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**FINAL SECTORAL REPORT – MULTIMEDIA SECTOR
(ICT DIFFUSION AND APPLICATIONS)**

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Executive summary¹

Background and Motivation to ICT Diffusion Project

This report represents part of the second Phase of an eight-sector study, commissioned by the Department of Trade and Industry and funded by the European Union, to examine:

- i) The likely trajectories for the absorption of ICTs in a range of economic sectors; and
- ii) How to adjust the policies and strategies of the government and the domestic private sector to maximise the benefits to South Africa from the insights flowing out of i).

The project builds on existing research work but has at its heart the analysis of a number of 'vertical markets' for ICT, first through a worldwide scan (Phase I) and then through sectoral research in each of the chosen eight sectors.

The sectors selected were drawn from three broad categories – traditional sectors, service sectors, and new economy sectors, as follows:

Traditional:

- Platinum Mining
- Automotive Manufacturing
- Clothing Manufacturing Deciduous Fruit Farming

Service:

- Cultural Tourism
- Healthcare Information Flows

New Economy:

- Biotechnology
- Multimedia

The objectives of the research work were to:

- Generate accurate, objective findings regarding patterns for absorption of ICTs in a range of SA economic sectors, in order to guide South African participants in vertical markets for ICT;
- Provide recommendations for impacting public and private sector policies;
- Guide the government in directing some of its existing and future intervention strategies, including research and development programmes and industrial development facilities, whether through the science vote or departmental programmes; and to
- Give government more guidance regarding the commitment of funds for human resource development.

¹ Excerpts from this report may be publicly quoted provided the source is acknowledged and the report is identified as a DTI South Africa project funded by the EU Business Support Programme.

Project Research Methodology

The overall approach adopted by the lead consultants was to use Sectoral Experts for the interviewing and primary research, with three ICT coordinators (responsible for up to three sectors each) ensuring consistency across the sectors. An International Consultant was employed to provide an external perspective to the research.

The research methodology for Phase I of this project (The International Scan) involved:

- Defining each of the eight industry sectors;
- Identifying the main players in the value chain; and then
- Performing secondary research on each of the sectors to obtain current data about the diffusion of ICTs into those sectors; and
- Identifying leading-edge applications, as far as possible.

Phase II (Diffusion of ICT in South Africa) involved the use of these sector and value chain definitions to identify the major role players and to set up interviews, based on a structured questionnaire, with selected stakeholders across the value chain.

The questionnaire consisted of both a generic section (i.e. used by all sectors) and a sector-specific section (i.e. aimed only at those interviewees within the sector). Most of the questions relied on the *perception* of the interviewee. A rating scale was typically used, but a number of 'open-ended' questions were included to allow interviewees to express opinions in a less structured way.

The questionnaire was subdivided into six generic sections and one sector-specific section:

1. Background Information (Name, Address, Organisation Size, etc.)
2. ICT Usage (of Technology and Applications)
3. ICT Spending Patterns
4. Sources of ICT Information and Training
5. ICT Adoption: Drivers and Barriers
6. Diffusion of ICT into Organisation/Sector
7. A sector-specific section dealing with issues of importance to the particular sector.

Between 40 and 55 interviews were conducted per sector; these should not necessarily be construed as being representative of the sector, as the selection of interviewees was often dependent on personal contact from the sector researcher. Also, the responses from those interviewed undoubtedly contained an emotional bias (for example, the desire not to seem technologically backward), which would have influenced the responses. Hopefully, these biases have been minimised through the averaging process

Analysis of the Results

The results from the questionnaires were captured on an Excel spreadsheet and a basic analysis performed centrally. This information was then fed back to the individual sector researchers for further analysis and comment. The generic portion of the questionnaire captured up to 117 separate items of information per respondent (either a rating, a comment or basic data), so that a typical sector analysis involved 5000+ items. These

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responses were subdivided into various categories (e.g. Large, Medium, Small organisations) as applicable and further iterations performed.

Most of the results were shown graphically for ease of comprehension, although only basic statistical analysis was performed due to the nature of the data.

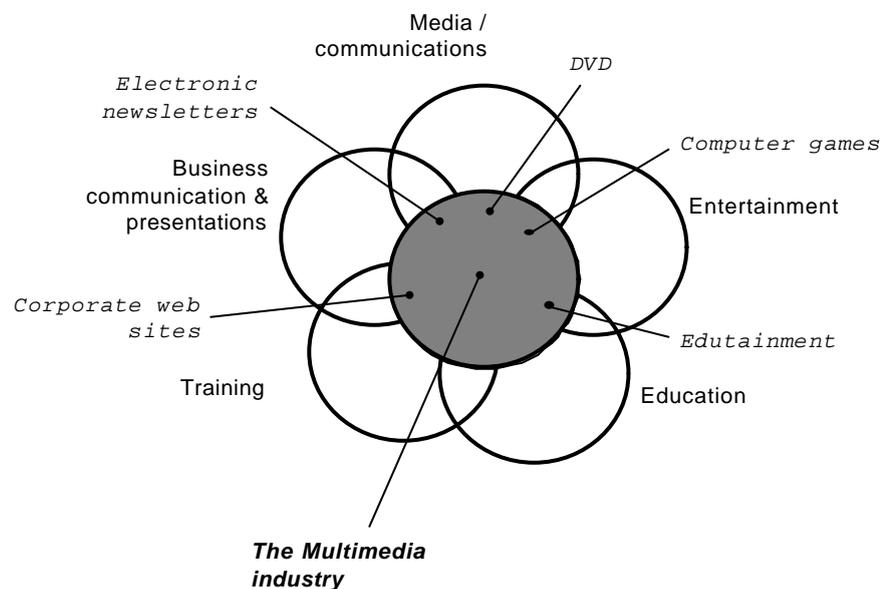
The Multimedia Sector

This report is a research component of a study commissioned by The South African Information Technology Industry Strategy Project (SAITIS), which set out to assess the application and diffusion of Information and Communications Technology (ICT) in eight economic sectors. One of these is the multimedia industry. The research was conducted during the first half of 2002.

A well-accepted definition of 'multimedia products' is:

Multimedia products enable the consumer to experience simultaneously at least three of: sound, text, video and graphics, often in an interactive manner.

As shown in the diagram below, consumers of multimedia products include the media & publishing (print and electronic), entertainment (including games), education (including training and business presentations) and business customers for web sites and presentations.



Multimedia products are generally developed using tools to capture or create visual images (both film and graphic, generally in digital form), text and sound and manipulate them together. These tools are created by the suppliers to the industry; this distinction further narrows the definition of the multimedia industry to **the developers of multimedia content for customers.**

The activities likely to be carried out in the multimedia industry include:

- Design and definition of multimedia products;
- Generation of content for multimedia products;

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- Integration of content of various kinds (sound, text, video, graphics) into multimedia products; and
- Reproduction, marketing, sale and distribution of these products.

The skills needed by participants in the sector include:

- Animation and 3-D modelling;
- Film and video production;
- Graphic design;
- Scriptwriting, translation and copywriting;
- Sound composition and recording;
- Interactive presentation design and development; and
- Electronic product design and development.

South African multimedia content developers are evolving into a recognisable, albeit nascent industry. A particular opportunity for this industry is to capitalise on both the digital nature of the product and the cost advantage of South African skills over the developed world, to become a ‘design and development factory’ of multimedia products for the international market.

The research study identified fifty-seven companies in South Africa that actually or potentially fit the broad definition of ‘multimedia company’. Senior personnel in thirty companies were eventually interviewed. Most companies interviewed (63%) were ‘micro’ in size—less than ten employees. In this industry, twenty people constitute a ‘large’ company. Only three had twenty staff or more and none had more than twenty-five. Twenty-three of the thirty companies interviewed (77%) had or have overseas clients. Some also have international operations in the form of a physical presence—often a sales or client relations office - which feeds work back to South Africa for production.

Only five interviewed companies met a more rigorous definition of a multimedia company, with full integration between strategic, creative and a broad range of technical capabilities. Those five were all larger companies (for the industry), providing strategic, creative, technology and even reproduction services in-house, and all have international clients.

Regarding technology use by multimedia companies, it is important to appreciate that multimedia companies only exist because certain types of digital technology allow them to exist at all. ICT use is inherent in the nature of the services that they provide, products that they offer, and tools that they use to do so. Thus respondents did not see certain technologies as ‘needing emphasis’—they are understood and used as tools to do a job of work. What was very frequently mentioned instead was the need for skills development. This is also universally seen as a major inhibitor of the achievement of business goals in this sector, together with access to viable markets. Appropriate expert skills are in short supply, and competent and experienced developers of multimedia products are in demand, even in a static — or for some, shrinking — market.

If multimedia companies are typical, then it would seem that companies who use specific digital technologies for their core production process are also highly likely to use ICT business tools in support of their administrative processes and promotional activities.

The ‘technologies and application areas needed for growth of the business’ are seen to be not the development of new technologies, but rather the penetration of existing technologies into the workplace and the populace at large so that more people will be in a position to utilise multimedia products. The limits on this are taken to be the sophistication and education of the general population, and their very limited ability to afford the necessary technology platforms—for example, home PCs—as well as the (by developed world standards) exorbitant cost of bandwidth and connectivity.

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The size and rate of growth of the market for multimedia products in South Africa is thus limited by the rate of diffusion of computers as multimedia viewing platforms throughout homes and businesses. While computers are now ubiquitous in most more sophisticated businesses, the number of people with access to computers and other multimedia-capable computing platforms either at work or at home is still a small proportion of society. This has two consequences:

First, most multimedia products developed in South Africa are for the purposes of business-to-business communication. These mainly take the form of company web sites, promotional and sales presentations and tools. When the Internet is not the medium of distribution these take the physical form of CD ROMs.

Second, the focus of South African multimedia companies wishing to expand their client base is on international, developed world markets—primarily in America and Europe.

The multimedia companies interviewed are confident that they can compete in these markets on the basis of product quality (including innovative use of multimedia development tools to create new kinds of product), price and delivery time.

Computer games – which are a form of multimedia product - have a very small market in South Africa. South African multimedia companies do have some experience of producing games for promotional purposes, which could be basis for the expansion of this area. One company was identified specifically focused on multimedia products for the gaming (gambling) industry whilst another supports back-office functions for a number of international gaming sites. Several of the more sophisticated multimedia firms have a market focus on the television and film industries, producing multimedia branding and special effects ‘products.’

Overall responses to the questionnaire may be summarised as follows:

- On average, the South African multimedia sector’s ICT expenditure is reckoned to be slightly less than the norm for the industry globally. This reflects the reality in South Africa that both the hardware and software tools are imported, and the industry’s customers do not demand products that require the latest tools. The consensus is that IT expenditure is not keeping up with other demands.
- For information about ICT developments respondents primarily use the Internet, followed by in-company ‘experts’, equipment and software vendors, and newspapers magazines and journals.
- The main source of training is Internet sources followed by company ‘experts’ and suppliers. In house and private training schools, together with magazine publications, were ranked next.
- ICT related costs are the major expense of multimedia companies. These costs break out as follows:
 - Hardware costs, including maintenance and support;
 - Multimedia and tools and other applications;
 - Network and connectivity costs; and
 - Skills acquisition and retention.

The first two costs are basically priced in US Dollars, and thus are relatively high for South African companies when compared to their developed world competitors. Connectivity costs—especially the cost of bandwidth—are generally higher in South Africa than in the countries of competing multimedia companies. This negatively affects the local cost structure, as well as the costs associated with servicing overseas clients. Skills are in high demand and command a premium relative to other similar ICT skills, but are still less costly than those of competing developed world companies. Other costs of doing business (rent, utilities etc) are lower than those of competing developed world companies.

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- Internal factors are overwhelmingly positive, with the exception of perceived ICT cost and the critical shortage of skills to use the available technologies.
- From a technology perspective, respondents are innovative, with most considering themselves to be more innovative than their competitors in the multimedia sector in South Africa, but marginally less so than their competitors globally. However, respondents do generally perceive their local industry to be better at product/service innovation than its competitors globally.
- The multimedia industry in South Africa is an innovative adopter of ICT tools that are relevant to its needs—though this attitude towards technology permeates even the adoption of ICT tools that are non-core, resulting in adoption—for example—of relationship management and administrative process tools ahead of most other industry sectors.

Provided that the industry can remain viable and access international markets, then the advanced diffusion of ICT is likely to remain or even advance further towards perceived international norms.

In looking into the future, it is noted that the multimedia industry is different from other industries in the overall DTI study of ICT diffusion. It is actually a part of the ICT industry itself. Aspects such as ‘what can this sector do to better exploit ICT?’ are not directly relevant. As the sector grows it exploits ICT in ways appropriate to the needs of its marketplace. A response to ‘What can the ICT industry do for this sector?’ on the other hand would include addressing its need for skills, and the high cost of hardware, imported software tools and costs of bandwidth. Multimedia products could be used to showcase not only the South African multimedia industry, but also its IT industry and the country as a whole. Given this high potential, there are several aspects that government and the industry as a whole might address:

Critical for sector growth will be the identification of factors required to increase international visibility and penetration, so multimedia products need to be recognised as viable exports, capable of generating appreciable foreign exchange earnings. As ‘virtual’ products they are often thought of—and categorised—as ‘services’, but with the right distribution of appropriate products these can be resold to multiple end consumers.

- Multimedia product development companies focused on servicing international clients could be afforded export processing zone benefits to reduce costs and enable local firms to break into international markets.
- One specific opportunity is international marketing support under the Export Marketing Investment Assistance (EMIA) programme.
- Some multimedia products are aligned with the entertainment industry; South Africa’s multimedia companies should be showcased at events such as the Sithengi film and programme market and the annual Design Indaba.
- The creation of opportunities to develop multimedia computer games and educational and training programmes should be explored.
- Current skills development for the industry is *ad hoc* and uncoordinated. Ensuring a supply of its critical resource—skills—can support the future growth of the industry.
- Major technology costs are imported: potentially offsets could be negotiated against exports.
- The infrastructure requirements of a multimedia company are considerable—both in terms of physical facilities and technology infrastructure including networks and tools. Co-location of multimedia companies in shared facilities could help to spread and lower some of these costs. ‘Multimedia hives’ should be investigated.
- The cost of connectivity and (especially) outward bandwidth limit the ability of local multimedia companies to communicate with international clients, distribute products

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and provide support services. The reduction of the cost of access to this vital input should be aggressively pursued through the introduction of telecommunications and network competition.

In summary, multimedia in South Africa is a nascent industry with considerable potential. Its role in ICT diffusion, and the value that it can add to other industries should be fully recognised. Certainly, a healthy multimedia industry is critical if South Africa is to have a vibrant ICT sector, and more generally participate in the emerging global knowledge economy. What the industry really needs is to become globally competitive—not just produce products of an international standard. This means finding ways to promote the industry (not just individual companies) to a global market in ways such as described above. The ripple effects of success would be considerable for the ICT sector, South African business and South African economic and social development as a whole.

1 Background

This report is a component of a study commissioned by the Department of trade and Industry, which sets out to assess the application and diffusion of Information and Communications Technology (ICT) in eight economic sectors—Platinum Mining, Automotive Manufacturing, Clothing Manufacturing, the Deciduous Fruit Industry, Health Information Flows, Cultural Tourism, Multimedia, and Biotechnology. The sectors were chosen to create an international context for the examination of trends in the application of ICT and its diffusion into the South African economy and to consider potential applications and ways to enhance the diffusion of ICT into those sectors.

Further, the chosen sectors have perceived potential in the following areas:

- They are either large employers presently or have the potential to become so in future;
- They present an opportunity to exploit the African Growth and Opportunity Act (AGOA);
- They build on existing South African strengths; and
- They are essential for the well-being of the workforce.

It is accepted that organisational and indeed national competitiveness relies increasingly on successful technological innovation, and especially ICT innovation. It is worth noting, however, that most of the research and evaluation of diffusion has taken place either at the firm level, or the country level. The present study, where the level of analysis is the industry, breaks relatively new ground.

This research took the form of an in-depth survey of ICT use in a sample of multimedia development companies in South Africa. This was preceded by initial research into the sector with the goal of defining its boundaries and understanding its dynamics, which are summarised in the introduction that follows. The findings of this initial research were validated against international benchmarks.²

For the purposes of this study, the ICT Sector has been defined in terms of the OECD recommendation, which states that the ICT Sector comprises:

“The industries that produce the products (goods and services) that support the electronic display, processing, storage and transmission of information.”

The major industries include manufacturing of computer hardware and telecomm equipment, IT professional services, computer software and telecommunications services.

Further, ICT diffusion has been defined³ as “a special type of communication concerned with the spread of messages that are perceived as new ideas. The four main elements in the diffusion of new ideas are (1) the innovation, (2) communication channels, (3) time, and (4) the social system.” In this context we are concerned with the penetration of the use of and knowledge about ICT within the subject sectors.

The findings of this report will be consolidated with those of the other sectors involved in the study, with consequent recommendation to be made to government. The overall report will be made public, and this specific sector report circulated within the multimedia industry.

² ‘An International Scan Prepared for The South African IT Industry Strategy Project (SAITIS)’ Miller, Esselaar & Associates, March 5 2002

³ Rogers E.M. “Diffusion of Innovations” (4th ed.), New York: The Free Press, 1995.

2 Introduction

This section is a summary of the desk-top research into the multimedia industry.

2.1 What is 'multimedia'?

'Multimedia' is a relatively new and therefore poorly defined term. In economic terms it can be broadly considered to encompass those business activities that develop multimedia tools, use multimedia tools to create multimedia products⁴, and the customers for these products who in turn use them for education, research, training, entertainment or other forms of communication.

As the use of multimedia products becomes more pervasive, then the multimedia industry is itself becoming a driver of the diffusion of ICT through business and society. This phenomenon is an example of what has been called the 'law of accelerating returns'⁵ We here, therefore, define the sector in terms of the technology, and then focus on the industry in order to define sector study boundaries.

Multimedia technologies are widely utilised in a variety of more traditional, and therefore well-defined sectors – such as publishing, entertainment and education. These are broad sectors, which include many activities that do not utilise multimedia technologies.

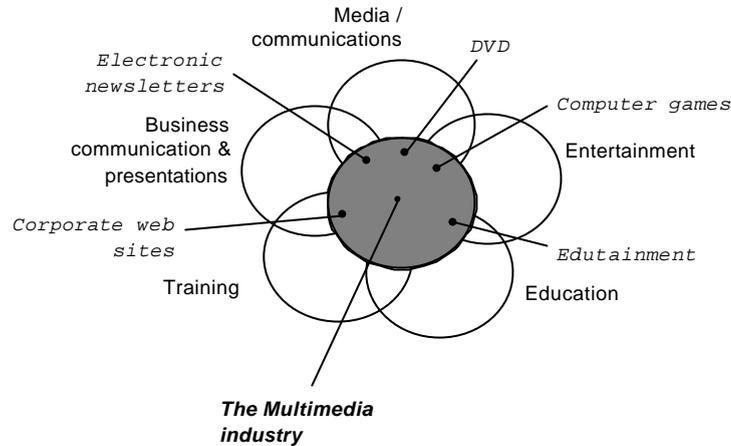
From the perspective of the consumer, the value of the products of such technologies lies in their informational, educational, cultural, or entertainment content - not in the format in which they are distributed or the technology used to develop and distribute them. But, to provide the necessary focus, we must primarily be concerned with the format and the underlying technologies rather than the benefit experienced by the user.

For the purpose of this study, we therefore considered the intersection of multimedia technologies as they are applied to media & publishing (print and electronic), entertainment (including games), education (including training and business presentations) and aspects of commerce such as web sites and business presentations. These sectors necessarily overlap, and – as noted above – include many aspects that do not use multimedia technologies. The development and application of multimedia technologies for sale to – and use - within these segments we thus broadly consider to be the 'multimedia industry'.

⁴ Throughout this report we refer to 'multimedia products' as being the final deliverable of multimedia development projects. Whilst those engaged in such development are sometimes described as delivering 'multimedia services', multimedia development differs from other pure services in that there is a final tangible product. This product can be reproduced and distributed as any other.

⁵ 'The Age of Spiritual Machines' Ray Kurzweil, Penguin Putnam 1999

Industry segments encompassing multimedia



As we shall later explain, the ‘multimedia industry’ as here defined is dependent on certain specific inputs – multimedia development tools – the creation of which is itself a logical component of the industry. However, our initial scan has not revealed any indication of the development of such tools taking place in South Africa, whilst the use of such tools to create multimedia products is prevalent and already widespread.

The use and dependence of the industry on other inputs – especially technology platforms – and the use and dependence of the industry on ICT systems for the dissemination and use of its products and services by customers was also considered during the study.

2.2 International Applications and Diffusion of Multimedia

As we have elucidated above, ‘multimedia’ can be considered to be a form of content for communications used by other, more formally defined sectors. Considering the traditional sectors with which multimedia intersects:

Business Communication

The use of digital technologies for the purpose of business communication has grown with the use of the Internet. Most established businesses in the developed world, and many in South Africa, have some form of corporate web site. These are used to both promote and inform customers and other stakeholders about the company and its products, and increasingly to provide a channel for the ordering of and payment for these products. Some of these web-based communications include a kinetic⁶ multimedia presentation.

Such presentations have also migrated from the Web to other physical media, such as CD ROM, for distribution to prospects and clients for the purpose of business and product

⁶ We use the term ‘kinetic’ to describe multimedia presentations that are not interactive, other than the ability to stop and start them at will. Interactive multimedia products have multiple ‘paths’ through the content, which can be selected and guided by the user.

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communication. These are, in turn, used to deliver public presentations at trade fairs or at product workshops – though these are necessarily not interactive.

Multimedia technologies – especially 3D animation – also finding their way into business to consumer promotional material. This often has a high ‘entertainment’ value.

Companies in IT related industries have typically lead the way in using multimedia for such purposes, but others – especially financial institutions – have quickly followed.

Electronic newsletters (delivered by e-mail) are increasingly being used as an internal (corporate) communication tool as well as a marketing tool and a project management tool. Some of these are starting to use elements of multimedia as a part of the communication content.

Entertainment

Entertainment is a broad category usually segmented by medium (film, television, print, etc). Since ‘multimedia’ is not a medium, the term has not become widely used as a segment of the ‘entertainment industry’. However:

- Multimedia technologies are increasingly being used to produce feature films and other similar forms of entertainment;
- Computer games (both PC based and games consoles) fully utilise multimedia technologies and are one of the best examples of interactive multimedia. There is a trend toward such games being ‘played’ between competitors online – though only where access and cost of bandwidth permits this; and
- Web sites, CD ROMS and DVDs are increasingly being used to deliver entertainment content, often using multimedia to do so.

Education and Training

Education and training materials and programs are increasingly being digitised and delivered electronically using computer based platforms. The range of such materials includes:

- Subject databases held on searchable CD ROMS on on-line;
- Electronic encyclopaedias, usually distributed on CD ROM;
- Teaching or training programmes that the learner interacts with and progresses through at his or own pace;
- Computer games specifically developed for younger children to develop basic alphanumeric literacy as well as computer literacy;
- Business training programmes that are interactively ‘played’ as a ‘game’ to teach various business principles through experience;
- Computer games intended (at last in part) to develop computer literacy; and
- Virtual reality simulations, increasingly used for technical training, or for simulating the management of operations.

In each case, multimedia technologies are used to develop the content, which is then delivered through either a physical or electronic medium, and is ‘viewed’ or ‘played’ on a suitable platform – most commonly a computer.

2.3 The Role of the Internet

The diffusion of multimedia technologies through these sectors is closely related to the growth in the use of the Internet as a vehicle for personal and business communication and transaction. The Internet allows any type of content which is digital – including those produced using multimedia technologies – to be transferred and shared between any computer connected to it. Thus, for example, we even see larger consumer goods marketers producing multimedia advertisements specifically for ‘viral’ distribution⁷ using the Internet. The growth of the multimedia industry and the adoption of the Internet are closely linked.

The Internet has for some years provided a computer based communications network for education, industry and commerce. Additionally, the power of multimedia in marketing and sales has been growing with the arrival of multimedia capable equipment. The combination of Internet and multimedia, in the form of web sites and e-commerce, now provides organisations of all types and sizes with both the means and the capability to conduct marketing and sales operations with worldwide reach.

Whilst the rate of increase of Internet subscribers is slowing from the exponential growth seen in the mid to late 1990’s, the numbers of companies and individuals with access to the Internet continues to clime.

Internet use is closely related to a household’s socio-economic status. For example, according to Statistics Canada, the highest proportion of regular Internet users in 1998 was found in households with revenues in the top quartile (65%) and in which the head of the household had a university degree. This makes them attractive (if demanding) clients for companies operating in the Internet economy, particularly the companies producing multimedia content for entertainment, business communication, education and training.

South Africa ranks in the top twenty countries for the use if the Internet, and represents more than 90% of the Internet users and unique Internet hosts on the continent of Africa. The number of individual dial-up connections is estimated to be approximately 400,000. The number of individuals with a personal e-mail address is approaching two million, whilst the total number of Internet users is estimated at three million.

2.4 Nature of the multimedia industry in South Africa

Within the more affluent and business sectors of South African society, the availability of computing and similar platforms required to ‘play’ multimedia products is reasonably widely available. Content for these products is generally imported, with the exception of local business web sites, which are locally developed. As noted, a proportion of these of the deliver multimedia content.

A wide range of public and private initiatives is further contributing to the potential emergence of a multimedia industry. For instance, the Multi Purpose Community Centre Program (provides public access to the Internet in urban and rural areas), the Schools Programmes and SchoolNet, have improved the opportunities for access in rural and public areas in South Africa. South African teaching institutions are closely linked to the development of education and training programs that benefit from South African creative and technical skills.

South African multimedia content designers are thus evolving into a recognisable industry. The content produced by this industry can range from very simple texts and graphics to

⁷ The term ‘viral’ distribution refers to the intentional use of network effects to spread an idea – often for marketing purposes.

elaborate graphics and acoustic transmissions and streaming video. The majority of South African or other Internet content consists essentially of alphanumeric text. Even though the use of audio and video elements, singly or in combination, appears to be on the rise, the capacity to provide long-running programs of an acceptable technical quality is still taking hold slowly, especially where video is concerned.

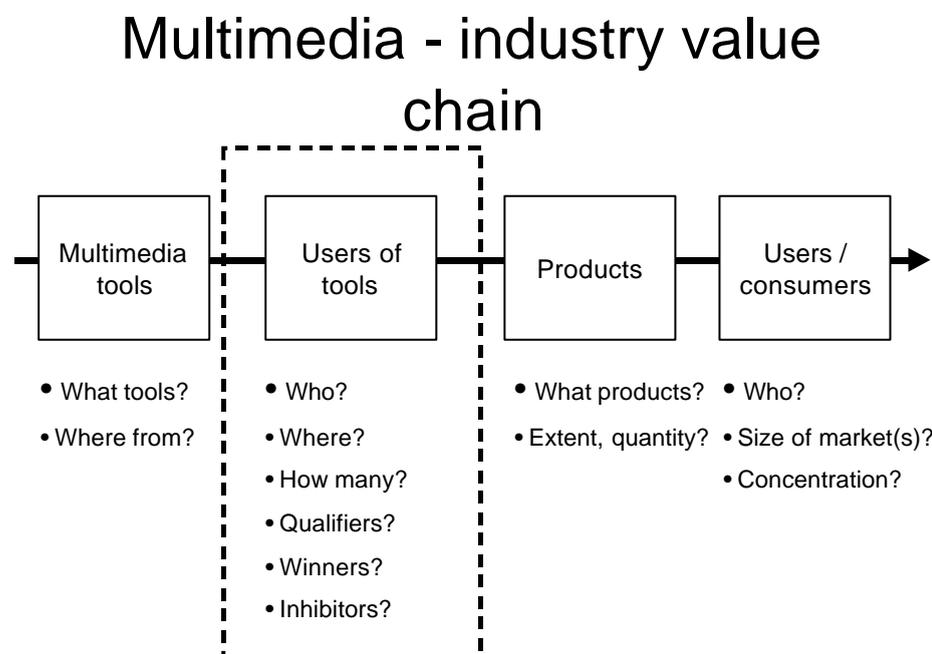
A particular possible opportunity for the South African industry is to capitalise on both the digital nature of the product and the cost advantage of South African skills over the developed world, to become a 'design and development factory' of multimedia products for the international market. Currently, the USA is by far the predominant developer and producer of multimedia technologies and products. The opportunity exists for multimedia companies in the USA and elsewhere to contract with South African multimedia developers to create multimedia content for globally distributed products.

As elsewhere, the South African industry makes use of ICT extensively in the development of new products that typically have an integral ICT component. Some multimedia companies have their origin as content providers in the ICT sector.

2.5 Research Approach

Boundaries of the multimedia industry

Clearly from the forgoing, the established business sectors that use multimedia content are not the 'multimedia industry'. These sectors are the markets for multimedia products that are produced by the multimedia industry. The nature of this 'industry' can be further understood by considering the following multimedia value chain:



Multimedia tools are hardware and software applications, which enable the users of such tools to capture or create visual images (both film and graphic), text and sound and manipulate them together so as to create multimedia products.

Multimedia products are thus defined as follows:

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Multimedia products enable the consumer of the product to experience least three of: sound, text, video and graphics – simultaneously, and often in an interactive manner.⁸

The important qualifier that the ‘product’ may be ‘interactive’ also defines a role for the consumer of the final product in the way in which s/he experiences it. In some sense the consumer of an interactive product is also partially responsible for its production.

Such products are generally developed by ‘users of multimedia tools’ for customers who are not the final consumer of the multimedia experience. These customers could be games distributors, educators, business advertisers and promoters, or entertainment companies. Thus:

The multimedia industry is primarily composed of those companies developing multimedia content for products that enable the consumer of the product to experience least three of: sound, text, video and graphics – simultaneously, and often in an interactive manner.

Though - as previously discussed - the multimedia industry more broadly includes the developers of multimedia tools, the focus of this study was on the users of these tools to develop multimedia content.

The key supply-side input to this critical value chain element is the tools available that can be used to capture or create visual images (both film and graphic), text and sound and manipulate them together. As these tools improve in terms of both their capabilities and ease of use, they drive the development of the industry.

Of equal importance are the (human) skills to use these tools.

The media & publishing (print and electronic), entertainment (including games), education (including training and business presentations) and business customers for web sites and presentations represent the demand side of the industry.

The supply constraints (multimedia tools, hardware to run these tools, and skills needed to use them) are tightly bound to the diffusion of technology. Similarly, demand is constrained by the availability of technology and equipment to distribute and ‘play’ such products.

Within this sector, we anticipated the following skills to be represented:

- Animation and 3-D modelling;
- Film and video production;
- Graphic design;
- Scriptwriting, translation and copywriting;
- Sound composition and recording;
- Interactive presentation design and development; and
- Electronic product design and development.

These activities can be considered to be concerned with the:

- Design and definition of multimedia products;
- Generation of content for multimedia products;
- Integration of content of various kinds (sound, text, video, graphics) into multimedia products; and
- Re-production, marketing, sale and distribution of these products.

No attempt was made to define the size of the industry in economic or employment terms.

⁸ More appropriately multimedia products are ‘experience products’ (see Shapiro and Varian ‘Information Rules’ Harvard 1999), the utility of which is only verifiable by ‘consuming’ (experiencing) them – though of course they are not destroyed or degraded by the process of ‘consumption’.

3 Methodology

3.1 Nature of questionnaire (Sector Specific Components)

The research was carried out by means of a questionnaire⁹, the core of which was the same across all sectors.

In addition to the standard questions, the following questions were asked:

Issue: Suppliers

7.1 Industry specific suppliers

Which software tools do you use to create multimedia products?

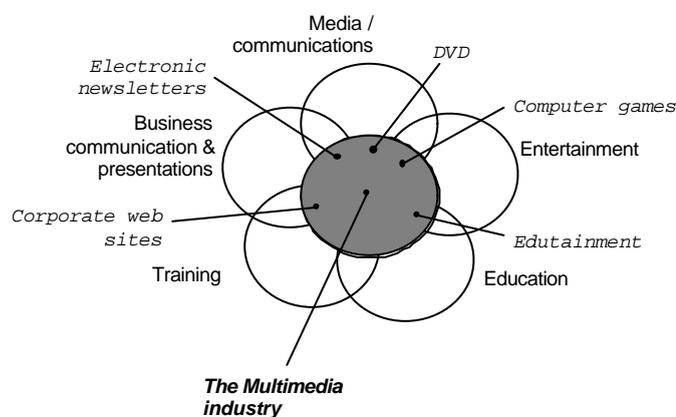
Name of multimedia tools used	Your usage is:		
	Declining	Constant	Increasing
1.			
2.			
3.			
4.			
5.			

Issue: Markets

7.2 Customers for your multimedia products

The following diagram illustrates some customers for multimedia products:

Industry segments encompassing multimedia



List your major customer segments and the types of multimedia products that you sell to them:

⁹ See Appendix 1 for example of full questionnaire

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Your markets for multimedia products	Multimedia products sold into these markets
A.	1.
	2.
	3.
B.	1.
	2.
	3.
C.	1.
	2.
	3.
D.	1.
	2.
	3.

7.3 General points about the use of ICT by your industry:

(free form notes)

Responses to these questions were used to inform the comment interspersed throughout the following discussion of the survey results (Section 4).

3.2 Questionnaire administration and interview process

Interviews were conducted between the middle of March and the beginning of May 2002.

The interviewer generally completed questionnaires during face-to-face interviews held on a one-to-one or group basis. The only 'groups' interviewed were two people from the same company who could each provide a different and valuable perspective on the use of ICT by their company and/or industry.

In two cases the interviewer completed the questionnaires during the course of a telephone interview, for which in one case the interviewee had been e-mailed the questionnaire in advance.

In one case the questionnaire was completed by the interviewee, after it had first been discussed telephonically.

Five different interviewers contributed valid questionnaires.

Seven questionnaires were rejected after the interviews were complete after the interview as it was clear that the interviewee / company did not qualify as a 'multimedia company', and as such they had no insight of value to contribute.

Several multimedia companies were identified during the course of the research that we did not have an opportunity to contact. These have been included in the schedule in the appendix.

3.3 Interviewees: selection and list by name and role in sector

Identifying ‘multimedia companies’ in accordance with the definition developed during Phase 1 of the project was a major challenge. During the course of the research a number of candidate companies were identified and contacted which were later excluded as they either did not fit the criteria and/or could not provide any insight into the use of technology by the multimedia industry.

Most multimedia companies are ‘small’ to ‘micro’ in size (less than 10 employees) – they tend to depend on a network of clients and personal reputation to attract clients. They are thus not generally ‘well known’ and thus not always easy to track down. Other than those few personally known to us at the outset of the research, we identified candidate companies by:

- Membership of DIMA (the Digital Interactive Media Association) – see <http://dima.org.za>;
- Listings on Web Developers Showcase – see <http://www.webdeveloper.co.za>;
- Web searches – on the premise that most multimedia companies are likely to have a web site; and
- Referral by other companies. Interestingly, few companies were able to name more than two or three competitors.

During the course of the research process we were referred to a number of likely candidates that we were unable to interview due to lack of time. The full list of identified companies is given in the appendix¹⁰. We are confident that this includes at least 80% of the multimedia companies in the country. (Alternatively, some of those identified – and listed - but not contacted may not be multimedia developers as defined.)

We did identify and interview more companies in Cape Town than in Johannesburg. This was because:

- Identification was frequently by onward referral – Cape Town companies (the research team is based in Cape Town) tended to refer us to other Cape Town companies.
- The observation (not statistically tested) that there are more multimedia companies based in Cape Town than in Johannesburg. Our district impression is that Johannesburg has a smaller number of larger companies, whereas Cape Town has a larger number of smaller multimedia companies.

During the course of the research we did also interview a small number of freelance (individual) multimedia developers. Though not ‘multimedia companies’ in the sense of the research definition (though in fact often trading through legal entities such as closed corporations), where relevant these were included because:

- They are respected multimedia designers with useful insight into the industry and its use of technology; and
- Much of the labour force of the industry is made up of individuals who act as freelancers contracting their skills on a project-by-project basis, or who move frequently between a roster of companies depending on the fortunes and thus resource needs of these companies.

We did also interview two representatives of a multimedia training organisations (City Varsity in Cape Town, and Concept Interactive).

Neither upstream suppliers of multimedia tools nor downstream distributors or customers for multimedia products were interviewed.

Overall:

¹⁰ See Appendix 2 for full list of multimedia companies identified during the course of the research.

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- Approximately 120 potential ‘multimedia companies’ were identified – this excludes individual free-lancers (of which there are many – more than 250 are registered with one ‘project broker’ in Cape Town alone)
- Approximately 90 were approached – at this stage many were filtered out of the process as clearly not being multimedia companies according to our research definition
- 57 discussions took place – in person or by telephone
- 46 interview forms were completed – seven of which were later rejected as not being representative of a member of the multimedia industry
- Valid interviews were conducted with 39 individuals from 30 different companies.

The companies that participated were (key contact in brackets):

1. /tinCrow (Peter Brandt)
2. Acceleration Media (Grant Keller)
3. Bandwidth (Peter Case)
4. Business Presentations Group (Keith Denner)
5. Cambrient Interactive Applications (Jarred Cinman)
6. City Varsity (Sandi Benskin)
7. Concept Interactive (Anje Merret)
8. Cyberzoo Interactive (David Werb)
9. Delapse (Gusaf Presket)
10. Digital Junction (Rob Ramsden)
11. DNA Creations (Dennis Willaims)
12. ePages (Martin Duys)
13. FCB Electric Ocean (Diane Ritchie)
14. Fireworkx.com (Steve Mathew)
15. Fur (Tracy Gander)
16. Gendel Interactive (Mike Gendel)
17. Generator (Ian Davidson)
18. Ideosphere (Richard Dorman)
19. Ikineo (Timea Kulscar)
20. Janus Gabalke (independent)
21. Interactive Limited (Tom du Plessis)
22. LARD (Chris Higgo)
23. Maverick Interface Design (Mark Parsons)
24. MicroMesh (Piotr Ogonowski)
25. Odd Digital Media (Robert Hofmeyr)
26. Ogilvy Interactive Worldwide SA (Sandra Woodburn)
27. Redshift Digital (Jaques Venter)
28. Tinderbox (Clint Bryce)
29. TypeO1.com (Mike McLennan)
30. Wireframe (Paul Tooze)

In almost every case the interviewee was a director or partner of the company – with the exception of independent freelancers and the multimedia teacher from City Varsity. Titles were managing director, creative director, client service director, or (in one case) technology officer.

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As stated above, 59 companies¹¹ were identified which actually or potentially fit the broad definition of 'multimedia company'. Of these, (subjectively) only five of those interviewed (and maybe six or seven of the total) met the research definition of a multimedia company, with full integration between strategic, creative and technical capabilities (see discussion of this following). These were all larger companies (for the industry), all with international clients. The remainder provided some – but not all – of these capabilities. Additionally there may of course be others (not interviewed) in South Africa with the same level of skills, experience and competitive capability.

4 Results and analysis

4.1 Multimedia companies – background information

Few multimedia companies refer to themselves specifically as such. All finally interviewed (and not rejected) do undertake the development of multimedia products as defined, but most also undertake a variety of development projects using digital media – including, for example, the development of web sites of varying degrees of complexity.

As noted above, of all the companies identified only six or seven (by our assessment) are multimedia companies in the sense that they are well-established companies consciously and primarily focused on the development of multimedia products, and capable of operating in the global market (from product quality, business promotion and client service perspectives).

Some others do not develop complete multimedia products, but – for example – are focused on the development of database and other 'back-end' tools that allow some multimedia products to function.

In every case, the definition presented of multimedia products and the boundaries of the industry was accepted as valid. Some commented that it was the most concise definition that they had come across; others debated the role of the medium used to distribute multimedia products, leading to interesting discussion around the extent to which the tangible medium constitutes the multimedia product. (General consensus is that the product is the digital content – not the CD-ROM or other medium that is used to store or transfer it.)

Companies producing multimedia products do refer to themselves as being involved in 'digital communications', 'interactive marketing' or 'strategic internet consulting and new media design'. This reflects both a lack of clarity as to what a 'multimedia company' does, and also a reluctance to 'box themselves in' in a marketplace that is changing rapidly – both in terms of what constitutes value and the perceptions of clients for multimedia products.

An important construct in the understanding of individual company operations is the relative importance placed on creativity versus technology, and the role of strategy as an element of the service delivered to clients. Thus, some companies focus more on the 'creative' elements of a multimedia product or communication (and are thus moving closer to advertising agencies) whilst others perceive the technological aspects of their products to be more important. Almost everyone says that they naturally deliver strategic consulting services to their clients – advising as to what outcomes are desirable or achievable and

¹¹ Listed at Appendix 2

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defining products to deliver accordingly. This 'tension' does impact the perceived role of technology in delivering products and services, and can be illustrated as follows:

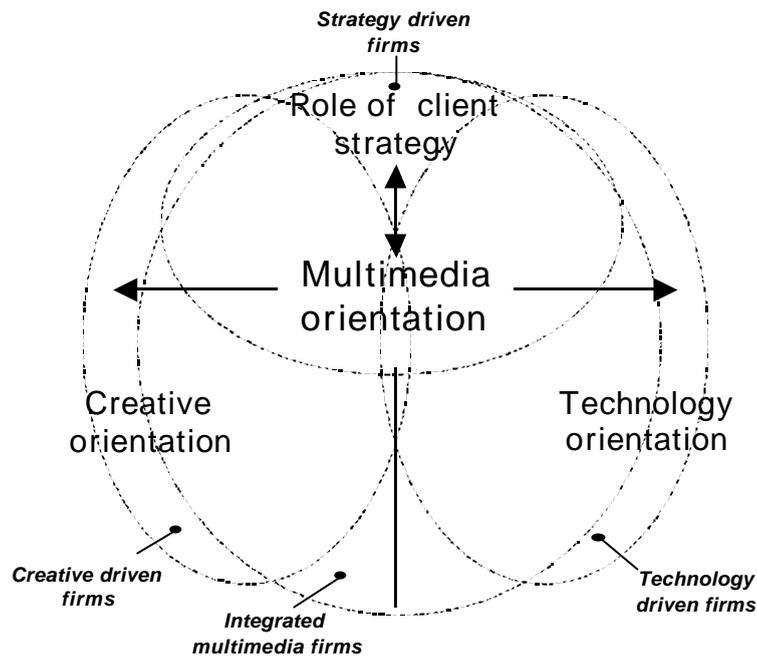


Diagram 1: Components of integrated multimedia company

The larger, full service multimedia companies have migrated through the supply chain to provide strategic, creative, technology and even reproduction services in-house.

Within the boundaries of this construct, we found a high degree of similarity between different multimedia companies. All use technology in similar ways and extent, varying primarily with scale according to the size of the company. The one exception to this being the ownership and use of digital video editing suites (costing from R1.5 million to \$20 million), which is only viable for larger (in multimedia terms) companies.

Company size

Most companies interviewed (63%) are 'micro' in size – less than ten employees. In this industry, 20 people constitute a 'large' company – only 3 had 20 staff or more. None had more than 25. (Thus the balance of the sample – 37% - are 'small' companies.) Of the 27 respondents who gave a precise answer, the average number of employees was 8.4.

The current economic conditions and demand for multimedia products has resulted in a recent shake out in the industry, with many companies going out of business, consolidating operations or being taken over/absorbed into more sustainable organisations. This trend seems to have had more impact in Johannesburg than in Cape Town, with the result that the larger companies tend to be found there. This also reflects the geographic concentration of demand for multimedia products for business communication.

It is important to understand that multimedia companies generally work on a project-by-project basis, rather than being contracted to deliver an on-going service to a select range of clients (often referred to as operating on an 'agency basis'). This does mean that demand for resources can be highly variable as projects are secured or concluded. Those that have managed to secure a more consistent client base have been able to invest more fully in both technology hardware and software tools and the human skills and expertise to use them.

23 of the 30 (77%) companies interviewed had or have overseas (that is international - not elsewhere in Africa) clients. Some also have international operations in the form of a

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physical presence – often a sales or client relations office, which feeds work back to South Africa for production. Other than through these, most international clients had been gained through personal contacts or as a result of specific company promotional efforts (such as sales representation as mentioned above). None had obtained such business as a result of the reputation of the South African industry. (One company with international offices does not even put their Johannesburg address on business cards!)

Thirteen companies (43%) only service clients in South Africa. Three companies (10%) had or have clients in Africa outside of South Africa. Only one of these three has international clients also, reflecting a promotional bias towards developed western countries.

4.2 Characteristics of ICT use

The average score for the 39 interviewees' involvement on ICT was 4.6 (with 1 signifying none or very limited involvement and 5 signifying extensive involvement). This denotes a high degree of ICT involvement within the respondent cohort and the industry as a whole. These companies view their ability to use ICT tools to create new and innovative products as a core skill.

The critical aspect of technology use by multimedia companies is to appreciate that multimedia companies only exist because certain types of digital technology – which encompasses ICT in general – allow them to exist at all. ICT use is inherent in the nature of the services that they provide, products that they offer, and tools that they use to do so.

The average number of computers across 29 companies (the City Varsity multimedia school excluded) was 17.62. With an average number of employees of 8.4, this is almost two computers per employee. This reflects the considerable number of respondents reporting the use of Apple computers (commonly used for graphic design) as well as 'PCs'. [Note: both are collectively referred to here as 'computers'; i.e. the question "approximately how many PCs is there in your organisation" was queried to include Apple computers.] Further, most companies have file servers linking their computers in a local area network, further increasing the computer/employee ratio. And one or two have high-end Silicon Graphics workstations, which use Unix operating systems.

However, this high use of computers should not be taken to mean that multimedia companies use all available technologies – far from it. Rather, multimedia companies tend to be highly selective about which technologies they use. But those that are used are utilised fully. For example, being micro to small in size, few need process control and business system automation technologies. But PC use, connected into local area networks, Internet connectivity, and the use of web applications and e-mail for information acquisition and exchange, promoting services, dealing with customers and conducting financial transactions is ubiquitous.

The following graphs illustrate the average usage on a scale of 0 – 5 (0 = not needed; 5 = fully utilised) of a range of ICTs.

ICT Usage - ICT hardware and communications infrastructure

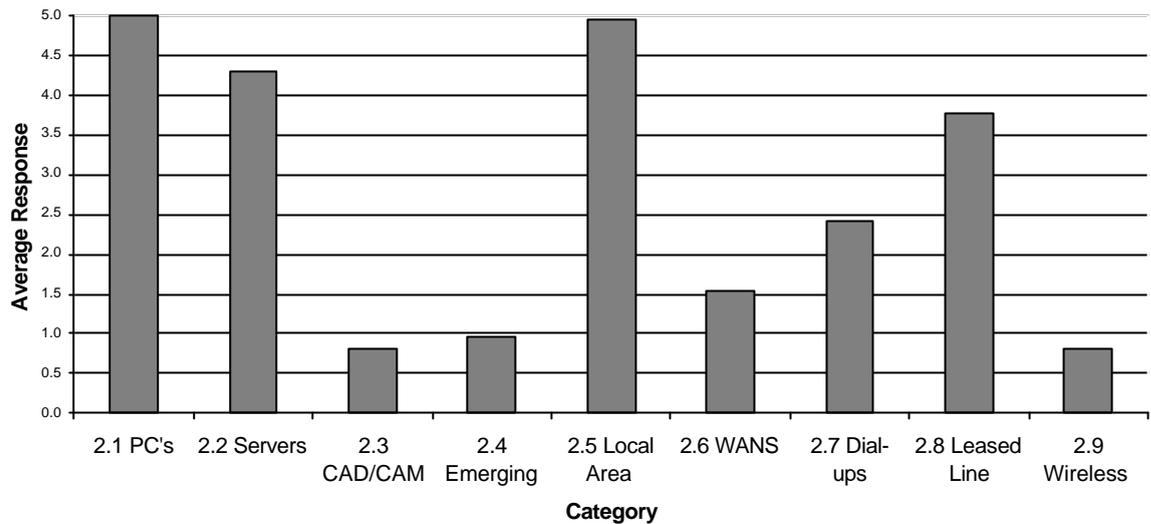


Figure 1a: Extent of ICT usage across a range of ICT hardware and communications infrastructure categories

Figure 1b: Extent of ICT usage across a range of ICT applications

ICT Usage applications 1

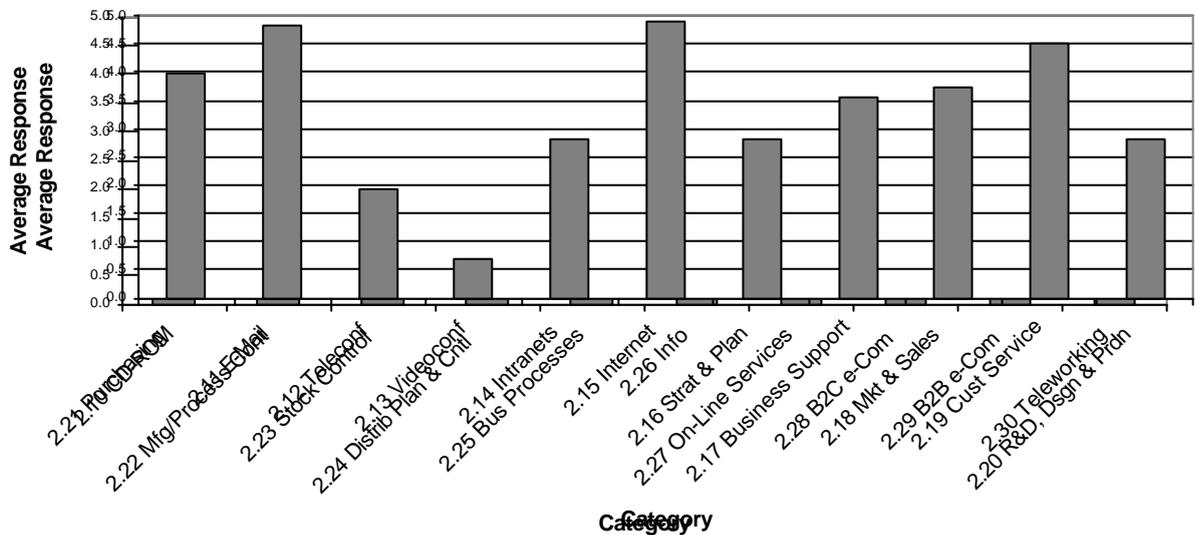


Figure 1c: Extent of ICT usage across a range of ICT applications

In summary, multimedia companies strongly tend to be heavy users of certain types of ICT – and especially those involving networks, including the Internet (a key medium for the distribution of multimedia products) – whilst having less use for technologies for the coordination of large scale or logistically complex processes. Their products are virtual – except when transferred to CD-ROM there is no apparent need for manufacturing process

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control or inventory management¹². Familiarity with ICT means that the provision of on-line services, the completion of commercial (B2B) transactions and some degree of teleworking is the norm.

Basic Technologies

PCs (or Apple 'Macintosh' equivalents – generally for graphic design purposes) together with file servers networked locally are fully utilised. Most interviewees view the Internet as a wide area network, which again is fully utilised – no instance of the use of a virtual private network was identified. Most use leased line Internet connectivity. Emerging technologies (as defined in the questionnaire) have no use, though other newer technologies such as digital 3-D rendering and digital video editing are frequently found. Wireless networks – even for local internal use – have not yet been adopted (this is still a novel technology and with legal limitations on use). The delivery of multimedia content over wireless cellular networks is limited by network bandwidth and the low penetration of WAP¹³ handsets, though SMS¹⁴ use for promotional purposes is growing.

Applications

E-mail is the prime source of information acquisition – workers in multimedia companies have their computer in front of them at the centre of the desk, not to one side. Most 'live on e-mail'. A few use teleconferencing occasionally (sometimes using web-cam technology), but most see this and videoconferencing as unnecessary and expensive. The Internet is used for communication, information gathering, business promotion, providing customer support and for transaction processing.

ICT is used for stream-lining relevant business processes – shared files are generally stored on central servers for knowledge management purposes, and accounting functions are performed with appropriate PC based packages. Most rely on digital communications to promote their businesses – though never exclusively (face-to-face contact with clients is still important!)

Customer records are stored digitally, and some aspects of project management and related process control are performed via the network – though the paper 'project job file' has not yet been superseded.

As stated previously, there are no uses for manufacture process control, inventory management or distribution management systems within this environment.

Multimedia products are themselves responsible (in part) for transforming business processes, and so – as one would expect – they are fully utilised where appropriate. The provision of information on-line or via websites, as well as quoting process, answering queries and taking orders by e-mail is fully utilised. Business-to-business transactions are mostly – and when ever possible – concluded on-line. Teleworking is common – though not extensively used (partially due to the high cost of bandwidth into homes or other remote work locations – people come to a place of work because that's where the connectivity is!)

When further probed, respondents generally did not see certain technologies as 'needing emphasis' – they are understood and used as tools to do a job of work. What was very frequently mentioned instead was the need for skills development. This is also universally seen as a major inhibitor of the achievement of business goals, together with access to viable markets. Appropriate expert skills are in short supply, and competent and

¹² Theoreticians have subsequently mentioned the possible need for asset management software to manage multimedia content, but interviewees did not mention this.

¹³ Wireless Application Protocol, a technology standard for the delivery of digital content to cellular telephones.

¹⁴ Short Message Service, a format for the delivery of 160 character alphanumeric text messages to cellular telephones.

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experienced developers of multimedia products are in demand – even in a static (or – for some – shrinking) market.

The ‘technologies and application areas needed for growth of the business’ are seen to be not the development of new technologies, but rather the penetration of existing technologies into the workplace and the populace at large so that more people will be in a position to utilise multimedia products. The limits on this are taken to be the sophistication and education of the general population, and the very limited ability to afford the necessary technology platforms – for example, home PCs – as well as the exorbitant cost of bandwidth and connectivity (by developed world standards).

Since this situation locally is unlikely to change any time soon, the local market is not expected to deliver significant growth for the foreseeable future.

Specialist ICT use

The sector supplementary question (7.1) examined which multimedia development tools are used by the industry. These fall into the following categories (specific products listed if mentioned).

- **Graphic design tools**
 - Adobe Photoshop
 - Quark XPress
 - Macromedia Freehand
 - Softimage
 - Corel applications
- **Presentation tools**
 - Macromedia Director
 - Microsoft PowerPoint
- **Web site development tools (visual)**
 - Macromedia Flash
 - Macromedia Dreamweaver
 - Adobe Illustrator
 - Microsoft Interdev
- **Web development tools (applications programming)**
 - HTML
 - Microsoft ASP
 - Java and Java tools (e.g. Borland’s JBuilder), JavaScript
 - Microsoft SQL Server
 - Microsoft Visual Basic, VBScript
 - Macromedia ColdFusion
- **Animation tools and visual effects**
 - Maya
 - Softimage|xsi
 - Houdini
 - Alias Poweranimator
 - Discreet 3DS Max
 - Adobe After-Effects
 - MetaCreations Bryce
- **Sound tools**

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- Fruity Loops
- **Editing tools**
 - Apple Final Cut
 - Adobe Premiere
- **Production tools**
 - Apple DVD Studio Pro
 - Apple QuickTime

Given the variety of tools used by the different companies, few discernable trends in usage are apparent. However, everyone who mentioned them noted increasing use of animation tools and visual effects tools.

Comment¹⁵

International positioning and growth potential through ICT utilisation

The multimedia industry is a product of the rapid spread of digital technologies for information management, communication and entertainment. Without the logarithmic increase in computing power¹⁶ and the rise of the Internet as the ultimate network of networks (so far), the platforms for the ‘viewing’ of multimedia products would not exist. Thus the growth of the multimedia industry is dependent upon the availability and diffusion of hardware platforms (computers and other computer-based hardware such as games consoles) within a given market. Without access to these platforms people cannot experience multimedia products. As access to these platforms diffuses through society so demand for multimedia products will grow.

The size and rate of growth of the market for multimedia products in South Africa is thus limited by the rate of diffusion of computers (multimedia viewing platforms) throughout homes and businesses. Computers are now ubiquitous in most more sophisticated businesses, but the number of people with access to computers and other multimedia-capable computing platforms either at work or at home is still a small proportion of society. The current rate of growth is thus low off a low base.

This has two consequences:

First, most multimedia products developed in South Africa are for the purposes of business-to-business communication. These mainly take the form of company web sites, promotional and sales presentations and tools. When the Internet is not the medium of distribution these take the physical form of CD ROMs.

Second, the focus of South African multimedia companies wishing to expand their client base is on international, developed world markets – primarily in America and Europe.

The multimedia companies interviewed are confident that they can compete in these markets on the basis of product quality (including innovative use of multimedia development tools to create new kinds of product), price and delivery time. [It may be more realistic for multimedia companies to focus on only certain elements of the competitive mix for promotional purposes, in the same way – for example – as India has developed a reputation for software development of the basis of price.]

Industry markets for multimedia products

¹⁵ These comments on ICT use are additionally based on comments made and captured under Section 7 of the questionnaire.

¹⁶ The increase in computing power is often described in terms of Moore’s Law, which states that the computing power available for \$1,000 doubles every eighteen months. Ray Kurzweil in his book ‘The Age of Spiritual Machines’ (Penguin Putnam 1999) demonstrates that this law has basically held true since the start of the 20th century (before Moore postulated it) and shows no sign on failing well into the 21st century.

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As noted, most multimedia products currently developed in South Africa are for the purpose of business communication.

Multimedia products for training and education are starting to be developed as the benefits for self-paced education become appreciated.

Computer games are a form of multimedia product, which has a very small market in South Africa – they require (relatively) high-performance machines to be available in the home. Just about all commercially produced computer games are imported. South African multimedia companies do have some growing experience of producing games for promotional purposes, and one company was identified which is currently engaged in the development of a computer game for commercial distribution (the primary markets being America and Europe).

During the survey one company was identified specifically focused on multimedia products for the gaming (gambling) industry, whilst another (not included in the schedule in the appendix) supports back-office functions for a number of international gaming sites. (This latter not categorised for the purposes of this survey as a multimedia company.)

Several of the more sophisticated multimedia firms identified have a market focus on the television and film industries, producing multimedia branding and special effects ‘products’ (typically digitally manipulated video and computer generated graphics) – though these are not interactive (as yet!). These companies help to benefit from Cape Town’s growing position as a film location – though the meaningful transfer of post-production activities to Cape Town will be required before this can really take off.¹⁷

Multimedia as a driver of ICT diffusion in the local market

Though the South African market for multimedia products is limited as a result of low penetration of computing platforms, the immediacy and utility (read: entertainment and fun!) of multimedia products may also become a driver of ICT diffusion throughout South African business and homes. People will buy computers (provided they can afford them) when they can be used for some valued purpose – not just for their own sake. Experiencing multimedia products may be such a purpose.

However, the ‘need’ to experience multimedia products may be diverted into the purchase of digital platforms such as DVD players rather than computers – still potentially good for the local multimedia industry but without the positive benefit of spreading access to more generic computing and communications technology.

4.3 ICT spending patterns

¹⁷ There is currently only one post-production unit of substance in Cape Town.

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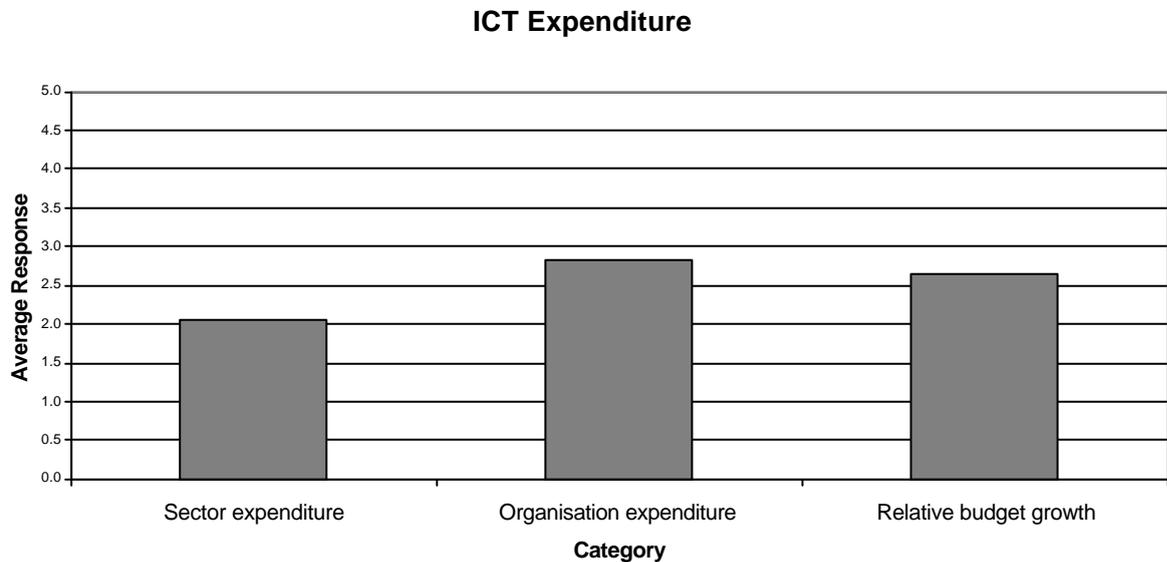
On average, the South African multimedia sector's ICT expenditure is reckoned to be slightly less than the norm, with an index of 2.1 with a standard deviation of 1.36 (scale: 1= much less than the norm; 3 = about the norm; 5 = much more than the norm). However, most companies thought that they spent about the norm (index 2.8, standard deviation 1.22) when compared to other companies in their sector. This reflects the reality in South Africa that both the hardware and software tools are imported, and the industry's customers do not demand products that require the latest tools (as most do not know what is possible). Rather, developers use the tools available to deliver ever more innovative multimedia products.

Figure 2: ICT spending patterns

Some respondents (generally from smaller companies) considered the question asking about the rate of growth expenditure on ICTs relative to other areas to be irrelevant, but of those who did respond (n=22), the consensus is that IT expenditure is not keeping up with other demands (index 2.6, standard deviation of 1.28). This may reflect the downturn in the current market, putting pressure on capital investment.

4.4 Sources of ICT Information and Training

Information



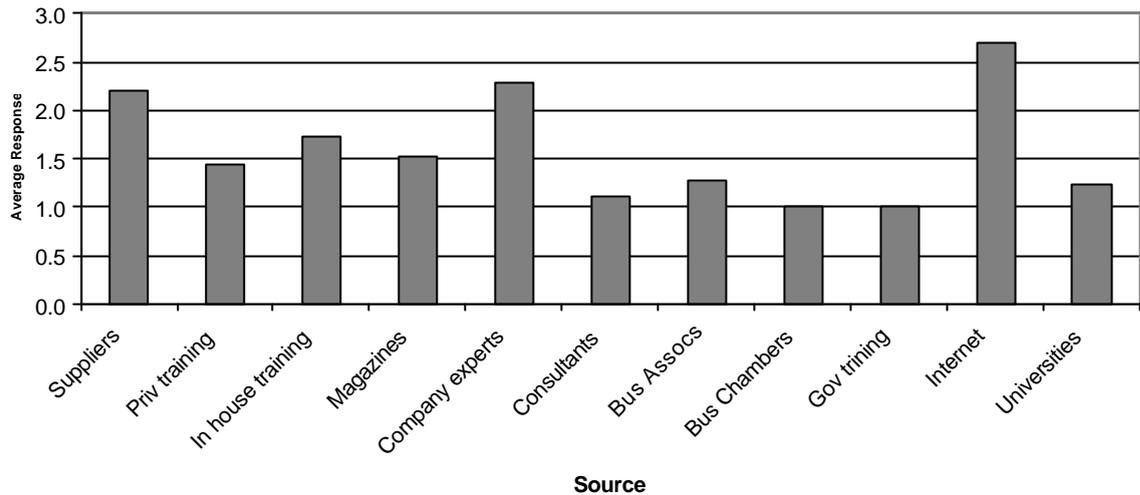
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Respondents primarily use the Internet, followed by in-company experts, equipment and software vendors, and newspapers magazines and journals as a source of information about ICT developments. (Scale: 1 = least used; 2 = sometimes used; 3 = most used).

Figure 3: Sources of ICT related information

Training programmes (from what ever source) and external organisation such as business

ICT Training

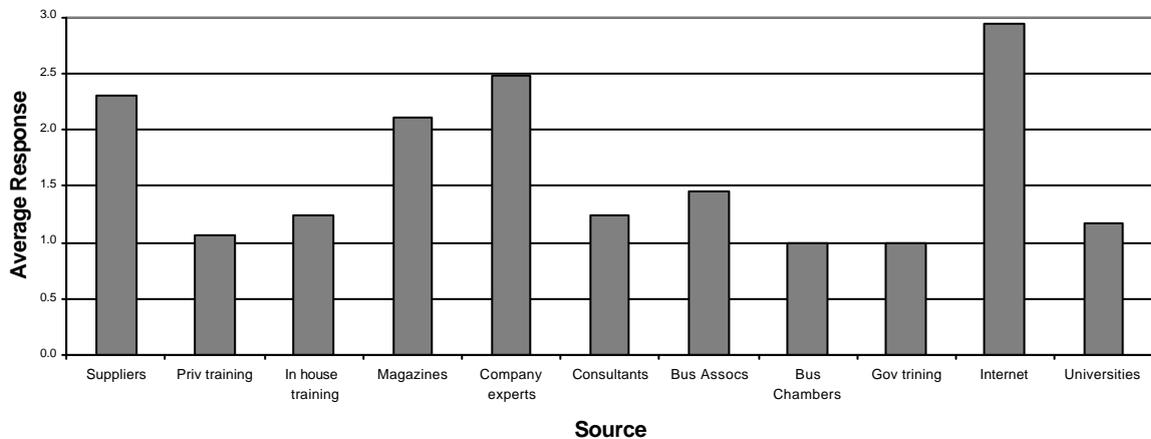


associations are little used. This is mirrored by the sources of ICT related training, illustrated in Figure 4.

Figure 4: Sources of ICT related training

Again, Internet sources followed by company 'experts' and suppliers were the main source of training. In house and private training schools, together with magazine publications were

ICT Information



ranked next.

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Many employees of the industry have some formal technology training, gained either at school or at a tertiary institution. This is augmented through experience as skills in the manipulation of multimedia development tools are developed.

It should be remembered that within the multimedia environment, the technology is constantly changing, and employees in the industry are generally always keen to learn new skills. New information is quickly put into practice – training and skills development becomes ongoing as staff continually ‘learn-by-doing’. This is also reflected in the relatively little faith placed in formal training initiatives for further training (though initial training to gain entry into the industry is better regarded). Staff are primarily employed on the basis of basic aptitude (a rare blend of logic and mathematical skills married with creative ability), and their level of experience.

ICTs are inevitably used in training, as ICTs are the tools that must be mastered to do the job. No respondents were aware of any government initiatives supporting the ICT industry.

Comment¹⁸

ICT related costs are the major expense of multimedia companies. These costs break out as follows:

- Hardware costs, including maintenance and support;
- Multimedia and tools and other applications;
- Network and connectivity costs; and
- Skills acquisition and retention.

The first two costs are basically priced in US Dollars, and thus are relatively high for South African companies when compared to their developed world competitors.

Connectivity costs – especially the cost of bandwidth – are generally higher in South Africa than in the countries of competing multimedia companies. This negatively effects the local cost structure, as well as the costs associated with servicing overseas clients.

Skills are in high demand and command a premium relative to other similar ICT skills, but are still less costly than those of competing developed world companies.

Other costs of doing business (rent, utilities etc) are lower than those of competing developed world companies.

The development and retention of skills is thus the main competitive factor. Skills are currently developed mainly through access to online information (available to anyone with an Internet connection –i.e. a fortunate minority), interaction with vendors, and through experience. Current industry training programmes (outside of in company training) are generally perceived to only get candidate employees ‘onto the playing field’, not ready to contribute value to the company. Many industry employees have developed the necessary additional skills and experience at least partially through a personal investment in self-training, just as a musician may achieve professional competence through practice and amateur performance.

Generally these costs are not a barrier in this industry to ICT use and diffusion, but do reduce the international competitiveness of the industry from a price perspective. However, these are generally perceived to be less of a barrier than identifying and promoting to potential customers in overseas markets – especially in the absence of an industry reputation and a general perception of South Africa that does not position it as a hub of creative IT and multimedia skills.

¹⁸ These comments on ICT information and training in the context of overall costs are based on additional comments made and captured under Section 7 of the questionnaire.

4.5 ICT adoption: drivers and barriers

On this scale, an average score of three indicates that the relevant factor has no influence on ICT adoption; less than three indicates a negative influence whilst more than three indicates a positive influence.

The strongest positive economic driver is the multimedia industry’s general culture and overall attitude towards ICT; for many these are more than ‘just tools’. ICTs are a means of creative expression as well as source of income and profit. (However, this should not be taken to mean that ICT spending is undertaken recklessly, especially in the current poor economic environment; larger companies especially expect a measurable return on their investment on the technologies they employ.) The expectation of increasing global business opportunities is also a positive factor, as well as the need to stay competitive. On the negative side, current economic conditions and short-term competition are a current disincentive to investment in the further adoption of ICT.

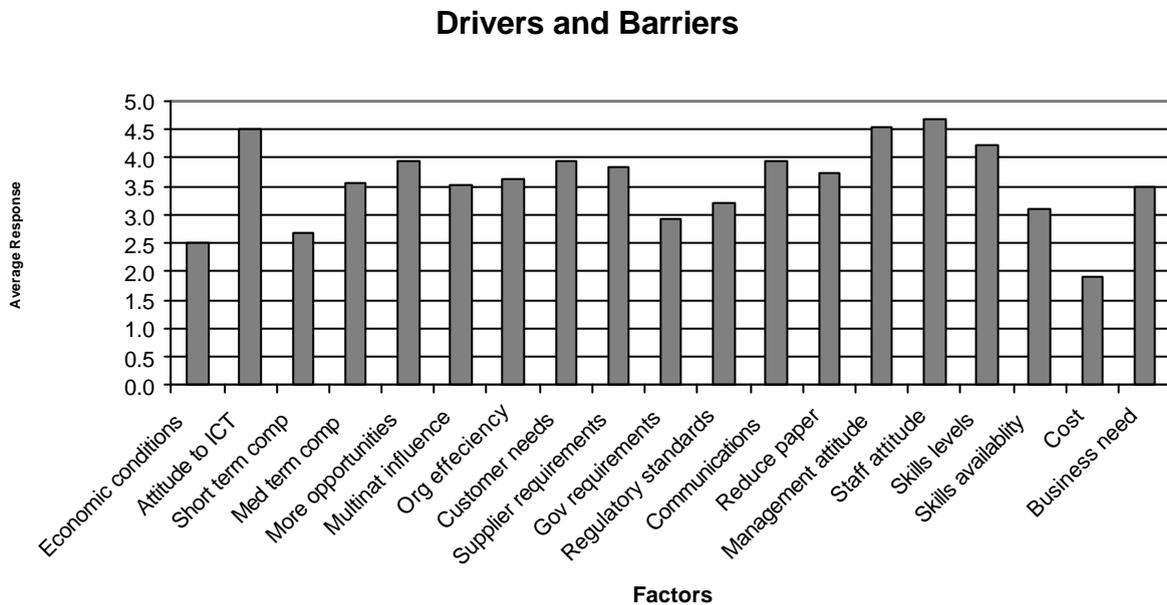


Figure 5: Drivers and barriers to ICT adoption

Supply chain factors are marginally positive, with responding to customer expectations and the continual push by suppliers to adopt new tools (or new versions of tools) the main drivers. The ubiquitous business needs to improve communications and reduce paperwork were also cited.

Internal factors are overwhelmingly positive, with the exception of cost, and the critical availability of skills to use the technologies available.

Responsibility for IT

The larger companies do have a specific individual responsible for managing ICT within the organisation – some even having a dedicated support staff. Six companies reported having a ‘chief technology officer’ (CTO) or similar – though not always with this as their only responsibility. But within the smaller firms the rule is that ‘we all look after the technology’. This reflects an industry culture that encourages individual responsibility for the application of technology. Even CTOs function primarily at a strategic – not operational – level.

Concern for security

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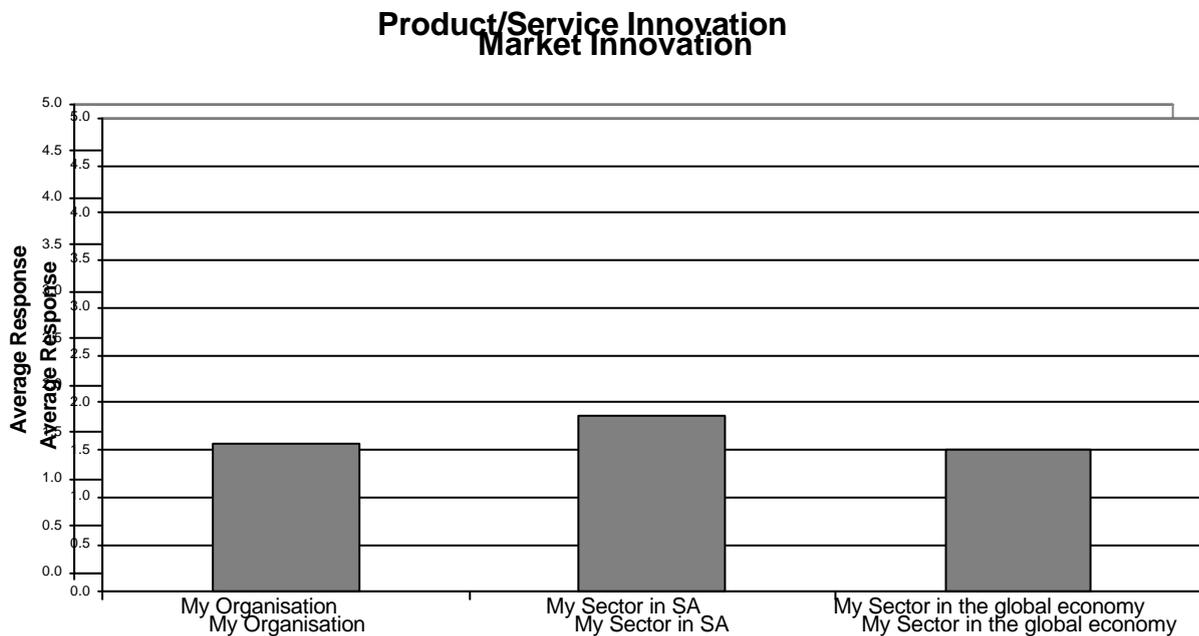
There is a high level of proactive concern for data integrity and security. Even in small companies, firewalls, back-up systems, virus protection tools and secure servers are the norm.

As most companies are not routinely dealing with personal data, a specific focus on the confidentiality of such data is not an issue. Web sites and other multimedia products that do collect personal data routinely have a stated privacy policy, though these vary considerably.

4.6 Diffusion of ICT

The final general section sought to determine the extent of diffusion of ICT by various categories of application. In each case the extent of diffusion was ranked according to the following scale:

- 1 = innovator
- 2 = early adopter
- 3 = early majority
- 4 = late majority
- 5 = laggard



(- derived from Everett Roger's model¹⁹.)

Figure 6: Product / service innovation

Respondents are innovative (index 1.6, standard deviation 0.67), with most considering themselves to be more innovative than their competitors in the multimedia sector in South Africa (index 2.1, SD 0,87) but less so than their competitors globally (index 1.5, SD 0.81)

¹⁹ Rogers E.M. *ibid*

Administrative Process Management

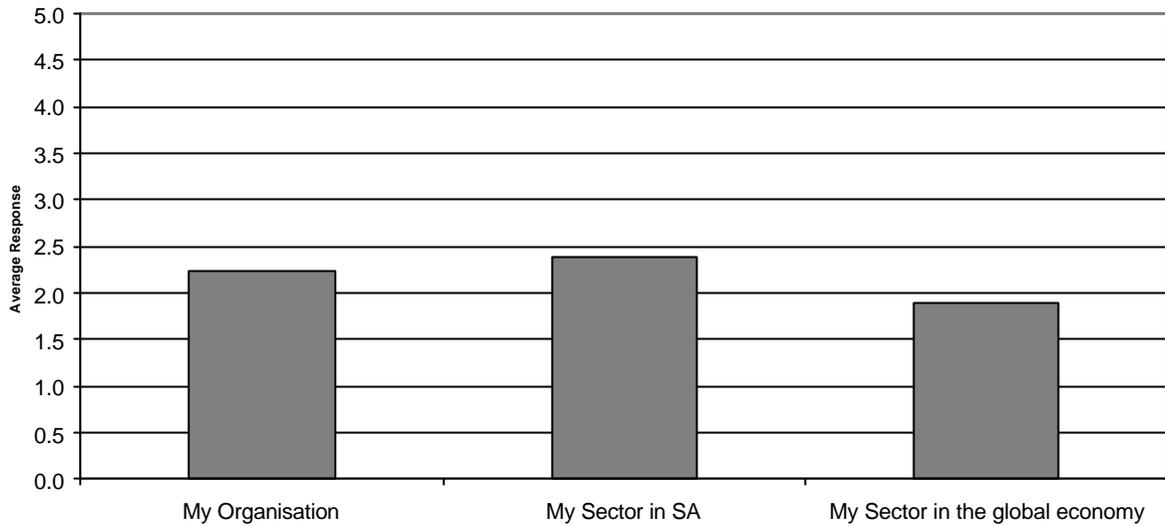
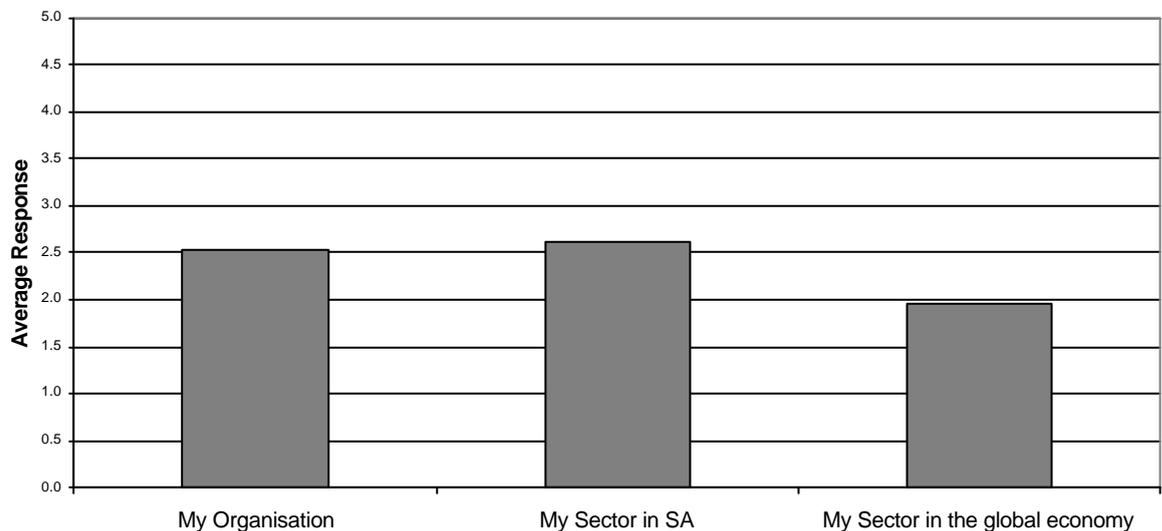


Figure 7: Market innovation

Respondents again considered themselves to be innovative (index 1.6, standard deviation 0.90), with most considering themselves to be more innovative than their competitors in the multimedia sector in South Africa (index 1.9, SD 0,86) but comparable with their

Relationship Management

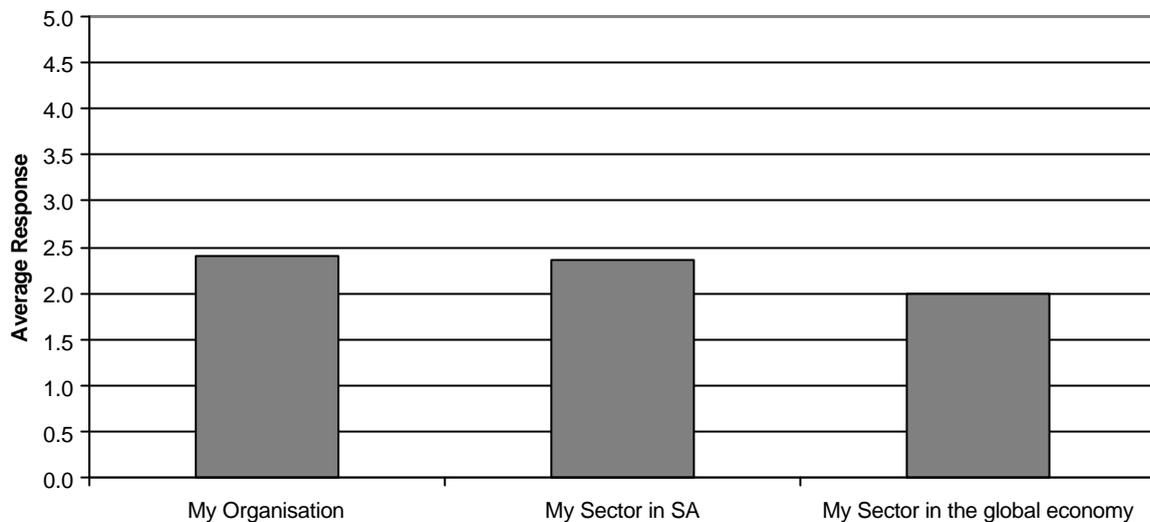


competitors globally (index 1.5, SD 0.58).

Figure 8: Administrative Process Management

Respondents considered themselves to be early adopters of innovations in the area of administrative process management (index 2.2, standard deviation 0.95), with most considering themselves to be marginally more innovative than their competitors in the

Resource Management



multimedia sector in South Africa (index 2.4, SD 0.78) but less so than competitors globally (index 1.9, SD 0.69).

Figure 9: Relationship management innovation

Respondents considered themselves to be early adopters/in the early majority in the utilisation of innovations in the area of relationship management (index 2.5, standard deviation 1.23), with most considering themselves to be marginally more innovative than their competitors in the multimedia sector in South Africa (index 2.6, SD 1.23) but less so than competitors globally (index 2.0, SD 0.81). Overall this reflects an industry where each company has a relatively small number of individual B2B clients. [Larger companies with multiple clients primarily benefit from current relationship management tools.]

Figure 10: Resource management innovation

Respondents considered themselves to be early adopters/in the early majority in the utilisation of innovations in the area of resource management (index 2.4, standard deviation 1.12), with most considering themselves to be the same as their competitors in the multimedia sector in South Africa (index 2.4, SD 1.03) but less so than competitors globally (index 2.0, SD 0.96).

Comment²⁰

The multimedia industry in South Africa is an innovative adopter of ITC tools that are relevant to its needs – though this attitude towards technology permeates even the adoption of ITC tools that are non-core, resulting in adoption – for example - of relationship management and administrative process tools ahead of most other industry sectors.

If multimedia companies are typical, then it would seem that companies who use specific digital technologies for their core production process are also highly likely to use ICT business tools in support of their administrative business processes and promotional activities.

²⁰ These comments on ICT diffusion are additionally based on comments made and captured under Section 7 of the questionnaire.

Provided that the industry can remain viable and access international markets, then the advanced diffusion of ICT is likely to remain or even advance further towards perceived international norms.

5 Conclusions and Recommendations

5.1 What can the sector do to better exploit ICT?

By its nature, the multimedia sector already tends to exploit appropriate ICTs to the full. Further exploitation will depend upon the expansion of the industry both in terms of scale and exposure to international clients. Opportunities to develop products for the global market – for example games for MS X-Box or Sony PlayStationII – would also tend to encourage greater exploitation.

5.2 What can the ICT industry do for this sector?

In the broader sense a more relevant question might be ‘what can the multimedia sector do for the IT sector?’ As previously commented, multimedia products could act as a driver of the diffusion of ICT platforms into companies and homes as a means of entertainment and education.

On a similarly broad level, the multimedia sector will benefit from any promotion of South Africa as a locus of competitive and innovative IT skills and companies.

The ICT industry can, in turn, better support this sector by attending to its need for skills, and – where possible – the high cost of hardware and imported software tools. Bandwidth costs are also an inevitable concern that could be addressed – in conjunction with government (though this is a concern of business in general, not only of this sector).

5.3 What can government do?

In conjunction with government or collaboratively as an industry, there are a number of initiatives that could be considered to assist the growth of the multimedia sector:

1. International orientation

Critical for sector growth will be the identification of factors required to increase international visibility and penetration.

First, multimedia products need to be recognised as viable exports, capable of generating appreciable foreign exchange earnings. As ‘virtual’ products they are often thought of – and categorised – as ‘services’, but with the right distribution appropriate products can be resold to multiple end consumers. The creation of opportunities to develop multimedia computer games and educational and training programmes should be explored.

International marketing support under the Export Marketing Investment Assistance (EMIA) programme could be provided.

Many multimedia products are aligned with the entertainment industry; South Africa’s multimedia companies should be showcased at the *Sithengi* film and programme market held in Cape Town each year.

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Cape Town also already hosts the annual *Design Indaba*, which has become one of the premier design festivals and conferences in the world, attracting international speakers and visitors. Whilst already having a focus on digital design, links with the multimedia industry should be encouraged and made more explicit.

Multimedia products could be used to showcase not only the South African multimedia industry, but also its IT industry and the country as a whole. The medium as well as the content is critical in sending out an appropriate message to the world.

2. Increase pipeline factors

The future growth of the industry can be supported by ensuring a supply of its critical resource – skills. Current skills development for the industry is *ad hoc* and uncoordinated.

Major technology costs are imported: potentially offsets could be negotiated against exports.

3. Facilitate infrastructure support

The infrastructure requirements of a multimedia company are considerable – both in terms of physical facilities and technology infrastructure including networks and tools. Co-location of multimedia companies in shared facilities could help to spread and lower some of these costs. ‘Multimedia hives’ should be investigated.

The cost of connectivity and (especially) outward bandwidth limit the ability of local multimedia companies to communicate with international clients, distribute products and provide support services. The reduction of the cost of access to this vital input should be aggressively pursued through the introduction of telecommunications and network competition.

4. Other

Multimedia product development companies focused on servicing international clients could be afforded export processing zone benefits to reduce costs and enable local firms to break into international markets.

The high cost of licensing multimedia software tools may potentially encourage the local development of alternatives.

6 Conclusion

The multimedia industry in South Africa is a nascent industry with considerable potential. All participants are necessarily heavy users of ICT based multimedia development tools, and subsequently also innovative users of other ICT business tools. The role of the industry in ICT diffusion, and the value that it can add to other industries should be fully recognised. Certainly, a healthy multimedia industry is critical if South Africa is to have a vibrant ICT sector, and more generally participate in the emerging global knowledge economy.

What the industry really needs is to become globally competitive – not just produce products of an international standard, but also develop an international profile. This means finding ways to promote the industry (not just individual companies) to a global market. A first step could be the formation of an ‘export council’ which would market the multimedia cluster into key international markets. The ripple effects of success would be considerable for the ICT sector, South African business and South African economic and social development as a whole.

7 Appendices

Questionnaire with sector-specific components

See attached file ICTdiffusion_Questionnaire_multimedia.doc



"ICTdiffusion_Questionnaire_multimedia.doc"

Interviewee list and identified multimedia companies in South Africa

See attached file Multimedia_database(29052002).xls



Multimedia_database(29052002).xls