The Information Technology (IT) Sector

Introduction

Information technology refers to the hardware and software used to store, retrieve and process data. The Information Technology (IT) market has maintained a degree of stability in spite of the effects of the global financial crisis. However, the prevailing uncertainty surrounding the global economy may well affect the future of the IT market. So far though, it has been somewhat protected because of its inherent features. An advantage for the sector, and a possible augur of growth, is its increased enterprise mobility, that is, the tendency to do business anywhere, anytime, using any device[31]. The Internet and virtualisation also continue in an upward trajectory, thus positively affecting the broader IT market.

South Africa, in spite of its solid political and regulatory environment, is not yet leveraging the potential benefits associated with the ICT sector, according to a World Economic Forum Report[32]. This is due to the lack of basic skills in large sections of the population, the high cost of accessing ICT services and insufficiently developed infrastructure, amongst other things. As a result, the economic impacts accruing from ICT in the country remain patchy.

The report also notes that increasing hyper-connectivity, facilitated by the Internet and its associated services, is redefining relationships between consumers and enterprises on the one hand, and citizens and governments on the other. However, interconnectivity is also introducing new opportunities and challenges in terms of individual rights, privacy, security, cybercrime, the flow of personal data, and access to information. These are all challenges that South Africa will have to confront as it develops its ICT sector.

Infrastructure, Services and Applications

The South African IT market, comprising of hardware, packaged software and IT services submarkets, is regarded as one of the most developed and sophisticated within the continent. South African IT companies rank among world leaders in areas such as mobile software, electronic banking services, pre-payment, revenue management, fraud prevention systems and the manufacture of set-top boxes[33], with some of the products destined for the export market.

The South African IT industry was valued at R77,1 billion in 2011 and is expected to grow at a compound annual growth rate (CAGR) of 8,6% to reach R116 billion in 2016[34]. There were

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[31] SA IT Market Overview for 2011 with forecast for 2012-2016. BMI-T. 2012.
http://www.doc.gov.za/key-programmes/ict-policy-review.html

[32] The Global Information Technology Report 2012. Living in a Hyperconnected World. (World Economic Forum Insight Report.)
http://www.weforum.org/reports/global-information-technology-report-2012

[33] http://www.southafrica.info/business/economy/sectors/icte-overview.htm#ixzz2h8sDQxhY

[34] SA IT Market Overview for 2011 with forecast for 2012-2016. BMI-T. 2012
http://www.doc.gov.za/key-programmes/ict-policy-review.html

close to 2000 companies in the IT industry as at the end of March 2012[35]. The IT services submarket is the largest, accounting for 51%, followed by hardware at 31%, and packaged software at 18% of the total IT market. The hardware sub-market is driven largely by storage and networking services. Cloud computing is expected to drive future growth in the IT services sub-market.

The hardware sub-market comprises personal computers, servers, network, and storage facilities. There has been a steady growth in the demand for personal computers as they have become more affordable[36]. This growth is also driven by retailers, telecoms service providers and banking institutions, which have been engaged in aggressive marketing techniques through bundled offerings of PCs, tablets and smart phones. However, end users' demand for mobile computing is affecting the PC market. Improvements in quality and durability are resulting in longer replacement cycles for PCs.

Insofar as the sub-market for servers is concerned, virtualisation requires more resources in terms of storage and management. However, energy costs may decrease as fewer server units are required compared with conventional data centres[37]. Cloud computing provides cloud-based storage services that cater for a large number of users thus reducing the number of servers that would ordinarily be needed by individual customers.

The growth in content is impacting on the ability of the network to cope with the increasing demand. This is likely to continue on the back of the 'net-neutrality' principle, that is, the equal treatment of all data on the Internet. This means that all manner of content will continue to be transmitted over the Internet without differential treatment, and unless this growth is accompanied by network expansion, the system may be overburdened. Similarly, net-neutrality raises questions around network security and the privacy of content, especially in wireless systems.

When it comes to software, South Africa is said to have a competitive advantage in embedded software design and development. Software testing and piloting of systems and applications are growing markets in South Africa. Local companies also offer niche manufacturing facilities for high-end technology solutions[38]. The area of systems management is also growing on the back of cloud computing. The growth of the subsector is inhibited by lack of skills, especially in business intelligence, cloud and systems management. Software piracy accounts for about 35% of total software. Government advocates for a free and open source software (FOSS) policy that provides[39] as follows:

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[35] The Media, Information and Communication Technologies Sector Education and Training Authority Sector Skills Plan 2013–2018. 2012
http://www.mict.org.za/inner.aspx?section=10&page=94

[36] SA IT Market Overview for 2011 with forecast for 2012-2016. BMI-T. 2012
http://www.doc.gov.za/key-programmes/ict-policy-review.html

[37] A dedicated facility used to store and operate computer systems

[38] The South African Software Development Industry
http://www.suedafrika-wirtschaft.org

[39] Policy on Free and Open Source Software Use for South African Government. Department of Public Service & Administration. August 2006
http://www.gov.za/documents/download.php?f=94490

- The government will implement FOSS unless proprietary software is demonstrated to be significantly superior. Whenever the advantages of FOSS and proprietary software are comparable, FOSS will be implemented when choosing a software solution for a new project. Whenever FOSS is not implemented, then reasons must be provided in order to justify the implementation of proprietary software;
- The South African Government will migrate current proprietary software to FOSS whenever comparable software exists;
- All new software developed for or by the South African Government will be based on open standards, adherent to FOSS principles, and licensed using a FOSS licence where possible;
- All government content and content developed using government resources will be made open content, unless analysis on specific content shows that proprietary licensing or confidentiality is substantially beneficial; and
- The government will encourage the use of open content and open standards within South Africa.

With respect to IT services, the growth of this sub-market is largely dependent on government programmes. There is an increasing blurring of lines between IT and telecoms services due to increased mobility.

Challenges for IT Market Growth

The growth projections of the IT market could be higher were it not for certain factors that seem to constrain it, including the cost sensitivity of customers, low expenditure by the public sector, market maturity, and bigger companies sourcing directly from the original equipment manufacturers (OEMs). These are discussed briefly below:

- **Price sensitivity** – Given the economic slowdown, IT customers are employing cost containment measures and where possible are sweating assets instead of investing in new equipment. This tendency impacts negatively on the growth of the IT market.

- **Public sector procurement** – The public sector is a major user of IT goods and services in the country. However, procurement decisions in the public sector tend to take time and where they are taken they are often challenged on procedural and other grounds, thus negatively impacting on the growth of the market. In 1999, government established the State Information Technology Agency through the SITA Act No 88 of 1998, to centralise procurement as well as to consolidate and coordinate the State's information technology resources in order to achieve cost savings through scale, increase delivery capabilities and enhance interoperability. SITA is mandated to ensure that the public sector improves its services, systems and administration processes. The vision of SITA is to be the lead ICT agency to enable public sector delivery, and its mission is to render an efficient and value-added ICT service to the public sector in a secure, cost-effective and integrated manner, contributing to citizen convenience. The Chairman's report for the 2011/12 financial year notes that SITA recorded progress in key service delivery areas, including reducing turnaround times on procurement, improving quality of services, achieving economies of scale and addressing pricing issues. However, over the years, SITA's effectiveness has been hampered by management challenges. As a result it has not played the role that was envisaged when it was created.

- **Market maturity** – The IT market is reaching levels of maturity, meaning that the rate of growth will be slower than it was two to three decades ago than when the market was still developing.

- **Direct sourcing** – IT market growth is also impeded by bigger companies that by-pass IT vendors and go directly to OEMs for products and services. This impacts negatively on smaller companies that provide niche services within the broader IT sector.

Key Success Factors and Future Trends

Despite the challenges facing the IT sector, its products and services have become part and parcel of everyday business and social life. The fast pace of innovation helps the sector to remain relevant, while shaping the future of business and society. The following factors are set to drive growth in the IT sector.

Digitisation, that is, the mass adoption of connected digital technologies and applications by consumers, enterprises and governments, is one of the key drivers for the success of the IT market. The success of digitisation is dependent on the following factors:

- **Ubiquity** – the extent to which consumers and enterprises have universal access to digital services and applications;
- **Affordability** – the extent to which digital services are priced in a range that makes them available to as many people as possible;
- **Reliability** – the quality of available digital services;
- **Speed** – the extent to which digital services can be accessed in real time.
- **Usability** – the ease of use of digital services and the ability of local ecosystems to boost adoption of these services; and
- **Skill** – the ability of users to incorporate digital services into their lives and businesses.

Consolidation among vendors

As a market matures, operators and service providers tend to consolidate. In a maturing market, the survival of certain companies can be guaranteed only through mergers and acquisitions. This trend will continue into the foreseeable future.

Growth in mobile computing

Smartphones are fast replacing the PC as a preferred method of computing and accessing the Internet. It is estimated that by 2015 the shipment of mobile smartphones will surpass four billion. Moreover, the computational power of smartphones continues to increase, and will soon reach 2.5GHz processing power.

A pilot project among nurses in the Eastern Cape revealed that the use of 3G-enabled smart phones helped nurses and doctors to make accurate diagnoses, prescribe the correct medication, and reduce patient mortality. Nurses and doctors were also enabled to provide up-to-date information to patients regarding their health conditions and treatment, update their own clinical knowledge and share information with their colleagues. Whilst this development may affect the PC sub-market, it has positive spin-offs in the rest of the sector, including the development of software and applications.

Economy

Should the global economy pick up, it is likely that key sectors will be impacted positively and we are likely to see accelerated growth of the IT market.

Public sector

Implementation of the e-government policy is critical for the success of the IT sector in South Africa. This policy has four pillars:

- **Interoperability** – government IT systems (including networks, platforms, applications and data) are supposed to be linked to each other. This way, it should be possible for various government departments to share and exchange information and documents automatically as well as coordinate seamless transactional services, among other things;
- **IT security** – information processed and stored through the government IT system should be protected from unauthorised access and cyber crime;
- **Economies of scale** – government should leverage its massive IT buying power to influence the development of the local IT industry, by promoting entrepreneurship, especially among small and medium sized enterprises. According to SITA, its SME strategy aims to set aside 10% to 20% of its procurement budget for SMEs, in addition to ensuring early payment for their services as well as promoting SME training[40]. It should also assist in the development of local IT skills that are crucial to e-government initiatives, and promote IT research that can be steered towards meeting government's service delivery imperatives; and
- **Eliminate duplication** – One of the objectives of SITA is to help prevent unnecessary duplication of similar IT functions, projects and resources (including collection, processing and archiving of the same data).

Innovation and new applications

Cloud computing

Cloud computing can be defined as the storing, processing and use of data on remotely located computers accessed over the Internet[41]. It involves sharing computer resources, thus giving users unlimited computing power on demand and accessing their data anywhere through the Internet, without making major capital investments. The 'sharing' aspect of cloud computing also allows users to spread their development and maintenance costs over many users, resulting in lower costs and better service quality compared with 'on-premises' IT services. The hosted services of cloud computing include:

- **Infrastructure-as-a-service (IaaS)** –the provision of storage, hardware, servers and networking components to support the operations of an organisation. The service provider owns the equipment and is responsible for housing, running and maintaining it. The customer pays on a per-use basis;
- **Platform-as-a-Service (PaaS)** – this involves renting hardware, operating systems, storage and network capacity over the Internet. The customer rents virtualised servers and associated services for running existing applications or developing new ones; and

[40] SITA will do more for SMEs. www.ITweb.co.za. 13 Sep 2011.

[41] What does the Commission mean by secure Cloud computing services in Europe? European Commission Memo. 15 October 2013.
http://europa.eu/rapid/press-release_MEMO-13-898_en.htm

- **Software-as-a-Service (SaaS)** – a software distribution model where applications are hosted by a vendor or service provider and made available to customers usually via the Internet. This includes Web-based e-mail services and data processing.

Cloud computing is expected to become one of the fastest growing technologies leveraging on the ease-of-use and scalability of access to large amounts of secure Web-based services, software and infrastructure. Worldwide investments into cloud services are likely to double from around $55 billion per annum in 2011 to about $130 billion per annum in 2015[42].

Bring your own device

This refers to the policy of allowing employees or students to bring personal mobile devices such as laptops, tablets and smart phones to their workplace or classroom to access privileged company information and applications or school work[43].

IT security

The amount of data processed and stored through the IT system is growing at an exponential rate. This growth is accompanied by growing concerns about security of the system. There are three main elements to IT security and these are: confidentiality, integrity and availability.

- **Confidentiality** – IT users and providers need the assurance that data stored will be used and shared only among people authorised to do so;
- **Integrity** – the information processed, stored and retrieved should be authentic; and
- **Availability** – users should be able to access the information as and when needed.

Concerns around IT security will lead to the development of specialist skills and services to address the emerging challenges.

[42] www.engineeringnews.co.za. Seacom cloud computing unit moves to develop cloud market for SMEs. 11 March 2013. http://www.engineeringnews.co.za/article/seacom-cloud-computing-unit-moves-to-develop-cloud-market-for-smes-2013-03-11

[43] www.wikipedia.org http://en.wikipedia.org/wiki/Bring_your_own_device