus resulting in enhanced production ability and increased efficiency.
• Suppliers can also benefit from supply chain integration as this will shorten the business transaction cycle, lower capital cost in stocking, lower labour costs, increase efficiency, enhance accuracy and give a faster handling time and speed of delivery.
• Adopting supply chain integration can help SMEs to standardise production, which can result in improved quality control, improved efficiency and shortened production time.

E-business
There is evidence from research that the use of advanced Information and Communications (e-business) Technologies (ICT) by small firms makes a strong contribution to their productivity and profitability. 80%-90% of the benefits are attributed to e-business derived from business to business transactions as well as from savings resulting from making internal business processes more productive. According to USHER (2006), e-business is not only the specific online trading processes commonly described as online transactions. It is also a host of other business trading activities that benefit from the increasingly networked economy. This networked economy includes distributed working practices (teleworking) and distributed teams, supply chains, virtual business and remote collaboration. It also allows remote marketing and the building of relationships with customers and trading partners at a distance.

There are several constraints found by SMEs for adopting ICTs. These include:
  • High cost of purchasing hardware and software, as well as IT maintenance.
  • Poor communication infrastructure.
  • Limited ICT literacy.
  • Undeveloped legal policy for electronic payment.
  • Too much legislation.
  • Inexperiance in integrating ICTs into the business process.

The use of new technology to support the integration of the supply chains is much harder for SMEs. This is due to:
  • Lack of financial resources and technology ability (Burns 2001).
  • The maturity of integration technologies (e.g. EAI and Web Service)
  • Lack of cases in integration technologies adoption in SMEs have made the problem even worse for SMEs

Barriers to E-business
Studies have shown that SMEs have embraced e-commerce to strengthen their competitive position. SMEs have increasingly enjoyed the benefits of e-commerce, which are that it is a low-cost and effective marketing tool and it also has an ability to reach out to a global audience (Hornby et al 2002). SMEs are of crucial importance to many countries, both developed and developing. Traditionally, SMEs have faced a number of barriers to the adoption of e-commerce. Chau and Pederson (2000) list the following barriers:
  • General lack of resources.
  • Lack of cost-effective e-commerce enabled software.
  • Lack of technical skills and training.
  • Complications in implementing change.
  • On-going support costs.
  • Computer apprehension.
  • Inter-organisation motivation.
Giving priority to e-commerce initiatives.

According to Clegg and others (2005), effective development of e-business requires understanding of the interplay between people, processes, organisation, business models and technology. Kalakota and Robinson (2001) state that the creation and manipulation of an e-business project is inextricably linked to the management of change. Few SMEs have taken steps to manage e-business change and involve users in the design and adoption of e-business (Lin et al 2005). People resistant to new technologies believe that they do not have the skills to use and gain benefits from them and because they lack understanding as to how it changes how business is done and processes are executed (Wargin & Dobiey 2001). It is generally acknowledged that the success of eEurope is critically dependent on whether SMEs are fully engaged in e-business.

Some barriers to e-business, however, are beyond the control of SMEs. For example, the telecommunication infrastructure, which is a fundamental enabler to SME e-business adoption. Besides infrastructure there are other reasons why SMEs are not ‘e-volving’. Firstly, they are too preoccupied with survival, with focus on short-term issues such as profit, regulation, tax and competition. Secondly, SMEs have limited recognition of opportunities available through e-business. Finally there is very little strategic view of their businesses. To help SMEs enter the digital economy, the above barriers need to be removed. This clearly requires a consistent policy that provides a conducive environment for SMEs to take up e-business.

Ideas and suggestions

Small- and medium-scale enterprises (SMEs) can play a key role in economic growth and equitable development in developing countries. The following are some of the ideas and suggestions can be used to help SMEs to promote competitiveness.

Networking

Individual SMEs experience difficulties in achieving economies of scale in the purchase of inputs and are often unable to take advantage of market opportunities that require large production quantities, homogenous standards and regular supply. (UNIDO 2005). It is generally acknowledged that isolation, rather than size, is the key obstacle, preventing SMEs boosting their competitiveness. Isolation is also a constraint on internalisation of functions such as training, market intelligence, logistics and technology innovation. Because of these, small-scale entrepreneurs in developing countries are often unable to innovate products and processes. Networking offers an important route for individual SMEs to address their problems as well as to improve their competitive position. Clusters (groups of firms located in close proximity have proved to be capable of rapid economic growth, sustainable leadership in export markets, significant employment generation and/or preservation of high-value-added jobs, sustained technological progress. There is much evidence that in both developed and developing countries that SME cluster development provides for reconciling the objective of economic development, environmental sustainability and social equity. In the many dynamic clusters to be found around the world, these features are the outcome of the co-operative linkages both between local firms and among local firms and business partners (such as suppliers of plant & machinery, producers of raw materials, testing laboratories, financial institutions, industrial associations; technical and management consultancy organisations, training institutions and local government agencies).

Internationalised infrastructure

Factors such as rapid changes in ICT and access to the worldwide web would appear to make it easier for SMEs to move across borders. Other factors are at play, however, which may be impeding SMEs’ access to the global economy. One major factor said to continue to impede SMEs contribution to the global economy is the complexity and differences in the regulatory systems and business environment between countries.
A more internationalised infrastructure geared to the smooth growth of firms across borders will help the growth of international SMEs. This includes the infrastructure for financial markets, advisory services, information access, telecommunications, intellectual property rights markets and regulation, dispute resolution processes, etc. all of which need to be internationalised. To achieve these requires active collaboration between governments, international agencies and the private sector to address these issues with the view to reaping the significant potential benefits that should accrue from the creation of a simpler, more business-friendly, and more integrated economy at international levels (OCED 2004).

The OCED Report (2004) recommends the following policies:

- Seek, through the WTO Round and other channels, to ease trade barriers. Progress in this regard will facilitate efforts by SMEs to access international markets.
- Promote the role that foreign direct investment can play as a vehicle for SMEs to access international markets. In particular, the inclusion of local SMEs in the supply chains of multinational enterprises, and their resultant (indirect) involvement in exporting activity can lead to significant diffusion of technology and more efficient business models, thereby raising the international competitiveness of SMEs.
- Encourage the smooth, cross-border growth of SMEs by reducing the need for internationally active SMEs to comply with multiple sets of rules or requirements. Important areas in this regard include standards, intellectual property rights, financial market regulations and other regulatory domains.
- Facilitate access to the information SMEs need to operate internationally. Particularly important is information relating to tax, regulatory frameworks and requirements, advisory and support services for SMEs and dispute resolution procedures.
- Enhance incentives for new public-private partnership initiatives that would help SMEs reach global markets for innovative products and access foreign sources of advanced technologies and knowledge. This involves broadening the scope for foreign participation in national programmes and linking national networks of SMEs with similar needs and complementary capabilities.

Governments must play a role in lowering the barriers faced by entrepreneurs who wish to globalise their activities. Governments need to ensure that regulatory, administrative and policy environments do not inhibit access to global markets. Efforts by governments seeking to ease such barriers through the WTO Round and the appropriate channels would benefit SME trade and FDI involvement (OCED 2004).

The author concurs with OCED that governments can correct such imbalances within global innovation networks by: (i) ensuring that their promotional programmes help national actors to access international networks, and (ii) developing the international dimension of public-private partnerships. They must also co-operate to avoid mismatches between the strong regional dimension of most self-organised SME networks, the national scope of many programmes to promote them, and the increasingly global nature of the knowledge infrastructure and of markets for innovative products and services. This involves interconnecting national and local hubs of technology transfer, linking national networks of SMEs with similar needs and complementary capabilities, building global networks of intermediary organisations, and coordinating national support programmes.

**Virtual enterprises**

Manufacturing organisations must be able to respond quickly to customer requests, cooperate closely with their global partners and participate actively in order to remain competitive. This is particularly true for SMEs. The virtual enterprise concept is increasingly gaining importance in manufacturing as an instrument to help organisations facing the challenges of fast-evolving market conditions (Sislak & Valcuha 2005). A virtual enterprise is a temporary network of autonomous firms dynamically connecting themselves, driven by business opportunity by the market (D’Atri 2003). Each member makes available some sub-processes and part propriety of its knowledge. When the business is over, members disconnect and look for new business.
The virtual enterprise consisting of a set of SMEs is usually informally organised. It adopts a non-hierarchical, lean and modular configuration. The network acts towards the external environments as a single organisation and is shaped to exploit the emerging opportunity as best as possible (Barbini & D’Atri 2005). It is flexible, dynamic, proactive and not constrained by predefined structure (Goldman et al 1995). There is evidence from the German IT sector that SMEs which adopt the virtual organising approach to managing their online operations tend to be successful (Tetteh & Burn 2001). Virtual enterprise is consistent with the policy of European integration pushing for a culture of cooperation in order to join forces by SMEs to remain competitive (Sislak & Valcuha 2005).

**Government Measures**

Because SMEs have the potential to drive economic growth, the government of the country should move beyond politics that encourage basic connectivity and to foster business environments that facilitate e-business and the use of more complex applications of information technology. It is the responsibility of government to target programmes to overcome failures to the extent that they are needed in particular areas (e.g. framework for standard, skill information, R&D initiatives, information and demonstrations on best practices and benefits from adoption and use of ICT). These include:

- Encourage roll out of affordable quality bandwidth network to underpin the competitiveness and growth of SMEs (OECD 2004).
- E-government services to enterprises should be used as tool to improve efficiency of government interactions and operations with SMEs.
- Strengthen the infrastructure of trust, security (including spam and virus), privacy and consumer participation.
- Expand, in conjunction with business and consumer groups; strengthen cross border cooperation between stakeholder and the development of rules with cross border applications (OECD 2004).
- Strengthen government and private sector roles to improve basic ICT skills and developing frameworks to encourage higher level ICT and e business skill formation.
- Strengthen SMEs capacity to improve their competitiveness in domestic, regional and global markets.
- Develop a national ICT strategy and establish a National council on e- economy to advance ICT in Taiwan.
- Government should create a conducive investment climate that encourages domestic and foreign investment in e business for SMEs.
- Government should remove constraints and create an enabling environment.

Governments are responsible for establishing an environment conducive to the development of SME competitiveness. They can generate policy that impacts the trading environment. Policies that can encourage the growth of SMEs include:

- The creation of science parks and incubators.
- Providing business consulting services.
- Providing business skills education.
- Simplifying registration and other legal processes.
- Implementing favourable tax and trade policies,
- Helping SMEs link to larger companies.
- Providing SMEs’ finance.

**SME development agencies**

One of the main problems facing SMEs today is the lack of knowledge, expertise and financial resources to carry out in-depth research in order to appropriately assess the current and potential market situation with regards to products and consultancy services in international markets. SMEs also need to
cooperate to be successful in transferring technology. They need to set up international joint ventures. This requires the support of agencies. SME Development Agencies (SMEDAs), trade promotion organisations (TPOs), trade and industry associations, chambers of commerce and other agencies can offer other assistance to exporting SMEs (TSS 1995).

Integration and automation of the supply chains

A supply chain is a network of facilities and distribution options that performs the functions of procurement of materials, transformation of those materials into intermediate and finished products and the distribution of finished products to customers (Kulkarni 2001). The aim of the supply chain is to link different functions and entities within and outside the company from raw materials to manufacturing, distribution, transportation, warehousing, and product sales, joining together a large number of partners and customers like manufacturers and parts suppliers, logistics suppliers, wholesalers and retailers (Zaremba et al 2004). SMEs should achieve greater coordination and collaboration among supply chain partners known as supply chain integration to remain competitive.

Zaremba and others (2004) list the advantages related to integration and automation of the supply chains of SMEs over the Internet as:

- Cost saving based on keeping minimum inventory level. Suppliers can access information about inventory that allows them to react faster.
- Increased revenues. Reducing levels of inventories enables cost saving leading to increasing revenues.
- Cost savings based on integration. Improved vendor management.
- Reduced cycle time.

The actual cost of supply chain management, if properly done, should be more than recouped from greater supply chain efficiencies, increased sales and reduced cycle time. Although ICT plays a crucial role in supply chain management, having the information technology is not a guarantee of success. The IT must be capable of improving communications between companies and their suppliers, their customers and the consumer in the chain. Several measures recommended by the United Natural Industrial Development Organisation can help developing countries to make significant progress towards achieving an environment that fosters SMEs full integration into the international supply chain. The measures can be from government and/or from private sectors.

New Initiatives and Innovations

E-business offers a range of benefits in terms of efficiency and market access for SMEs. At the inter-firm level, it reduces the costs and increases the speed and reliability of transactions, especially over long distances (OECD 2004). Because of the importance of e-business for SMEs, many countries have launched initiatives to promote the use of ICT for SMEs. A brief review of some of the initiatives is given.

Initiatives by Asian Countries

There are several initiatives that Asian governments have launched to encourage and enable SMEs to use ICTs. Examples include (APDIP e-note 2005).

- Japan provides tax rebates for SMEs using ICT.
- Hong Kong targets training at different sectors.
- The Philippines is working to reduce cost of international phone calls by deregulating Voice-Over-Internet-Protocol.
• The Republic of Korea provides a web forum for SMEs to showcase their products to an international market.
• Singapore subsidises computer training for SME employees and provides the foundation for developing secure e-payment services.

Researchers (Wilson et al 2001) believe that the threat of marginalisation faced by SMEs in the digital economy can be reduced by systematic support for transformation of traditional business approaches, sectors and networks. Various regional innovation strategy projects for SMEs have been developed, such as EURADA, ERISA and Go DIGITAL, RITTS and USHER.

Technology Means Business (TMB) in UK

Technology Means Business (TMB) is the standard for the provision of business IT support to Small and Medium Enterprises (SMEs). TMB provides a regional and widely accepted standard against which the competency, proficiency and professionalism of both advisors and the centres from which they operate are measured. TMB was launched by the then e-commerce minister in 2000, following the publication of the DTI’s competitiveness white paper, which called for a national IT business advisors accreditation programme. Its purpose was to address the problem of poor support to UK SMEs. Funding and current partners/suppliers include members of the private, academic and public sectors such as BT, Microsoft, HP, Intel, Business Link for London, Scottish Enterprise, Durham Business School, University of Central Lancashire, Advantage West Midlands, Sunday Enterprise, The Welsh Development Agency, McAfee and the South West Regional Development Agency. The medium-term aim for TMB is to provide an environment in which balanced advice and reliable delivery mechanisms are available to the SMEs. The TMB standard will reflect the constantly changing landscape of the business professional. It is based on competent academic research and practical experience. Besides these initiatives, there are several new initiatives that have just been announced by the EU to encourage research and innovations to foster competition as well as to stimulate diffusion of innovation. Subsequent sections discussed some of these initiatives.

New initiatives By EU

Knowledge management

Globalisation is a major driver that has impact on nearly every business. SMEs face new challenges in a globalised economy that will impact dramatically the way they do business. Only sustainable strategies will save them from destructive power of the heavyweight companies. The EU has been paying much attention to small and medium enterprises (SMEs) to increase their competitiveness and contribute to the employment generation within an increasingly globalised context. To be successful requires that they can combine flexible production with the continual innovation of products and production processes. In order to achieve this, enterprises must learn to compete in a fast changing environment. (EC 2006). The European Commission, in April 2006, adopted a proposal for a new EU programme for research. The proposal aims to provide new impetus to increase Europe's growth and competitiveness, recognising that knowledge is Europe's greatest resource.

Knowledge management can be used to increase productivity, effectiveness and efficiency in operations for SMEs. Knowledge is at the heart of any business. Master knowledge and the business will prosper; ignore it and the business will fail. When time is short, the ability to make informed decisions rapidly is critical to sustained performance and to establishing an enduring competitive advantage (Chesbrough, D.E. 2006).

In June 2006, the European Parliament has adopted the first “Competitiveness and Innovation Framework Programme” (CIP). Between 2007 and 2013, some 350,000 small and medium-sized enterprises (SMEs) will receive € 3.6 billion in EU support to invest in all forms of innovation and growth. (Finfacts 2006). The new programme will support actions to help enterprises and industry to
innovate. It will also boost energy efficiency and renewable energy sources, environmental technologies and a better use of information and communication technology (ICT).

Networked European Software & Services Initiative (NESSI)

The president of the European Commission has re-emphasised the importance of the objective for Europe to become, by 2010, “the world’s most dynamic and competitive knowledge-based economy”. The objectives set in Lisbon in March 2000 were higher growth, more and better jobs and greater social inclusion. Information and Communication Technologies (ICT) were identified as playing a key role in driving the transformation of the European economy. (NESSI 2005).

Software and IT services take a significant share of the European economy within the ICT area. In 2004 they directly employed more than 1 million European professionals. Taking into consideration the added value of IT for economic sectors that utilise it, the actual share of software and IT services ranges between 5% and 6% of the European GDP. The software and IT services is a growth engine that stimulates the creation of high added-value, sustainable jobs. It is estimated that that in the last five years, 60% of the jobs created in Europe were highly skilled, and the increase of ‘high-knowledge’ employment was three times faster than the average growth in more traditional sectors.

The NESSI Technology Platform was set up and promoted by thirteen major European ICT corporations, totalling almost a million jobs and about 300 B€ revenues. It aims to provide a unified view for European research in Services Architectures and Software Infrastructures that will define technologies, strategies and deployment policies fostering new, open, industrial solutions and societal applications that enhance the safety, security and well-being of citizens. Partners of the NESSI technology Platform include Atos Origin, BT Engineering, Ingegneria Informatica S.p.A, IBM, HP, Nokia, ObjectWeb, Software AG, Telecom Italia S.p.A. and Tales.

NESSI is an enabling infrastructure. The strategy of NESSI is to provide environments that will empower citizens and companies across a wide range of applications. The aim of Nessi is to pull together competencies and resources to create a dynamic and dependable software infrastructure middleware. This will allow a seamless and cost effective composition of web services. The NESSI Technology Platform offers software services and infrastructure for the mobile European citizen. This infrastructure will connect data sources, software-intensive systems, European, national and regional laws and regulations by offering services that support the citizen in all roles – as a consumer, as a traveler using cars, trains, etc., as an entrepreneur, as a user of medical services, in dealing with administration, in learning and teaching, etc. Services will be provided adapted to the users’ needs and habits (Achatz 2005).

It builds upon open standards that offer participation for big and small companies alike, fostering Open Source solutions, particularly for certification purposes. The platform will comprise middleware that allows the retrieval and composition of services and will facilitate secure connections and transmissions as shown in Figure 1. The variety of information sources, data formats, rules, and regulations will be maintained while services will provide users with a harmonised view and easy usage.

The purpose of a business is to create a customer. It has two entrepreneurial functions – marketing and innovation (Drucker 1955). Marketing is more than selling. It encompasses everything from identifying needs to fulfilling those needs. Innovation is more than new products. It is about doing things differently, meeting customer’s needs and desires in new ways, getting ahead of the game (Irwin 2000). Business needs to innovate in order to survive and remain competitive.

Today, business faces many challenges, including increasing reliance on the successful exploitation of intellectual capital; rapidly expanding technological advances; satisfying ever-more-demanding customers; more efficient use of natural resources and less waste, and increasing industrialisation by developing countries. In order to survive, business today must turn these challenges into opportunities, that is, they must innovate (Irwin 2000). Business needs a constant flow of new ideas and imaginative applications for their products, marketing and distribution. Effective businesses need to constantly capture new ideas, keep ideas alive, imagine new uses for old ideas and put promising concepts to the
test. Because business today relies more on the development and exploitation of intellectual assets, as compared to physical assets, they must have the capacity to capture and share knowledge. Consequently, the effective application of knowledge becomes a source of competitive advantage for the organisations. Innovation is about opportunity-spotting. It is about meeting customer needs and wants. Innovation is about using technology to differentiate products and services. Innovation also requires entrepreneurship and risk taking. It is about spotting and exploiting opportunities quickly before others.

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Innovations
Innovation is important in today’s economy and can dramatically change an organisation’s competitive position. However, the management of innovation is a complex process. In order to support innovation management, a well-structured innovation approach is needed for idea-generation to the dissemination and service of the whole process. This is particularly important for SMEs. A structured approach leads to reduction in time for marketing, a reduction of the R&D and production costs, and to an improvement of product quality (Eversheim 1997). How do we promote innovation?

E-innovation
E-innovation is a new way to conduct innovation. It emphasises effort to improve innovations (Kogut & Mieta 2000). It is not confined to a particular industry, but occurs in different fields.
E-innovation includes e-services, e-government and other categories. It has become part of a nation’s security (William 2000). E-innovation is the use of the Internet to plan, initiate, conduct, run, facilitate, and/or promote innovation (Lau 2004).

Communities of creation are another new way for e-innovation. In communities of creation, the entire community owns the intellectual property rights. A central firm acts as sponsor and defines the ground rules for participation governing the community. Explicit knowledge and tacit knowledge within the community can be shared. The community functions as a complex adaptive system (Sawhney & Prandeli 2000). Each of the community members can access and contribute to the community.

**Technology foresight**

Technology innovation management has become the dominant issue in managing worldwide competitiveness (Roberts 2002). Firms need forward thinking and related foresight systems to remain competitive. The main function of entrepreneurs in private firms is to combine existing resources to put forward new uses and new combinations or innovations. Many different factors influence the innovation process. These include factors such as economic, technological, social, political, environmental and value changes.

It is the author’s belief that technology foresight plays a crucial role in innovation. Technology foresight is the process involved in systematically attempting to look into the long-term future of science, technology, the economy, the environment and society with the aim of identifying the emerging generic technologies and the underpinning areas of strategic research likely to yield the greatest economic and social benefits. (Martin 2001)

Foresight is a relevant competence. It includes the ability to think ahead about issues that are not measurable, but can shape the future. Foresight research is needed because it produces foresight knowledge concerning trends, and alternative development options. Besides foresight knowledge, other knowledge such as hindsight and insight knowledge are also needed.

Early foresight activities were mainly concerned with science and technology resource allocation (Irvine & Martin 1984). Recent activities have emphasised the importance of common-vision building as a step towards the synchronisation of the whole innovation system. Totti and others (2005) distinguish foresight activities as consisting of, (i) setting of S&T Priorities, (ii) developing the connectivity and efficiency of innovation system, and (iii) creating shared awareness of future technologies. Besides these activities, Totti and others also argue for the importance of diversity in foresight activities. They agree that diversity is a key determinant of innovative capabilities. Diversity is defined as the presence of a wide range of variation in the qualities or attributes (Wikipedia 2005). Within innovation systems, diversity contributes to the ability to anticipate different kinds of futures and assists in responding to them in an adequate way (Totti et al 2005).

**Conclusion**

E-business is not only the specific online trading processes commonly described as online transactions. It is also a host of other business trading activities that benefit from the increasingly networked economy. This networked economy includes supply chains, virtual business and remote collaboration, distributed working practices (teleworking) and distributed teams. It also allows remote marketing and the building of relationships with customers and trading partners at a distance.

Globalisation is a major driver that has impact on nearly every business. SMEs face new challenges in a globalised economy that will impact dramatically the way they do business. Only sustainable strategies will save them from destructive power of the heavyweight companies.

The only way to remain competitive in business today is to be constantly and fully alive to new ideas, new practices and new opportunities. Although Information Technology remains a powerful transforming force in our modern competitive society, it is the author’s belief that the success of every organisation centres ultimately on the effective performance of its workforce.
The increasing importance of globalisation for organisations in today’s economy has sharpened competitiveness. This is particularly true for small-medium enterprises (SMEs). For small firms to meet the challenges of globalisation, they need to take advantage of new resources and markets while dealing with intense and global competition.

Innovation is a necessity in a knowledge-based economy in order to retain competitive advantage. It is not science and technology or research or ingenuity or enterprise that innovations are dependent on. Although these factors are important, innovation is more than that. Innovation also depends on economic, marketing, social, organisational and other knowledge innovation activities that require creative and intellectual skills.

There are several ways that we can stimulate more innovation. Firstly it is important to share and exploit knowledge. This can be achieved by closer collaboration between universities and businesses, making use of such schemes as the Teaching Company Scheme; College Business Partnership; Shell Technology Enterprise Programme; Faraday Partnership and Higher Education Reach Out to Business and the Community Fund. Secondly, encourage foresight for smaller businesses. Encouragement should be given to managers to engage in networking to exploit ‘know-who’ both at home and internationally. Finally, assist businesses to think strategically and creatively. Businesses need to be encouraged to foster innovative ideas among their employees. Training can be given to help employees to be technology-foresight focused and innovation oriented. Many universities have now embarked on teaching postgraduate students how to be research oriented, innovative and entrepreneurial. It is important that employees of SMEs to given training to help them to identify problems, generate new ideas to meet the needs of consumers in order to stay competitive.

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