CREATIVE INDUSTRIES CLUSTER STUDY

STAGE ONE REPORT

Contents

EXECUTIVE SUMMARY

The purpose of the first stage of the Creative Industries Cluster Study is to undertake a preliminary analysis and mapping of the industries producing digital content and applications identifying the key enterprises, their location and productivity drivers and barriers. The findings of this stage of the study will be used to inform more detailed analysis proposed for further stages of research.

There are large economic and cultural gains to be captured in digital content production and applications development. The wider information communications technology (ICT) industries need the content and applications industries in order to innovate new services and new ways for people to interact with information systems.

In turn, the content industries need the new vistas that digital forms provide. This will require new business models and ways of working, as well as new skills and infrastructures to support business management and collaborative work within the digital content and applications industries themselves.

Digitisation and the possibilities of convergence are a disruptive process for Australia's creative and related content industries. It presents opportunities and threats to companies engaged in the production, acquisition, distribution and consumption of content. Established industry structures and markets are changing and companies are attempting to navigate this new environment.

The role of clusters in creative and related content industries, which is well documented, involve collaboration between small-to-medium sized firms in investment, production and distribution of content. This report has investigated the extent to which existing or new clusters have developed in the production of digital content and applications.

A key finding of this report is that some creative and media industries, like music and film post-production, are undergoing significant changes and are increasingly engaged in the production of digital content and applications. In other industries, the impact of digitisation has been slower or less dramatic resulting in a smaller changes to the production of content.

It is interesting to observe that while digitisation has led to significant changes within some industries, there has so far been little apparent impact on the linkages and extent of collaboration between industry sectors.

Another key finding is the small scale of digital content and applications development activity in Australia. This presents a major limitation that must be faced in any strategy to position Australia's industries in global value chains. Australia is a small player, and this presents a difficult challenge. Australia's relatively small and fragmented domestic industry contrasts with the rising direct government support and increasing levels of vertical and horizontal integration observed in some industries overseas.

Marginalisation in the global value chain is a significant threat faced by small players in the market. The key opportunity is simply the reverse: by developing the new capabilities required by the global digital value chain, a strong globally-competitive position can be established.

The implications for Australia are two-fold:

- policies for digital content and applications industries must address the issue of our positioning in global marketplaces, including in the downstream distribution channels where large multinational firms dominate; and
- policies must have regard to the capabilities of our industries to deliver commercial outcomes in the new global digital value chain.

The industry development agenda that emerges is clearly not the same as the existing cultural agenda. It extends beyond the traditional 'cultural' industries into areas like software development, industrial design and distributed computing—and focuses on commercial capabilities rather than purely on cultural outputs. This economic agenda complements cultural policy by giving attention to the capabilities that underwrite the content industries' capacity to create and innovate.

Cluster development in the Australia digital content and applications industries is embryonic and patchy based on the limited data available. There are encouraging signs in some industries, but industry fragmentation and small domestic market discourages the collaboration and long-term investment that underpins cluster development.

From this study, it is clear that cluster approaches do potentially offer a means of addressing barriers and market failures in the digital content and applications industries, and that these approaches warrant further, more detailed investigation. Clustering provides an organising principle for mapping the development of these industries, but other elements including the role of government support and access to finance and distribution need to be addressed as well.

The preliminary findings of the Study against the Stage 1 Terms of Reference are:

1. **Drawing on published data and interviews with industry associations and experts identify the key enterprises engaged in the production and marketing of digital content and applications in Australia, the enterprises which support those activities, and their geographic distribution.**

Data

- Useful information on these industries is currently limited and patchy because published data does not align with any comprehensive industry definition. They also miss significant in-house production activities.

- There is a need for more systematic collection, research and analysis of information on these industries. The respective roles of government and private sector research organisations in undertaking this task needs further examination.

Industry structure

- The Australian Bureau of Statistics (ABS) identifies around 7 000 firms in these industries. Most of these firms are small businesses, with the exception of a few production and distribution entities that wield significant market power in certain industries.

- The Study did not have the resources to undertake a comprehensive survey of the key enterprises in the industry. However, it is apparent that certain firms, operating principally in the established media, are key to the industry as well as some smaller enterprises which have a leading role in the development of digital content and applications.

Geography

- Relevant firms are located in all of Australia's major population centres. There is a definite tendency for these industries to group together within certain postcodes, but it is difficult to determine the extent to which this is due to clustering dynamics.

Linkages

- Some industries like film and interactive games exhibit some strong internal linkages. Otherwise existing linkages mostly appear to be bilateral commercial relationships along the value chain.

- A strong impression is that there are few linkages between different industries under the 'digital content and applications industries' umbrella. These industries still operate as independent industry silos and do not collaborate on shared issues or interests. There is little awareness of common interests or issues.

- Horizontal collaboration on shared issues such as skills formation or infrastructure investment is patchy or *ad hoc*. There is also little evidence of robust industry linkages to educational institutions or telecommunications carriers.

Other digital content production and acquisition

- There is a significant amount of in-house production of content and applications not identified in published data. In particular, the public sector is a significant commissioner and producer of digital content and a sponsor of many kinds of creative activity.

- An increasing number of companies in other industries (e.g. finance, travel, etc.) are involved in the either the production or acquisition of digital content as a component of their electronic business activities.

2. Identify and describe the drivers and barriers that Australia's creative industries face in producing digital content and applications.

Drivers

- Demand for digital content and applications to underpin service delivery is growing steeply.

- Demand is variable for different digital content. There is also an important difference between economic demand (involving revenue) versus user demand (which on the Internet is currently largely free), implying a high elasticity of demand.

- Demand drivers include the growing familiarity of Australians with IT and multimedia services, business demand for improved communications technologies and demographic factors such as the growth of 'IT-savvy' demand segments amongst the young.

- The falling prices of technology, its ease of use and the emergence of standardised platforms are all reducing costs of digital production and usage significantly.

Barriers

- Industry fragmentation limits the scope for collaboration to promote investment in shared capabilities and infrastructures, and Australia's lack of global scale in many content industries exacerbates this problem.

- There are poorly developed business models in many markets for digital content and applications, limiting incentives for both production and digital infrastructure investment.

- Digital rights licensing and management systems are still at an early stage of development. This leads to difficulties, especially for small firms, in acquiring and managing digital rights and uncertainty about what constitutes reasonable terms and conditions.

- High levels of risk and the project by project basis of these industries make a particularly difficult environment for raising finance.

- Access to some kinds of production, business and project management skills is limited.

3. **Identify, describe and provide a preliminary assessment of any market failures that may be restricting the growth or development of Australia's creative industries producing digital content and applications, having regard to similar assessments conducted in other country markets.**

Market failures

- Fragmentation of these industries exacerbates other market failures related to information difficulties and investment disincentives.

- The lack of information on digital business models appears to be a market failure, but a complex one. Small firms in particular would be assisted through access to timely research and analysis of emerging international business models. This issue might also be addressed through support for a commercial pilot of digital services, and increased investment in business skills formation.

- The lack of experience in managing digital rights appears to be a barrier for a number of firms in the industry. Investments in information, skills, and digital rights management infrastructures are all difficult to recover in a fragmented industry.

- It is possible that there is failure in the market for risk capital where a small fragmented industry creates systemic information problems and uncertainty, making it difficult to manage risk. These problems are exacerbated due to the project-based approach taken in many sectors.

- Skills shortages appear to be the result of market failure, including informational difficulties in predicting demand for skills, and weak linkages between skills providers and some industries.

- Australia's small market size is not strictly a market failure, but like fragmentation, it exacerbates the impact of other market failures. Greater access to international markets, either through traditional distribution channels or networked services, might help to address this.

- Studies undertaken in other countries, particularly those relating to new media and digital content, were considered by the study team in assessing market failures.

4. **Assess the potential and relevance of clustering strategies to Australia's creative industries and their ability to energise the dynamics of digital content production and applications development, and provide advice on policy interventions designed to address any identified market failures or cluster deficiencies.**

- Broadly, the cluster approach provides a useful framework for analysis and policy development in these industries, and allows emerging issues spanning a number of industries to be addressed systematically.

- The limited nature of current cluster dynamics suggests that the initial focus of intervention should be on bolstering industry collaborative mechanisms, and creating and diffusing knowledge about prospective business models. Examples might include: identifying and diffusing knowledge of new business models through educational institutions and industry associations; engaging with a range of industry associations in analysis of new issues and possible commercial and policy responses; and funding of commercial pilots for digital services.

- There is a high degree of concentration of ownership in key content industries like media and many examples of vertically integrated companies throughout the content industries.

- The lack of evidence of cross-industry linkages suggests that detailed cluster studies should focus on intra-industry capabilities and linkages, rather than inter-industry ones.

- The governments' own use of digital content and applications is already driving development. Further investigation may uncover opportunities for purchasing to be used to further develop the scale and sophistication of the digital content and applications industries. Education and health have been identified as possible opportunities to examine.

INTRODUCTION

The range of enterprises producing, or capable of producing, digital content and applications in Australia is large. It includes consumer products and services such as publishing, broadcasting, film and video services, the visual and performing arts and collecting institutions, and extends to services such as architecture, visual and industrial design, advertising and software development. It can be conducted in, and for, industries as diverse as health and education.

The convergence of digital technologies offers these Australian industries increased opportunities to participate in international markets. At the same time, the global industries and markets that make up the sector are becoming more complex, competitive and in many instances more domestically regulated and subsidised.

In order to gain a better understanding of the development prospects and needs of content activities, the Minister for Communications, Information Technology and the Arts, Senator Richard Alston, hosted a forum on digital content in Melbourne in June 2001. Following the forum, he announced on 31 August 2001 that he would initiate an examination of opportunities that may emerge from the establishment of a cluster approach focussed on the 'creative' industries engaged in the production of digital content and applications in Australia. It was explicit in the Terms of Reference that the focus should be on digital content and applications, rather than areas unaffected by digitisation.

This report represents the first stage of an exploration of the issues and opportunities confronting Australia's content industries as a result of the spread of digital technologies, skills and processes, and the relevance of clustering strategies as a framework for policy development.

Stage One of the Study, to consider the drivers and barriers to the development of digital content and applications, and any market failures, was conducted by a joint Study team established within the Department of Communications, Information Technology and the Arts and the National Office for the Information Economy. Later stages will undertake a more detailed study of the dynamics, networking and common needs of existing and emerging clusters and advise on possible policy initiatives. The terms of reference of the Study appear at Attachment 1.

This Stage One report is based on an analysis of published data on the industry and on a series of consultations with a range of industry participants (see Attachment 7). It looks at:

- the broader context of structural change in the digital content and applications industries;
- the idea of clusters and examples of how cluster-based policies have been applied to industry development issues—particularly digital and new media issues—in other countries;
- whether an approach intended to foster cluster dynamics would progress the development of the industry; and
- areas of further work in order to identify potential problems and opportunities and so enable detailed policy development.

The enterprises undertaking digital content and applications activities are not well documented. Consequently, the Study faced a scarcity of the usual raw materials of analysis—appropriate data and a pervasive 'feel' for the essential commonalities among the target enterprises and activities. The analysis was, therefore, based on a combination of limited statistical data and insights from a series of industry consultations. Though necessarily general, the findings form a basis on which to ground a deeper analysis. They point towards approaches that seem promising, and could be developed at the industry level in Stage Two.

Context of the study

The ultimate objective of this Study is to devise policy strategies that help the digital content and applications industries to achieve commercial outcomes in domestic and international markets. The focus is on the capabilities of those industries and identifying the key capabilities that are required. Clusters are a framework for the analysis of these issues.

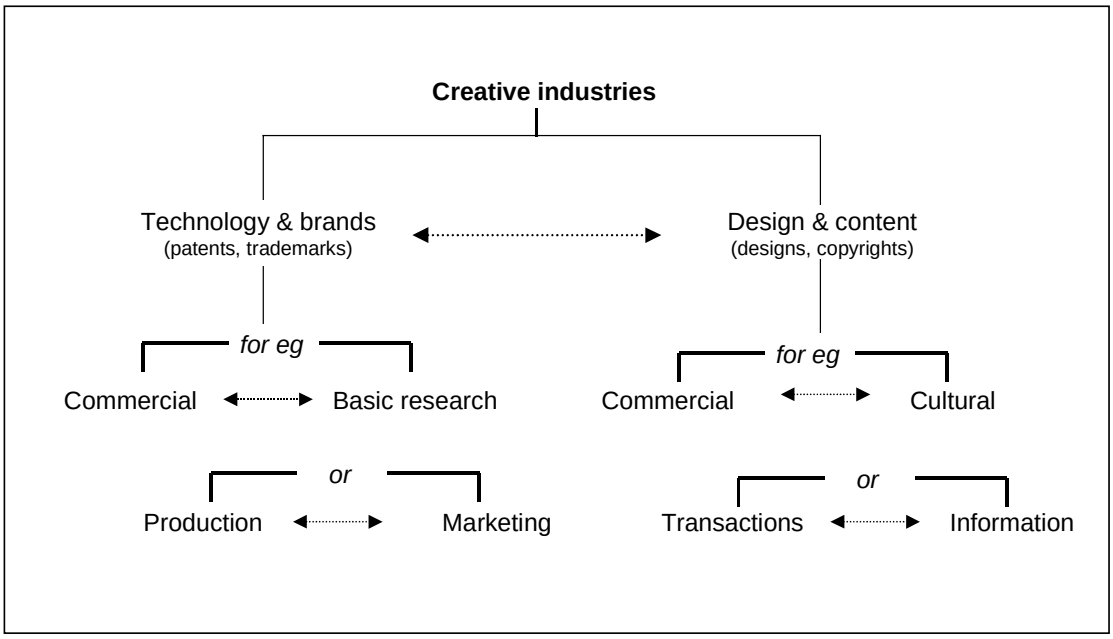
This issue cannot be addressed without first defining the content industries and their place in the creative industries, and considering their changing technological and industry context. The content industries are undergoing a process of major structural change. This change is enabled by the penetration of digital technology and techniques into the content value chain, and is being driven by powerful commercial incentives to seek out new efficiencies and markets. These changes are occurring globally—new capabilities are required and new challenges need to be faced.

Creative and content industries: definitions

The term 'creative industries' is widely used around the world, but is used in different ways. In its broadest sense, creative industries are taken to include all industries that generate copyrights, patents, designs or trademarks[1]. In other contexts, the term is taken to refer solely to content-producing industries or cultural industries.

The taxonomy below is a rough guide to these distinctions. Following Howkins' definition, creative industries are identified with the creation of intellectual property: patents, trademarks, copyrights and designs. The distinction made between 'technology & brands' and 'design & content' roughly corresponds to the split between industrial and cultural activities, but there is still considerable overlap between the categories (as represented by the dotted arrows). Further and different distinctions can be made, for example: the distinction between commercial and non-commercial activities, transactions and information, production and marketing, and digital and non-digital representations, as appropriate.

[1] Howkins, *The Creative Economy*, Allen Lane, 1991.



The appropriate approach depends on the context. It is true that the underlying economics of knowledge are similar in all of the creative industries, but each operates in a different economic, regulatory and technological context. For this reason, it is not true to say that all creative industries face the same issues, or have the same relevance to all government objectives.

The context in this case is set by the terms of reference for the Study, which make specific reference to content and applications (i.e. software and software-based services), especially digital content and applications. This emphasis has been adopted because the strongest impact of digitisation is in the area of design and content. Both networked and non-networked digital content and design have emerged in recent years as areas of significant growth and development. It is in these areas where the most significant new threats and opportunities are emerging.

So what are these industries, and who in Australia are members of them? There are many industries under the 'digital content and applications industries' umbrella. Even in a converged world, each retains distinctive features that make generalisations difficult, and they cross a wide range of production and distribution activities.

Allen Consulting have adopted a distinction between 'core' copyright industries (which have copyright as their predominant output), and 'partial' copyright industries that have copyright as part of their output[2]. The following provides a reasonably comprehensive, but not exhaustive listing of these industries and their key enterprises.

[2] Allen Consulting, *The Economic Contribution of Australia's Copyright Industries*, 2001.

- Core industries:
  - Film, e.g. Animal Logic, Beyond, PlanetX, Cutting Edge, Complete Post;
  - Music , e.g. Mushroom, Warners;
  - Broadcasting, e.g. radio networks; television networks (pay and free-to-air) including ABC New Media, SBS New Media, ninemsn, Austar;
  - Publishing, e.g. Lonely Planet, Penguin, Common Ground, newspapers (Fairfax f2, News Ltd);
  - Games, e.g. Microforte, Infogrames, Torus;
  - Interactive media, e.g. Yahoo, Looksmart, Massive, ice interactive, brilliant digital, Sausage, Drome Media, Beyond Online, Becker Entertainment, Whoopi, ITV World; and
  - Industrial and visual design, e.g. automotive design.

- Partial industries:
  - Software design and development, e.g. data processing, business applications, business communications—Wizard, EDS, SMS, Technology One, Solution 6, Rational;
  - Advertising, e.g. George Patterson, BMC, Satchi & Satchi; and
  - Architecture and related professional services.

Once the related distribution industries are included, these activities are estimated to form a significant and growing part of Australia's economic activity:

- Between 1994–95 and 1999–00, output as a percentage of GDP has grown from 2.2 per cent to 3.3 per cent, or roughly $8 billion to $18 billion;
- Between 1995–96 and 1999–00, employment grew from 312 000 to 345 000 at a rate of 2.7 per cent per annum. This compares favourably with the national average of 2.0 per cent per annum;
- Copyright royalties from exports have grown strongly to around $1 billion in 1999/00, but are still outstripped by imports by a factor of more than two to one.

In keeping with a cluster approach, there are also important demand segments to consider:

- Entertainment, e.g. games, film and music;
- Information, e.g. current affairs and news;
- Education, e.g. digital curriculum materials, online distance resources;
- Health, e.g. telemedicine, imaging;
- Government information and services;
- Financial services, e.g. online banking; and

- Business services, e.g. accounting, advisory.

Digitisation and convergence

The emergence of digital coding as a *lingua franca* in these industries also presents opportunities for new kinds of inter-industry collaboration. Digitisation is forging a new, wider, and more complicated value chain for production, distribution and consumption. The original intellectual property in physical manifestations of content or design can be re-formatted and embedded in a range of different applications, spawning a range of related services. Digital networking then allows these services to be accessed at a distance, even globally.

Simultaneously, the burgeoning impact of information technology on the whole services sector has emerged as a strategic and operational challenge for business and government. Capturing both the economy-wide benefits of ICT investment and profitable supply-side activity is now the declared goal of many governments worldwide.

These two developments are related. Digital content and applications are a key input to an ICT-enabled services sector. In its 1998 *Strategic Framework for the Information Economy*, the Commonwealth Government identified 'a substantial efficiency dividend to the economy as a whole, especially in the information-rich sectors such as banking, insurance, finance, wholesale and retail trade, legal and accounting services, education and health' from the use of ICT technologies. Economic modelling published by the National Office for the Information Economy (NOIE) has quantified significant gains to growth and employment over a 10-year timeframe from the application of ICT in the Australian economy.

There are also large gains to be captured by innovating new technologies and services. Digital content production and applications development will play a major role in this area. New business models for digital markets must be based on digital content, applications and services that generate economic value and are both useful and useable. The IT industry needs content and applications industries in order to innovate new services and new ways for people to interact with information systems.

In turn, the content industries need the new vistas that digital forms provide. This will require new business models and ways of working, as well as new skills and infrastructures to support business management and collaborative work within the digital content and applications industries themselves.

These changes will have important consequences for the Government's cultural and economic objectives as they call into question many of the assumptions that underpin our understanding of the content industries, and the policies that currently support them:

- the boundaries between content, design, software and services are blurring, and content development is increasingly an input to service sector innovation;
- the value chain in the content industries is restructuring, shifting the sources of economic value and centres of economic power; and

- internationalisation of content markets is accelerating.

These changes present corresponding challenges to current policy settings for the content industries:

- How well do current policy settings reflect the growing linkages between digital content and applications policies and other Government objectives such as improved government service delivery, promoting service sector productivity, encouraging new industries and enhancing business and community access to service offerings?
- How well do current policy settings address the changing structure of the content and software industries, and what constraints do they impose on new investment and innovation? What effects will these industry changes have on cultural policy objectives?
- How well do current support policies position Australia for an increasingly internationalised marketplace?

The 1999 Convergence Review defined convergence as 'services sector restructuring enabled by digitisation'—it was explicit that these changes are only enabled by technology. Technology offers possibilities and imposes constraints, but the real drivers of change are commercial, not technological. The final outcome is determined by the complex interplay of demand with these supply-side factors.

Digital technologies differ significantly from the traditional analog technologies they replace—services provided using analog technologies are usually strongly vertically integrated but horizontally separated. The service and its infrastructure are indistinguishable because each infrastructure can only produce one service. Television is good for video, telephones can carry voice and newspapers provide text, but each exists in its own industry 'silo'.

Digital technology creates new possibilities. As a digital network can carry a range of services—video, voice, text and transactions—there is much greater scope for horizontal integration, and the use of common infrastructures and technologies. These can be used to provide content, but also a range of other interactive, transactional, and value-added applications online (for example banking services). This study addresses both content and applications for this reason.

Digitisation is occurring in many areas in content and applications industries but only a few industries have a fully digital value chain. It is in industries where the products and services can be digitised and made available on two-way networks that the most dramatic changes are possible. Not all industries will be affected equally by these changes—this means that generalisations about policy responses should be avoided, and industry-specific analysis and policy development is likely to be necessary.

Technology change alters the underlying economies of scale and scope within these industries. As old economies of scale and scope are eroded, new ones emerge. New business models and industry structures then emerge to exploit these new economies. For example, it can become more profitable to bundle different services together, to offer services across wider or narrower markets, or use common infrastructures where separate ones were previously needed.

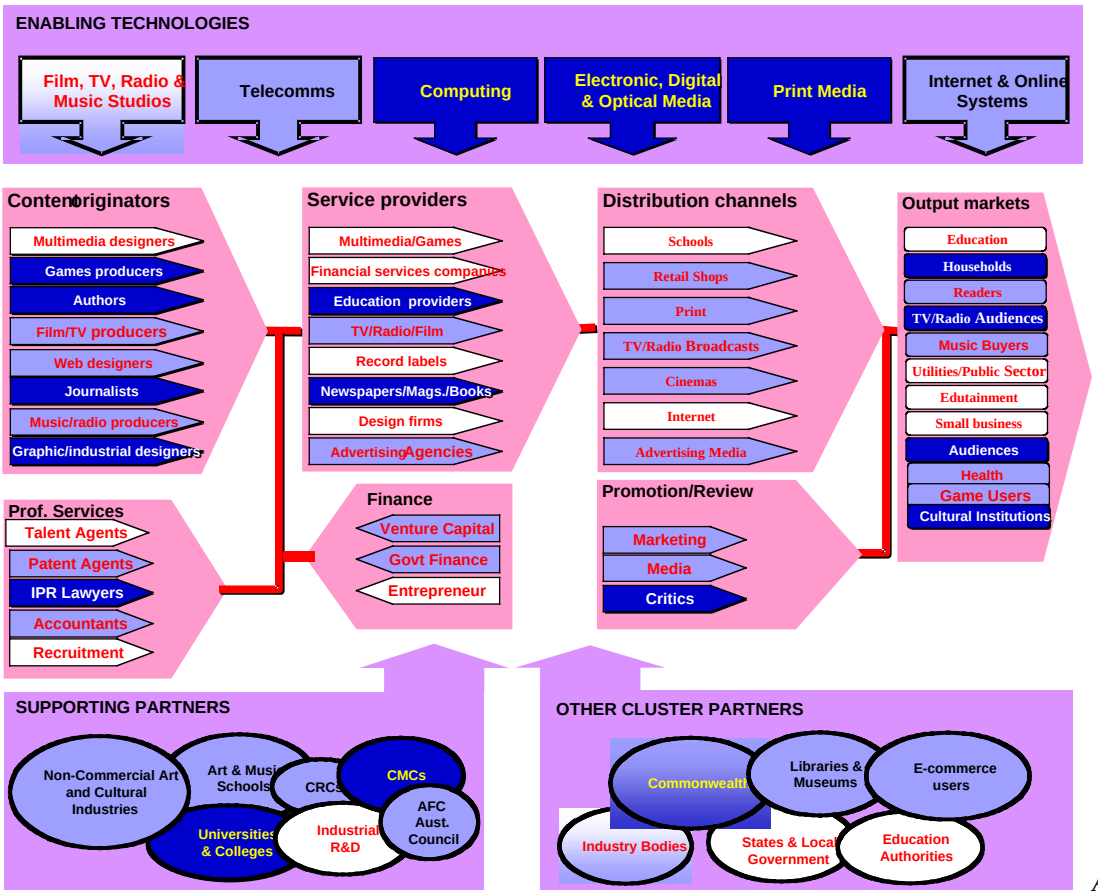
It is important not to exaggerate the changes to date. The digital content and applications industries are still heavily influenced by the structures of the non-digital industries from which they grow. In many cases, the pre-digital industries consist of large distributors or integrated entities and relatively small, creative satellite firms. There are no robust business models for new digital services in some markets and limited penetration of mass-market delivery platforms such as interactive television and personal internet devices. Digital content and applications creation is still in its infancy.

At the same time, change is definitely underway. Direct effects can already be observed in many industries. Indirect effects from other countries are also felt through international markets.

One of the key structural consequences of convergence is the emergence of an interlinked value chain for the production of digital content, applications and services. This value chain extends well beyond the traditional arts/media space into areas such as education services, health services, financial services and industrial design.

Each of these areas retains some special industry and market characteristics, but also takes on common attributes in a digitised value chain. Levels of industry concentration, the geographical size of markets, and the nature of demand vary a great deal.

At the same time, these industries increasingly share common infrastructures such as the digital telecommunications network and other digital distribution channels, and some common inputs such as skills and digital equipment. Over time, these commonalities will grow.



Adapted from Creativity and Enterprise, Scottish Enterprise, Creative Industries Team 1999

Threats and opportunities from convergence: policy implications

During a period of structural change, it is inevitable that both threats and opportunities emerge.

Structural change generates threats and opportunities because shifting value chains change the balance of economic power between different value chain participants. New centres of economic power emerge, and exploit that power to capture the bulk of the new value generated by new investment and innovation.

In this process, there are winners and losers. The winners are those that succeed in establishing a position in the new centres of economic power through their control of new, unique or hard-to-replicate capabilities. The losers are those who are marginalised in commoditised activities where capabilities are easily reproduced.

Australia's position is also unusual. A geographically isolated, English-speaking, small, open trading economy will inevitably find itself positioned differently to many other potential participants in the global digital content and applications industry.

The small scale of digital content and applications development activity in Australia is the key limitation that must be faced in any strategy to position Australia's industries in global value chains. Australia is a small player, and this presents a difficult challenge. Australia's relatively small and fragmented domestic industry contrasts with the rising direct government support and increasing levels of vertical and horizontal integration observed in some industries overseas.

The key threat faced by a small player in these markets is marginalisation in the global value chain. The key opportunity is simply the reverse—by developing the new capabilities required by the global digital value chain, a strong globally-competitive position can be established.

The emergence of the global digital value chain matters to policy makers for two main reasons:

- the objectives of policy will change as the emphasis on the promotion of cultural outputs is complemented by a new emphasis on the industry capabilities needed to produce those outputs; and
- the intervention toolkit available to policy-makers will change as the industry and market structure changes. Interventions and policies that were effective in one industry framework are often ineffective in another framework, and must be reviewed critically.

Both of these are fundamentally about a major structural adjustment in the digital content and applications industries:

- The first is about the new challenges presented by the global digital marketplace, with an emphasis on the barriers that would prevent the development of new global capabilities;
- The second is on the challenge of adjusting established industries and support mechanisms to meet the demands of the new environment.

The implications for policy-makers are two-fold:

- policies for digital content and applications industries must address the issue of our positioning in global marketplaces, including in the downstream distribution channels where large multinational firms dominate; and
- policies must have regard to the capabilities of our industries to deliver commercial outcomes in the new global digital value chain.

The industry development agenda that emerges is clearly not the same as the existing cultural agenda. It extends beyond the traditional 'cultural' industries into areas like software development, industrial design and distributed computing. It focuses on commercial capabilities rather than purely on cultural outcomes.

It also complements the cultural policy agenda by giving attention to the capabilities that underwrite the content industries' capacity to create and innovate. Cluster approaches to analysing Australia's content and applications industries (and possibly to strategies for supporting their development) address these capabilities.

CLUSTERS AND CAPABILITY DEVELOPMENT

Approaches to industry development based on the notion of industry clusters are gaining currency in a number of countries as a means of equipping industries or regions to exploit their natural advantages in ways which will enable them to achieve higher levels of innovation and competitiveness.

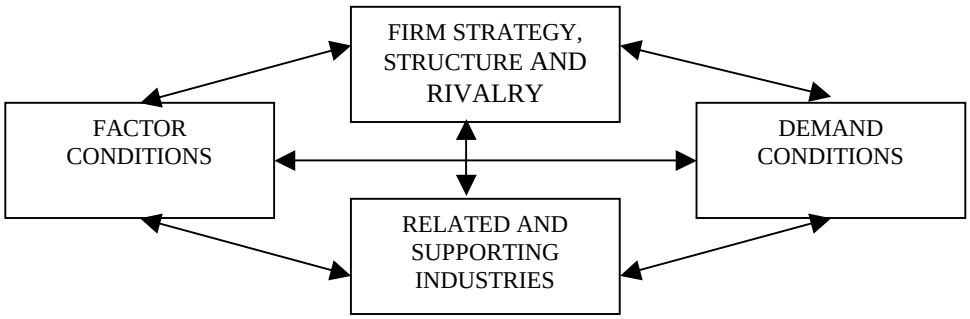
The idea of clusters

Industry clusters were originally described by Porter (1990) as geographic concentrations of firms producing a particular product or service. Porter observed that geographic proximity produced vigorous competition among firms and so provided a spur to innovation. At the same time, it provided the opportunity to share information, aggregate demand for particular inputs and reduce transaction costs. This enables otherwise isolated firms to benefit from shared economies of scale and scope. The presence of related and supporting industries and demanding customers created conditions favourable to the development of tailored inputs and services.

The increased competitiveness of firms within the cluster was seen by Porter as developing a momentum of its own, exerting an attraction for new firms and resulting in a gradual accumulation around the firms of specialised resources of skills, facilities and other resources.

Other analysts have extended Porter's ideas to encompass groupings of firms which have established links based on 'networks of activity' (Marceau 1997:5) rather than on spatial proximity alone. Such 'virtual' clusters can exhibit similar linkages as geographically based clusters. For this purpose of this Study, this broader definition of clusters was used.

Porter (1998:211) depicted the development of competitive advantage within clusters in terms of a 'diamond'—where factor conditions, demand conditions, related and supporting industries, and firm strategy, structure and rivalry develop in mutually reinforcing ways.



Porter's 'diamond' (Porter 1998)

Examples of high-performing clusters cited by Porter developed spontaneously from, or around, a particular area of natural advantage. In each case, the activities involved the manufacture of sophisticated products incorporating significant intellectual property.

The advantages of clusters derive from the external effects, or spillovers, that they produce. Firms working in close proximity, or with strong collaborative networks, are able to achieve cost advantages and innovations that increase their productivity, creativity and competitiveness relative to firms outside the cluster. These advantages take the form of:

- lower input and transaction costs;
- improved access to high-quality, low cost information such as marketing information through sharing and cooperation;
- higher levels of familiarity and trust, which reduce the time and cost of reaching cooperative and other agreements; and
- the aggregation of demand for services, which may result in the provision of specialised skilled labour, transport, communications and other infrastructure.

Other countries have embraced the notion of clusters both as an analytical framework and as a policy tool to encourage industry development in particular industries or regions. Cluster strategies targeting these industries have frequently formed part of, or have complemented, broader initiatives and projects including urban renewal, precinct development and regional development.

There is a highly developed literature on clusters and successful cluster development strategies. In Australia, the wine industry has many cluster features.

The Australian wine industry—the development of industry capabilities

The Australian wine industry displays the cluster characteristics of a geographic concentration of interconnected companies and institutions producing a defined product. Components of the cluster include the CSIRO and other research and educational organisations which have collaborated with the industry to supply the scientific, research and educational inputs that underpin the industry's innovation and competitiveness.

Other characteristics include collaboration and competition, with the industry citing the pre-competitive sharing of research outcomes, the development of market strategies and the sharing of costs in relation to research and industry development. These links and relationships have allowed the industry to develop the wine brand 'Australia' under which even small firms can benefit from in an international market.

The Australian wine industry has shown continuing growth in exports over the last decade with a compounding growth rate of 15 per cent per annum in volume and at least 20 per cent per year in value.[3] This has also seen a shift from production of non-premium to purpose built wine in response to consumer demand.

The industry has done much to build its capabilities which has been evident in its strategy to vertically and fully integrate research, education and technology diffusion and combine it with business and marketing principles around the wine brand of 'Australia'. Improved industry capabilities have allowed the industry to compete effectively in the global markets including United Kingdom/Europe, North America and Asia.

The development of an industry with a unified and common purpose has allowed it to focus on research, education and technology diffusion to build industry capabilities, and for these activities to be undertaken collectively and collaboratively.

Key industry organisations including the Winemakers' Federation of Australia, the Winegrape Growers Council of Australia, the Australian Wine and Brandy Corporation and the Grape and Wine Research and Development Corporation have been important in shaping this sense of common purpose and directing collective action on issues such as infrastructure development, research and development (R&D) and market promotion. These organisations have also facilitated an integrated approach to industry development, most recently the development of *Strategy 2025* and a complementary five year research plan by the GWRDC.[4]

The industry has built on its technical capabilities by focussing on the role of R&D, technology diffusion and education and their impact on innovation in the industry. These three elements which support an innovation strategy have are designed to:

- enhance commitment to R&D through increased financial contributions, industry participation (priority reference groups) and partnership with government;
- close the gap between science and application through pre-competitive sharing of professional user pays research and the communication of research issues to industry through its Research to Practice™ programs; and
- support industry centred and directed education and encouraging a learning culture within the industry.

Cluster analysis does not provide universal policy solutions for industry development. In order to see whether clustering strategies may be relevant, it is necessary to examine the industries themselves, their characteristics and problems, and then assess the extent to which cluster type solutions may address these issues.

The relevance of clustering strategies to digital content and applications industries

The earlier analysis pointed out that any industry or policy response to digitisation must have regard to the new capabilities required for positioning in the global digital value chain.

[3] Prime Minister's Science, Engineering and Innovation Council, The Australian Wine Industry – Success through Industry Leadership, Planning and Innovation, November 1999

[4] The AWBC and GWRDC are Commonwealth statutory bodies and are funded by industry levies.

The cluster perspective is relevant here because it provides a recognised analytical framework to assess the requirements for industry capability and competitiveness that are the subject of this Study. It addresses both the enterprise-level and systemic capabilities of industries, and the effectiveness of the linkages between these different capabilities.

In their broadest sense, cluster policies are simply industry development policies that are mindful of the importance of linkages, relationships and location to industry performance, and address the kinds of issues raised above. A number of countries have proposed cluster-focused policies for industries that correspond quite closely to the subject of this Study. Scotland has targeted 'creative industries', Toronto in Canada has a 'new media' focus, while in Ireland a 'digital media' district has been proposed for Dublin. Attachment 6 compares the approaches taken in Scotland and Canada.

In these cases, clustering has been seen as an appropriate policy response to the changed economic and structural conditions under which content is produced, distributed and marketed. It has also been seen to complement direct assistance and support provided by government to the content industries through tax concessions, direct funding and regulation of output markets like television.

Given the fragmented nature of the creative industries in many of these countries, clustering has been considered as a strategy that allows the innovation, creativity and flexibility displayed by smaller firms to be incorporated as part of a larger industry structure and strategy. It allows firms to improve information flow, coordination and transaction characteristics, while retaining each firm's independence.

However, it should be noted that the creative industries have also seen considerable consolidation and vertical and horizontal integration in response to industry fragmentation. Plausibly, both clustering and industry consolidation are both responses to the pressures of globalisation and digitising marketplaces, and a range of balances can be struck between them.

The benefits are likely to be greatest for activities for which information and the ability to engage in sophisticated transactions are key, or specialised inputs are required. Though they are relatively diverse, digital content creation industries appear to be united in the significance of these factors at some point in the supply chain.

Implications for policy

It is well beyond the scope of this Stage One Study to recommend specific cluster policies. Nevertheless, in the process of coming to an understanding of how clusters might be used to tackle barriers and build on strengths, it is useful to have an eye on the range of possible policies that may ultimately take shape.

At the most interventionist end of the scale, governments may attempt to 'force' clusters by providing strong inducements to co-locate, contracting for specialist services to be provided to cluster firms, and providing inducements for particular supply relationships to be established and maintained. Such approaches may appear decisive and assertive, acting as a signal to business of

direction and commitment. However, they are not only costly, but also run the risk that substantial costs, such as that of firm relocation (so the magnitude of necessary inducements for co-location), will not be factored into the policy. There is also the risk that in attempting to orchestrate an entire cluster, governments will misread the nuanced relationships and needs of diverse businesses. OECD analysts have recommended against governments taking this approach in cluster initiatives (OECD: 421).

Alternatively, governments, in partnership with industry and in concert with other government initiatives providing direct and indirect support, may focus on building and strengthening of linkages and relationships judged to be valuable.

This may include, at the broad level, facilitating industry associations along existing or new dimensions. More targeted efforts may be made such as facilitating information exchange and familiarisation between digital industries and providers of finance. Such lighter touch polices appear to have the advantage of allowing the breadth of knowledge within industry, of industry needs, to determine and colour the exact shape of the growing lattice of linkages and relationships. Policies that rest primarily on data collection, information provision, and facilitation have also been seen in a number of overseas contexts. Industry development policies that are not explicitly 'cluster policies' are often consistent with cluster strategies.

FINDINGS ON AUSTRALIA'S DIGITAL CONTENT AND APPLICATIONS INDUSTRIES

This section turns to the available data on the digital content and applications industries in Australia.

Data sources

Comprehensive data on the creative industries is difficult to find because published statistics are not sufficiently disaggregated or are not comparable between different industries. There is anecdotal evidence of large amounts of in-house production of digital content and applications that are not captured in official statistics. These problems are prevalent in industries like industrial design, software development and video production.

Consequently this Study looked at a range of data sources. Apart from ABS statistics, these included the *Yellow Pages* database mentioned earlier, and the listings of industry associations, and other databases assembling such information.

While ABS data are reliable and comparable across industries, they classify firms into single industrial classifications based on their main activity. They also provide only limited coverage of very small (non-employing) and recently established enterprises. Other databases are frequently useful supplements.

For the purpose of this Study, a database was compiled from business listings in the May 2001 edition of *Yellow Pages* (Dependable Database Data 2001). *Yellow Pages* provides both a different classification and more recent and probably more comprehensive listings. It includes most businesses with a phone line, and so is likely to incorporate firms such as very small and very new firms that are difficult to capture in official collections. It also allows firms to list (for a fee) in multiple classifications, and so enables combinations of activities to be analysed. The May 2001 listing shows around 11 500 firms in 13 categories. Because firms are able to list in multiple classifications, this number provides a 'ceiling' estimate of the actual number of firms operating in those classifications.

Attachment 2—Australia's Creative Industries and Digital Content Producers provides greater detail.

Industry structure

The ABS has identified approximately 7 000 businesses in the creative industry categories it covers, employing over 76 000 people and generating $2 100 million per annum in output (see Attachment 2). Most are small firms, and in the ABS categories for which classifications by employment size were available, over 95 per cent of firms had less than 20 employees, placing them in the small business category. Indeed, many are very small 'micro' businesses. There are also large distribution firms in industries like film, television and games where mass audiences are available. Industry structure and the balance of market power vary substantially between different creative industries.

Any intersection between the firms in the *Yellow Pages* listing under multimedia classifications and those listing in the creative industries suggests that some firms both create content and produce it in the form of a multimedia output.

A little over 20 per cent of firms listing under multimedia are also listed under the creative activity classifications, which included film production services, design, illustration and graphic art. The remainder include retailers, computer training firms and systems designers. On the face of it, this suggests that the bulk of firms listing in the multimedia categories are not primarily creative industries. Indeed, when the reverse calculation is applied (the proportion of firms in each creative industry category who also list in the multimedia category), the proportions are typically very small.

Creative industry enterprises listing in *Yellow Pages* multimedia classification

Creative industry category	Per cent also listing in multimedia classification
Advertising agencies	1.9
Artists – commercial	1.4
Designers – graphic	2.0
Designers – product and industrial	1.2
Desktop publishing services	2.9
Film production services	1.2
Illustrators	0.7
Libraries – photograph and/or film	33.3
Multimedia services	100.0
Music arrangers and composers	1.2
Photo lithographers	15.4
Photograph restorations and retouching	1.0
Photographers – commercial and industrial	0.9
Recording services	3.2
Slides and/or film strips	10.0
Sound engineers	2.1
Training films and videos	5.2

Source: Dependable Data Database (2001)

Analysis of other databases provides less comprehensive, but more detailed, information on the activities of firms. The Australian Interactive Multimedia Industry Association (AIMIA), for example, currently lists approximately 950 companies on its website (2001). Their activities range widely over web design, activities related to film production, script writing and games production, through to support services such as legal, marketing and education and training. Some appear to offer a range of services related to a particular creative activity (video/film production), while others specialise in the provision of a particular service but apply it to a number of activities (web design). Others specialise in the provision of a particular service to a

particular set of end-users (e.g. specialised legal or recruitment services, educational CD-ROMs, software).

The Multimedia Victoria (MMV) database includes 875 firms in 24 categories (2001). Most of these firms have listed in a number of categories, producing a total of 5 211 listings. The majority of businesses are in the business related categories such as business-to-business services, business systems, intranet applications and websites.

The categories that meet this Study's definition of creative industries—2D/3D modelling/CADCAM/animation, Audio and Sound Design, Digital Imaging and Video, Games, Information or Software delivered via the Internet and Multimedia—constitute approximately 20 per cent of the number of listings. Of the creative classifications, the greatest representation falls into the Information and Software Design via the Internet and the Multimedia categories—which are two categories that are likely to support business systems, software applications and web design.

Creative industry enterprises listed on Multimedia Victoria's database

Category	Number
2D/3D modelling/CAD CAM/animation	107
Audio and sound design	43
Digital imaging and video	146
Games	70
Information and software delivery via the Internet	378
Multimedia	270

Source: Multimedia Victoria website

Clearly some activities complement the production of the underlying content and have naturally evolved. The production of an online counterpart to a published work (e.g. online magazines, an online version of a series of travel books such as those of *Lonely Planet*) or a music CD is an example.

However, it seems likely that creative activity and the production of digital content and applications are not typically combined in single firms, except where the two are indistinguishable (interactive games). It seems that different skills are required. Even fairly straightforward digital rendition (or 'repurposing') of content is likely to require skills and equipment individual creators do not have. Instead, specialist producers of digital content (e.g. advertising agencies, film producers) may commission or otherwise acquire content (such as soundtracks) to create new digital content and applications.

The public sector accounts for a relatively small number of these enterprises, but a large number of employees. It also, of course, provides a significant revenue source for many private individuals and firms, either through direct subsidy or tax deductions on the production of, or the provision of, a market for the creative output.

Geography

In Porter's view, the success of a cluster is critically dependent on constructive interactions among enterprises. The likelihood of such interactions is greatly improved if the enterprises are located in close proximity.

Creative industries tend to cluster in cities in concentrations that exceed that of businesses generally. The strength of these concentrations was measured by calculating location density indexes for particular postcodes (see Attachment 2). Creative industries concentrations occur primarily in the older and inner suburbs of Australia's major cities. They are strongest for activities such as film—where a variety of skills and facilities are typically drawn together for a particular project, often around a major facility such a studio—and weakest for activities requiring less coordination, such as commercial art.

Mapping firms in the multimedia categories of *Yellow Pages* and other databases showed very similar tendencies (see Attachment 2). While these groups generally contained different enterprises, the locational choices of those enterprises appeared remarkably similar.

Two findings follow from the mapping analysis:

- Creative industries tend to cluster geographically—which suggests there is scope for links to develop based on proximity, particularly in activities where the clustering tendency is most pronounced.
- The tendency for different industries to cluster in similar geographic areas indicates considerable scope for cross-industry collaborations.

For example, the *Encore* directory lists at least 18 film-related entities in the Sydney suburb of Lindfield. This is the location of Film Australia Limited, which is at the hub of a cluster, who in commissioning and producing of the National Interest Program acts as a business incubator.

The company has experience in bringing together creative principals for multimedia production. It occupies a purpose-built film and television production facility which provides screening venues, a sound stage, sound post-production facilities, a film laboratory, production offices, editing and transfer suites. The site used by both Film Australia and independent film and television productions, and also by long-term tenants who operate production facilities and service companies from Film Australia's premises.

Linkages

Of course, geographic proximity is neither a necessary nor a sufficient condition for interactions to occur. Links can be formed through bilateral contractual relationships, through formal structures such as industry associations, or loose and informal relationships. They may result in collaborative activity such as sharing of ideas and information, alliances to undertake activities of common benefit, contractual arrangements such as joint ventures or project partnerships, or formal buying or marketing agreements. The case study of the interactive games industry at Attachment 4 provides an example.

Consultations with industry produced many examples of collaboration among firms. These included industry databases (the *Encore* directory), equipment sharing (interactive games developers) and information exchanges (e.g. on potential employees and recruitment sources). Most collaborations are still patchy and *ad hoc*, rather than formal and long-term.

Formal structures of collaboration appear limited but important. Three major types were apparent:

- The formation of industry associations and of specialised groupings under the umbrella of such associations.
- The formation of special-purpose groupings to achieve a particular outcome;
    - in late 2000, a number of key players in the post-production industry established the Film Industry Broadband Resources Enterprise Pty Ltd (FIBRE) as a company to progress the interests of the post-production industry, particularly its need for affordable and accessible high bandwidth communications services; and
    - as part of the Commonwealth Integrated Film Package, announced last year, FIBRE will receive $600,000 over two years commencing in 2001–02 to develop and implement a demand aggregation case for affordable telecommunications bandwidth for the post-production sector.
- Membership of advisory committees or boards in educational institutions (e.g. games developers, see Attachment 4).

Structured collaborations enabling firms to engage in joint ventures are clearly important in activities where different skills must be combined to produce a particular output. Such collaborations often involve a dominant player and a number of smaller firms, in project-based arrangements such as film productions. These kinds of relationships could be described as linking a major enterprise with a number of smaller enterprises. Collaborations among smaller firms in order to improve their bargaining power with the 'hub' firm seem limited, although it was not possible to measure this with any precision.

Other collaborations involve activities such as equipment sharing, the development or testing of new content or techniques and the sharing of CVs when labour is required.

There was limited evidence of spontaneous collaborations emerging across traditional industry groupings. With few exceptions, traditional industry 'silo' structures predominate. However,

organisations such as AIMIA have sought to bring together firms involved in the production of digital content and encourage through a variety of industry activities stronger links and collaboration across traditional industry groupings.

Some linkages are public sector-led. For example, the Australian Film Commission actively encourages producers to work across film, television and interactive media. The Documentary On Line project was designed to bring together traditional documentary practitioners with interactive media producers. The Commonwealth Government's new $2.1 million Broadband Content Fund encourages similar linkages.

Links with related and supporting industries

All firms establish links with related and supporting industries as a necessary means of acquiring the skills, infrastructure and services to do business. Consequently, the links reflect the activities undertaken. The strength of the links, however, is likely to reflect the extent to which common interests provide an incentive for cooperation.

Education and skills development is an area where the links forged with creative firms are stronger in some types of activities than in others. There is clearly an incentive to encourage educational institutions to develop and offer courses that provide a good match to skill requirements that are both specific and common to a set of enterprises. Where the firms cooperate to approach institutions with proposals for specialised courses or course inclusions, and particularly if they are able to offer resources such as technology, facilities or lecturers, their ability to achieve such an outcome increases. Developers of interactive games in Australia, for example, now benefit from the establishment of dedicated courses in two universities and a TAFE college (see Attachment 4).

Skills specific to particular technologies or particular activities (e.g. sound mixing, DVD authoring) may also be common to a number of enterprises, increasing the probability of courses being developed to accommodate them.

Public sector production and acquisition

The public sector emerged as an important user of digital content and applications. Government departments, their agencies and public sector organisations are both providers and consumers of digital content and applications in all forms. Strong links are clearly developing in some areas, and seem likely to influence capability development in all areas of the creative industries.

Examples of use include the 'consortium' arrangements being developed by the Curriculum Corporation for the development of online curriculum materials for schools, and the 'accords' between Victoria's Cinemedia and ABC Online and SBS Independent respectively for the development of online content (documentaries and music programming) (see Attachment 3 for further information on the industry context).

However, beyond such structured arrangements, the extent of mutually beneficial collaboration between government agencies and digital content providers remains unclear. As in the private

sector, the current preference may be to form a digital or online branch within the organisation rather than seek to contract work to often small and fragmented private enterprises. This may change as the industry's capabilities (including project and business management skills) develop and become more visible.

The Le@arning Federation—Schools Online Curriculum Content Initiative

As part of the Government's Innovation Action Plan, *Backing Australia's Ability*, $34.1 million in Commonwealth funds were committed over a five year period towards the development of online curriculum resources, services and applications for Australian schools. These funds have been matched by the States and Territories and a joint venture of two ministerial companies, the Curriculum Corporation and ***education.au***, has been established to manage the Le@rning Federation Initiative.

The Initiative has a number of components which provide those working in the digital content and applications sector with an opportunity to build on their capabilities and compete more effectively in what is increasingly an international market.

The Lea@rning Federation Initiative maintains a register on its website which allows suppliers to register contact details and competencies, download tender information, and access information updates and announcements. It also allows suppliers of core services including digital content developers, curriculum experts and systems professionals to match skills, competencies and capabilities across firms and form consortia to tender for online curriculum content projects. The experience gained from adopting a collaborative across-discipline approach to the development of content should assist digital content producers as they seek to work with a range diverse industries in the future.

The adoption of a modular approach by The Le@rning Federation to the procurement process allows content producers such as animators, multimedia producers and web site designers to become involved in moderately sized content projects. Content producers who have worked in fields other than education can now broaden their experience and develop capabilities in relation to instructional design.

The Initiative also provides those involved in developing digital content and applications with an opportunity to build on the capabilities of the sector in relation to the management of digital rights. The Le@rning Federation has conducted a number of workshops on digital rights management at which shared rights arrangements, rights holder agreements, content and DRM standards, reuse and new business models were discussed and will be developing a digital rights management model as part of the project.

DRIVERS, BARRIERS AND MARKET FAILURES

Drivers

The emergence and takeup of new digital technologies and platforms are the single major energising forces in the market for digital content and applications. Takeup has grown steadily in most developed countries, and is expected to rise further as the cost of access technologies falls and the range of available content improves in both quality and quantity.

The spread of digital technologies among businesses and households reflects the willingness of producers and consumers to adopt new means of production and consumption and a desire for the efficiency, novelty and convenience of products and services in digital form. Business demand for digital content and applications is driven, in addition, by the desire for faster, more responsive and lower cost means of production and product development.

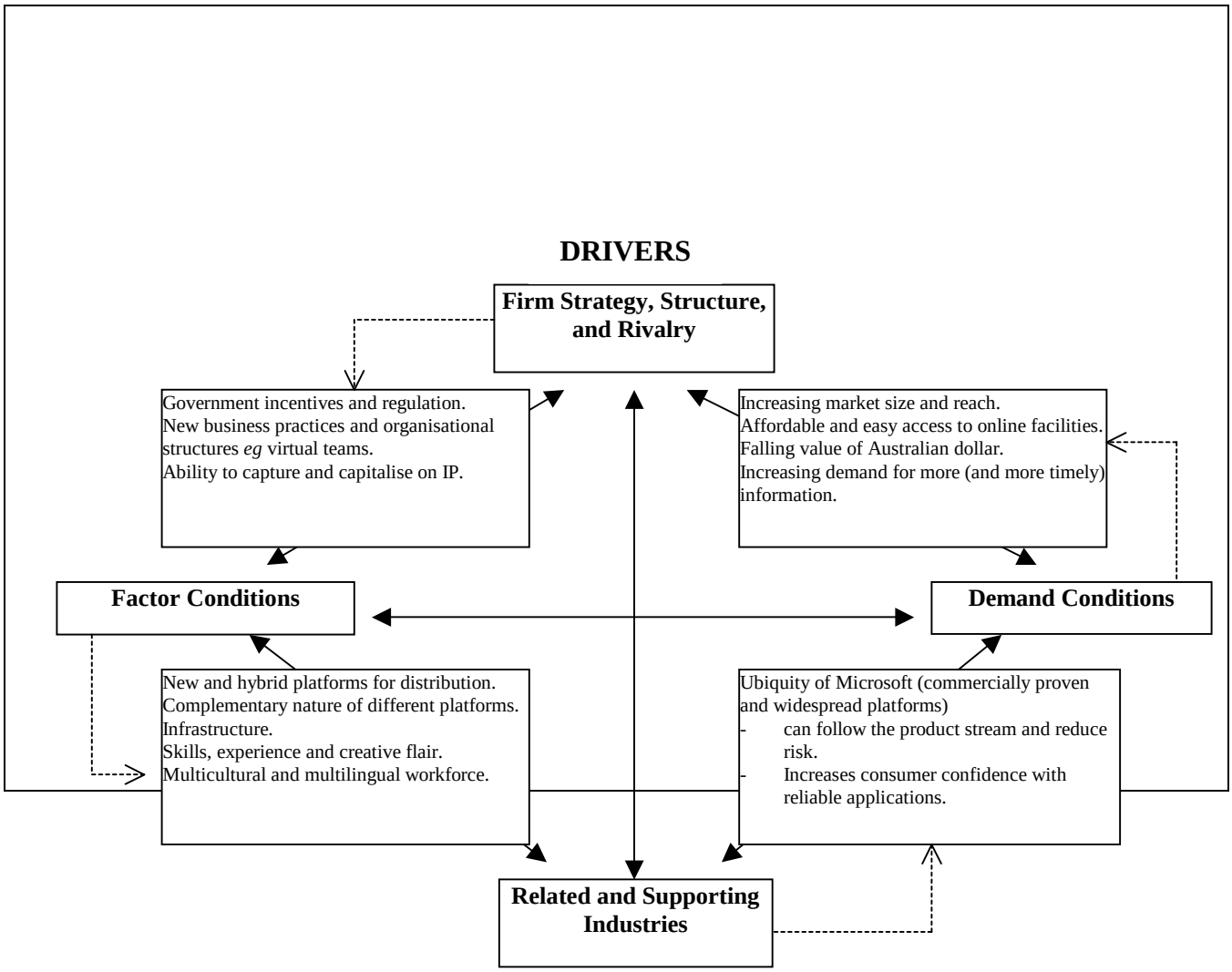
Underlying these shifts are long term trends in the falling cost and growing standardisation of digital platforms and major shifts in demographics and taste:

- The rapid fall of IT costs is driven by Moore's law—doubling of capacity per dollar every 18 months—is likely to be maintained for at least another decade;
- In Australia, one third of households are now connected to the Internet (NOIE 2001) and the adoption of dedicated technologies such as DVD and CD players and games consoles is high especially amongst the so-called 'Gen-X' and 'Gen-Y' demographic.

Predicted domestic market changes will only accelerate the impact of these trends. Digital television is expected to develop in Australia over the next few years and, while currently low in Australia as elsewhere, takeup of broadband access technologies, including Internet and pay television, is rising in all developed countries. Higher levels of broadband use are generally expected to provide a market ideally suited to entertainment-oriented digital content.

Many of the costs of creating content and applications are incurred in development rather than production so do not vary with the number of customers and the extent of use. Larger scale will therefore reduce average costs and the risk associated with individual projects. Larger scale also increases the likelihood that specialised services will emerge in related and service industries. Specialised legal, recruitment, marketing and other services are examples. Such services develop from specialised knowledge of the industry and are able to offer their clients more cost effective services than more generalised operations. This has implications for Australia's small market that are discussed below.

Other drivers include the emergence of common standards for a range of technologies and applications (particularly the near-ubiquity of Microsoft applications). This reduces the need to produce for different standards and tends to increase consumer acceptance of content based on familiar applications. The views of participants in industry consultations concerning drivers in their industries are reported in Attachment 5.



Barriers and market failures

Different kinds of barriers can limit the growth of global capabilities in digital content and applications industries:

- barriers to entry in key markets, whether structural or regulatory;
- true market failures based on information scarcity, information asymmetry or public good effects;

- infant industry problems due to the absence of critical mass in key inputs such as finance; and
- delays in structural adjustment leading to persistence of inappropriate industry structures and business models.

In practice these categories can overlap, and it is difficult to separate them out at a general level. A thorough analysis would require a deeper, industry-level analysis. A problem that exists in one industry can be much less significant or even absent in another if structural or business conditions differ enough.

The observations in this section are therefore general ones about difficulties faced by many digital content and applications industries. These will need to be tested in Stage Two, as the analysis is 'drilled down' to the industry level.

Industry fragmentation

The fragmented industry structure observed in most creative industries, particularly in production activities, appears to be a brake on collaboration and long-term investment. Fragmentation exacerbates information difficulties and makes it difficult for firms to capture the full benefits of investment in shared infrastructures and capabilities.

Industry structures and collaborative mechanisms to overcome this issue are embryonic. This manifests itself in a lack of awareness in many quarters of the potential benefits of collaboration, both within and across the creative industries.

There may be scope for promotion of collaborative mechanisms to overcome some of the disadvantages of fragmentation, particularly where these processes could catalysed but not led by governments. Examples of this approach include the creation of 'digital precincts' in some state capitals, and new kinds of collaborations within industries. However, consultation with industry also revealed some support for consolidation as a strategy for encouraging equity growth and enterprise based investment patterns in the sector.

Market size

Australia's small market size is not strictly a market failure, but like fragmentation, it exacerbates the impact of other market failures. The products of digital content and applications industries can generally be profitably sold at a lower average price if the audience is large. This is because the major costs are in development and production, not reproduction.

In the Australian context, this often presents a problem, because producers can only sell to a relatively small market before facing the hurdles of exporting. Greater access to international markets, either through traditional distribution channels or networked services, might help to address this problem.

Business models

Discussions with industry revealed that many sectors of the digital content and applications industries had yet to establish sustainable business models. This issue was perhaps most evident in relation to new or novel applications which had yet to establish a clear market attachment or demonstrate sound commercial viability. A business model in this context relates to a commercial arrangement whereby funds are available for the development, production and distribution of digital content allowing for later commercial exploitation with returning revenue streams.

In other cases the business models, regulatory and other supporting arrangements that dominated traditional forms (such as advertising revenue in television and other screen based services) are not well suited to the emerging digital content industries.

In areas where business models are more robust, they have in many cases emerged from traditional arrangements—includingt music and CDs, pay television, electronic games and DVDs. Although, these models are perhaps more effective in distributing than producing content and may not provide adequate access to international markets for Australian producers.

Firms are experimenting with various concepts and models including mass customisation, personalised marketing and electronic trading to connect value derived from content with value from access.

The Government plays a role in assisting digital content producers to establish viable businesses through the provision of tax concessions, grants and subsidies. Support is currently provided to digital content producers through direct funding from the Australian Film Commission and the Australia Council. A number of programs administered by these agencies encourage producers to seek commercial funding and attachment for their projects resulting in the project being supported by a mix of funding. Other forms of indirect assistance from Government including support for information exchanges and the promulgation of best practice models could also assist in establishing sources of funding for the industry.

Other possible solutions include funding of commercial pilots, dissemination of the information gleaned and increasing investment in general entrepreneurial and business skills.

Digital rights management

Business models are also complicated by the need to protect and manage digital rights. Firms may favour arrangements that enable them to recoup revenues early because of the up-front and essentially sunk nature of many of the costs of developing digital content and applications. Confusion about the types of arrangements which may be possible, or appropriate to negotiate, and suspicions based on the apparent imbalance of market power between creators and publishers, appear common—especially amongst small enterprises.

Markets are generally inefficient in the absence of clear and enforceable property rights, and there is generally perceived to be a role for government to encourage structures that contribute to the clarity and enforcement of property rights. With the passage of the *Copyright Amendment*

(Digital Agenda) Act 2000, major changes in the way rights are enforced and managed are occurring in the digital environment.

The lack of experience in acquiring and managing digital rights appears to be a barrier for many in the industry. The fragmented nature of the industry may also inhibit investment in information, skills and digital rights management infrastructures.

There may be a role for government or industry collaborations to further clarify and inform industry about digital rights negotiations and management. Examples could include: disseminating information; including comparative information; economical modelling of rights payments under a range of possible licensing arrangements; contract arrangements for digital rights transfers; supporting technical standards for digital rights management; or promoting investment and participation in IT infrastructures for digital rights management. Pilot projects such as the Performing Arts Media Library (PAML) have been undertaken in the past along these lines.

Finance

The lack of business models for some types of activity or distribution platforms is related to difficulties in obtaining finance. The problem is accentuated by the very small size of many firms, their reliance on project work, and a lack of specialised expertise among finance and venture capital providers. Industry consultations revealed that many firms contemplating the development of a major project are forced, by the difficulty of obtaining venture capital, to choose between taking on the significant burden of self-funding in order to take on a global market or reconciling themselves to a smaller, purely local operation.

Investors are also discouraged by the absence of comprehensive revenue and market data, and by the need to invest in projects rather than specific business entities. This makes calculations of risk difficult—uncertainty can only be eliminated by the information needed to calculate risk probabilities.

It is possible that there is failure in the market for risk capital where a small fragmented industry makes it difficult to spread and manage risk. These problems are exacerbated in the creative industries due to the project-based approach taken in many sectors.

Like many industries with a large number of small firms, creative digital content and application industries appear to be limited in their growth by access to finance. The underlying difficulty is the cost to the investor of assessing a firm's worthiness for investment. This cost is often relatively small for a large investment in a large firm, but large for a small investment in a small firm. The intangibility of the product and the short-term nature of the projects exacerbate the problem. The market may fail to fund worthy projects, though this may not be inefficient when the cost of all assessments necessary to find these worthy projects is taken into account.

These financing difficulties may lead to a market failure when they prevent the attainment of a 'critical mass' (which requires increasing returns to industry scale) that would justify

specialisation by finance providers in these industries. A range of interventions is available in this area, but the cost-benefit is difficult to assess in the absence of comprehensive data.

The Government announced in 2001, that as part of the Film Industry Package, it would provide additional funding of $2.1 million over the three years from 2002–03 to the Australian Film Commission for the establishment of a grants program—the Broadband Content Fund—to seed the development and production of innovative broadband content. The emphasis will be on high end, high technology content, including interactive applications.

Skills

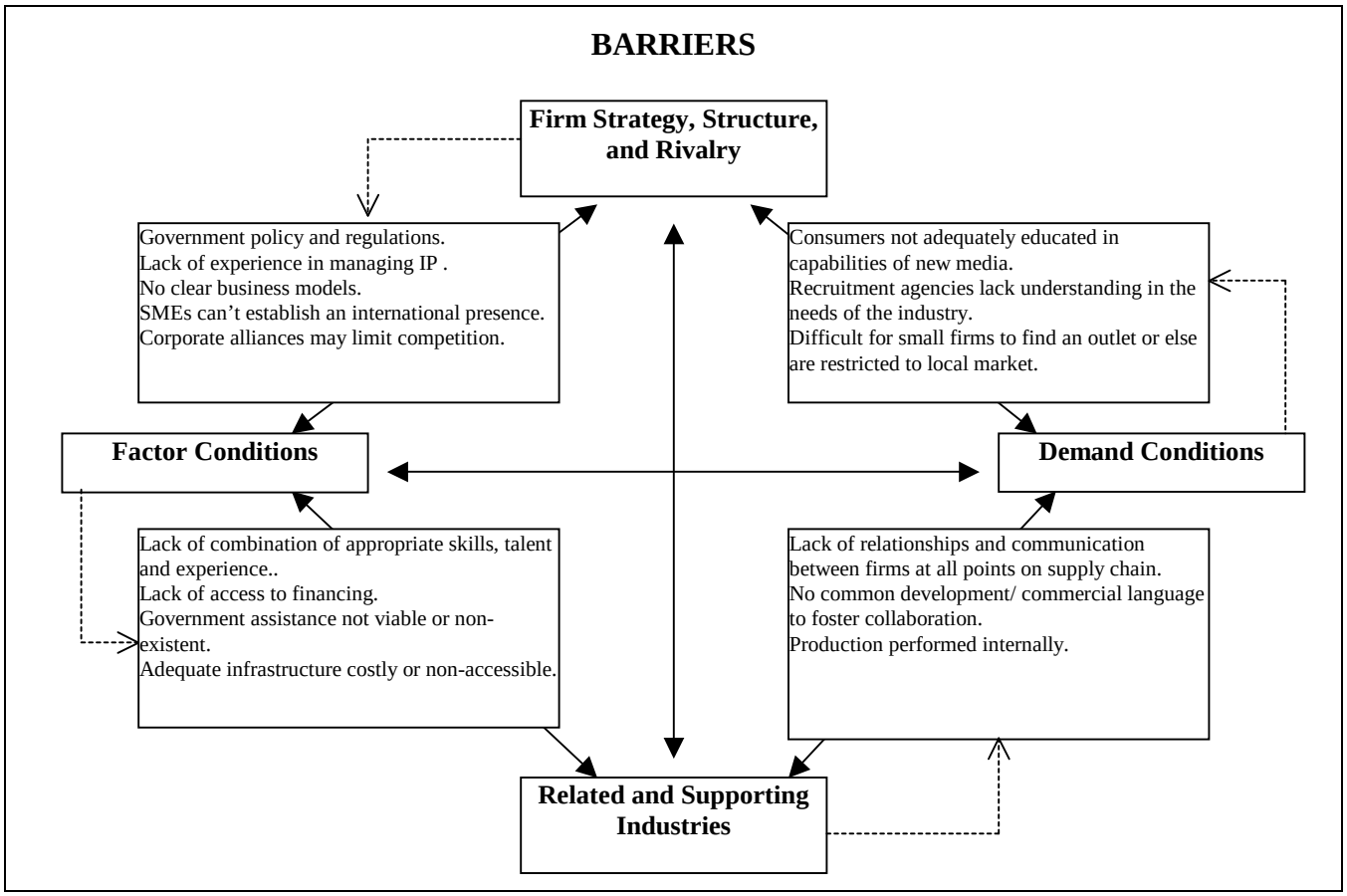
Discussions with industry indicated that a number of enterprises have difficulty finding and retaining people with the right skills. A number of firms indicated that on leaving university or institutes of technology students were frequently not 'industry-ready' and required further specialised training. With the skill sets required to produce digital content and applications being relatively new, recruitment agencies are not familiar with employers' requirements and are frequently unable to identify suitably qualified staff. Discussions also identified a lack of business skills and project management talent.

This is a complex area because of the broad intervention by government in education and training to, among other things, address perceived general education market failures. The question for the scope of this Study is whether education institutions (perhaps hybrid government-market entities) are providing the appropriate quantity and quality of skilled graduates to the creative digital content industries. The answer to this would depend, among other things, on the outlook for the industries over the careers of the graduates – something inherently difficult to assess, and for which conclusions could not be reached in Stage One of this Study.

It is worth noting that a common industry desire for graduates to be 'industry-ready' is not necessarily the role of education and training institutions. There will often be a trade-off between specific narrow training and broader capacity and flexibility building training. An 'industry-ready' graduate may have diminished capacity to adapt to changing situations.

Skills shortages appear to be the result of market failure, including informational difficulties in predicting demand for skills, and weak linkages between skills providers and some creative industries. This issue is also related to the small-scale and fragmented nature of many activities. Catalysing generic collaborative mechanisms that help industry to identify its own needs and work with skills providers could be a useful first step.

The views of participants in industry consultations concerning barriers in their industries are reported in Attachment 5.


BARRIERS
Firm Strategy, Structure, and Rivalry
Government policy and regulations.
Lack of experience in managing IP .
No clear business models.
SMEs can't establish an international presence.
Corporate alliances may limit competition.
Consumers not adequately educated in capabilities of new media.
Recruitment agencies lack understanding in the needs of the industry.
Difficult for small firms to find an outlet or else are restricted to local market.
Factor Conditions
Demand Conditions
Lack of combination of appropriate skills, talent and experience..
Lack of access to financing.
Government assistance not viable or non-existent.
Adequate infrastructure costly or non-accessible.
Lack of relationships and communication between firms at all points on supply chain.
No common development/ commercial language to foster collaboration.
Production performed internally.
Related and Supporting Industries

PROSPECTS FOR CLUSTER DEVELOPMENT: A PRELIMINARY ASSESSMENT

Current strengths and weaknesses of the creative digital content industries in Australia have been outlined in this chapter—as have some key drivers of, and barriers to, growth identified during industry consultations.

The key finding is that, based on the limited data available, cluster development in Australian creative industries is embryonic and patchy. There are encouraging signs in some industries, but industry fragmentation and a small domestic market discourages the collaboration and long-term investment that underpins cluster development.

The key conclusion is that cluster approaches do potentially offer a means of addressing barriers and market failures in the creative industries, and that these approaches warrant further, more detailed investigation. Clustering provides an organising principle for mapping the development of the creative industries, but other elements including the role of government support and access to finance and distribution need to be separately addressed.

In this section, specific mechanisms of clusters are matched with barriers and drivers to demonstrate the ability that clusters may have to meet a variety of quite specific industry needs. The FIBRE project, designed to provide broadband access to post-production activities, provides a useful example.

FIBRE: film and television post-production industry bandwidth

In September 2001 the Government announced, as part of the Film Industry Package, support of $300,000 per annum in 2001–02 and 2002–03 to enable FIBRE—a group of key players in the post-production sector—to act for the sector in developing and implementing a demand aggregation case on the bandwidth requirements of the post-production industry.

The announcement of support funding follows two industry forums that were hosted by the Minister for Communications, Information Technology and the Arts in October 2000 at which issues facing the sector were discussed. The sector identified the cost of bandwidth as a key issue for the future development of the industry and its ability to operate more efficiently locally and to be more competitive internationally.

The objectives of the project being implemented by FIBRE are to:

- lower the costs of bandwidth for the film and television post-production industry, thereby making the industry more efficient locally and more competitive internationally; and
- develop and implement, to the extent found to be possible, the operation of a commercially sustainable broadband network for the film and television post-production sector with local/ intercity/interstate and international connections.

Since November 2001, FIBRE has begun to quantify the industry's particular bandwidth requirements and approach telecommunications carriers to obtain industry based pricing for the sector including whole-of-service models. The post-production industry's bandwidth requirements are unusual in so far as data flow is intermittent or 'bursty' and there is a need for high bandwidth to enable the transfer of high resolution audio-visual material.

FIBRE is also seeking to collaborate with researchers in the telecommunications sector on the conduct of an electronic file transfer pilot that will trial changes to business processes and the provision of value added services in a network environment.

Improving bandwidth access and connectivity, particularly for small-to-medim sized entreprises (SMEs), will facilitate the formation of network-based post-production teams and encourage collaborative relationships within the sector—opening the possibilities for alternative product development of content. This will help the industry to obtain economies of scale in the production and distribution of content, while at the same time retaining the innovation and creativity found in individual firms. Improved connectivity with studios and production houses will also assist the industry to build on its international reputation as an efficient and innovative provider of post-production services to the film and television production industries.

There is a tendency, due to the current fragmentation of many digital content and applications industries, to think in terms of the specific issues faced by the various sectors. There will undoubtedly be a continuing role for industry-specific approaches. However, some issues may be amenable to sector wide interventions as well. Most likely, both approaches will continue to be important.

If the cluster dynamics can improved, then many sector-specific problems might be alleviated—in particular, improved linkages may facilitate the information flows necessary to address information shortages and other market failures. Attachment 6 provides findings and outcomes from two creative industry cluster studies—one undertaken in Scotland, the other in Toronto, Canada.

The tables below give some indication of the match that can be seen to exist between many of the problems faced by industry as well as its current strengths, and the mechanisms that clusters can offer. Further work is generally required to discover whether efforts to encourage cluster relationships could reasonably be expected to make a substantial difference—such as investigating whether significant market failures are at play, or whether the difficulties are inherent in the digital content and applications industries' fields of operation. If substantial market failures are absent, it may be that intervention is not in the broader public interest.

Barriers and cluster mechanisms

Barriers (in terms of Porter's diamond)	Possible causes of barrier / market failure	Relevant cluster mechanism
Factor conditions		
Venture capital and other finance shortage	Inherently risky	More informed and better venture plans and greater skills transfer may exist within clusters
	Information asymmetries and scarcity	Abundant and low cost information, trust, reputation and recommendation structures may exist within clusters
Skills – shortage of graduates with adequate skills	Lack of industry-institution collaboration	A cluster may facilitate information flow and coordinated industry cooperation with training institutions
Bandwidth – cost and availability	Lack of coordinated bandwidth purchasing strategy	Cooperation may be easier within clusters. Infrastructure provision may be more efficiently provided to concentrated firms
Demand conditions		
Shortage of robust business models	Newness of industries, among other things	Clusters may provide improved flow of information and understanding of successful business models as they develop
Capabilities not recognised by aggregators / distributors	Inadequate information flow	Clusters may allow a more visible industry and greater information flow
Low return from domestic market	Small domestic consumer base	Greater visibility of cluster industry to export markets
Low level of government demand	Lack of government knowledge of available creative digital content	Cluster industry outputs more visible to governments. Scope to aggregate whole-of-government demand.
Related and supporting industries		
Lack of connection between content-capable and technology-capable	Information, transaction and coordination costs high for small firms	Lower information, transaction and coordination costs within clusters
Firm strategy, structure and rivalry		
Distributors have not formed relationships with local content suppliers	Lack of familiarity, reputation and shared history	Familiarity may be more easily established within clusters
Lack of standards for interoperability	Failure to coordinate	Coordination easier within clusters

Drivers and cluster mechanisms

Drivers (in terms of Porter's diamond)	Possible causes of driver	Relevant cluster mechanism
Factor conditions		
Skills, experience and creative flair of workforce	Creative 'culture'	Clusters can intensify the creative 'climate' via the flow of ideas and sharing of creative values
Technological advances providing new distribution possibilities	Global technological change	Improved flow of information about technological change
Demand conditions		
Increasing market size arising from new media	Technological advances	Greater visibility of industry to export markets
Demand for ever-improving graphics and production qualities	Consumer tastes	Clusters foster efficient and effective innovation to keep pace with demand
Related and supporting industries		
Ubiquity of Microsoft	The advantages of accepted standards	More readily allow coordination of further standard setting
Firm strategy, structure and rivalry		
'Connectivity' allows improved distance linkages	Improved communications technology and platforms	In the 'virtual cluster', familiarity may be maintained between meetings

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ATTACHMENT 1—TERMS OF REFERENCE

The study on clustering, the creative industries and digital content will be undertaken in three stages.

Stage One

The purpose of this stage is to undertake a preliminary analysis and mapping of the industries producing digital content and applications identifying the key enterprises, their location and productivity drivers and barriers. The output of this stage of the study can be used to inform the more detailed cluster analysis to be undertaken in stage two.

1. Drawing on published data and interviews with industry associations and experts identify the key enterprises engaged in the production and marketing of digital content and applications in Australia, the enterprises which support those activities, and their geographic distribution.

2. Identify and describe the drivers and barriers that Australia's creative industries face in producing digital content and applications.

3. Identify, describe and provide a preliminary assessment of any market failures that may be restricting the growth or development of Australia's creative industries producing digital content and applications, having regard to similar assessments conducted in other country markets.

4. Assess the potential and relevance of clustering strategies to Australia's creative industries and their ability to energise the dynamics of digital content production and applications development, and provide advice on policy interventions designed to address any identified market failures or cluster deficiencies.

Stage Two

The principal activity of this stage of the study is to undertake a number of studies, including mapping and cluster analysis, of emerging or established sub-clusters that serve creative industries producing and marketing digital content and applications.

1. Critically examine and comment on each cluster's (geographic or virtual) capabilities, dynamics and ability to support competitiveness, innovation and cooperation amongst participating content and applications producing creative industries.

2. Examine the extent to which firms in the cluster have common needs or shared capabilities or deficiencies in relation to supply, information, skills, technology, distribution channels and infrastructure. Assess the ability of the cluster to contribute to servicing these needs and to strengthening capabilities and linkages.

3. Describe and analyse the dynamics and nature and strength of interconnections between capabilities and firms that constitute a digital content industry cluster including the extent to which the cluster has linkages with outside economic actors or capabilities.

4. Identify any gaps, weaknesses or market failures in capabilities or linkages affecting the cluster's performance, and provide advice on policy interventions designed to address any market failures or sub-cluster deficiencies identified.

In undertaking this stage of the study the following matters, amongst other things, would be expected to be considered:

- links to training education and research organisations and infrastructure;
- access to shared production and distribution facilities;
- availability of development and commercialisation expertise;
- information exchange, advocacy and practice development;
- access to equity and working capital;
- capacity to respond to changes in technology and industry structure; and
- support for innovation in creative practice, distribution, marketing and audience development.

Stage Three

1. In light of outcomes from stages one and two: develop comprehensive cluster intervention strategies to assist the creative industries to overcome barriers in the production, distribution and marketing of digital content and applications.

ATTACHMENT 2—AUSTRALIA'S CREATIVE INDUSTRIES AND DIGITAL CONTENT PRODUCERS

This attachment describes the approach adopted to defining *creative industries* for the purpose of this study, outlines the sources of data used and explains the geographic distribution of creative industries. It then cross-correlates the creative industries with producers of digital content.

Definition of the creative industries

All productive activity is creative. Creative activity is ubiquitous and occurs in all industries and enterprises, it included any product or service combining imagination, skills and materials to produce something valued by others.

The creative *industries*, however, are less easy to define. For the purposes of this study, we have adopted the definition used by Richard Caves (2000:vii), who defined the creative industries as those producing

… product[s] or service[s] contain[ing] a substantial element of artistic or creative endeavour...

This definition places primacy on the *output* of an industry or enterprise although it requires judgement concerning the nature and extent of 'artistic and creative endeavour' embodied in the resulting products and services. The defining feature of the output of creative industries is the nature of the *intellectual property* they produce. Where that intellectual property (e.g. a copyright, patent, trademark, or design) is essentially unique, novel and non-obvious, it may be considered 'creative' intellectual property. An enterprise qualifies for classification into the creative industries if its main output is in the form of creative intellectual property.

As an industry definition, there is a potential conflict between the output produced and the industry of the enterprise producing it—for example, a substantial amount of the output may be produced in vertically-integrated firms whose main output places them in quite a different industry category. Many creative *activities* and creative *inputs* produce creative *output*. Clearly the cultural industries—visual and performing arts, broadcasting and publishing—fall into this category, as do architecture, advertising, some types of software and applications. This is the case even though not all of their outputs and inputs are creative.

Some industries use creative inputs but do not produce an output which could be described as creative in the sense of its attributes and intellectual property. These include some types of digital output (databases, etc.).

Others produce or commission creative output as an intermediate input to their eventual output. Some of these are large enterprises, and their contribution to the total output can be a substantial one. Education and health and some types of scientific endeavour are in this category.

Sources of data

There are two main sources of comprehensive data—the Australian Bureau of Statistics (ABS) and the *Yellow Pages*.

The ABS provides a snapshot of the creative industries:

Activity	Businesses (no.)	Gross product ($m)	Employment (no.)
Publishing, books[1]	207	369.2[4]	4 822
Recorded music manufacturing, publishing[3]	541	254.8	3 886
Film and video services[1]	1975	606.8[4]	15 195
Radio services (private broadcasters)[2]	261	342.7	5 064
Television services (private broadcasters)[2]	41	na	10 668
Radio and television services (public broadcasters)[2]	2	394.8	5 248
Libraries[1]	521	na	12 596
Museums[1]	2049	na	6 956
Performing arts[2]	1399	401.1	13 359

[1]At 30 June 2000 [2]At 30 June 1997 [3]At 30 June 1996
[4]Gross product not available, industry value-added used instead.
Sources: ABS: (2001a), (1997), (2001b), (2001c), (1998a), (2001d), (2001e), (1998b)

The *Yellow Pages* categories of creative industries include:[1]

Category	No. of firms
Advertising agencies	2140
Artists—commercial	713
Designers—graphic	4120
Designers—product and industrial	421
Desktop publishing services	1062
Film production services	1161
Illustrators	268
Libraries—photograph and/or film	3
Multimedia services	1256
Music arrangers and composers	334
Photo lithographers	26
Photograph restorations and retouching	96
Photographers—commercial and industrial	1257
Recording services	1009
Slides and/or film strips	60
Sound engineers	96
Training films and videos	116

[1] Source: Dependable Database Data, *Australia On Disc* (based on *Yellow Pages* listings), May 2001

Using the ABS data, we see:

- a multitude of small firms, with a few large firms; and
- most of the businesses are in film and video services, museums and performing arts. Fewer are in publishing, radio and TV, where substantial infrastructure is required and activity is concentrated in large firms.

Using *Yellow Pages* data, we see graphic designers, photographers and film production and recording services account for the largest number of businesses. This suggests this work is specialised and project based, rather than being supported as employment in larger firms.

The geographic distribution of the creative industries

Yellow Pages data show that creative industry businesses are distributed throughout the country, with a concentration more or less consistent with the distribution of the population. This probably reflects the dispersed demand for most types of creative output, and the opportunities to service local markets. It may also reflect the predominantly local orientation of smaller enterprises (they exist to service a local market, and do not have either the resources or the market knowledge to go after global markets unless working in collaboration with others).

However, a closer look shows that within this constraint some types of creative industry businesses do tend to cluster in particular areas. By this, we mean that they tend to group in particular areas *in greater proportions than the concentration of business generally.* Initially, specific industies were mapped by postcode in the major cities of Sydney and Melbourne. This illustrated that there was a higher density of the industry in the business districts than other areas of the cities. A location density index was then devised to show the extent of the concentration compared to the general business density.

$$\textbf{LOCATION DENSITY INDEX (LDI)} = \frac{\dfrac{\text{No. of firms of category X in a particular postcode}}{\text{No. of firms of category X in Yellow Pages}}}{\dfrac{\text{Total number of firms in that postcode}}{\text{Total number of firms in Yellow Pages}}}$$

This compares, for a particular postcode, the proportion of all *creative businesses in a particular category* with the proportion of all businesses. If, for example, a particular area was a business centre and accounted for, say, five per cent of all Australian businesses, then the LDI would register five per cent as its denominator. The proportion of all creative businesses which were located in that postcode would appear as the numerator. Consequently, if more than five per cent of all Australia's businesses in that creative category were located in that postcode, the indicator would register in excess of 1. The larger it is, the greater the clustering of creative activity in that zone. Below is an indicative table showing the LDI for a number of specific activities.

Postcode	No. of firms of this category	Total no. of firms	LDI

Film production services (1161 firms)

SYDNEY			
Crows Nest	52	3921	14.850
Darlinghurst	35	4149	9.446
Potts Point	30	1438	23.360
North Sydney	28	4050	7.741
Bondi Beach	24	1668	16.111
Paddington	21	1300	18.088
MELBOURNE			
South Melbourne	36	3070	13.130

Graphic designers (4120 firms)

SYDNEY			
Darlinghurst	101	4149	7.681
Sydney City	72	22550	1.007
Crows Nest	69	3921	5.553
North Sydney	68	4050	5.298
MELBOURNE			
Richmond	55	3478	4.990
South Melbourne	54	3070	5.550
Prahran	51	2243	7.174

Commercial artists (713 firms)

SYDNEY			
North Sydney	11	4050	4.952
Sydney City	9	22550	0.728
Darlinghurst	9	4149	3.955
MELBOURNE			
St Kilda	13	1960	12.093

This shows that, while clustering does tend to occur within cities (particularly in the older and inner suburbs), it differs for different activities. It is greater for film activity than for, say, commercial artists. This is likely to reflect the nature of the work and the links involved.

Creative enterprises producing digital content and applications

This section provides an overview of the nature and structure of the firms and sectors producing creative digital content and applications. It is clear that many firms in the creative industries are using and producing digital content and applications and many examples were revealed during the industry forums conducted for this study. Ample evidence is also available from casual observation of business and retail sites.

However, it is also apparent that the production of digital content and applications in many sectors is still in its infancy relative to the industries' likely potential. Many sectors, such as text (or print) media, audio-visual entertainment and advertising are still dominated by the structures of the non-digital parent industries. Distribution is often concentrated in the hands of a few large entities, such as book publishers. In the case of television, and the 'newspaper' sectors, the distributors are quite large integrated entities, operating as producers of content as well as distributors. Smaller firms, including the creative ones, often operate around these large entities by providing input.

Many large firms in these traditional sectors have 'one foot' tentatively in the digital arena—both testing the ground and preparing to migrate or diversify in a significant way into digital. The small creative firms that produce dedicated digital content have a relatively small but probably growing market via these larger entities. There is a fringe of creative firms that choose to 'go it alone'. Other sectors such as music production have also been relatively little influenced by their first steps into digitisation. Few sectors were 'born digital'—like the electronic games industry. However, this sector too, follows the pattern of the large distributor/publisher and much smaller creative firms—developers in this case.

While an overall 'feel' for the industries can be gained from discussions with industry players and others, statistical data on the production and producers of digital content and applications are very limited. Data from official sources, such as the ABS, do not enable ready identification of enterprises *within the creative industries* producing digital content and applications and the nature of their production. Because such sources classify enterprises according to their main activity, any other activities are difficult to identify.

For this reason, a database compiled from the telephone listings in the *Yellow Pages* was constructed for the purpose of this study. *Yellow Pages* enables firms to list under multiple activity classifications, and so enables *combinations* of activities to be identified and analysed. The listings are also more likely to include new and very small firms than official collections.

Yellow Pages does not include a category entitled 'digital content and applications'. Instead, this study identified *Yellow Pages* classifications covering activities which, in our estimation, either *produced or had the potential to produce* digital content and applications.

These classifications were:

- Desktop publishing services;
- Film production services;
- Illustrators;
- Internet services;
- Libraries—photograph and/or film;
- Multimedia services;
- Music arrangers and composers;
- Musicians and/or musicians' agents;
- Photo lithographers;
- Photograph restorations and retouching;
- Photographers—commercial and industrial;
- Photographic processing services;
- Pre-press production services;
- Radio and television schools;
- Recording services;
- Slides and/or film strips;
- Sound engineers; and
- Training films and videos.

The multimedia category is difficult to interpret. Firms self-classify into *Yellow Pages* categories, and it is likely that different firms interpret the term 'multimedia' in different ways. *Yellow Pages* listings may understate the number of enterprises within the scope of this study. Nevertheless, to test the extent to which multimedia activities are undertaken within creative industry enterprises, we counted the number of enterprises in each creative category *who also listed in the multimedia category.*

First, of the 1 256 firms who self-classified as producing multimedia, only around 20 per cent were from the creative industry categories. Most of the others were involved in the production and/or retailing of computer software and packages, or were manufacturers or wholesalers of compact disks, records and tapes. While these activities and products certainly include the creation of some intellectual property, they appear less likely to be intensively reliant on creative intellectual property production than those categorised as creative industries.

This result suggests that only a relatively small proportion of creative industry enterprises self-identify as producing multimedia products or services.

Second, the number of firms *in each creative industry category who also list in the multimedia classification of the Yellow Pages* is both low and variable. It is highest among photo production services (photo lithographers and slides and/or film-strips) and least amongst artists and illustrators.

Together, these results seem to suggest that there is limited intersection between firms in the creative industry and the multimedia classifications. Multimedia firms do not tend to list in creative categories, while creative firms do not list in multimedia categories in large numbers. However, these interpretations of the data should be treated as suggestive only. The *Yellow Pages* is a marketing tool. Whether creative multimedia firms list in multiple categories may depend on whether they perceive themselves to be operating in multiple markets or whether the creative activity is perceived by the market to be inherent in the multimedia service offered.

Other characteristics of digital media firms

For individual industries, some insights into the types of enterprises producing digital content and applications can be obtained from the listings of the industry associations and other groupings or directories. Among the databases examined for this study were the membership listings of Australia's Interactive Multimedia Industry Association (AIMIA) and Multimedia Victoria (MMV). These databases include both public and private sector enterprises, and large and small enterprises.

Like *Yellow Pages*, such listings enable firms to self-classify into multiple activity categories and enable combinations of activity to be identified. Many such activities are clearly complementary—web design and web publishing, for example. However, others show that a broader range of activities is undertaken within specific enterprises.

Multimedia Victoria

A total of 875 businesses are currently registered with Multimedia Victoria (2001). Most of these list under a number of activity classifications, with the average being just over six activities. The majority of businesses are in the business related categories, such as business-to-business services, business systems, Intranet applications and websites.

Around 20 per cent of all Multimedia Victoria's listings are in categories consistent with the definition of creative industries used for this study—2D and 3D modelling/ CADCAM/ animation, Audio and Sound Design, Digital Imaging and Video, Games, Information or Software delivered via the Internet, and Multimedia. The remainder classify themselves into categories suggesting greater involvement in the technical rather than the creative aspects of digital content—business systems, software applications and website design. Of those listing in the more creative classifications, the majority are in the Information and Software Design via the Internet and the Multimedia categories, the two categories likely to support business systems, software applications and web design.

Most of the businesses listed appear to be in the small and medium size range. However, larger businesses including Apple Computer, Acer Computer, ABC New Media, and Disney Interactive are among the listings.

The AIMIA membership

The AIMIA database (AIMIA Membership Directory 2001) breaks up its listings into corporate, individual and students. Corporate listings make up 41 per cent of the total, individuals 40 per cent and students 19 per cent.

The database provided information on the skills capabilities of member firms—AIMIA currently lists approximately 950 member firms. A distribution of these skills is summarised in the following table.

AIMIA Skills List

Skill set	No. of firms	Skill set	No. of firms
Accountancy/Bookkeeping	10	Information technology	40
Advertising	25	Instructional design	15
Animation	21	Interactive design	100
Business management	28	Legal	2
Composers/audio	4	Marketing	37
Computer programming/Software development	61	Project Management	66
Consultant	32	Publishing	29
Content creation	84	Research and Development	34
Distribution	11	Retailing	5
Editing	27	Script writing	42
Film/Video production	38	Training/Education	63
Financing	12	Voice over	7
Graphic design	28	Web design	34

Note: Most members are listed under multiple skills sets
Source: AIMIA Membership Directory, www.aimia.com.au

The geographic distribution of digital media firms

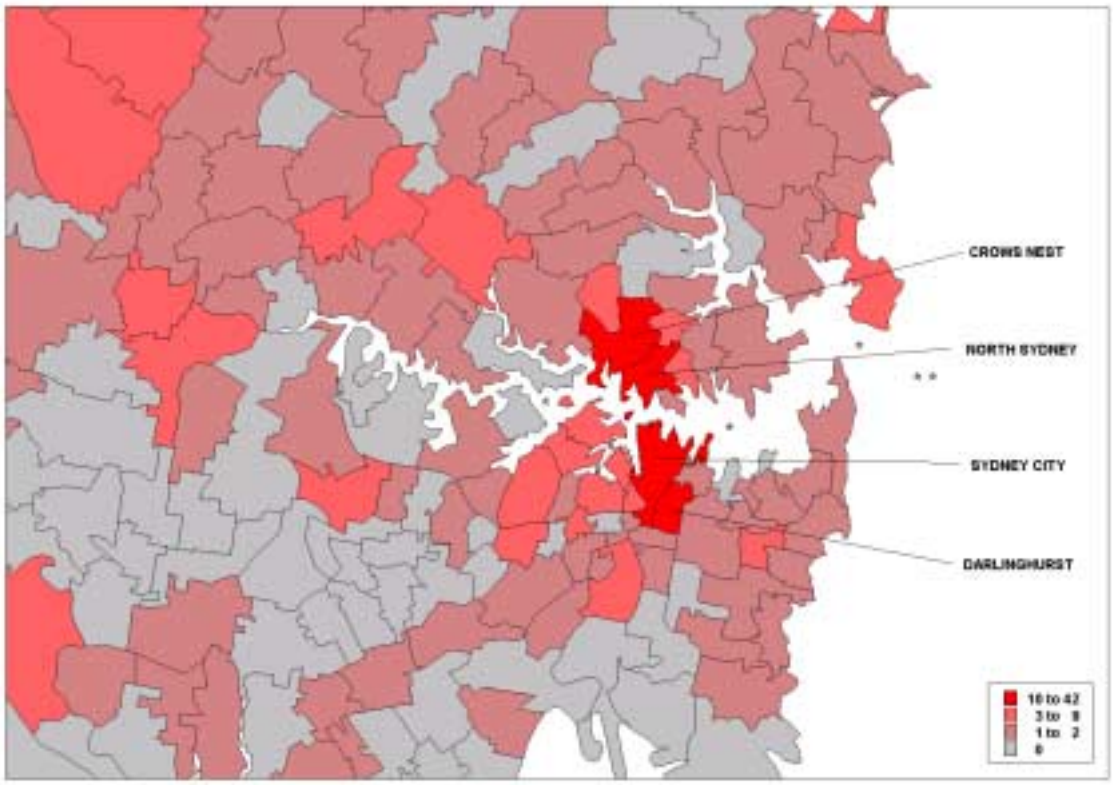
Mapping the enterprises engaged in particular activities enables their spatial distribution to be analysed. This allows preliminary assessment of the extent to which firms exhibit signs of spontaneous clustering tendencies. *Yellow Pages* listings were used for this purpose, using categories (listed earlier) encompassing firms either engaged in, or with the potential to be engaged in, the production of digital content and applications. For this purpose, the categories are jointly described as 'digital media'. Maps identifying clustering tendencies by State and key geographic regions follow this section.

Examination of the maps suggests that, as found in the case of the creative industries generally, digital media firms tend to concentrate in the capital cities. Beyond this, however, they do exhibit some tendency to geographic concentration in particular parts of the cities. The maps show the density of enterprises by postcode. The colour scheme of the maps indicates the relative density of firms located in postcodes—postcodes with dark shades indicate higher concentrations of firms.

The maps indicate that geographical concentration does take place. In most cases, the concentrations occur in postcodes encompassing the inner and older areas of the cities involved. In Sydney, the relevant postcodes are Sydney City, Darlinghurst, North Sydney and Crows Nest. In Melbourne, the postcodes are South Melbourne, Richmond and St Kilda. In Brisbane, firms are more numerous in Brisbane City, South Brisbane and Fortitude Valley.

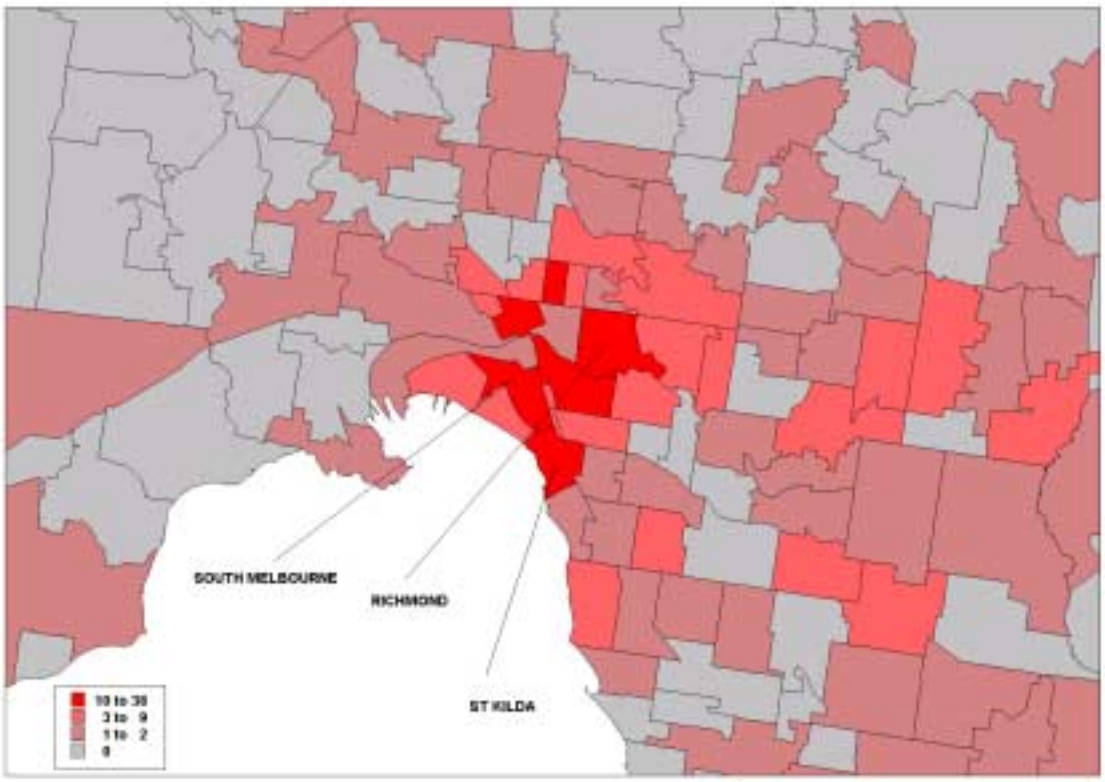
Some exceptions occur to this rule, generally because of the presence of an apparent gravitational pull from a major facility. Film production services, for example, tend to cluster around film studios—examples include Film Australia at Lindfield in Sydney and Warner Brothers on the Gold Coast.

Digital Media Firms - Sydney

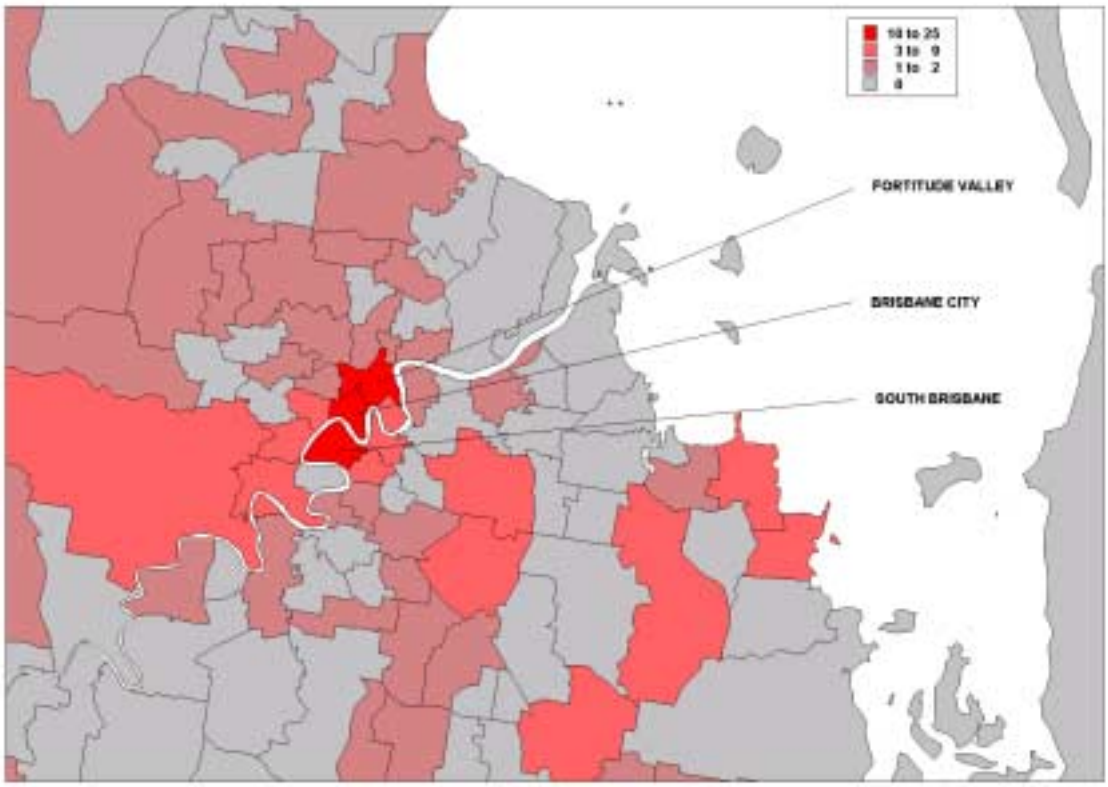


Di

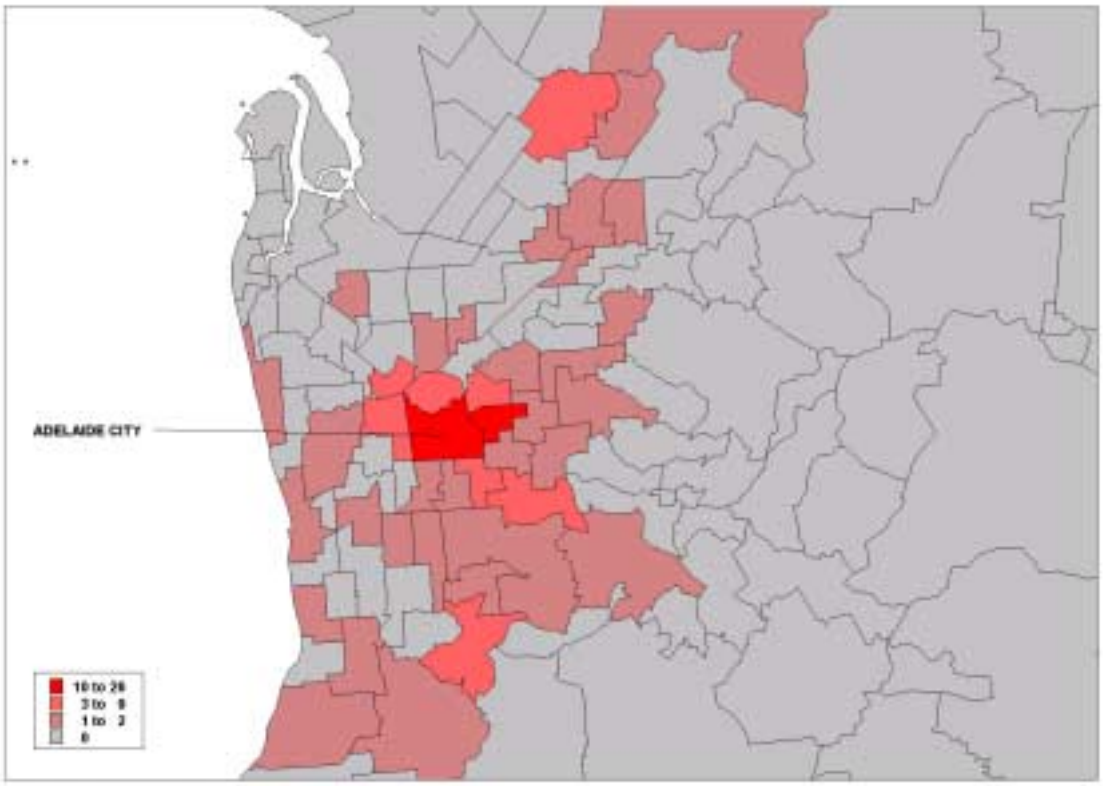
Digital Media Firms - Melbourne



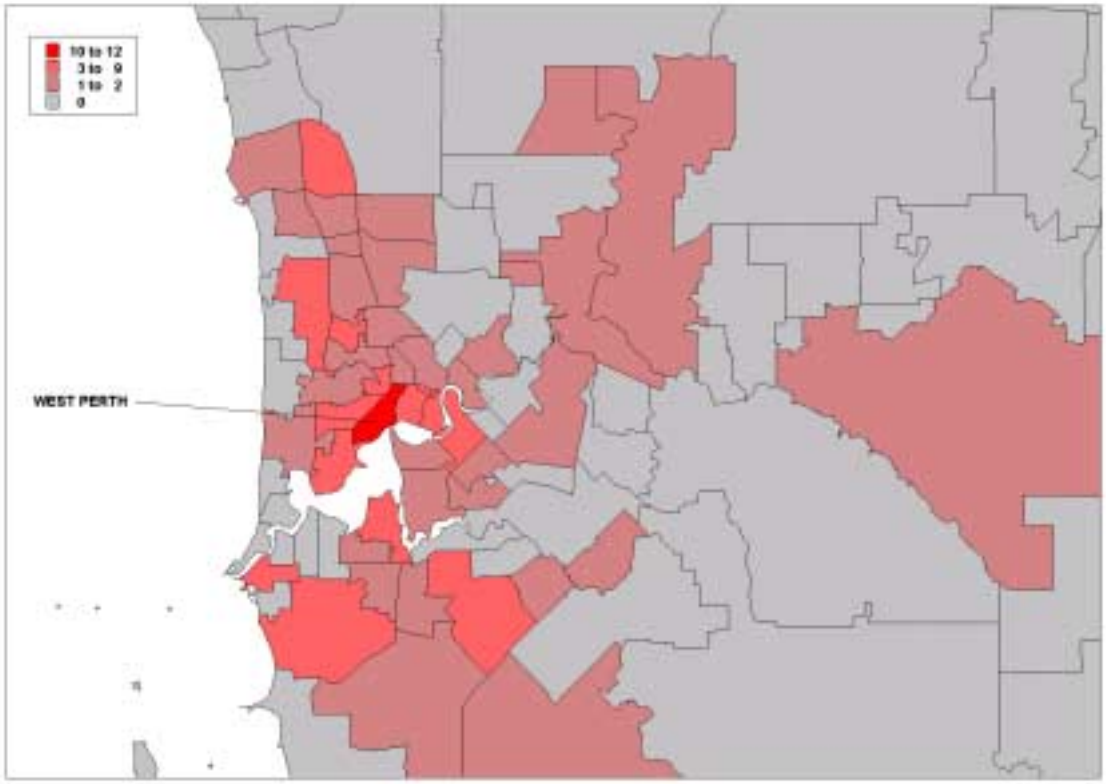
Digital Media Firms - Brisbane



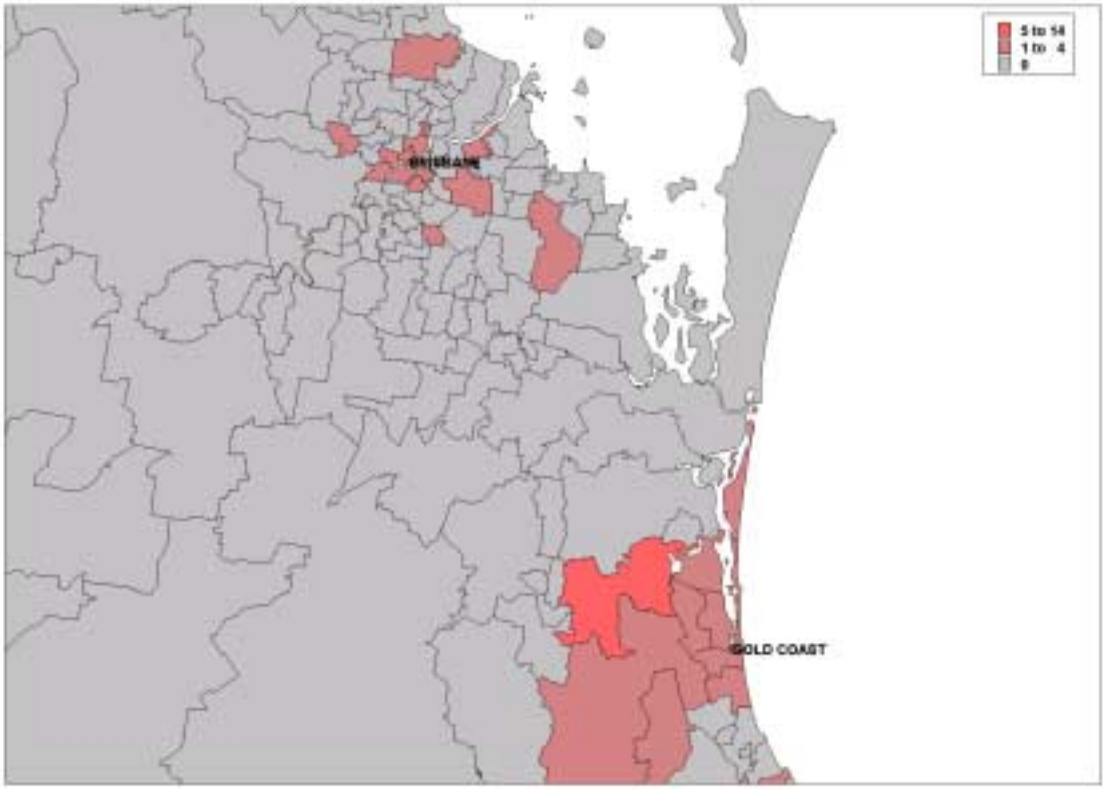
Digital Media Firms - Adelaide



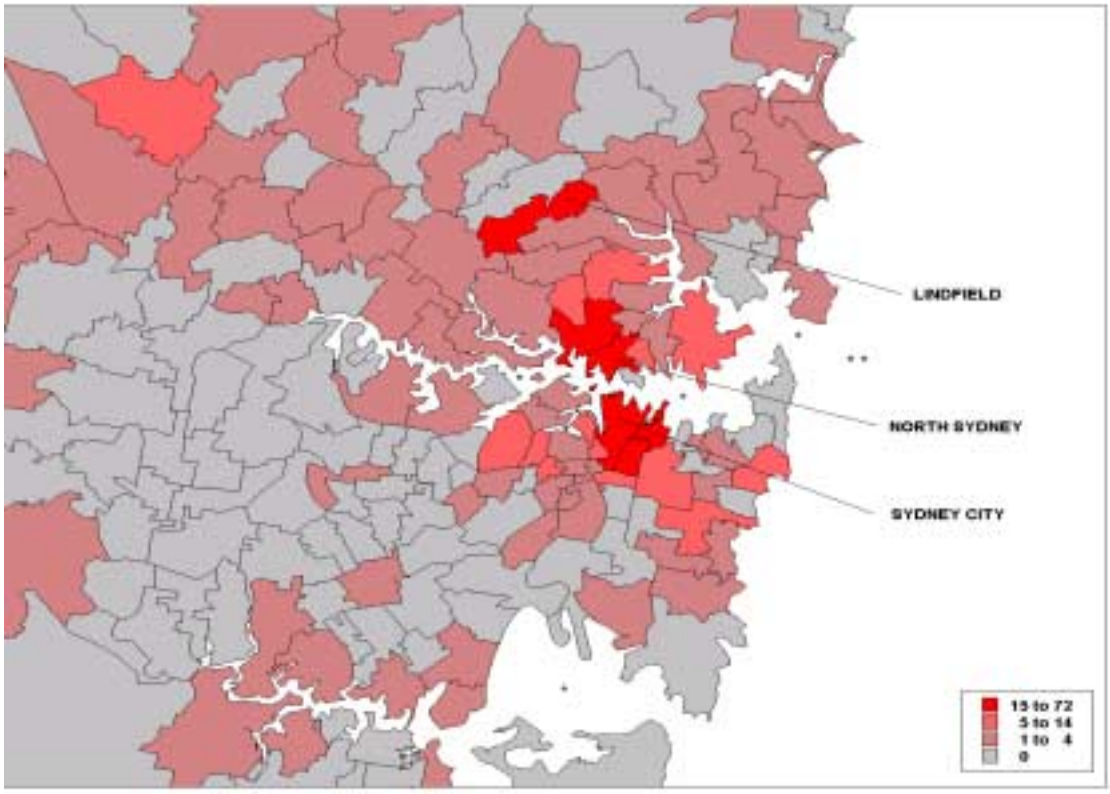
Digital Media Firms - Perth



Film Industry - Queensland



Film Industry - Sydney



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ATTACHMENT 3—INDUSTRY CONTEXT

This attachment looks at upstream and downstream users of creative digital content, and related policy areas.

Education

The education sector relates to the digital industries along a number of dimensions—principally, its role as a provider of supporting inputs in the form of training and specialised consultancy, a user of content and applications and a commissioner of content. Post-secondary and tertiary educational institutions provide a vital set of inputs—skilled people and ongoing training. Small group discussions found that tertiary educational institutions are increasingly undertaking consultancy work on behalf of creative digital firms, and providing access to specialist equipment that may be beyond the means of many individual companies. The education sector also keeps abreast of developments affecting the industry and helps disseminate this information.

Educational institutions engage with creative digital content industries on a number of levels. An increasing number of post-secondary and tertiary institutions offer courses of direct relevance to production digital content by the creative industries. The Queensland University of Technology has, for instance, established a Creative Industries Research and Application Centre which provides teaching and research resources. Six Cooperative Multimedia Centres have also been established in Australia to develop and support the provision of courses and provide specialised services to the multimedia industry. These centres were established to perform as collaborative enterprises between the education and training sectors and other public and private organisations. This has allowed industry, as a whole, to have significant input into the processes of designing and implementing training courses, particularly if industry needs are complex, diverse or not well understood. As noted in Attachment 4, the Academy of Interactive Entertainment and the QANTM CMC has an ongoing relationship in relation to the games industry.

A number of participants at the industry forum were of the view that educational and training content is likely to evolve as an important market for the creative digital industries.

The considerable role of Government as a source of demand for educational content is highlighted by the Schools Online Curriculum Content Initiative. Under this initiative the Commonwealth, States and Territories are collaborating, through the Curriculum Corporation, to develop online content for schools. The Commonwealth contribution of $34.1 million with a matching amount from the States and Territories, will over five years develop content, services and applications such as standardised frameworks that will support both joint development and distributed access for schools across Australia.

As a related or supporting industry, education in Australia is significantly placed from an industry development perspective, to drive the growth of digital content production in Australia creating the basis for a larger and more viable industry.

The Cooperative Research Centres (CRCs) bring together researchers from universities, the CSIRO and other government laboratories, and private industry or public sector agencies, in long-term collaborative arrangements which support research and development and education activities that achieve real outcomes of national economic and social significance to accelerate

the availability of such courses and provide specialised services to the multimedia industry. These centres are formed by consortia between educational institutions, the private sector and, in some instances, governments. As part of *Backing Australia's Ability*, the Commonwealth Government announced additional funding to increase its support for the CRCs from $143 million this year to $198 million a year in 2003. Funding will increase again in 2005 to $256 million per annum.

Health and other science-based industries

The health sector is an example of an area developing as a sophisticated consumer of creative digital content and applications. Such areas hold interest for creative digital industries because of both the high potential level of demand and the sophistication of requirements. A sector that demands and can pay for ongoing improvements in content can, in principle, create a momentum of innovation—a momentum that provides a competitive edge more broadly.

In the case of health, the value of digital content and applications lies in the potential to both reduce the cost and improve the quality of service delivery, though the requirement that applications be highly accurate, reliable, secure and available on demand. It can also require high levels of bandwidth as many of the applications rely on complex real-time graphics.

An example of a sophisticated health application is the Haptic Workbench developed by the CSIRO and the CRC for Advanced Computational Systems (ACSys) which combines 3D images with a sense of touch. This enables surgeons to hone their skills through virtual operations in which they can actually feel the response to their actions and also to have the process recorded to retrace sections in which they want more practice. It also enables specialists, say in metropolitan centres, to assist practitioners in remote areas with procedures in which they need assistance.

Other science and technology related industries that appear to have significant current or potential demand for creative digital content and applications include aerospace, defence, geology and engineering.

Advertising

The advertising industry provides ongoing work for the film and TV production sector. The budgets for TV advertisements in terms of their cost to time ratio dwarfs that of film and TV resulting in very high end products. At the 'lower' end of the print media, advertising provides digital work for graphic artists and designers who also use digital applications to interact with clients to exchange ideas and obtain approval of the final product, saving considerable time and expense over traditional means such as meetings or draft material being couriered between the parties. It pays well and demands high quality and, sometimes, high end outputs. Discussions between team members and production companies suggest that a few large agencies appear to exercise tight control over contracts and the flow of work from clients. Accordingly, the production companies need to cultivate the agencies.

With the advent of digital TV, there is interest in interactive advertising and this is potentially an area of innovation in the core industries.

IT (hardware and software)

The information technology sector is a fundamental enabler and driver of digital content and applications. Its products and services make possible new forms of creativity, provide new tools for creative people and, through its convergence with the communications sector, facilitates interaction between people in the creative sector. It also uses the talents of the creative sector to improve the attractiveness of many of its own products and services by making them more compelling and intuitive, for example in graphic user interface design.

This sector has an interest in increasing the demand for online services and digital products as this will drive demand for its products and services. For Microsoft, one way of doing this has been to form a joint venture—ninemsn—which claims to be Australia's largest Internet portal. Apple Computer Australia introduced its $10 million Apple Development Fund in 1988 to invest in Australian companies to stimulate IT research and development, commercial development and export of products and technologies. Apple claims that investments by the fund are increasingly being directed towards fostering Australian software development and innovation for world markets (Apple Computer Australia 2001).

The Commonwealth has also taken a role encouraging the ICT sector's involvement in content development. A new industry development program for the information and communications technology sector, the Strategic Partnership Industry Development Agreements (SPIDA) program, provides for digital content specifically developed for the Internet or other multimedia formats to be considered to be 'ICT-related' for the purposes of SPIDA recognition. The SPIDA program replaces a range of previous mechanisms, including the Partnerships for Development program, aimed at encouraging strategic industry development linked to government procurement of ICT goods and services.

Finance

Finance provision is a critical factor in the development of creative digital industries. Participants at small group discussions consistently raised the finance industry as a critical supporting industry. In common with sectors consisting of principally small firms, creative digital content industries have difficulty accessing sufficient and affordable funding. However, the problem is compounded by the project-based nature of much of the work carried out in the sector as venture capitalists and other providers of finance invest more readily in firms than in projects. The fundamental newness of creative content, its intangibility and the subjectivity of its value also accentuate the problem. In relation to specifically digital creative content, the relatively embryonic nature of the industry also presents problems, as does (in the short term at least) the bursting of the 'dot.com' bubble.

Well functioning clusters can encourage the establishment of specialised input industries. This may be quite crucial for efficient provision of finance, as specialist knowledge may be needed to determine the relative merits of investment opportunities in what is a new sector. However, with the exception of the film sector, there currently appears to be little specialisation in relation to the provision of finance for the creative industries in Australia. The benefits of the Innovation Investment Fund and Pooled Development Fund schemes run by the Commonwealth Department of Industry, Tourism and Resources are available to companies wishing to provide finance to the core industries. The Commonwealth has long recognised this as an issue and has, for instance, intervened in film financing for some time. Most recently, the Government announced:

- increased funding of $92.7 million for Australia's local film industry and a new refundable tax offset for qualifying large film productions to support production, development and the use of new technologies; and
- additional funding of $2.1 million over three years for the Australian Film Commission to seed the development of innovative broadband content and applications.

Intellectual property

As with finance, the issue of managing intellectual property was regularly raised at the forums. Ownership and the ability to exploit intellectual property generated by core industries is an important source of income. The legal profession has an important role in supporting the core industries establish practices and negotiate contracts that advance their interests. This is becoming increasingly important as intellectual property becomes more and more recognised and valued, and as governments enact new provisions to cope with technological developments.

The advent of digitisation raised problems not anticipated with copyright legislation that was designed around reproduction rights in the analogue world. To address these, the Digital Agenda Act came into force in March 2001 to provide a technology neutral right to copyright owners to control how their work is transmitted or made available online. The legislation encourages owners to enforce their own rights by using devices such as access codes, encryption and software locks and assists them in this by banning the trade in copyright hacking tools.

On the other hand, the Act extends the prior 'fair dealing' provisions to the digital world while protecting users who make temporary reproductions in the course of legitimate use such as viewing material on screen. It also protects telecommunications carriers and Internet service providers from infringement unless they have control over the content or they authorise an act of infringement.

Digital rights management has been recognised as a problem in a number of countries. One of the opportunities identified in Scotland's study of their creative industries was a Commercial Exchange for creative intellectual properties—a structured environment for intellectual property to be commercially exchanged. This would ensure that creative assets could be fully exploited across all media and channels, and it would allow for more content originators, even as individuals, to engage confidently with the commercial system (Scottish Enterprise Creative Industries Team 1999:15).

Telecommunications infrastructure

Telecommunications infrastructure is becoming increasingly important to the digital creative industries, providing a conduit for the delivery of creative digital content. High levels of Internet usage in Australia, and elsewhere, offers the opportunity for content to develop via online markets. A number of participants in small group discussions considered the rollout of broadband would be a critical factor in encouraging the growth of the creative digital content industries.

Prices for traditional telecommunications services have fallen markedly in recent years (Collins, Hancock and Chen 2001:91-121). However, the prices of high-end

telecommunications services, such as broadband, are seen by industry as a constraint on development, and a source of competitive disadvantage in relation to a number of other countries. High bandwidth charges are seen not only as inhibitors of the development of robust home demand, but are also seen as placing upward pressure on business costs as producers exchange large files during collaborative production processes.

The critical supporting role of telecommunications as a supporting industry is apparent in relation to the film post-production sector. Film post-production is an example of a sector with very high bandwidth needs for the transmission of graphics-rich content. However, their usage is 'bursty' rather than relatively constant. This is not attractive to telecommunications carriers, whose prices favour a steady usage pattern. To encourage carriers to meet their bandwidth needs at an attractive price, the industry has formed the Film Industry Broadband Resource Enterprise (FIBRE) to aggregate their requirements and present a business case to the carriers.

Distribution

Traditionally, creative firms, which have often been quite small, have had to join forces with larger distributors or publishers to get their product to market. To some extent, this has reflected the nature of costs in the publishing and distribution process. Printing a book or a CD is done more efficiently by firms that operate on a very large scale. Similarly, transport and distribution to retail outlets are processes of increasing efficiency with scale. In some sectors, there have also been technical limits on distribution channels. In the broadcast sectors, for instance, there are limits on the radio frequencies available.

These factors have combined to give the often large firms, in control of these distribution channels, a potentially significant position of power over creative firms. Distribution was identified as a bottleneck for the digital content industries by Cutler and Co as far back as 1994 (Cutler and Co 1994).

The advent of digital technologies and the Internet, on the face of things (and from a technical perspective) solve these problems. Reproduction of an electronic file containing creative content can occur at almost zero cost, and distribution channels over the Internet become almost infinite. At the height of the dot.com boom, some expected that creative firms (along with many others) would be freed from the restraints imposed by the relationship with distributors.

However, there is an increasingly common view that this hope will not be met. Distributors perform an additional function that might be expected to persist through the transition to digital forms of content. By their reputations, distributors provide a quality-assurance service. In doing so, they reduce both the search costs and the risk of disappointment faced by customers. This is particularly important in the case of creative content products, because of both the vast quantities of low quality content available (produced by hobbyists) and the difficulty consumers have in assessing the quality of a content product prior to consumption. A familiar distributor (or aggregator) reputed to provide content of high quality (or content matching the consumer's tastes) offers a superior value proposition to that of an unknown creative firm delivering its own content.

Though the dominance of large players in the digital environment performs a useful—perhaps unavoidable—function, it creates an imbalance in the power relationship between creators,

distributors and consumers. The market power can potentially be exploited to the detriment of both creators and consumers via high retail prices and low returns to creators. Alternatively, power may be exerted via unnecessary non-price control of content.

In principle, if the initial reputation could be established, non-profit, government or cooperative bodies could provide the quality assurance service sought by consumers without the inefficient exploitation of the market power opportunities created. OzAuthors (*www.ozauthors.com.au*), a joint venture between the Australian Society of Authors and IPR Systems Pty Ltd is an attempt to provide such an alternative distribution channel. This has yet to prove successful—there are just 40 publications under 50 subject headings. Government bodies with existing reputations are another alternative channel. There is some evidence that the public broadcasters are emerging with such a role in the online environment.

Collecting institutions

Collecting institutions have multiple roles in the creative industries. In addition to acquiring, safeguarding and displaying creative content, institutions like museums, galleries and media and film archives hold significant amounts of material of interest to content creators. For example, the National Archives receives around 2 500 requests for digitised photographs each month (National Archives of Australia 2001), while the National Library of Australia's web-based Picture Australia service has recorded well over one million hits per month since its launch in August 2000. Access to this material on reasonable terms and with low administrative costs may be an important driver of new content development. In this role, collecting institutions are potentially an important supporting industry.

The institutions are also making their collections more widely available online as a means of improving their audience reach, making more of their collections accessible (the National Gallery has only three per cent of its collection on display at any time) and improving the richness of their displays by associating information of interest, such as artists' biographies, with the digitised works. Most offer extensive online services, including collection database searching and digitisation on demand. Some are engaging in collaborative projects with other bodies to produce a range of virtual exhibitions and archives combining material from a range of different institutions.

Australian Broadcasting Corporation (ABC)

As well as being a major creator of online content in its own right, ABC New Media extends and enhances ABC radio and television output to the Internet. The ABC has a team of website designers, developers, producers, executive producers and editors. These staff are responsible for the overall production of the ABC website. Other program and output areas also have staff that produce and maintain ABC Online sub-sites, including Radio National, Corporate Affairs, ABC TV. Most ABC sub-sites are created in-house by ABC staff, however, occasionally external developers are contracted to design and develop ABC sub-sites.

State Governments

Digital content and applications are also being supported at the State Government level.

Multimedia Victoria

Multimedia Victoria is a government body working to implement the Victorian Government's Connecting Victoria policy, a strategy for growing the State's ICT sector. To deliver the policy, Multimedia Victoria works closely with the ICT industry, community groups, education and training providers and the wider business community. The Multimedia Victoria website (*www.mmv.vic.gov.au*) identifies its core responsibilities as including:

- creating growth in the ICT industry in Victoria;
- working with government bodies to deliver services online;
- increasing community uptake of the Internet; and
- promoting the uptake of e-commerce by Victorian companies;

Cinemedia

Cinemedia is a Victorian State-owned Australian screen cultural agency, which is part of the Victorian Arts portfolio. It is an organisation devoted to the creation, collection and study of screen culture and content for cinema, television and computer. Cinemedia encourages and assists in the development, production, exhibition and knowledge of film, television and new media. It also supports the growth of screen-based interactive content to maximise the economic and cultural development of the Victorian digital media industry. One aspect of this fund is the accords that Cinemedia have with ABC and SBS respectively.

Arts Queensland

Arts Queensland is the Queensland State Government's funding, advisory and advocacy body for arts and cultural development.

In 1999–2000, Arts Queensland supported multimedia development by allocating funding to the: (Queensland Government 1999)

- Digital Media Program—which promotes the production of innovative digital multimedia and also offers opportunities to established developers to work with the film and cultural sectors on the production of new multimedia titles;
- Digital Multimedia Labs—in Brisbane, Townsville and Cairns for artists and multimedia developers. These labs offer a supportive approach, similar to Technology Incubators, in an effort to encourage the application of new technologies to business enterprise; and
- Multimedia Art Asia Pacific Digital Arts Festival—which supports the production and presentation of multimedia art.

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ATTACHMENT 4—CLUSTER CASE STUDY: THE INTERACTIVE GAMES INDUSTRY IN AUSTRALIA

Interactive games are a prime example of digital content and applications. This attachment is a case study of the Australian interactive games industry, describing the development and growth and discussing the elements of clustering that the industry exhibits.

Australia developed early expertise in interactive games. In the 1980s, companies such as Beam Software developed games for early DOS-based PC platforms. While the market was limited, it was soon clear that it was to grow rapidly, and Australia's knowledge of the market positioned it well to exploit this growth. Today, industry estimates place global turnover in excess of $US20 billion per annum, with rapid growth in the Asian market expected to raise this to close to $US100 billion over the next decade. Multiplayer online gaming is the most rapidly growing portion of the industry, particularly in the fast-expanding markets of Korea, Japan and, increasingly, China.

In Australia, the interactive games development industry consists of around 40 firms employing over 600 people, the majority in a full-time capacity. Its turnover is estimated by the industry at around $75 million. Most development firms are Australian-owned, although a number are foreign-based. These include the United States-based firms, Irrational Games and Pandemic, which have recently established studios in Australia, and French-owned Infogrames. The firms specialise in particular types of games applications, from console games developed for proprietary platforms such as Nintendo, PlayStation, Sega and Game Boy, to computer-based and 'massively multiplayer' online games.

The projects undertaken range from the innovative and risky business of developing titles for marketing to publishers to the essentially 'fee-for-service' work of operationalising concepts developed by others under contracts arranged with publishers. Some developers create both the technologies to enable new types of games to be developed, and then the games to exploit them. Games development costs are reported by the industry to average US$2–4 million, although both costs and contracts can be well in excess of this.

Other major participants in the industry are publishers, distributors and retailers. In many cases, publication and distribution functions are combined in single firms, which as a result, control the development component of the industry. Such firms either source games within their own organisations or acquire them from independent game developers. Few publishers and distributors are currently located in Australia, and as a result, all the product of the Australian games development industry is exported. However, several publishers maintain a presence in Australia, including the European-based publisher and the world's second largest computer game company, Infogrames, which established its Asian Regional Headquarters for Publishing and Development in Melbourne, following its acquisition of Beam Software/Melbourne House in 1999.

The structure of the industry is, in some respects, atypical of the creative industries more generally. In the first place, the firms are larger, on average, than the micro-businesses which form the basis of many creative industries. Twelve of the 40 firms currently employ more than 20 people. This reflects, in part, the range of skills required in order to develop a game (including game design, direction, production and testing, programming, 3D graphic art, animation, sound engineering and composition) and the fact that firms tend to employ staff rather than rely on project-based contracting arrangements as in the film industry. Second,

and as a result of this larger average firm size, it requires more emphasis within firms on the development of business and project management skills, in addition to the technical skills of games development. Finally, and reflecting the global base of the industry, it services a largely foreign-based network of publishers and distributors.

Australia's electronic games industry shows several classic elements of clustering.

Geographic distribution

The industry shows a degree of geographic clustering, with Victoria accounting for the majority of activity. There, clustering reflects the history of the industry, with the pioneer developer Beam Software being Melbourne-based. Games developers in Victoria are now centred around a number of publishing companies—Infogrames, which acquired Beam in 1999, and the US companies Acclaim Entertainment and THQ. A further concentration exists in Canberra/New South Wales, where Micro Forte is located. Other developers have established in Queensland and South Australia.

Links among games developers

More striking than the geographic concentration of the firms, however, are their *networks.* Both formal and informal structures are apparent.

The industry's peak representative body, the Game Developers Association of Australia (GDAA), was established in 1999 to promote the industry and advance its joint interests. Eight of the largest games developers, as well as the QANTM Cooperative Multimedia Centre, are members of the GDAA. The GDAA compiles industry statistics, arranges technical seminars by major hardware and software vendors, works with both public and private educational institutions to develop course content to better serve the needs of the industry, provides introductions for members to overseas publishers, assists members in locating funding and operates a website to service members and ensure that the industry and its products are visible to the wider world. It also conducts the annual Australian Game Developers Conference, of which the Victorian Government is now a major sponsor, and represents its members' interests to government agencies.

The games developers have achieved close links with government, particularly the Victorian Government, which last year released its 'Game Plan' for the industry in Victoria. That Plan addresses many of the barriers to entry and to growth which the industry has identified, including the:

- cost of developer kits for the next generation of consoles;
- need for a computer games incubator to assist new starters;
- cost of, and access to, bandwidth;
- lack of specialised understanding of the industry among venture capital organisations;
- cost of showcasing local products at international trade fairs and missions; and
- development and evaluation of curriculum for the computer games industry.

Firms in the industry have also worked, individually and collectively, to encourage the development of courses with a specific games development focus and to promote the industry

to intending students with an interest in programming and entertainment. These initiatives are discussed further in the following section.

Among the businesses themselves, formal and informal linkages appear productive and relatively frequent. As in other industries with common elements in their skills requirements, businesses share the CVs of potential employees. However, transactions requiring a greater degree of trust also appear common. These include arrangements to engage in joint development work, to share IP over prolonged periods or to cooperate to share equipment or facilities.

Factor conditions

The growth of the games development industry has created sufficient demand for specialised skills to justify the development of dedicated courses and course components. Charles Sturt University offers a bachelor of Computer Science degree in Games Technology and sponsors a number of PhD students focussing on games-related research and development. The QANTM Co-operative Multimedia Centre established Australia's first Diploma in Games Development in 3D animation, and Canberra's TAFE College is home to the Academy of Interactive Entertainment (AIE), founded in a joint venture with Micro Forte in 1996 as Australia's first educational institution focusing on the interactive entertainment industry. The AIE also operates incubators for the business ventures of new graduates in Canberra and Bathurst. These developments appear to owe much to the initiative of the industry itself, which has representatives on the boards of the Charles Sturt University and the AIE.

The industry has also sought, through the GDAA, to improve access to the specialised management skills necessary as a result of the growing size and complexity of the businesses themselves.

As for most small and medium firms operating in an uncertain environment, the difficulty of obtaining venture capital is a potential constraint on development of higher-value activity. A typical console game development project is estimated by the industry to occupy between 20 and 30 people for between 12 and 36 months, and to cost around $3 million. The industry appears to rely for much of its project funding on publishers, who then control the type of games developed, and on the cash flows generated by normal business operations. As a result, it appears to be limited in the extent to which it can engage in the more creative components of game development, which can be likened to R&D. Games development projects, like film and multimedia applications, are generally eligible for a 100 per cent tax deduction under Division 10B of the Income Tax Assessment Act, but the deduction is not available until the project begins to derive income and is then spread over two financial years. The expected emergence of an Australian-based publisher/agent over the next few years is likely to assist in the funding of game development.

Demand conditions

As well as attempting to improve the match between its demand for productive inputs and the availability of those resources, the Australian games development industry is attempting to respond to the opportunities presented by the rapid growth in the volume and mix of demand for its product.

Demand for interactive games product is driven by global factors—demand is growing in volume and sophistication, as a result of the increasing number of games platforms, improved infrastructure accessibility (especially in Asia), greater awareness by consumers of games possibilities and increasing scope for niche marketing.

The local industry's product is acquired by publishers and distributors based overseas. A number of local games developers have sought to develop closer links with such groups. Micro Forte, for example, has close links with Boston-based publishers. Australia already produces material for both the United States and European markets, and appears to have developed a brand which, together with its cost advantages relative to other producers in the United Kingdom, the United States and Japan, and its established talent pool, offers the prospect of further rapid demand growth.

Growing demand in the Asian region, particularly Korea, is seen as favouring Australia because of publishers' recognition of the Australian industry's demonstrated ability to produce for those markets, and the compatibility of Australia's timezone. Australia's track record in the production of successful games also appears to be driving new games development contracts, as publishers seek to place new work with the firms responsible for developing particular products, and as Australian firms obtain access to development kits from firms such as Nintendo.

Development of related and supporting industries

While games developers appear to have developed strong links among themselves, their links with their related and supporting industries seem more limited. Related industries include those with whom they share skill and other requirements and those producing complementary products and services. In the latter category are the film and television industries, as games rights to major new productions are typically sold alongside the associated movie, television and merchandising rights. This means that games developers may be required to link closely with those working on the movie to ensure that characterisation, scenery and other details are faithfully reproduced in the game. The game development process must be integrated with the development of the other products in both their production and distribution phases.

Skills (and to a lesser extent, proprietary hardware and/or software) are the main input into the games development industry, and the area most likely to overlap with related industries. However, discussions with the industry suggested that skill interchanges are limited and that labour mobility between games development and other industries is generally low. This is likely to be explained partly by the preference of games developers to build up in-house capabilities rather than relying on contractors, and partly by the need for fairly extensive training of otherwise well-qualified recruits on the specialised hardware and software used in the industry.

Perhaps because of the apparent market power of games publishers and distributors, combined with their overseas location and focus, Australian games developers appear to have only bargaining power with them.

Conclusion

The games development industry in Australia is a relatively small grouping of enterprises in a limited number of geographic locations with a common interest in developing the industry and

promoting its capabilities to overseas publishers and distributors. Although different enterprises produce products for different platforms, their common attributes almost certainly exceed their differences. In particular, they share a common interest in the development of the particular skills requirement of their activities, in the pursuit of more favourable funding arrangements and in the branding of Australian product overseas in a way which will increase the opportunities for all of them.

This offers the potential for strong linkages among games developers themselves. The *actual* emergence of such links appears largely attributable to the activity of individuals within the industry who have played a catalytic role in establishing the mechanisms (notably the industry association and the annual conference) which facilitate the development and reinforcing of those links.

The industry also appears to have developed strong and advantageous links with educational institutions and with the Victorian government. These links suggest that a number of strong cluster dynamics exist in the industry and are likely to contribute to continuing growth and competitiveness.

However, the dominance of overseas-based publishers and distributors who constitute the industry's chief market, the apparent lack of venture capital options matched to the industry's production and sales cycles, and the lack of strong links with other locally-based industries with related interests, suggest deficiencies in other elements of the cluster dynamics. A number of these are related to the relatively small size of the industry, and are likely to dissipate as it expands. They appear unlikely to threaten the industry's growth. Nevertheless, any strengthening of those links can only improve the capability and competitiveness of the industry in the longer term.

ATTACHMENT 5—DRIVERS AND BARRIERS TO CAPABILITY DEVELOPMENT

Views from Industry Consultations

During forums conducted in Canberra, Brisbane, Melbourne and Sydney, participants were asked to consider the drivers and barriers facing creative industries producing digital content and applications in Australia. In this attachment, the drivers and barriers identified have been broadly categorised. Selected quotations from participants indicating how and why particular drivers and barriers affect particular activities are also included.

The embryonic nature of the industry has created a few very powerful drivers stemming from the introduction of new digital technologies and a larger range of challenges (barriers) that need to be addressed for the digital content and applications (DC&A) industry to mature and possibly reach its full potential. These cannot be looked at simplistically and indeed most of the broad categories we have used have some points that can be classed as drivers, others as barriers and a few that could fall into either.

Drivers

Technology

Technological advancement is the engine that is driving the development of digital industries. This growth is being enabled by a combination of factors including:

- the emergence of new platforms for distribution including digital TV, DVD and mobile telephony and hybridic derivatives;
- the accessibility of the necessary digital infrastructure, such as broadband, in terms of both affordability and usability. The latter has been greatly improved by the ubiquity of standard software packages, specifically Microsoft. This has both fortified consumer confidence in the reliability of applications and reduced the risk of product development for producers; and
- significant investment in hardware and technology by major telecommunications and entertainment companies.

Demand

Not only is demand for DC&A growing as a result of growing numbers of online users expanding the market size, it is also growing due to the enabling features of DC&A, specifically:

- digitisation is facilitating demand for more and more timely information; and
- it is raising consumer expectations and appetites for aspects such as high-end graphics and online games.

Business environment

The emergence of digital technologies is changing the competitive framework in which business operates e.g.:

- the ability to capture and capitalise on intellectual property rights is increasingly becoming a key component to long term profitability;
- competitive businesses are seeking to cut costs and provide new services through the incorporation of DC&A. DC&A is enabling new ways of doing things (e.g. new business practices, new organisational and work arrangements—virtual teams);
- content can be exploited on multiple platforms thereby increasing revenue. Platforms are often complementary. For example content is frequently re-purposed between film and games platforms ('The game of the movie and the movie of the game');
- the low value of the Australian dollar has enhanced the competitiveness of Australian businesses, including those involved in DC&A production; and,
- increased levels of connectivity may potentially facilitate virtual clustering, especially in high-tech industries such as those involved in DC&A production.

Government involvement

Government policies can provide key drivers for DC&A industry development. Forum recipients specifically identified the following as ways the government has helped drive the development of DC&A industries:

- regulatory regimes such as local content rules;
- the provision of government incentives to promote digitisation; and
- the public sector acting as a lead consumer (e.g. the digital imaging initiatives of the national collecting institutions). This is particularly important for industries involved in new technologies such as those producing DC&A.

Skills base

On the face of it Australia should be well placed to capitalise on advantages the skills set of its workforce enjoys. Specifically:

- the Australian creative industries enjoy a wealth of world-class talent and creative flair; and
- our multi-cultural and multi-lingual workforce is well placed to serve international DC&A markets, particularly Asia.

Barriers

Technology

Whilst technology remains a key driver of DC&A industries, aspects of its introduction can pose significant challenges during the introductory phase and as such can pose barriers to DC&A industry development. Some technology issues identified include:

- difficulties in accessing adequate bandwidth both physically and in terms of cost;

- difficulties in obtaining off-the-shelf software—or in the case of the games industry, licenses to use specific application development kits—to develop cutting-edge content/applications; and
- user readiness given that most people are time-poor, averse to change and do not fully understand the benefits digitisation present.

Demand

Some elements of demand also may pose challenges to DC&A industry development, specifically:

- that most consumers are not yet adequately literate online. This both reduces notional demand and the development of the sophisticated domestic demand that can be a key component of developing effective clustering;
- there is some evidence that the consumption of digital media may have stalled or actually be going down; and
- there has yet to be developed enough compelling content to drive demand. To date content has not generally met consumer expectations (e.g. webcasts and interactive TV).

Business environment

Business challenges, particularly the lack of working business models, issues surrounding the fragmentation of advertising markets in a multiplatform environment and the complex management of IP present the most significant barriers for companies producing DC&A. As such we have divided these business challenges into three key subcategories—finance, business models and issues to do with the competitive dynamics they operate in.

Finance

Traditionally, there have been issues with obtaining finance/venture capital for innovative concepts in Australia and it appears the development of DC&A is no exception.

- Industry finds it difficult to obtain adequate capital due to a general poor understanding of the industry and the evolving technology on which it is based. Perceptions of risk have also been further enhanced in the wake of the ‘dot.com collapse.
- Set up costs required to access DC&A products are often high and may be unattractive to consumers who have not yet been convinced of the benefits of DC&A.
- The low value of the Australian dollar can deter firms from seeking overseas capital.
- There is a general gap between the cost of the high quality content consumers expect and what producers are prepared to pay.

Business Models

A key issue that needs to be overcome is the development of effective business models in the digital environment. Some challenges that have been identified include:

- issues surrounding effective intellectual property management. Many producers are finding it difficult to commercialise the IP of in-house development and/or negotiating the myriad of IP rights needed for multimedia content. Uncertainty surrounding IP has pushed out the risk averse and made some IP holders overly defensive of their IP rights. As a result many firms are unwilling or uncertain of sharing IP rights when collaborating;
- there are difficulties in developing effective revenue models for embryonic products. The business models of the traditional industries from which DC&A has sprung may not be transferable to the digital environment. For example the models used for free-to-air TV do not appear to be effective for interactive TV;
- the industry is still in the process of determining agreed standards for interoperability across platforms and the rules and processes for interactive content are not yet fully evolved (unlike traditional media such as movie making). The net result is inefficiency and uncertainty for those involved; and
- there is some evidence of uncertainty from advertisers concerned about the fragmentation of audience markets and demographics across the multiplatform environment. Some vertically integrated companies may not allow the re-purposing of content on other in-house channels in order to protect advertising revenue streams.

Competitive dynamics

DC&A producers operate in a particularly difficult competitive environment involving both new technology and an industry structure that is characterised by a large number of very small companies and a handful of very large firms. As such the following may be limiting industry development:

- powerful distributors (with perhaps the exception of Telstra) do not have good links with the local industry and look abroad for content. ('Have their heads down so miss good local capabilities'). The sheer size of their market power may also mean that they effectively act as 'gatekeepers' for the effective distribution of content. Some small firms have difficulties in finding an outlet;
- powerful players are hoarding IP rights. Many try to lock up IP in perpetuity across all platforms thereby limiting further development. In many instances now, major media players push to purchase 'bundled' free-to-air (FTA) and broadband IP rights— although often without exercising the broadband right, in order to maximise audiences on FTA and maintain advertising revenues;
- the capabilities and skills of the local industry are not known to all content aggregators / distributors;
- the plethora of small budget work, whilst appropriate for the characteristically small Australian content firms, is limiting their growth and restricting them to the domestic market. (This is a world-wide phenomenon);
- providers have yet to develop a deep understanding of how consumers want to use new technologies and what products they desire;

- certain providers of digital content, such ninemsn and most games developers, produce all material in house to the exclusion of outside contractors. Additionally, corporate alliances can push out outsiders thereby limiting competition; and
- traditional business models may not fully understand how to accommodate the requirements of digital industries (e.g. the high cost of file footage on SBS—now being rectified).

Government involvement

There were mixed views in the forums about the role of government in the industries' development. Participants raised a number of issues:

- The regulatory environment in which the DC&A industry operates, specifically: datacasting restrictions (currently under review), content restrictions on adult content and gaming (two key drivers of DC&A) and progressing a digital standard for the broadcast of data/interactivity on digital TV (MHP)[5];
- Government could do more to educate industry and users on the benefits of DC&A and provide further financial support;
- Obtaining government assistance can be in itself resource intensive, particularly for small and micro businesses;
- Project based government assistance may not adequately encourage broader development of a sustainable industry; and
- Whilst many government agencies have considerable IP resources, they have not been able to sufficiently commercialise these resources.

Skills base

As with most high-tech industries finding workers with the right skills set can be difficult. Forum attendees have stated that DC&A industries face the following issues:

- Graduates are often not industry-ready and thus require further training. This links in to the need to develop closer links between the industry and the higher education system;
- There are not enough people with the right combination of business/management, technology and creative skills required by the industry. Alternatively, there is a need to develop stronger linkages between those with content capabilities and those with technology capabilities;
- Some forum participants had the perception that there was an inadequate appreciation of the need to work on time and to quality within the industry; and,
- Recruitment agencies have yet to develop enough understanding of the industry and therefore don't always find suitable people.

Industry structure

[5]The free-to-air television broadcasters announced in October 2001 that Australian Free-To-Air television industry's support for DVB-MHP (Multimedia Home Platform) as the standard for delivery of interactive television services.

DC&A industries have evolved out of a range of traditional media and often do not perceive they have shared interests with other DC&A providers. The industry structure is still embryonic and faces a series of issues.

- The development of DC&A in a diverse number of industries has prevented the development of a common commercial language or collaborative relationships;
- There has not been a collaborative effort to exploit the three major DC&A markets of TV, internet and mobile telephony;
- The relevant industry associations lack the resources to facilitate effective collaboration;
- The small firms that characterise the industry are not able to penetrate international markets;
- There is an identified issue with communication between new media industries and the telcos; and,
- The Sydney-centric film and television industry can be difficult to penetrate from other locations.

ATTACHMENT 6—CLUSTER APPROACHES TO THE CREATIVE INDUSTRIES OVERSEAS

A number of countries have undertaken cluster or industry studies resulting in recommendations of initiatives called 'cluster policies' for their creative industries. The term is open to much interpretation, with a range of different initiatives constituting a cluster policy. Below are descriptions of two studies, from Scotland and Toronto, with a comparison of the two approaches.

Scotland

The creative industries have been identified as playing a substantial role in Scotland's economy. A study conducted by Scottish Enterprise (a government agency concerned with economic development in Scotland) concluded that the creative industries will grow rapidly over the next decade or so, particularly industries which focus on the new digital media channels (Scottish Enterprise Creative Industries Team 1999:6) The potential for growth was inferred or deduced from a variety of sources—work commissioned through the London School of Economics, Scotland's employment figures, the drivers for the acceleration of growth, and interviews, meetings and research fora with key figures.

From the study it was concluded that 'a vigorous indigenous content-originating cluster is vital to the continued global competitiveness of Scotland's electronic and information industries' (Scottish Enterprise Creative Industries Team 1999:8).

The study found that there are a number of drivers that accelerate growth in the creative industries. Those identified included (Scottish Enterprise Creative Industries Team 1999:6):

- appreciation of the value of information and knowledge;
- massive growth in capacity to store, transmit and manipulate content;
- ease of transfer across media channels;
- an increased demand for content as a result of easier access and new technology applications; and
- shift of emphasis on computers from user-generated to pre-published content.

Toronto

In the Greater Toronto Area, which can be described as Canada's business centre, there is an established and recognised New Media cluster. In 2000, Toronto New Media Works, an industry-local government-provincial government consortium, coordinated the *Toronto New Media Works Study* to analyse this cluster. The cluster was mapped with reference to existing and potential markets, the commercial supply capabilities, the infrastructure supply base and the levels of support for the industry. To obtain the necessary information, interviews with all levels of industry, an online survey, a focus group of thought leaders and benchmarking Toronto against other cities was undertaken.

The existing strengths of the Toronto cluster identified in the study (PricewaterhouseCoopers 2000:40*)*:

- A competitive advantage in the new media market due to local business understanding the importance of communication and information technology.
- A high quality of life.
- A highly-educated and skilled workforce - a broad base of skilled entry-level people whose skills are being maintained and upgraded through the availability of appropriate courses and training programs.
- A competitive regulatory environment.

The barriers to the cluster identified in the study included:

- The small size of firms.
- Questionable profitability in the industry, with the cluster being described as 'unstable' and 'volatile'.
- Lack of investment, due to the high risks associated with the industry.
- An apparent disconnection between the supply side and the demand side, due to a lack of close relationships.
- A lack of business skills.
- Issues of intellectual property.
- Lack of recognition inside and outside the cluster of its strengths in New Media.

Recommended interventions

Scotland	**Toronto**
R&D – creative media lab	**Linkages** - Specific projects to build positive relationships and links within the cluster, involving both the private and public sectors initially.
Skills – craft skills centres of excellence, eg School of Music and Recording Technology	**Skills** - New Media-specific business components in education including educating and training in business skills. Incentives to assist Educators and New Media businesses in developing skills in the business of New Media
Finance – content development investment fund	**Finances** - Government financing to encourage investment from the private sector in the high risk environment, plus a specific program to redirect more traditional financing to the Cluster.
Competitive Place - A physical co-location of creative businesses, National Media Campus	**Marketing** - A strategy to raise the awareness and profile of the capabilities of the Toronto New Media Cluster eg a trade association

Infrastructure – national film studio, encompassing postproduction and supply as well as production	

Outcomes

Not all outcomes recommended in the studies were adopted. This section looks at the actual outcomes from the studies.

Scotland

The Creativity & Enterprise study formed a basis for a national strategy focusing on industry development in Scotland which was announced towards the end of 2000. Four main development strategies were identified:

- develop a dynamic business environment;
- develop the talent and skills base;
- increase innovation; and
- enhance Scotland's international reputation

As for the specific interventions recommended by the study:

- The National Media Campus project is going ahead and work is underway to develop a site in Glasgow. One of the possible elements is the Creative Media Lab which will bring together a range of research expertise. However the project is only at a preliminary stage.
- While content development funds already exist in Scotland, they are not exclusively aimed at economic development and are not the specific responsibility of Scottish Enterprise. However, Scottish Enterprise is closely involved in developing funding criteria to ensure that business development is included as an element.
- The National Film Studio recommendation is still under investigation and work is planned to examine the commercial viability of studio facilities in Scotland.

Toronto

To date, there has been no measurement done of the outcomes which may have flowed from the findings of the Toronto New Media Works Study. Greg Warren, the Chair of the Toronto New Media Works Study steering committee, has said that while the study contributed to a developing consensus that may have moved the timing of certain industry and government actions forward, it would not be accurate to suggest such events resulted exclusively from the findings of the study. However he does acknowledge that some of the developments may have been conveniently expedited by the timing of the release of the study.

These developments, according to Greg Warren, include:

- An ‘Interactive Digital Media Small Business Growth Fund, initiated by the Government of Ontario, to encourage consortia building among digital media SMEs. One of the first projects approved was the ‘Liberty Village New Media Centre’ located in the heart of one of Toronto’s new media clusters. This centre focuses on activities most appropriate to SMEs, for example, knowledge exchange regarding management, marketing and finance, and regularly supports networking events and opportunities for new media entrepreneurs.

- ‘Ontario Film Development Corporation’, the Provincial Government agency regulating eligibility for film, television and sound recording development tax credits became the ‘Ontario Media Development Corporation’, with its operational mandate expanded accordingly to include digital media.

- The Government of Canada’s Community Access Program (CAP), which previously focused on inducing Internet access technology transfer to rural and remote communities, was expanded to address social inequities of access to the Internet in urban areas. Web development was an eligible activity under CAP and some related revenues no doubt found their way to SME digital media firms in Toronto.

- Efforts since the study to bring forward a single exclusively Toronto focused, digital media specific industry association have failed. However there are numerous small associations with various geographical or IT industry mandates.

REFERENCES

PricewaterhouseCoopers *(2000) Toronto New Media Works Study*, Toronto New Media Works

Scottish Enterprise Creative Industries Team (1999) *Creativity and Enterprise: Scotland's Creative Industries*, Scottish Enterprise

ATTACHMENT 7—CONSULTATIONS

Name	Organisation
Canberra Forum	
Michelle Baird	Australian Library Industry Association (ALIA)
Jasmine Cameron	National Library of Australia (NLA)
Jenny Delroy	Department of Education, Training and Youth Affairs (DETYA)
Ian Gibson	Academy of Interactive Entertainment (AIE)
Jan Gough-Watson	Department of Education, Training and Youth Affairs (DETYA)
Bruce Moore	National Gallery of Australia (NGA)
John O'Callaghan	Australian Partnership for Advanced Computing (APAC)
John Santakne	National Gallery of Australia (NGA)
Brisbane Forums	
Seamus Andrewartha	Arts Queensland
Liza Austin	Beeps
Ian Bates	Procam
David Bevan	Web Raven
Michael Burton	Cutting Edge
Kirsten Cameron	Hoodlum
Stef Dunn	Cutting Edge
Cathy Henkel	Independent film producer
Paul Holland	QANTM
Bruce Jacobson	Grevillea Studios
Jeff Jones	Queensland University of Technology
Donna McDonald	Arts Queensland
Kim Machan	Multimedia Arts Asia Pacific
Louise O'Neil	Photon
Prof Tom O'Regan	Griffith University
Tracey Robertson	Hoodlum
Leo Ryan	F5
Zane Trow	Powerhouse
Stephen Viner	Liquid Animation
Melbourne Forums	
Julia Adams	Shiff & Co.
Philip Bird	Cinemedia
Lorraine Billiet	Lonely Planet
David Coggins	City of Melbourne
Dominic Friguglietti	ABC New Media
Margery Hornibrook	Curriculum Corporation
Peter Kaufmann	Australian Film Commission
Simon Kirby	Digital Zoo
Andrew McLorinan	Ericsson
Dean Mason	Common Ground Publishing
Andrew Minack	Multimedia Victoria

Dea Morgain	Open Channel
Fabienne Nicholas	Experimenta
Matthew Nickson	Museum Victoria
Victoria Pope	Film Victoria (Cinemedia)
Paul Redman-Brown	Spidereye
Tim Ryan	Madman
Chris Schwarze	Complete Post
Veronica Sive	Screen Services Association of Victoria
Lucas Testro	Australian Children's Television Association (ACTF)
Sydney Forums	
Angus Boyd	Foxtel
Gary Brennan	NSW Film and Television Office
Andre Britten	Optus
Dominic Case	FIBRE / Atlab
Veronica Chalom	Austar Interactive
John Colette	UNSW
Marcus Gillezeau	Firelight
Colin Griffith	Australian Interactive Multimedia Industry Association (AIMIA)
Kate Ingham	Screensound
Tom Kennedy	Brainwaave Interactive
Merillee Kestran	National Association of Visual Artists (NAVA)
Kylie Legge	Royal Australian Institute of Architects (RAIA)
John Rolland	Telstra
Lynne Spender	Australian Interactive Multimedia Industry Association (AIMIA)
Ingrid Spielman	ABC
Mark Wells	Nine Digital
Others Consulted	
John Beever	Geomentus
Keith Bradbury	Queensland College of the Arts
Rod Brown	Australian Project Developments Pty Ltd
David Court	Content Capital
Sue Cowden	Film Australia (Policy Officer)
John Dean	Cairns Region Economic Development Corporation
John De Margheriti	Micro Forte
Rebekah Farr	Nectarine
Hugh Forde	South Australia Business Vision 2010
Roden Genoff	City of Playford
David Giles	Infogrames
Andy Gray	Queensland Department of Innovation and Information Economy
Prof John Hartley	Creative Industries Research and Applications Centre, Queensland University of Technology
Chris Hanlon	Australian Microelectronics Network
Mike Hollands	Act 3
Amelia King	Cinemedia
Stephen Leonard	Torus Games

Bill McIntosh	Torus Games
Brian McLaren	Creative Industries Team, Scottish Enterprise
Stewart MacIntyre	Queensland Department of State Development
Helene Merrilees	Brisbane City Council
Alfred Milgrom	Blaze International
Julianne Pearce	Australian Network for Art and Technology
Prof Brian Roberts	University of Canberra
Margaret Ryan	Western Sydney ICT Cluster
Prof Abdul Sattar	Griffith University
Brian Sewell	Ocean Capital
Prof Graeme Sheather	University of Technology, Sydney (UTS)
Tracey Taylor	Loose Cannon Interactive TV
Greg Warren	Toronto New Media Works Study Steering Committee