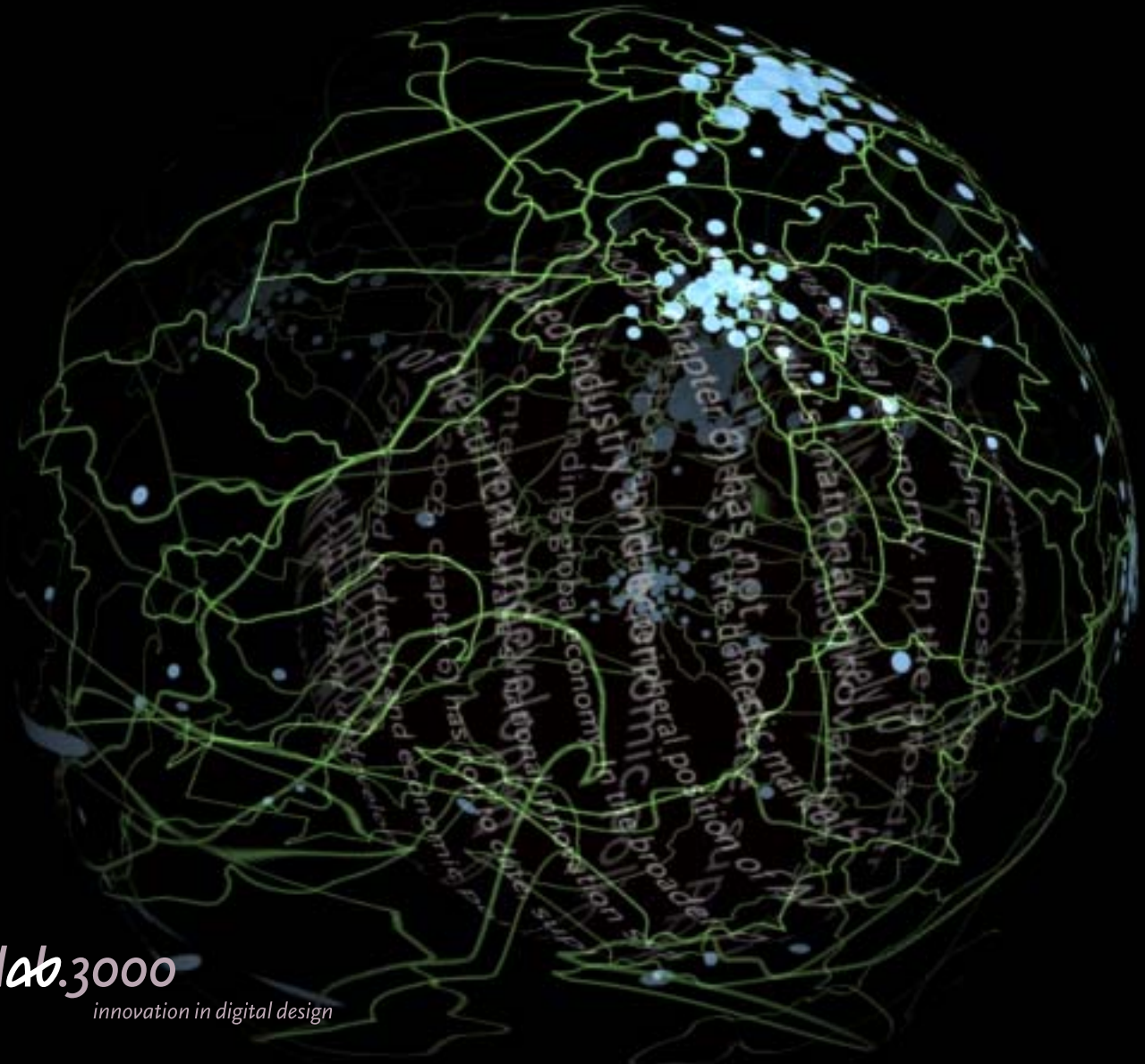


Growing Digital Design: Melbourne's Emerging Cluster

PROFESSOR MIKE BERRY SENIOR RESEARCH ASSOCIATE [lab.3000](#) JUNE 2004



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lab.3000
innovation in digital design



lab.report 02

I am proud to release [lab report 02](#). This report is the second in a series focusing on cluster research, design thinking, innovation tools and exhibition catalogues, all of which underpin lab.3000's role as Victoria's first centre of excellence in digital design.

In lab report 02 Professor Mike Berry, a leading researcher and eminent academic, outlines the findings of the second stage of his cluster economics research which builds upon [lab report 01](#) – Innovation by Design: The Economic Drivers of Dynamic Regions.

[lab report 02](#) further develops Professor Berry's investigation of the key drivers of innovation stimulation, and reveals the main barriers to clustering – such as high upfront costs of innovation and difficulty in accessing finance or venture capital – which are constraining the growth of innovation. Professor Berry has found that “the digital design cluster in Melbourne is young and clearly at an emergent stage” and that technology-driven industry clusters display key characteristics of being dynamic, open and evolving systems. lab.3000 continues to drive the development of the emerging cluster with a vision for establishing Melbourne's Digital Design Precinct.

These insights will continue to influence lab.3000's strategic approach and brokerage role in the future. As a broker, lab.3000 is working with industry to overcome the barriers to clustering by promoting new opportunities, encouraging face to face and online collaboration, and creating linkages through our website, events and research. All of these factors facilitate the flow of new information and the building of productive partnerships.

Once again, on behalf of lab.3000, I wish to acknowledge the generous funding and continuing support of the Victorian Government and thank RMIT University for its generosity and ongoing host support. I also thank Mike Berry for his significant contribution to research into cluster development. Professor Berry's exceptional insight and knowledge have provided a substantive basis for advancing our understanding of digital design.

I commend the [lab report 02](#) to you and invite you to work in collaboration with lab.3000 as we continue to build, connect and promote the digital design industry cluster by brokering design within and across the design professions, industry, government agencies and education systems.

Di Fleming
Director, **lab.3000** – innovation in digital design
Associate Professor in Digital Design



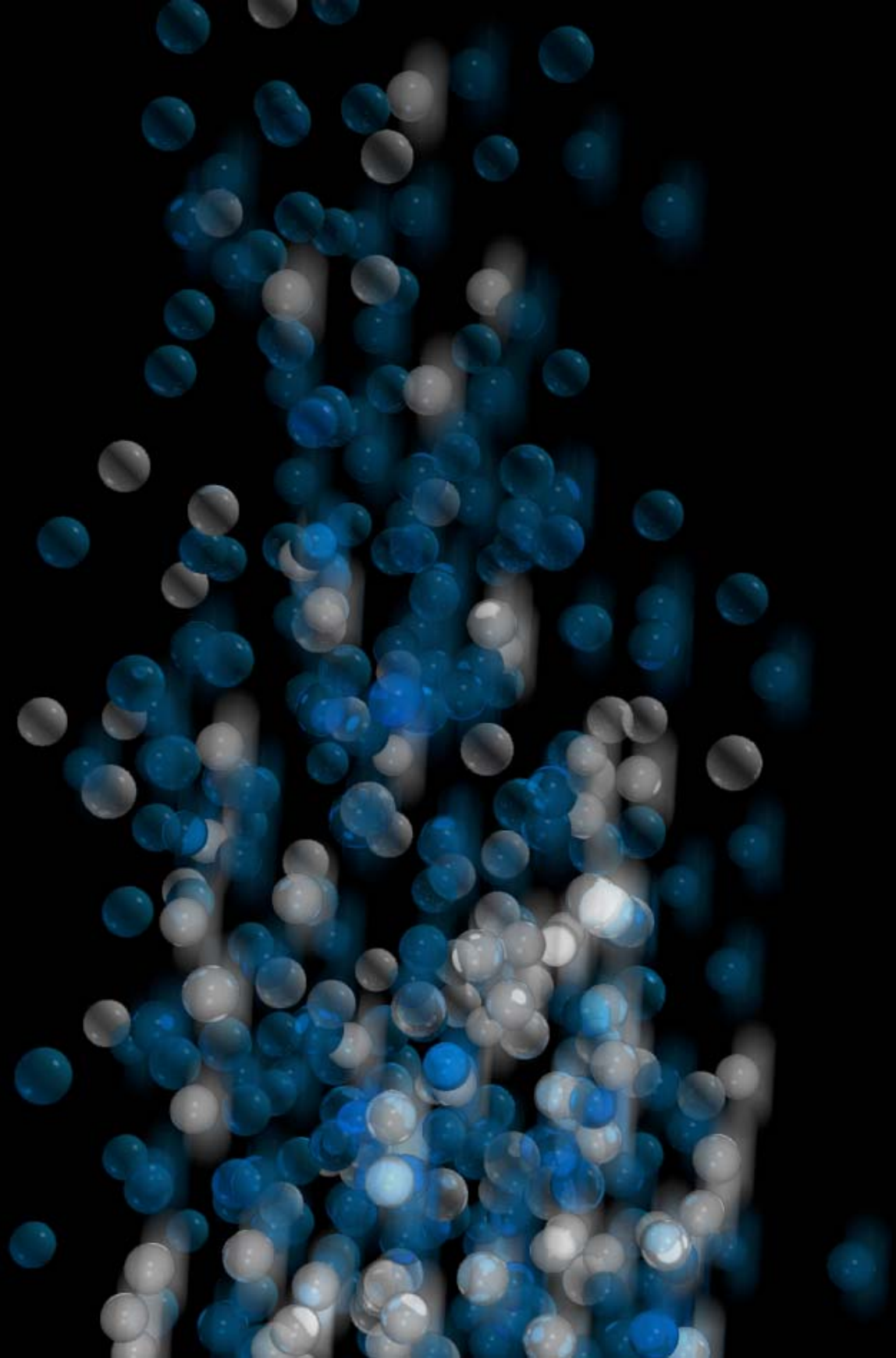
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01 What *is* Digital Design¹?

Design is a generic activity resulting in qualitatively new outcomes and opportunities. As such, design is both an input and an output. The *outputs* of design define the particular economic and cultural contributions of the traditional design industries in the economy – architecture, industrial design, graphic design, fashion, furniture and the like. As *creative inputs*, design impacts on a wide range of industry sectors, including automotive and aeronautical manufacturing, building and construction, advanced business services, information and communications technologies and transport.

“The use of the term ‘digital content’ implies a marriage of content and technology. Also obviously, digital content represents a new and emerging market, an innovation frontier” [Cutler and Co. and CIRAC, 2003, p. 6].

In an increasingly connected world, design as a creative practice is increasingly drawing on the new information and communications technologies, both as an input to the production of a range of products and services and as an output in particular cases like the rapid recent growth in the computer games industry. In this important sense *all* design is ‘going digital’. In the schematic diagram, the digital design core is expanding, encompassing a growing share of the design domain in the knowledge economy.

¹ This report is the second in a series to be published by *lab.3000* on a research project titled: “The economic drivers of dynamic regions: innovation, design, milieu and inter-firm networks”. The first report – “Innovation by Design: The Economic Drivers of Dynamic Regions” – was published in October 2003 and can be accessed under the research section of the *lab.3000* web site: www.lab.3000.com.au It has a detailed discussion of the theoretical literature and empirical findings on innovation, industry clusters and digital design.

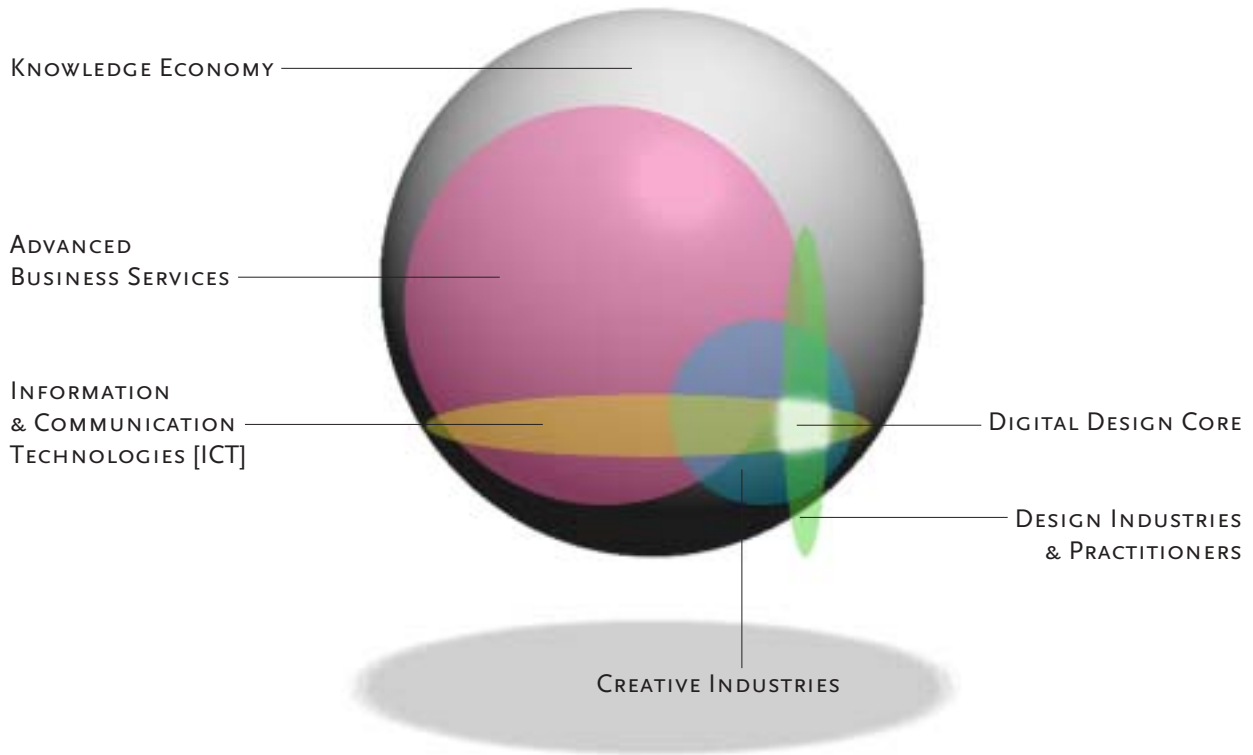


FIGURE 1: A CONCEPTUAL MAP OF THE DIGITAL DESIGN FIELD

Digital design covers the growing economic contribution of the following industry groupings:

- New media – education, entertainment, healthcare, advertising
- Creative industries – film, performing arts, publishing
- The design professions – architecture, graphic design, industrial design, fashion design
- Design-intensive manufacturing – cars, smart domestic appliances, medical instrumentation, etc.

Why is Digital Design Important?

Innovation is now seen as the central driver of successful national and regional economies. Design across many domains – and digital design in particular – is an essential element of innovation processes leading to continuous productivity improvements responsible for the creation of competitive advantage in the current global environment.

Design plays a critical and central role in the innovation process in many economic sectors. Inter-firm networks and regional economic clusters that have emerged in areas like greater Glasgow, North-central Italy, Silicon Valley and Helsinki are (literally) design-driven. Continuing developments in information and communications technologies are revolutionising design practice and opening up new avenues to both product and process innovations across most sectors of the economy. Tomorrow's successful national and regional economies will be those that recognise and capture the forces creating linkages, networks and clusters across industries and domains, ensuring appropriate regulatory environments, powerful incentive structures and productive cooperation with research and development centres in universities and other agencies.

What is an Industry Cluster?

A new logic of metropolitan concentration is emerging in the global economy. But it is not a logic that operates at the level of the individual firm. Competitive advantage is now about the quality of the interactions firms have with each other and other organisations, both within particular locations and in virtual space. The whole group is much stronger than the strengths of its individual members. Successful, rapidly growing regions act as magnets for expanding industry clusters.

“Clusters are geographic concentrations of interconnected companies, specialist suppliers, service providers, firms in related industries, and associated institutions (for example, universities, standards agencies, and trade associations) in particular fields that compete but also cooperate. Critical masses of unusual competitive success in particular business areas, clusters are a striking feature of virtually every national, regional, state and even metropolitan economy, especially those of more economically advanced countries” [Porter, 1998, p. 197].

Clusters drive regional and national economic growth because they directly and indirectly improve the productivity and enhance the competitive advantage of individual member firms. Clusters can create innovative milieux in which new ideas are quickly disseminated and efficiently absorbed; they are hot-beds of innovation. New business opportunities arise and new businesses are attracted to the cluster in a self-reinforcing process.

Digital design is an emerging industry cluster in regions, like Melbourne, that have a strong base in the traditional design-intensive industries and professions, excellent R&D facilities, a growing local ICT sector, rapid growth in the creative industries, active industry and professional associations and facilitative government policy.

Structure of the Report

This report presents a first mapping of the digital design cluster in Melbourne. The next section sets the scene, describing in more detail the make-up of key industry segments of this cluster. Section 3 describes the study forming the focus for this report, intended to build on existing knowledge, as sketched in section 2. Mapping the cluster has been approached in three ways: firstly, by way of a web-based questionnaire survey; secondly, through selected face-to-face interviews with cluster members; and thirdly, through interrogating lab.3000's extensive data base. Section 4 discusses the findings from this three-pronged study. A final section summarises the main conclusions of the study and points to the next steps in better understanding the nature, impact and significance of the emerging digital design cluster in Melbourne.

02 Setting the Scene

The key industrial components of the emerging digital design cluster include the traditional design disciplines and the rapidly growing areas of new media and the creative industries (as outlined in the preceding chapter). The boundaries between these sectors are changeable and porous. These sectors also cross-cut the conventional industry classifications long used to describe and track changes in the broader economy. Changing technologies, especially digital technology, further complicate the picture.

“Some firms clearly fit two or more of the digital design sectors. Thus, for example - more than 20 per cent of firms listed in the Yellow Pages telephone book under ‘multimedia’ are also listed under the ‘creative activities’ classification.”
[NOIE, 2002, p. 24].

Recent research presents at least part of the story².

² The most recent and relevant Australian research into what is here referred to as digital design has been carried out for the National Office of the Information Economy. Reports related to stages 2 and 3 of the study – *Creative Industries Cluster Study* – are accessible on the web site of the Department of Communications, Information Technology and the Arts (www.dcita.gov.au). The study focuses on the creative industries and new media sectors. Key results drawn from the published material to date are summarized in this section in order to provide at least a partial sketch of the overall industry scene, as it is emerging and to establish a backdrop against which the Melbourne study, presented in subsequent sections, can be read. Bibliographic details of the specific reports referred to in this section are included in subsequent footnotes.

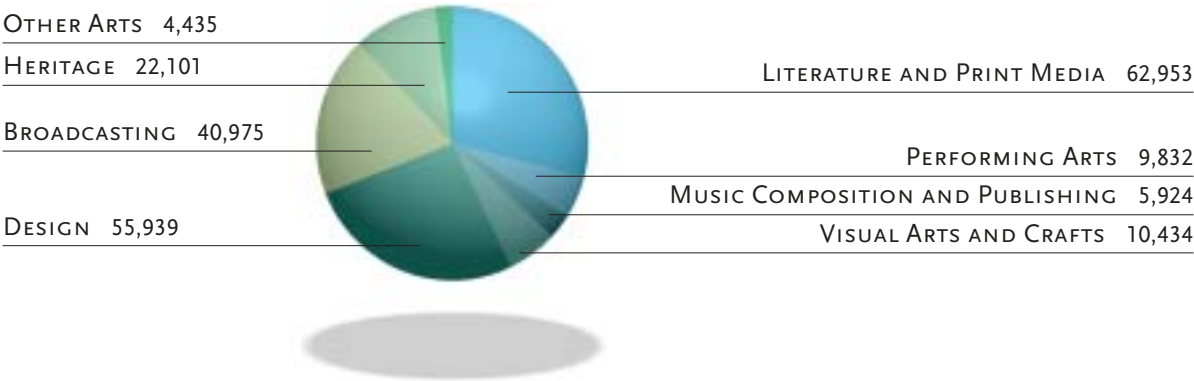


DIAGRAM 1: EMPLOYMENT IN CREATIVE INDUSTRIES, AUSTRALIAN CAPITAL CITIES. 2001 SOURCE: COX ET AL. [2003]

Most of the jobs in the creative industries, the design professions and the relevant sections of advanced manufacturing industry are located in Melbourne and Sydney. These two metropolitan areas – and especially the central regions of each – are the core of Australia’s emerging digital design cluster. These cities also attract the supporting information and communications technology industries and expertise, so critical to competitive success in the knowledge economy.

TABLE 1: LOCATION DENSITY INDEX [LDI]

LDI = D/T WHERE –

D = $\frac{\text{NUMBER OF FIRMS IN DIGITAL DESIGN CATEGORY IN A POSTCODE}}{\text{TOTAL NUMBER OF FIRMS IN THAT CATEGORY}}$

T = $\frac{\text{TOTAL NUMBER OF FIRMS IN THAT POSTCODE}}{\text{TOTAL NUMBER OF FIRMS}}$

ANY LDI OVER ONE MEANS THAT JOBS IN THAT CATEGORY ARE CONCENTRATED IN SPACE – THE HIGHER THE FIGURE, THE GREATER THE DEGREE OF GEOGRAPHIC CONCENTRATION.

FOR EXAMPLE, IN MELBOURNE:

- THE LDI FOR GRAPHIC DESIGNERS IS 4.99 IN RICHMOND, 5.55 IN SOUTH MELBOURNE AND 7.17 IN PRAHRAN.
- THE LDI FOR FILM PRODUCTION SERVICES IS 13.13 IN SOUTH MELBOURNE

NOIE, 2002, p. 46

The second stage of the NOIE study on creative industries clusters focused on *the production of digital content*.

The summary report states that the scope and reach of the creative industries, including new media, encompasses but also moves beyond the traditional cultural focus.

“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 cultural outputs. This economic agenda complements cultural policy by giving attention to the capabilities that underwrite the content industries’ capacity to create and innovate”. Cutler and Company, *Producing Digital Content*, Department of Communications, Information Technology and the Arts, Canberra, 2003, p. 4 [www.dcita.gov.au]

The **stage 2 NOIE study** looks in detail at digital content production in four segments of the larger creative industries-new media cluster. These segments are: interactive games, interactive media, advertising and education content (in the government sector). Digital content and applications here include a wide range of products like computer games, interactive home entertainment systems, medical imaging, interactive diagnosis, web design and marketing, content management services and interactive conferencing services, along with the technology platforms on which they operate.

Some key findings are:

Interactive Games

What is it?

- The games industry comprises title development, software and technology related to the content of the title, proprietary software operating systems tied to the competing game platforms. Content is delivered by computers (PC), online or proprietary games platforms (Sony, Microsoft, etc.).

How big?

- This is a large and rapidly growing global industry. Global sales turnover is around US\$20 billion and is, arguably, now bigger than the film industry with which it is closely associated. Film titles are increasingly licensed to games developers as part of the overall commercialisation of the film property.

- The industry is global. Domestic markets, especially in small countries like Australia, are unimportant. Games developers must act globally.

How is the Australian industry placed?

- Local producers are focused on title development and associated technologies. Distribution to world and local markets is dominated by a few very large multinational publishing companies based in North America and Europe.
- The local industry is made up of around 12 larger companies and 40 small 'second tier' firms. The Game Developers Association has been established to represent and promote the industry.

What are the emerging business models?

- Fee for service contracts, usually with publishers, to develop product using a licensed property like a film or key sporting event.
- Self funded new titles which are licensed to a publisher or distributor in return for a royalty stream.

What are the costs?

- Average development cost of a new games product is about \$6 million
- Development time for new titles generally ranges between 1 and 3 years.

What are the risks?

- Depends on the delivery format. Titles in CD ROM have a high failure rate (as high as 95%) and short shelf life. Multi-player online games have a much longer life. Participants actively contribute to the development of the game over time and generate a revenue flow through their subscriptions to remain 'part of the game'. The online games venue catering to the virtual community of participants can then develop a secondary commercial value, for advertising, etc.

What are the games developers' key assets?

- The creative talents of the staff - in design, animation, scripting, programming, project management.
- Technology assets and 'middleware' created through the title development process and generalisable to other products. These assets generally require significant investment in R&D and are therefore likely to be concentrated in the larger 'first tier' local producers.
- The rights to licensed properties like films.

What are the industry key drivers?

- Creative talent
- Passion
- Technical efficiency – no bugs
- Cost effective content development processes
- The large international publishers/distributors – who decide what gets sold, where

New Directions

- An emerging battle between ‘open systems’ – i.e. online multi-person games – and ‘closed system’ proprietary consoles.
- The move online will change the games developers’ business model as they may be able to gain a higher share of revenue flows through product margins in the form of subscription fees, vis a vis the rents flowing to the current owners of the main operating systems.
- It is unclear whether this trend will help or hinder Australian games developers. Distance from end user may be less of a problem but the relatively low penetration of broadband in Australia may be a problem.

Barriers to Industry Development

- Large up-front cost of new title development ± 25% of total development cost for a game (50% for first products) ± need for upfront finance which is in short supply – e.g. limited venture capital (need similar funding and taxation regime as film production)
- Uncertainty of royalty flows

“All the [games] developers to whom we spoke said they did not even bother to track domestic Australian sales. Domestic sales and reputation are entirely marginal in the business model” [Cutler and Co., 2003, p.22].

The global scope of the market places Australian developers at a disadvantage:

- Remote from face to face deal making
- Cost of frequent travel to northern hemisphere
- High cost of gaining up to date market information – i.e. cut-off from face to face informal or tacit knowledge

- Poor access to specialist financial and legal support resources

Cluster Formation and Location

- Often outside major cities in smaller cities – e.g. Montreal and Glasgow
- The international focus fosters local collaboration – not competing with each other for a limited local market but attempting to crack an expanding international market.

Some Quotes from Interviewees³ [Australian Games Industry]

The following statements were made by people working within the interactive games industry in Melbourne. They generally support the findings of NOIE’s national study.

“It costs \$5 million to get into the game – not a place for small players.”

“Government is sold on the export argument for the games industry.”

“There is a need for Victorian firms to get higher in ‘the food chain’ and a need for a stronger presence in the U.S. market.”

“There are skill shortages, especially in digital design and creative arts.”

“Design is the key input and value adding component of competitive advantage.”

“Competition is not direct but niche directed.”

“Globally, the next five years is likely to see 4 or 5 major games developers outsourcing to specialist providers.”

“The Australian industry is at a crossroads – either invest now and carve out places in the international market place or fall back into narrow niche provision.”

“Customers are critical drivers [of innovation]. Customers must have new experiences.”

“Big players are close followers of smaller pioneering firms.”

³ These comments are taken from interviews with key participants in Melbourne’s digital design cluster, held in the latter quarter of 2003. See section 3 and appendix 2 for more details.

“Linkages with other players are critical – franchisers, technology companies, financiers.”

“Employees need to train in-house. This investment is worth it because turnover in successful companies is fairly low due to the long development times of individual projects and the desire by employees to see several development cycles through.”

“Educators are too far away from recent industry developments and industry leaders don’t have time to be directly involved in education and training.”

“Online games provide a socialising environment, this may attract more girls and women than earlier generation games.”

“Risk minimisation is still a factor limiting growth, can’t afford to have two bad games in a row, reputation is everything.”

Interactive Multimedia

“Interactive multimedia became an umbrella term to capture digital content developments across the domains of information, education and entertainment.” [Cutler and Co., 2003, p. 26].

“A major conclusion of this study is that digital content production is not distinctive and different in its own right, but rather that issues around the industrial organisation and structure of digital content activities are common to content and creative industries generally.” [ibid.]

Interactive or multi-media refers to digital content development and delivery across the domains of information, entertainment and education. This segment can be broken down as follows:

- The *end users* are students, consumers, medical patients, companies and government agencies
- The *products* include: education packages for distance learning, animation products, medical imaging, online information directories, business conferencing, online banking and purchase facilities, web sites, interactive entertainment and training videos

- *Content providers* are: publishers, film, video and television producers, web site developers, information service providers, animation artists and scriptwriters, graphic designers, programmers and interface designers
- *Technology base*: computer systems and operating platforms, digital cameras and other equipment, internet, software developers
- *Support base*: specialist education and training facilities, R&D organisations, professional and technical consulting services, financial services, industry associations, regulatory framework, government incentive structures

The Australian Interactive Multimedia Industry Association (AIMIA) was formed to support and promote industry development in this segment.

The internet is central to this cluster segment. Online portals like NineMSN, VicNet and ABC Online facilitate communication in the virtual world. The main portals are generally associated with major content developers, like television and publishing companies.

Successful new business models are slow in emerging in this online environment. The challenge is to build the market – huge in a ‘borderless virtual world’ – while capturing value in the form of fee-for-service or subscription.

Building scale – i.e. creating and sustaining a growing business – is also difficult given the rapidly changing technological base, the changing market preferences of consumers, the need to continually adapt to new platform possibilities and competitive challenges and the mobile nature of the key creative talent in the business.

In the case of **web developers**, rich content, complex functionality and high production values run up against the limited penetration of broadband. There is also a need to educate clients about the possibilities inherent in available technology, moving a web site away from a simple information or publishing directory to an active tool in the client’s strategic marketing activities.

A number of web developers have – as with games – become technology incubators. Neither web developers nor games companies, however, are necessarily well placed to commercialise this technology, due to lack of wider market linkages.

Interactive television is breaking down the division between old and new media. The move towards digital broadcasting will accentuate this trend. The new technology platforms will increasingly give film and video producers the capacity to develop high resolution, content rich interactive products for the education and entertainment

markets. Multicasting offers the potential for an explosion in the delivery of information content. The motion picture industry has already been transformed through special effects and animation technologies.

Conventional media companies (News Limited, Channel 9, etc.) dominate the industry and bring with them to the new media sector a strong capital base and market presence, a skilled workforce and established international marketing/distributional linkages.

It remains to be seen what the proposed free trade agreement between Australia and the United States will mean for industry structure and development in this sector in Australia. Will the agreement accelerate the integration of Australian content and technology providers into world markets or will it marginalise and constrain the local industry? The main danger is the possible loss of local content government quotas and seeding funding in an industry segment flooded by vulnerable small start-up companies.

Other constraints on the continuing growth of this segment may come from:

- The cultural divide between old and new media workers
- Existing government regulatory and incentive policies – e.g. the differential taxation treatment of conventional films and interactive content
- Deficiencies in the education and training system
- The need for new working practices
- Inadequate venture capital and project financing avenues, in the absence of acceptable new business models
- Migration overseas of creative talent
- The slow take-off of digital television in Australia, limiting the demand for digital content
- The market vulnerability and high failure rate of new SMEs entering the interactive content industry

Interactive media is also wreaking major cultural changes in Australian society, changing the way we communicate, visit museums, develop special interest groups and hold public festivals. The Australian Centre for the Moving Image in Melbourne and the Queensland University of Technology's new Creative Industries Precinct in an inner suburb of Brisbane provide accessible public venues and facilities for public participation. The new media encourages groups – e.g. Indigenous communities – to record their lives and significant events in culturally and linguistically appropriate ways.

Quotes from interviewees in the new media sector (see footnote 2, above):

“There is a convergence of technologies and artists – a new dialogue”

“Governments need to recognise the high risk nature of the projects they support”

“there is a serious lack of distribution avenues for new products and a lack of successful online business models”

Innovation is – “finding new ways of storytelling online, encouraging interactivity and communication two ways.”

“New media in Australia lacks creative content, not technological smarts.”

“The industry is changing too quickly to accurately forecast.”

“Government agencies need to hire staff with knowledge in the new media.”

Innovation is – “unexpected consequences – dead-ends are possible (and allowed)”
– “trying the impossible”
– “free to fail”

“There is a high commercial orientation of some new media areas, as opposed to ‘arts for arts sake’”.

“The technologies are changing too fast for government to keep up.”

“Commercialisation is the key barrier [to innovation] – getting a return quickly enough to pay the bills and repay the up-front costs”

“Clusters can be seen after the event but difficult for governments to identify and facilitate in the early stages.”

“There is a need for an ‘accelerator’ in the new media sector [the stage after incubation] – to mentor export development.”

“Design curriculum of the future – home economics for the 21st century.”

03 The Study – A Methodological Note

Digital design is an emerging cluster. All industry clusters are dynamic, in the sense that they change and grow (and sometimes decline) through time. During the time taken to identify and describe a cluster, important changes will have taken place to the membership, interrelations and outcomes of cluster activity. This process of growth and transformation is likely to be particularly accentuated in areas – like digital design – where creativity and new technology intersect.

The changeable nature and trajectory of cluster growth poses particularly onerous challenges to any attempt to map the contours and interactions of cluster members in the digital design domains. There is no directory or census of members to consult, no known population from which to draw appropriate samples for closer investigation. Hence, the research strategy adopted here is necessarily exploratory and contingent. The aim is to focus on the industry components of the cluster, those industry practitioners who self-identify as operating within the field of digital design, broadly conceived, through their individual communications (virtual and actual) with *lab.3000*. As a critical linking element of the cluster, *lab.3000* assists in connecting individual industry practitioners with each other and with other organisations and agencies relevant to the flow of information, knowledge and resources. The picture emerging is a partial snapshot at a point in time (more accurately, over a relatively short period during which the study was carried out). Regularly revisiting the emerging cluster would be necessary to track the changes in size, structure, linkages and outcomes over time. The approach adopted in this study – and its focus on *lab.3000* – provides a way of doing so.

This study, then, is an initial attempt to describe and understand the dynamics of cluster formation and outcomes in the field of digital design.

It does not (nor is it intended to) provide a complete or definitive account of the cluster, but rather presents a picture of a growing community of designers from a particularly strategic viewpoint – that of lab.3000, an active participant, facilitator and catalyst in the cluster in question.

This study utilises **three main data sources**:

- (i) From July to September 2003 lab.3000 conducted an **electronic survey** via its web site⁴. A questionnaire was placed prominently on the site, inviting people accessing the site to self-select into the survey. Prospective respondents were asked to answer two questions:
 - “is there a significant design focus to their current employment” and
 - “do they utilise information and communication technologies in a significant way in their jobs”

If the answer to both filtering questions was “yes”, the person was invited to participate in the survey and was guided through the questionnaire (included as Appendix 1).

The questionnaire was divided into three sections:

- *Profile*: which collected information on the respondent’s business focus (sector), longevity, size, performance, staffing, organisational and geographical location
- *Linkages*: which explored how respondents found out about new ideas and opportunities, and interacted with customers, suppliers and other cluster members
- *Innovation processes and barriers*: which targeted the factors that might drive or encourage innovation (the application of new ideas, delivery of new products and creation of new business models), on the one hand, and block or raise barriers to innovation, on the other hand.

There were 133 respondents to the survey, a similar number to a similar survey carried out into the new media industry in London in the late 1990s. (This earlier study was summarised and discussed in *lab report 01* [Berry, 2003]). The results of this survey are analysed in the next section. Non-parametric statistical methods suitable to small sample studies are used to assist in gaining an understanding of cluster dynamics.

- (ii) After the survey was completed, one-on-one interviews were held with 12 industry practitioners and government officers, selected on the basis of their locations within the overall cluster (see appendix 2).

⁴ The electronic instrument used was SurveyMonkey (see www.surveymonkey.com).

The interviews were conducted using a semi-structured format, under “Chatham House rules”. In other words, the information gathered and views expressed during the interviews were available for publication but the source of the comments remains confidential. Hence, in section 2 and subsequent sections of this report, quotes from the interviews are presented, where relevant, with the designation “interviewee” and the relevant digital design domain appended.

An industry seminar was held at *lab.3000* (in February 2004) at which key results of both the survey and interviews were discussed and early findings tested.

No attempt has been made to select an unbiased sample of interviewees – resource constraints and the lack of a complete sampling frame prevented such an approach. The value of a small number of in-depth interviews, in traditional qualitative research terms, is to help tease out some of the key factors and causal mechanisms at work, and to help make sense of other data (including that gathered through the survey). It is, of course, not possible to extrapolate or generalise from small unrepresentative samples to the population at large. The results here are indicative only.

- (iii) *lab.3000* has built up a data base of over 1,000 practitioners who self identify with this broad field of digital design. This data base has been interrogated to supplement the data gathered through the survey, interviews and industry seminar. The results are also presented in section 4. Only aggregated data is utilised here; the absolute confidentiality of individuals has been maintained.

Damn statistics ...

In the section that follows, the responses of the 133 respondents to the web survey are analysed to identify, where possible, any important relationships – especially with respect to factors that appear to encourage or block innovation in digital design outcomes and practice. In the main, attention is drawn to strong *associations* between variables. At relevant points, the conventional chi-square test is used to establish the *statistical significance* or otherwise of the association found⁵.

⁵ Chi-square is one of a number of non-parametric statistical tests commonly used by social researchers; see, for example, Yeomans (1968). Its use does not require the restrictive assumption that the populations from which the variables are sampled are normally distributed. Since we know very little about the nature and contours of the rapidly changing digital design field, it makes sense to avoid the conventional parametric tests dependent on this restriction. Like all statistical tests, however, chi-square assumes that the sample has been drawn randomly from the larger population. Given the difficulty in establishing a full sampling regime in a new and changing field like digital design and the likely biases built into any web survey (such as this one) that relies on self-selection by respondents, the information on statistical significance reported in the next section should be treated with caution.

However, statistical significance should not be confused with *causal explanation*. The latter must be established through supporting argument and evidence. All that a test of statistical significance like chi-square establishes is ‘a negative’ – i.e. that it is highly unlikely (there is a low probability) that the association or difference found in the sample could have occurred if there is no such association in the population at large. To say that two variables or outcomes are associated in a statistically significant way still poses the question – *what* is causing this relationship⁶?

The analysis in the next section focuses on the structure of the digital design cluster and on those factors that seem to be associated, either positively or negatively, with innovation outcomes. The values quoted in brackets in red font indicate where the association is statistically significant. For example, $p < 0.05$ means that there is a less than one-in-twenty likelihood (the probability is less than +0.05) that the observed result could have occurred in the sample if there was, in fact, no such association in the population at large. If $p < 0.01$, then the probability is even lower – less than one-in-a-hundred. Once the statistical significance of a result is established it remains to *explain* it – or at least leave open the question for further research and persuasive argument. Where possible, in section 4, tentative causal or explanatory arguments are put forward for the significant results described.

⁶ Conflating statistical and causal significance is a common methodological flaw in social research, even in prestigious academic journals like the American Economic Review (see McClosky and Ziliak, forthcoming)

04 The Findings

“Innovation is giving someone something they need before they know they want it.”
[interviewee, ICT sector]

This chapter presents the findings of the web-based survey and follow-up interviews described in the preceding chapter. These findings relate to three broad sets of questions:

- A profile of Melbourne’s emerging digital design cluster – what does it look like now?
- The linkages – how do members of the cluster interact?
- Innovation – what drives it? What are the barriers?

Each of these three areas is addressed below.

To cast further light on this emerging industry cluster, this chapter will also look at the relevant information collected in the *lab.3000* data base.

It has to be stressed, once again, that both the survey and data base reflect the self-selection of respondents and neither can be considered a random sample, still less full census, of participants in this dynamic and evolving cluster.

Note: The numbers on the charts that follow represent raw responses. They do not all add to 133, since some respondents did not answer all questions.

The Profile

How new?

Almost two-thirds of respondents to the survey had started their businesses after 1990, two-fifths since 1996. This suggests that many businesses are still in the growth phase.

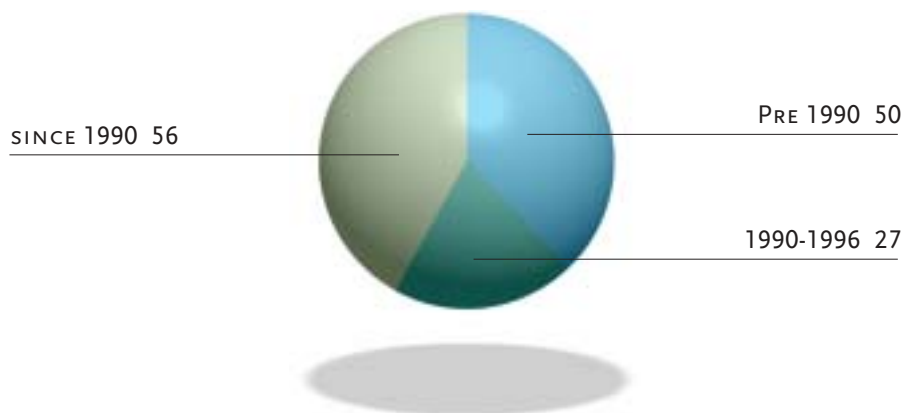


DIAGRAM 2: AGE OF BUSINESS

What is the business focus?

More than a third of respondents placed themselves in the segment that includes multimedia, publishing, computer games and digital art ('digital media' for short). The education sector figured as the next most popular location. Smaller numbers identified with the ICT and software sector and the traditional design industries and professions. Fewer were located in the creative industries or in design-intensive manufacturing.

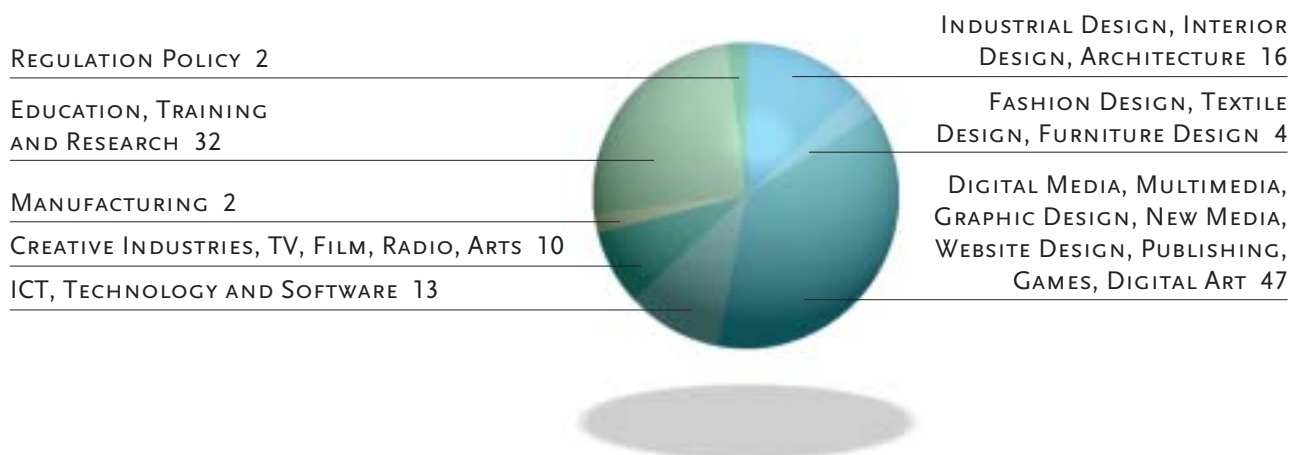


DIAGRAM 3: BUSINESS FOCUS

The industry sector of the respondents' largest clients varied considerably across the digital design segments ($p<0.001$). For example, those operating in fashion, textiles and furniture were likely to have their major clients in manufacturing. Those in digital media and creative industries had their clients strongly concentrated in marketing, advertising and education, while those in ICT (technology and software) had clients located mainly in telecommunications and government business enterprises.

How big?

Almost a third of respondents work in organisations employing more than 50 people. About one in six is a single person operation. Two fifths of the respondents work in firms employing 5 or less; three fifths are employed in firms with 20 or less employees. In other words, employment is spread across the size range of organizations. Small and medium size firms (SMEs) are well represented but do not dominate the relevant industry sectors.

However, the size distribution of organisations varies significantly across the digital design segments ($p<0.05$). Thus, most respondents from education, training and research, the creative industries and government regulation work in organisations employing more than 20 people. Those in digital media, ICT and the traditional design professions mostly work in organisations employing less than 20 people.

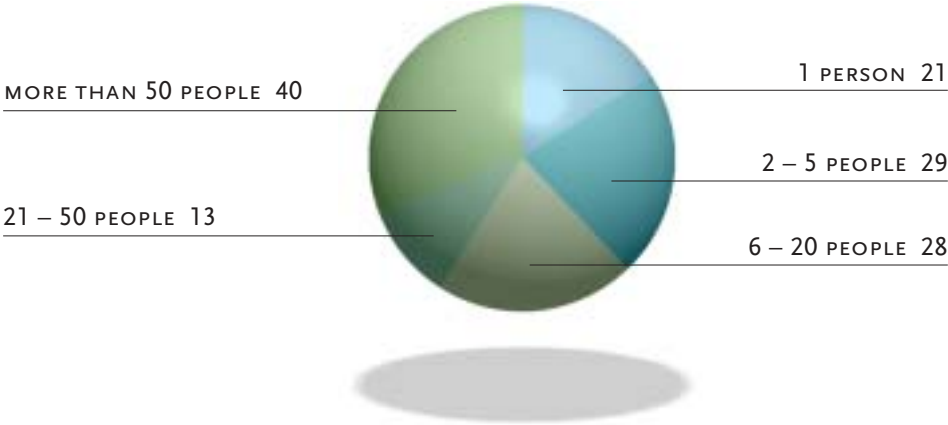


DIAGRAM 4: WORKFORCE SIZE

The variability of firm size is also reflected in the annual turnover or revenue earned and the size of firm payrolls.

A quarter of respondents reported annual revenues of less than \$100,000. More than half had a turnover of less than \$500,000. At the other end, about one in six worked in organisations with revenue in excess of \$20 million.

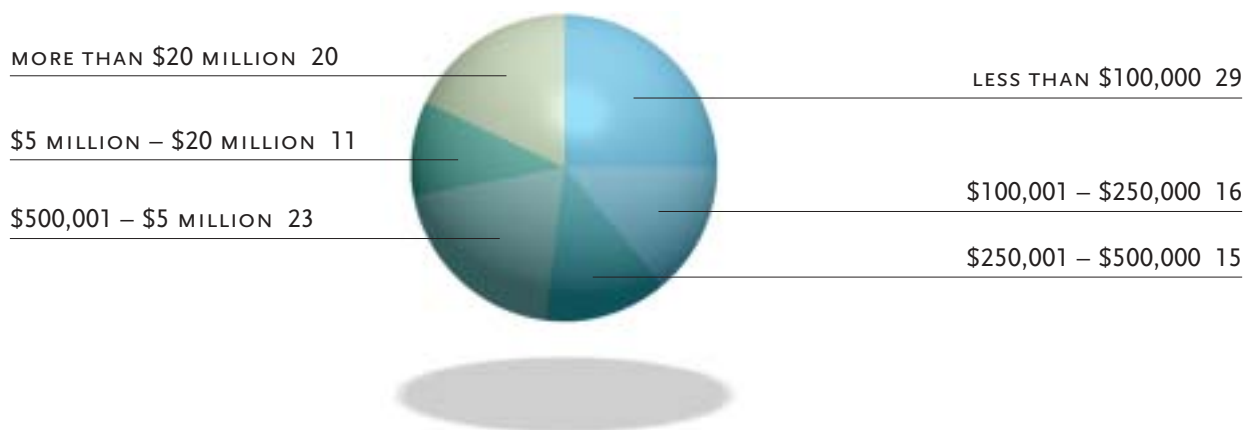


DIAGRAM 5: ANNUAL REVENUE

Two fifths of respondents worked in private companies. A small number worked in public companies (less than 10%). About one in five worked as sole traders and in partnerships. Around a third worked in non-profit or other organisations, including educational institutions.

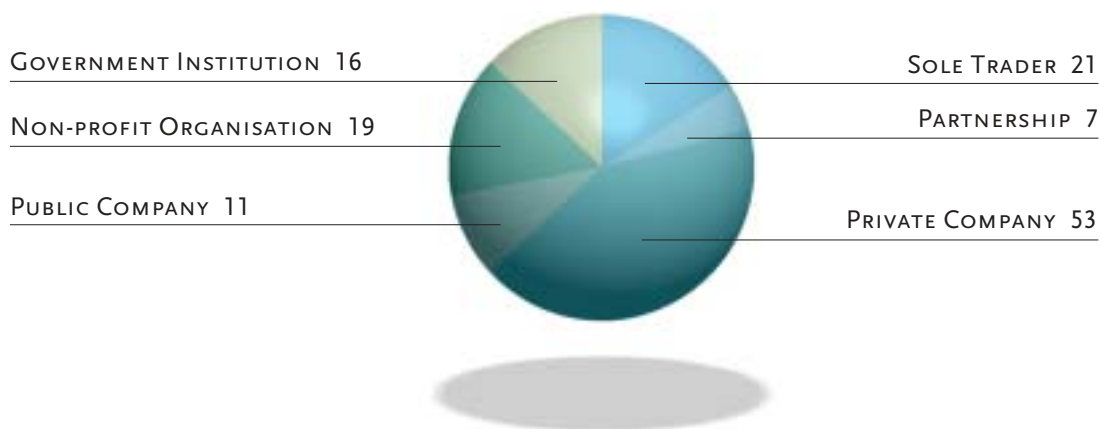


DIAGRAM 6: BUSINESS TYPE

Performance

Most of the organisations represented in the survey had made a profit in the year 2001-2002. Less than one in five reported a loss. This relatively upbeat result for a new and emerging area may reflect the high returns achieved by pioneer firms. Alternatively, or as well, it might be due to the booming general economy at the time, the fact that weaker and less competitive firms had been quickly weeded out or the biases built into the self selection of respondents to the survey.

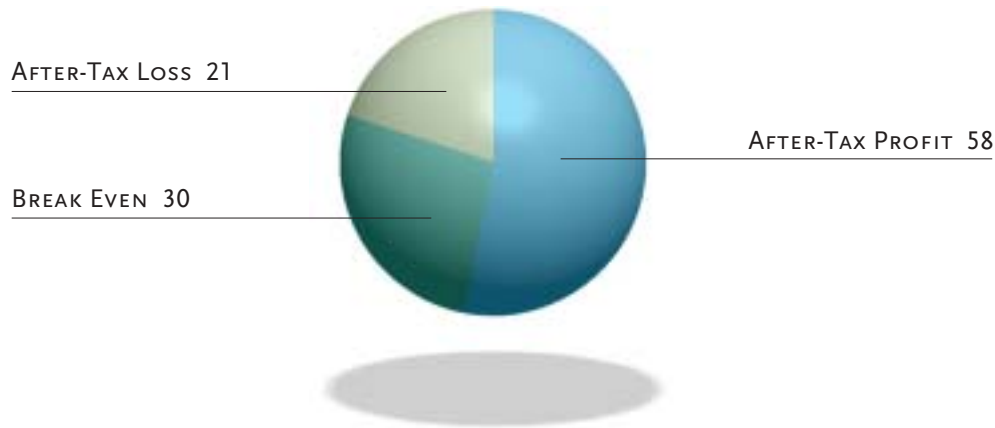


DIAGRAM 7: FINANCIAL PERFORMANCE

Staffing

One in six respondents worked in organisations that had more than 50% of employees in fulltime employment. Over a half worked in organisations with more than 80% in fulltime jobs. Fulltime, as opposed to part time work, appears to be the norm, at least among respondents in this sample.

The situation is similar as regards the balance of permanent to casual employment. About a quarter were in organisations with more than 50% working on a casual basis, whereas almost 60% worked in firms where more than 80% were permanent employees.

Difficulties in recruiting suitable staff appear to exist across the board – [DIAGRAM 7]. Respondents in the traditional design professions were most likely to point to the difficulty of recruiting project management staff, while those in digital media and ICT saw more difficulties in finding and keeping sales and marketing staff. (The differences were not significant at the $p=0.05$ level; $p=0.064$).

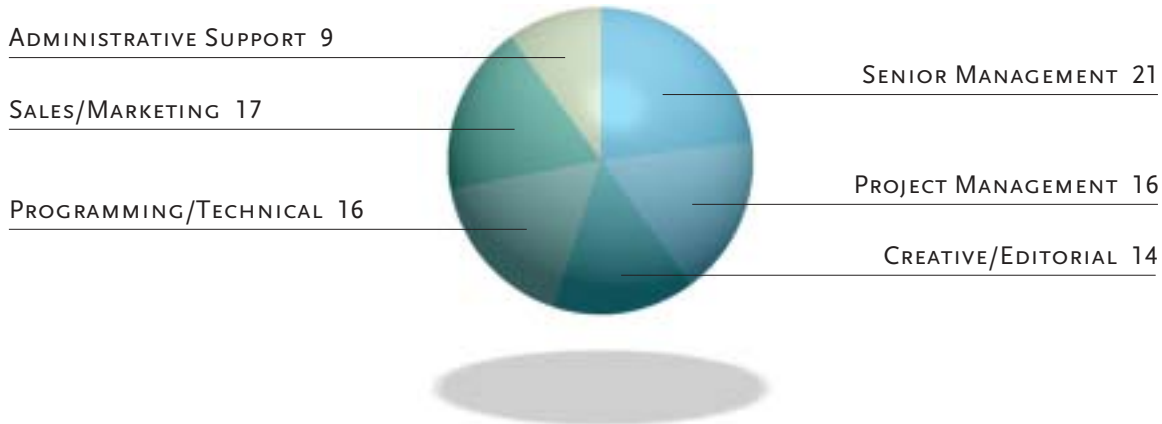


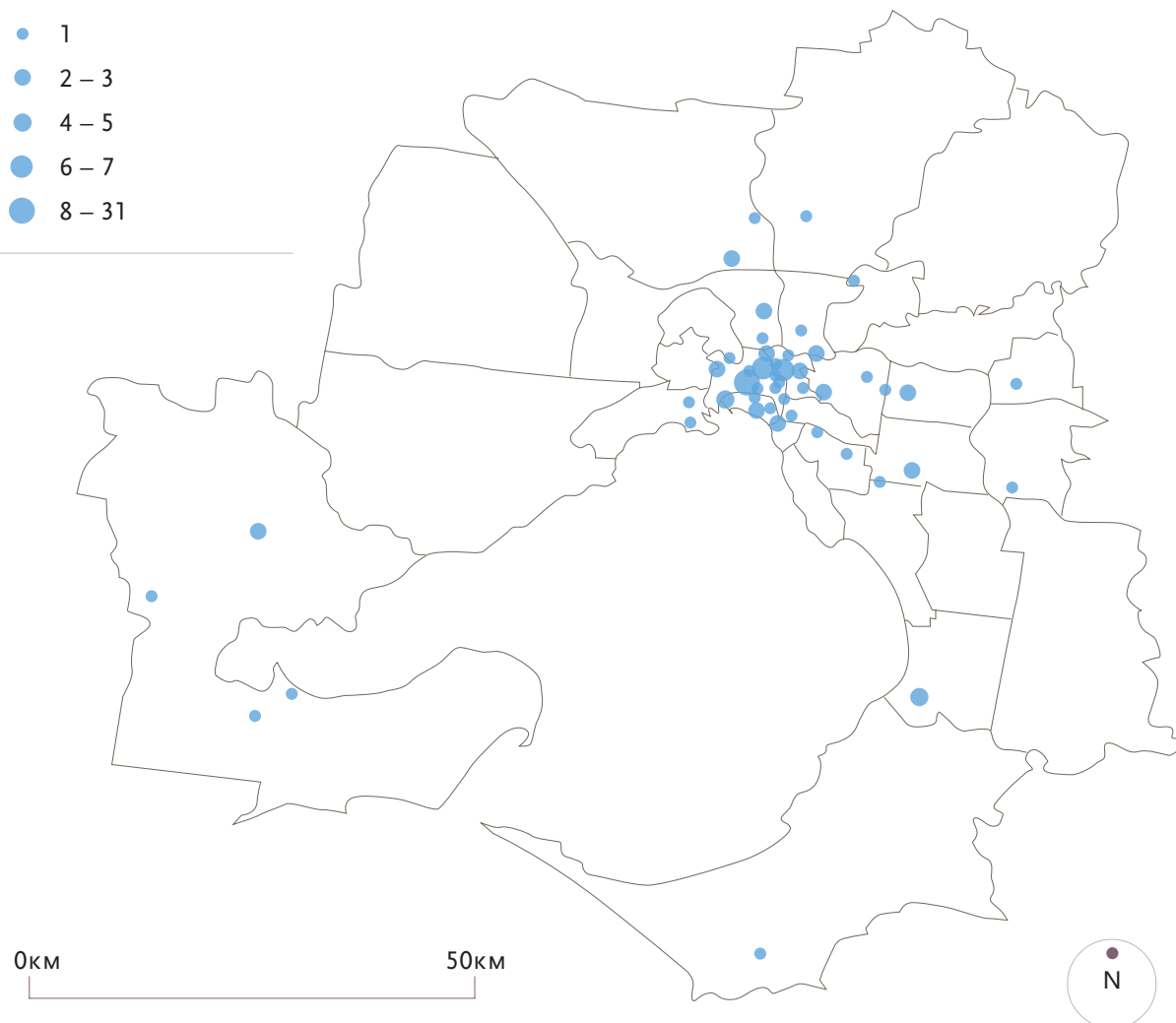
DIAGRAM 8: STAFFING CONSTRAINTS

Location

Respondents were fairly tightly concentrated in geographic terms within the inner Melbourne region, particularly in the inner east, CBD and inner south (see map 1).

NO. OF DESIGN INDUSTRIES

- 1
- 2 – 3
- 4 – 5
- 6 – 7
- 8 – 31



MAP 1: DESIGN INDUSTRY CLUSTER, GREATER MELBOURNE

The factors that respondents saw as ‘very important’ in deciding on where to locate were:

- affordable rents, a reasonable overall cost of doing business and the overall ‘quality of life’ of the area.

Factors regarded as ‘important’ were: proximity to market, access to suitable facilities and infrastructure, cost or rent and an ‘appropriate image’. Respondent comments to the question – ‘what were the three most important locational attractors for your business’ – included the following:

“rent, quality of life, proximity to employees”

“rent, quality of life, access to universities”

“image, rent, proximity to market”

“affordable rent, necessary infrastructure, appropriate image”

“rent, image, staff”

Other factors were also mentioned by some respondents: e.g.

“lifestyle, family friendly, avoiding city traffic”

“close to city, film facilities in the building, close to shops and bank”

“quality of life, access to cafes, distance from management”

For most respondents, access to suppliers, competitors, employees, creative staff, government agencies, financiers and universities were regarded as less important or unimportant in determining location.

Overall, most respondents were well satisfied with their current locations, in terms of the magnets just mentioned. Thus, two-thirds stated that their current location met the needs of their organisations ‘well’ or ‘very well’ with respect to the three most important factors – rent affordability, quality of life and the overall cost of doing business.

Nevertheless, a little over a third were contemplating a move. Comments included:

“run out of space in current premises”

“we are expanding”

“to have a CBD location”

“very old building with bad facilities”

“(moving to) Richmond, more access to people working in areas requiring training in fashion and design”

“parking limitations”

“larger space, cheaper rent”

“government building a new facility”

“closer to clients”

The main *disadvantages* of current location noted were seen to be:

“image, stairs, lack of expansion room”

“drug reputation, remoteness from cultural centre, distance from CBD”

“parking, no cable, poor amenities in building”

“peak hour traffic is a nightmare”

“no room for staff, poor image, destroys leisure time”

“distance from suppliers, suitable facilities, access to R&D”

“expensive, lack of car parking”

“high rent, distance from customers”

“cost, not big enough to bring together all creative disciplines, not in creative precinct”

Respondents were more likely to be considering a move if their current location was lacking in appropriate image or had poor access to skilled staff ($p < 0.01$, in both cases).

Linkages and Exchanges

Industry clusters form on the basis of partly overlapping networks that link firms and other agents in exchanges of information, knowledge and other resources (see Berry, 2003, ch. 3). The loose linkages formed can generate recurrent though sporadic patterns of cooperation, as well as competition, that help determine the relative economic success of cluster members.

We asked the respondents to the survey how they heard about new ideas, new products, new market opportunities. Where did they get this information? Who supplied it? How often did they hear from particular sources?

Key findings are:

- 53% of respondents ‘usually or almost always’ received news of new ideas and opportunities from ‘other people within my business’
- 74% of respondents ‘usually or almost always’ received news of new ideas and opportunities from ‘the internet and other data networks’
- 52% of respondents ‘usually or almost always’ received news of new ideas and opportunities from ‘professional and technical publications’

Conversely:

- 95% of respondents ‘almost never or only sometimes’ received news from ‘public patent documents’, and
- 72% of respondents ‘almost never or only sometimes’ received news from ‘consultants’
- 75% of respondents ‘almost never or only sometimes’ received news from government agencies
- 60% of respondents ‘almost never or only sometimes’ received news from competitors
- 56% of respondents ‘almost never or only sometimes’ received news from universities and R&D organisations

About a third of respondents, in each case, stated that they ‘often’ received news of new ideas and opportunities from suppliers, customers, industry and professional associations, the media and conferences and exhibitions.

Other sources explicitly mentioned included:

“newsletter email”
“galleries – i.e. Fed Square”
“friends and acquaintances”
“in house R&D’
“informal networks”
“pub”
“friends”

Linkages established between organisations as a result of regular or irregular exchanges help to forge collaborative bonds. We asked our respondents *how often* they had collaborated with others. The patterns of collaboration uncovered were extensive.

- 74% of respondents had collaborated ‘often or very frequently’ with customers and 48% with universities and R&D organisations

Collaboration had occurred ‘sometimes’ with:

- suppliers (44%)
- government agencies (35%)
- industry and professional associations (48%)
- competitors (52%)

Interaction with customers clearly represented the main avenue of continuing collaboration. This suggests that, for our respondents at least, relationship-building with existing and potential customers is likely to be an important strategic source of market-relevant information and innovation opportunities.

In general, the *level* of collaboration did not vary significantly across the different digital design segments, with one exception – i.e. in relation to collaboration with universities and R&D organisations ($p < 0.05$). Respondents in the traditional design professions overwhelmingly did not collaborate in this way, while collaboration was high among those located in the digital media and creative industries segments. However, there were differences in the pattern of collaboration of respondents with different partners ($p < 0.05$). For example, two-thirds of those in fashion, textiles and furniture collaborated with customers and with universities, while all of those in ICT collaborated with their customers but only a fifth of them with universities. Respective collaboration rates with customers and universities for creative industries were 80% and 33%; for industrial design, interior design and architecture, 78% and 50%; and for digital media, 76% and 43%.

We asked respondents *where* their main customer of the preceding 3 years was located. In more than 80% of cases the answer was 'Melbourne'. The main customer was located overseas in less than 10% of cases.

The main customer was distributed across the economy as follows:

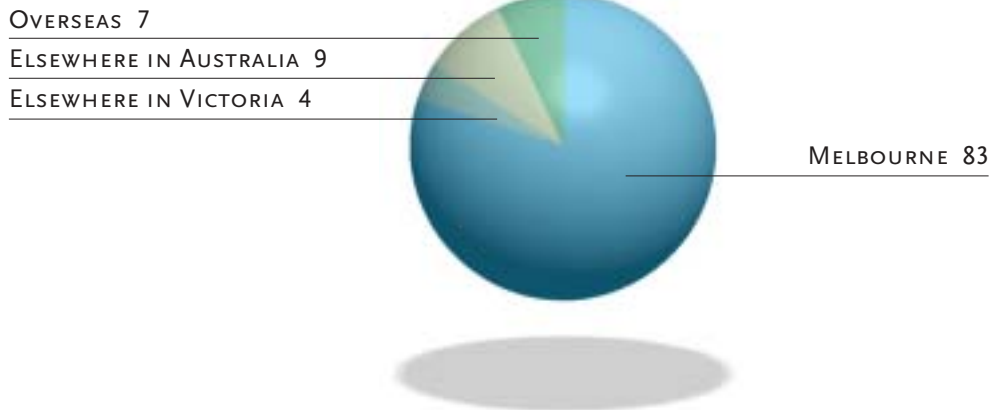


DIAGRAM 9: LOCATION OF LARGEST CUSTOMER

The same patterns held true when looking at the location of 'most customers'; in this case, 85% of respondents said that most of their customers were located in Melbourne.

Overwhelmingly, then, the picture of Melbourne's digital design cluster emerging in this study is of a large number of collaborating SMEs (in particular) focused almost exclusively on the local market. **A major challenge for industry leaders and government policy will be to grow the export capacity of cluster members, enabling them to operate competitively on a broader global scale.**

Innovation – Drivers and Barriers

We asked our respondents whether their organisation had engaged in 'a significant innovation' over the preceding 3 years.

- 77% said 'yes' and only 23% 'no'.

When engaged in that significant innovation:

- 80% said that they had collaborated with customers
- 61% had collaborated with suppliers
- 56% had collaborated with universities and R&D organisations and a similar proportion with industry and professional associations

On the other hand, less than 50% reported collaboration with – government agencies (45%); consultants (46%); and competitors (25%).

Firms formed before 1996 were much more likely to have engaged in a significant innovation over the last 3 years than those formed more recently. This difference is statistically significant ($p < .05$). This suggests that a capacity to innovate may, in part, depend on first establishing a market presence and an appropriate operating base.

Likewise, **larger firms** – i.e. those employing more than 20 people - were more likely to have innovated over the 3 year period than smaller firms ($p < .05$), suggesting that innovation requires both an established base of operations and a threshold size of operation to access adequate skills and finance to support successful innovation.

Sources of funding for their most significant innovation in the past three years came mainly from self-funding and government agencies. A major innovation was most likely to be associated with funding by the capital market (including venture capital), customers, self-funding and government grants and least likely when funded by family/friends, 'business angels' and all other sources ($p < .05$). This suggests that access to formal financial avenues, most likely to be open to larger, better established firms, supports the innovation process – an argument advanced by Joseph Schumpeter in his later work (see Berry, 2003, p. 46 on the 'Schumpeter II model').

The funding sources of significant innovation were differentiated across the digital design segments ($p < 0.05$). While respondents in all segments depended heavily (more than 50% of cases) on self-funding, digital media also sourced finance from customers, and those in the creative industries and education sector were significant recipients of government grants.

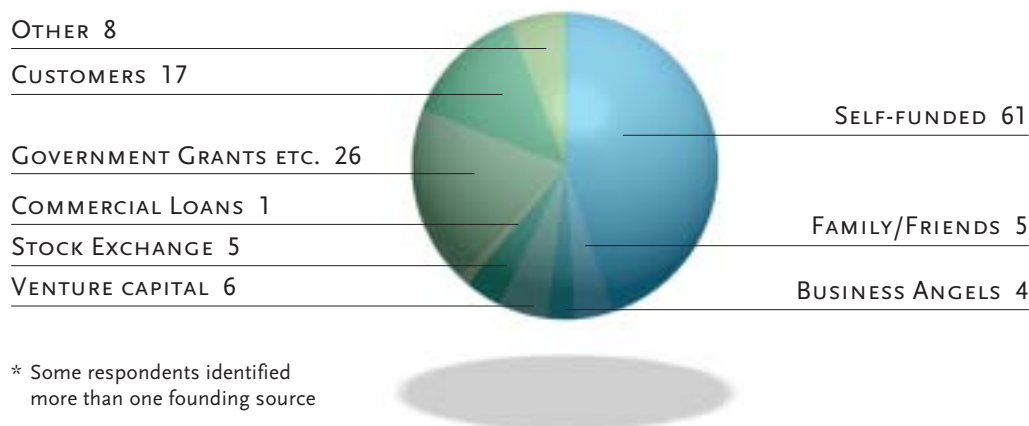


DIAGRAM 10: FUNDING OF MAJOR INNOVATION

Other funding sources identified included:

“private grants”

“external partnerships”

“sponsorship”

One respondent noted that - “new products are developed overseas” – implying that local funding was unnecessary.

The most critical drivers of innovation were seen to be access to *skilled labour* (in Richard Florida’s (2002) terms, ‘creative talent’), *finance and competitive pressures*. The differences were highly statistically significant ($p < 0.001$). Access to collaborators was also significant ($p < 0.05$). Government regulation was *not* found to be significant ($p = 0.607$). This outcome supports the arguments of, among others, Michael Porter and Richard Florida, on the importance of intra cluster connections and communication (see Berry, 2003, chs. 3-5).

There were some statistically significant differences across the digital design segments here. Thus, respondents in education, training and research and the creative industries were most likely to nominate 'access to skilled labour' as 'very important' to innovation ($p < 0.05$). Conversely, all segments ranked 'access to finance' in fairly similar ways ($p = 0.598$), as they did the importance of 'government regulation' and 'access to collaborators'.

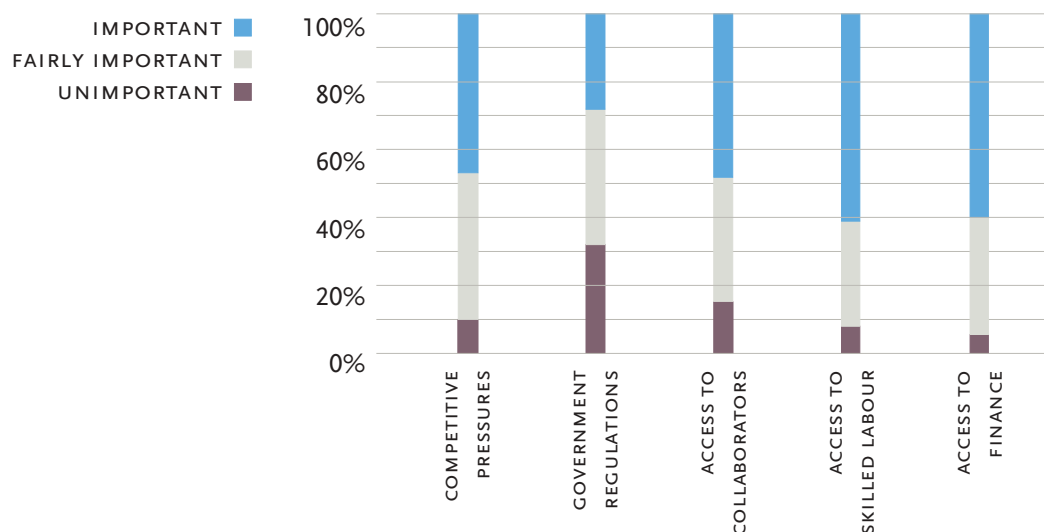


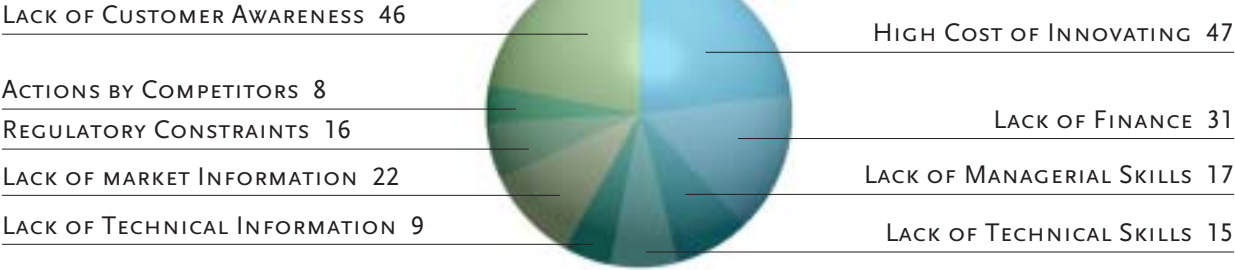
DIAGRAM 11: INNOVATION DRIVERS

Respondents who had engaged in innovation were highly likely to have collaborated with customers ($p < 0.001$) and (slightly less likely) with suppliers ($p < 0.1$). Conversely, those not innovating were most likely to have collaborated with competitors ($p < 0.001$). Collaboration with universities, business/professional organisations or government agencies did not seem to increase the likelihood of innovation occurring. This result again supports earlier international studies pointing to the importance of collaboration along the extended supply chain as a critical transmission belt for new industry developments.

The most critical barriers blocking innovation in their own organisations were identified as – **the high cost of innovating** and a **lack of awareness or interest among customers**; in each case, more than half the respondents noted these as significant barriers with respect to their major innovations over the preceding 3 years. Lack of both financing avenues and relevant market information were also seen as barriers by a quarter or

more of respondents. These four factors were seen as more important barriers than factors such as a lack of management or technical skills and regulatory constraints imposed by government.

However, there were statistically significant differences across the digital design segments ($p<0.05$). ICT respondents were much less likely than others to mention the 'high cost of innovation' as a barrier. 'Lack of awareness by customers' was particularly singled out by digital media respondents, as was lack of technical skills and information by those in the creative industries. 'Regulatory constraints' were seen as a barrier by respondents in education, training and research and the creative industries.



* Some respondents identified more than one founding source

DIAGRAM 12: INNOVATION BARRIERS

Specific comment on innovation barriers included:

“capability to afford technical and business analysis skills, pre-occupation of Australian government departments to purchase from large overseas suppliers, ridiculous insurance requirements”

“getting people to sign up and use it”

“lack of supplier awareness and marketing skills”

“organisational issues and sector complexities”

When respondents were asked to nominate the three largest barriers to innovation in their industry (rather than their own direct innovation experiences), more than 60% pointed to the high cost of innovation, 51% noted lack of awareness or interest among customers and 49% saw a lack of appropriate financing avenues as important in this respect. Respondents here also pointed to:

“lack of local government support”

“lack of marketing skills to find niche for the innovation”

“pressure to move too fast reduces attention to testing, backup and staged implementation. Organisational change is needed to support innovatory technologies – they don’t happen in isolation”

The high cost of innovation as a major barrier was strongly stressed by interviewees in the computer games sector (see comments in section 2, above).

For those whose organisations had engaged in significant innovation over the preceding 3 years, less than a third had systematically protected their **intellectual property** through registered trade marks, patents, registered designs, speed to market and secrecy. The partial exception was copyright, where almost half (48%) of respondents indicated that their organisation systematically protected their IP through that avenue.

Respondents were asked how important **spatial proximity** between collaborating partners was to successful collaboration. About three-quarters saw proximity as ‘important or ‘very important’. Respondents who regarded proximity as very important were much more likely to have engaged in innovation over the preceding 3 years ($p<.05$). This latter result is consistent with the arguments of Porter and others on the necessary geographic dimension of successful industry clusters.

We asked respondents for their views on what changes or additions to government policies would facilitate innovation in their industry. Responses included:

“Financial support for organisations to setup or even stay in Victoria. Tax relief, be it only for a short while for organisations setting up businesses in Victoria. Both these [ideas] are with respect to electronics design innovation and manufacturing businesses.”

“Changes to depreciation/capital investment regulations for computer and technology hardware - increased public investment in communications infrastructure.”

“funding, funding, funding”

“Access to new technology and training at affordable costs and on an ongoing basis. Especially, access for smaller organisations and companies.”

“Facilitate the entrance of qualified international workers. Modify existing working visa requirements.”

“If government and/or universities etc. were to invest in quality communication design, they would at least set a precedent and raise the profile of contemporary, effective graphic design. This could be supported through grants or other forms of financial support for individuals or studios committed to a critical research practice.”

“Reduction of internet bandwidth charges, including lifting bandwidth constraints. Reduction if not eradication of performance royalty fees imposed on streaming media providers, specifically those exploring means of content dissemination outside of mainstream (media) industries.”

“Funded and facilitated interactions across industry sectors and across stakeholder groups. Innovate as a Government instead of bureaucratically studying everything to death! Encourage and support ideation, creation, innovation and entrepreneurship in schools. Get the business and education communities working together by funding collaborative programs. Recognise that innovation sits on the shoulders of sheer hard graft/ longitudinally developed expertise. The cochlea implant was NOT invented in Victoria – it was the result of years and years of funded basic research in the US (by a great Australian). Therefore SUPPORT funded basic research in the design/creative disciplines.”

“We’re a small business, and find it difficult to rise above the day to day process of completing jobs for income, to get the head space to sit back and innovate and collaborate. GST compliance has seen our accounting costs triple and we constantly deal with clients (especially government organisations) who are confused about GST. About 4 years ago, we had completed a large project for [name deleted], and wanted to build on processes we’d created on that job, and chase more work out of the US. I made various calls to find out what R&D options were available. It was hard to work out who to talk to and I got bounced from department to department. In the end, partly because I couldn’t specify exactly what our final product would be, I hit a wall. Requested documentation never arrived, and the chance passed.”

When asked to offer any other comments on innovation processes, drivers and barriers, our respondents responded as follows:

“Given the small Australian market and lack of funds for prototyping and trialling of self-funded innovation by SMEs, there needs to be some policy framework for showcasing and funding the trialling of such new technologies by government and the private sector, such as large retailers and media groups. This could be done by tax concessions for investment and/or acquisition of early stage development.”

“Being in several industries I am amused by the differences. Architecture is saddled with codes of practice, a boring and expensive institute, and increasing regulatory complexities. The digital industries seem to suffer from a complete lack of an institution or professional body through which potential customers can access us, it is very free but closed off.”

“Federal and state government funding of ‘innovation’ and development is very, very poorly focused. It is clearly being run by people with little or no development experience.”

“I am completely perplexed why the state government will give me money to travel overseas and research while showing very little interest in purchasing products we build.”

“[A] culture of shared ideas and discovery is paramount to developing industry innovation in Australia. Stronger ties between designers and manufacturers with higher emphasis on quality and skilled labour, willingness of manufacturers to innovate and more manufacturers based in Australia to create stronger regional competitiveness. [Need to] push local consumption to be driven by factors including: innovation, quality, design and production, Aussie made – export, export, export!”

“Incubators that encourage and stimulate cross-disciplinary R&D, that recognise the creative rights of individual artists and the environment they need to work within. Incubators that are not market but creatively driven, that support innovation towards sustainable living, not oriented towards growth and over-consumption.”

Finally, we asked our respondents **how optimistic** they were about their organisation’s future prospects over the next five to ten years. About 60% expressed optimism, 20% pessimism and 20% were uncertain.

Further Views from Interviewees

Interviewees expressed a number of other views about the creative process and innovation outcomes.

“The visual image is a very powerful language” [creative industries]

“story telling (is) the archetypal human communication” [creative industries]

“a deep film culture and history resides in Melbourne – the oldest film festival, first TV, first film schools, first films.” [creative industries]

“break down the normal bureaucratic barriers to good outcomes – what’s good for a health department is death for a creative program.” [creative industries]

“you need to put together and keep together a network team that can recognise and take up new opportunities quickly - this is the knowledge engine. Innovation comes from internal pressures not the external environment” [ICT software]

“collaboration is a luxury for SMEs but an important one – business needs to free resources to build these links. Government agencies are not important – they are too far behind the game.” [ICT software]

“the biggest barrier to innovation is recruiting staff who can think. Many recent graduates have mediocre to good production skills but are poor designers.” [graphic design]

“Clients/customers want new solutions but are often very difficult to convince about a genuinely new idea. Market research tends to reinforce existing and traditional approaches. There is a potential role for government here – to encourage new ideas – but they need to protect designers’ IP in the process.” [graphic design]

“new technology is usually introduced to save money and reduce costs - but the real value of new technology comes from the unexpected opportunities opened up, the new design tools, the new connections and outcomes of doing design. An important part of the innovation process is putting together new combinations of people with different skills, perspectives and horizons – that is, engaging in what we call ‘malapropic discourse’”. [architecture]

What factors drive innovation? ...

“bleeding edge customers – that is, users who are risk takers, prepared to pioneer, demanders of improved quality and functionality.” [ICT R&D organization]

“an innovative milieu or climate favourable to design - flexible, receptive government agencies are key players.” [architecture]

“continuous declining cost of information transmission.” [ICT sector]

Where is the future headed (the next 5 to 10 years)? ...

“to the next generation of computer hardware, and online games as a socialising experience (which may be more attractive to girls and women than the earlier games environment).” [computer games]

“within 5 years more than 50% of Australian homes will have broadband. There will be 24/7 content access, digital TV will be mandatory. There will be increasing industry concentration due to the very large upfront costs and economies of complex complementarities.” [new media]

“to a more sophisticated and professional industry that requires greater professionalism and accountability.” [new media]

“the future will depend on a human capital constraint – how successful IT skills and resources are generalised and switched to a user-driven dynamic. Design as a non-linear process/practice will become more important at all points within functioning inter-firm networks and clusters, aiming outputs at increasingly knowledgeable and demanding customers.” [ICT R&D organisation]

“new opportunities will emerge around new visualisation models and applications, developments in meta-communication away from aping reality. There will also be an increasing ‘de-corporatisation of art’ – a move to user/artist control and flexibility (risk taking).” [ICT R&D organisation]

“more use of wireless (but there are security problems to overcome), a need for less hardware as more efficient integration and smart software is introduced, more intelligence, voice recognition.” [ICT software]

‘for Melbourne to be the hub the challenge is to marry design, arts and technology, to create ‘the aesthetic of technology’, the interface of technology and aesthetics – celebrate the vibe.” [ICT software]

The lab.3000 Database – A Further Glimpse

By early April 2004, more than 800 individual practitioners and businesses had voluntarily placed themselves on the lab.3000 database. An increasing number are also registering online on the ‘Business Directory’, which provides information to people accessing the lab.3000 website about those businesses’ products, skills and contact details. This data source also provides a picture – albeit incomplete – of Melbourne’s digital design cluster at this early developmental stage.

The profiles of those registered on the database and listed in the Business Directory to date divide across the digital design segments as noted in Table 1.

TABLE 2: REGISTRANTS ON THE LAB.3000 DATA BASE [APRIL 2004]

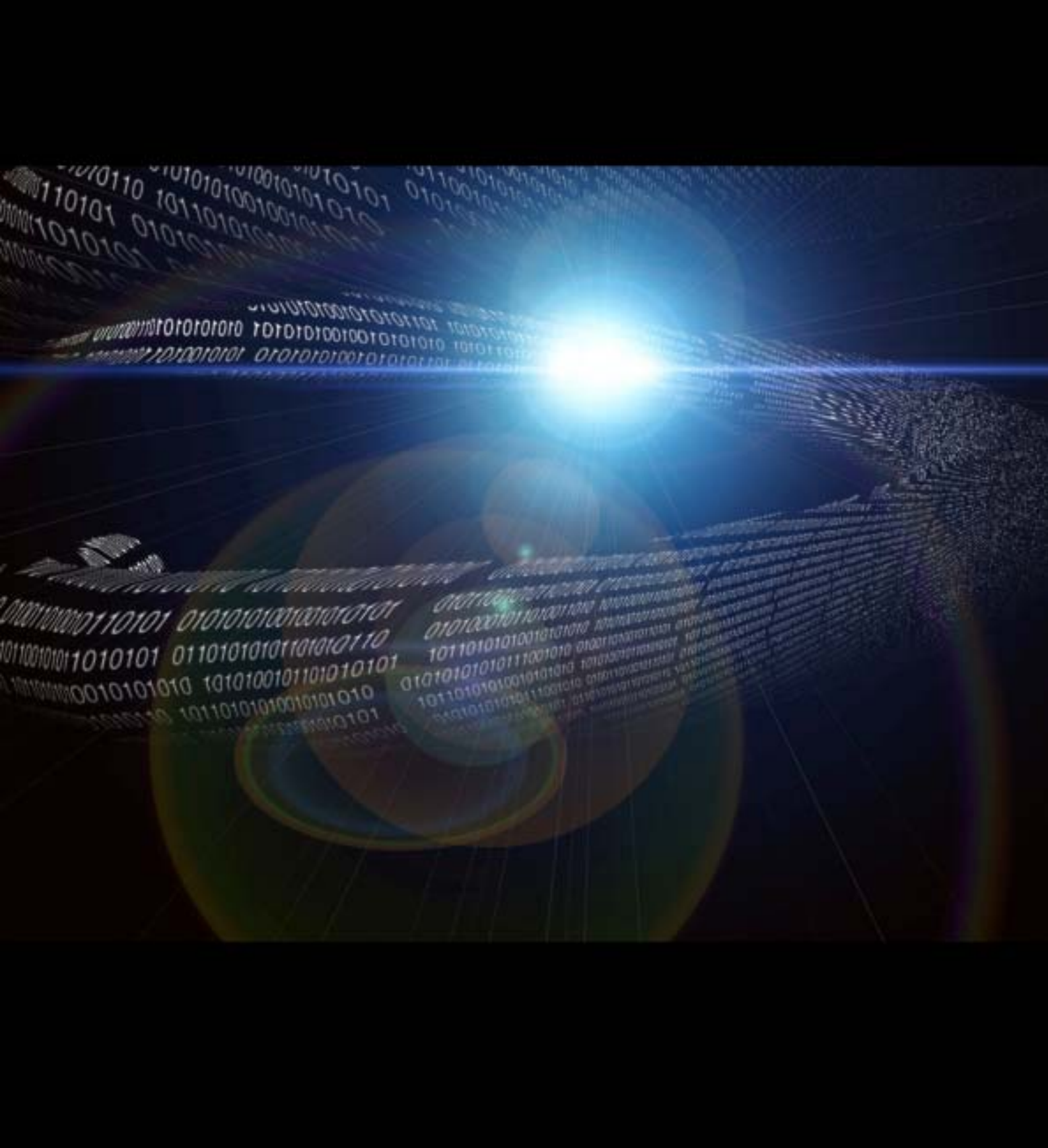
BUSINESS FOCUS	INDIVIDUAL PROFILES	BUSINESS DIRECTORY
INDUSTRIAL DESIGN, INTERIOR DESIGN, ARCHITECTURE, FASHION DESIGN, TEXTILE DESIGN, FURNITURE DESIGN	216	10
DIGITAL MEDIA, MULTIMEDIA, GRAPHIC DESIGN, NEW MEDIA, WEBSITE DESIGN, PUBLISHING, GAMES, DIGITAL ART	218	35
INFORMATION AND COMMUNICATION TECHNOLOGIES [TECHNOLOGY, SOFTWARE], NANOTECHNOLOGY, WIRELESS, BROADBAND	145	16
TELECOMMUNICATIONS, AEROSPACE, AUTOMOTIVE MANUFACTURING	78	4
CREATIVE INDUSTRIES, TELEVISION, FILM, RADIO, ARTS	142	15
EDUCATION, TRAINING, RESEARCH	82	13
CONSULTANCY, MARKETING, STRATEGY	76	15

Note: some registrants have nominated more than one segment.
lab.3000 has just started building the business directory and seeks to add firms and practitioners across all segments.

This division across the digital design segments is uneven. Digital media has provided the largest number of registrants to date, followed by ICT, the creative industries and the design professions.

The locations of registrants (either street or postal addresses) are strongly concentrated in the inner area of metropolitan Melbourne.

This brief sketch, drawing on lab.3000's database, presents a similar picture to that emerging in the larger and more detailed study described earlier in this section.



05 Conclusions and Implications

Industry clusters are dynamic and evolving institutional drivers of economic growth. Clusters therefore can be expected to move through a life-cycle marked by several stages – notably, emergence, incubation, acceleration, maturation and decline. In fact, long before a mature cluster tips over into the declining phase, processes of change – or mutation – may shift the focus and change the structure and composition of the networks making up the cluster. Unexpected opportunities and challenges can create space for new directions, spin-offs and synergies – a new pattern of path dependence – before the old path reaches a dead end. Previous research suggests that clusters based on ‘loose coupling’ (rather than rigid relationships), a diverse range of skills and perspectives and ‘redundancy’ (multiple channels of information exchange) fare best in the uncertain, changeable, globally competitive environment (see Berry, 2003, pp. 33-41).

This study suggests strongly that the digital design cluster in Melbourne is young, clearly in an emergent stage. In part, this conclusion follows from the relatively recent formation of many cluster members identified in the survey (about two-thirds have been established since 1990) and the newness of the technological paradigm underpinning digital design as an expanding field of operations. It is also likely to be due to the relative smallness of the domestic markets involved and the geographically peripheral position of Australia in the expanding global economy. In the broader public policy context, Australia’s ‘national innovation system’ (see Berry, 2003, chapter 6) has not, to date, supported a cluster-focused industry and economic policy. As a consequence of the current undeveloped state of the cluster, most industry participants are locked into a local or domestic market environment, which constrains the cluster’s further development. This raises the obvious implication for industry development and public

policy – how can this cluster be incubated and accelerated in order to achieve self-sustaining, export-oriented growth? We return to this question below.

The main conclusions of this study can be summarised as follows.

Profile

The emerging digital design domain or cluster in Melbourne is characterised by:

- a large number of small and medium sized organisations, with a substantial minority presence of big firms. About a quarter of survey respondents reported annual incomes under \$100,000
- a substantial minority of those who self-identified as cluster members worked in the diverse ‘digital media’ segment. Education, creative industries and ICT also figured prominently as segment locations
- the dominance of sole traders, small partnerships and private companies
- buoyant profitability and growth optimism
- a tight geographic focus on inner and central Melbourne location
- the dominance of the local market

Linkages

Information about new ideas and opportunities flows readily within and between the organisations in which our respondents worked.

- the main sources of such information tended to be other people within their organisations, the internet and professional and technical publications
- conversely, there was relatively little dependence in this respect on sources such as patent documents and external consultants
- other sources noted included suppliers, customers, industry associations and the media. Informal personal networks, friends and galleries/exhibitions also figured
- sources rarely mentioned were universities, government agencies and competitors

Patterns of *collaboration* between cluster members were strongly influenced by the supplier-customer relationship (Porter’s ‘value chain’); about three-quarters of the respondents noted this connection. A half of the respondents also identified universities and R&D agencies as collaborators. Collaboration also occurred sporadically with government agencies, industry associations and competitors.

Innovation Outcomes

Linkages and collaboration are important processes driving innovation and industry development through clustering. More than three-quarters of our respondents reported that their organisation had engaged in significant innovation activity in the preceding three years. When innovating:

- 80% had actively collaborated with their customers and 61% with suppliers; respondents who had innovated were highly likely to have collaborated with customers and/or suppliers
- more than half had collaborated with universities
- collaboration had occurred less often with government agencies, consultants and competitors

Longer established and larger firms were most likely to have innovated. Most innovation was self-funded and, indeed, the lack of external funding for new developments was seen to be a major barrier to innovation, especially within smaller organisations. This last point was strongly echoed in the interviews and focus group. In some segments, notably digital media, advanced funding by customers was an important source of development financing.

The main drivers or facilitators of innovation were found to be:

- access to skilled labour
- access to collaborators
- finance, and
- competitive pressures

Adequate access to skilled labour was particularly important in the creative industries and education segments. Collaboration along the value chain seems to be critical to the innovation process.

A large majority of respondents saw spatial proximity as an important prop to active collaboration. Those who had innovated were particularly likely to stress this point.

In addition to the external finance constraint, **the main barriers to innovation** appear to be:

- the high cost of innovating; subsequent interviews pointed to the problem of high *upfront* costs
- a lack of awareness among customers
- a lack of relevant and timely market information

Less important but still noted innovation barriers were formed by a perceived lack of skills (technical or managerial) or regulatory constraints by government.

Those in the digital media field were particularly likely to mention the lack of customer awareness as a major barrier, while ICT respondents were very likely to mention the high costs involved in innovation. *It is clear that different sets of barriers characterise the different segments of the diverse digital design cluster, which implies that industry leaders and government need to take these differences into account when framing appropriate policies.*

Implications

What lessons does this study offer industry players and interested governments? Digital design is a new and quickly evolving field, in Melbourne as elsewhere. It is particularly in the establishment and incubation stages that smart policy can have large returns.

The key characteristic of technology-driven industry clusters such as this one is that they are dynamic, open and evolving systems. Like all providers of services, rather than tangible goods, market definition is forever changing.

“...market definitions and segmentations tend to be dynamic rather than static: this results in blurred boundaries between economic activities within the services sector: [e.g.] the ‘convergence syndrome’ associated with online transactions or ‘web services’” [Cutler and Co. and CIRAC, 2003, p.9].

The diverse, opaque and changeable nature of this cluster makes appropriate interventions difficult to gauge. However, the study does provide some tentative directions.

First, the fact that the cluster is so new and diverse with different segments at different development stages, cautions against a one-size-fits-all approach. It is unlikely that any single government or university or industry-based agency could gain the knowledge and resources necessary to impose an effective universal set of incentives, constraints or directives across the whole cluster.

Second, far more effective would appear to be interventions that seek to identify and encourage cross-communication and collaboration between cluster members and segments, leaving the dynamic and essentially ungovernable process of innovation unleashed to drive cluster development. This entails an understanding of how the

underlying networks form and operate. A recent study of collaboration between inventors in the Greater Boston area, published in the *Harvard Business Review*, has identified the system importance of key ‘gatekeepers’ - those people or organisations who have or broker a large number of collaborations with other innovators (Fleming and Juda, 2004).

A cluster policy approach, such as that proposed by the Victorian Department of Innovation, Industry and Regional Development (DIIRD, 2003), could usefully

“Gatekeepers ... have two defining characteristics: They are prolific technical contributors (usually with advanced degrees), and they work and communicate with many people, both within and across discipline and organizational boundaries” (Fleming and Juda, 2004, p. 22).

encourage relevant gatekeepers to broker and facilitate cluster development in a number of areas, including digital design. This could entail seeding industry-led networks that form, through identifying and supporting emerging gatekeepers. The latter may be operating alone or through industry or community associations.

In the case of digital design, the Victorian government has funded lab.3000, a university-based centre of excellence with an explicit gatekeeper/brokerage role in this field. lab.3000 provides a virtual hub for members located (sectorally and locationally) in different parts of the cluster. Its role involves the facilitation of information flows, connections and collaborations that may spark innovation outcomes in ways identified in the study analysed in section 4. The lab.3000 website is designed as a ‘smart tool’, providing a showcase for cluster members skills and products, a match-maker facility for participants to find the ideas, skills and partners they seek and a window onto the wider world, tracking industry and related developments, domestically and throughout the world. Exhibitions and other public events aimed at cluster members reinforce, at a face-to-face level, the connections and exchanges on which clusters thrive. These functions, real and virtual, are underpinned by lab.3000’s educational and research activities, such as the study described in this paper. As an independent organisation – i.e. independent of government and any particular industry location – lab.3000 can play ‘the *honest broker*’.

A clear message coming through the interviews held for this study is that many businesses, particularly the smaller ones, are prevented by resource constraints from accessing necessary market intelligence and identifying potential collaborators. They suggest that accessing the lab.3000 website and participating in key events like Digital Drawcards ‘gets them in the game’. The more diverse and ‘dense’ an emerging cluster,

the more likely it is to ‘take off’ into self-sustaining growth. Thus, policies and organisations that can successfully extend the effective reach of the linkages and information flows across a region are likely to materially increase the success rate of cluster formation. Gatekeeper organisations like lab.3000 have a critically important role to play here.

In a recent international study of the forces driving cluster development carried out for the U. K. Department of Trade and Industry, the authors identified ‘the presence of functioning networks and partnerships’ as one of the three ‘critical success factors’ (Ecotec Research and Consulting, 2003). Brokering partnerships and strengthening networks is particularly important for SMEs seeking to make their mark.

“The key to growth for many small firms within a cluster is its ability to gain strength through the cooperation and collaboration utilising formal and informal networks” [OECD study quoted in Ecotec Research and Consulting, 2003, p. 22].

The DTI report highlighted two other characteristics of the successful industry clusters identified – viz. *a strong skills base and a growing innovation and R&D capacity*. Developing the national innovation system in ways that address the dynamic and evolving nature of the technology-driven clusters poses important challenges for policy makers. This point has also been stressed in Stage 3 of the Creative Industries Cluster Study; e.g. the policy move from ‘closed’ to ‘open’ models of industry innovation is held to require three conditions (Cutler and Co. and CIRAC, 2003, pp. 14-15):

- the recognition of cross-disciplinary and collaborative research models
- the recognition of the scope for and potential of cross-sectoral industry learning and technology transfer, and
- acceptance of the need for ‘technology integration’ rather than simply ‘technology invention’ in the innovation process

“The challenge is how to adapt and extend existing thinking about innovation systems to the services sector and to emerging, technology-based firms in service industries. Addressing this challenge has shifted the focus to the dynamics of industry change and structural adjustment within a globally turbulent environment and shifted attention to new levels of granularity in seeking to understand innovation processes in terms of dynamic feedback loops, non-linear change processes, and the learning processes associated with organisational and institutional adaptiveness” [Cutler and Co. and CIRAC, 2003, p. 14].

A *third set of interventions* that can encourage cluster growth concerns the specific barriers and drivers characterising identified cases, such as those uncovered in this study. For example, respondents to the survey and interviewees pointed to the high upfront costs (and risks) of innovating in areas like interactive games and multimedia. Specific policies can (and in Victoria, have) been tailored to spread or reduce some of these costs and risks, through government grant schemes and the like. But, as was pointed out by interviewees, government regulations and policies change slowly and often lag far behind current technological and industry developments. Existing onerous funding tendering procedures and anomalies in the taxation system (such as the fact that new media production does not qualify for some of the tax benefits applying to conventional films) may effectively deter smaller firms from innovating in these areas.

The lack of awareness among customers of the potential for new developments in digital design to add significant value to their products and the dearth of market intelligence – both uncovered as major barriers to innovation in this study – can both be addressed by government agencies, industry groups and universities collectively communicating relevant information and best practice cases. Exhibitions, industry awards and targeted workshops can contribute here; as noted above, organisations like lab.3000 have a role to play, both in face-to-face terms and through their websites.

Future Research ...

This report is the second in a series that focuses on the processes and outcomes of growth in design-driven clusters underpinning successful and dynamic regional economies like Melbourne. The first report (Berry, 2003) critically reviewed the extensive literature and research findings on industry clusters, innovation and regional development. Subsequent research will focus on a number of international case studies where the intention is to extend and test some of the key findings discussed in the first two reports, as a basis for then examining in more detail the public policy options that would encourage cluster development in digital design in the greater Melbourne regional economy.



Appendix 1: Survey Questionnaire

lab.3000 Mapping Melbourne's Digital Design Cluster

Questionnaire – Part 1: Profile

01 Age of business

How long has your organisation been operating?

- ☐ pre-1990
- ☐ 1990-1996
- ☐ since 1996

02 Business Focus

What is your main business? [Choose the most appropriate category]

- ☐ Industrial Design, Interior Design, Architecture
- ☐ Fashion Design, Textile Design, Furniture Design
- ☐ Digital Media, Multimedia, Graphic Design, New Media, Website Design, Publishing, Games, Digital Art
- ☐ Information & Communication Technologies (ICT): technology and software
- ☐ Creative Industries, TV, Film, Radio, Arts
- ☐ Aerospace and automotive manufacturing
- ☐ Education, Training, Research
- ☐ Regulation, Policy, Industry support
- ☐ Other [please specify]: _____

03 Business type

What organisational form does your business take?

- ☐ Non-profit organisation
- ☐ Public company
- ☐ Partnership
- ☐ Private company
- ☐ Sole trader
- ☐ Other [please specify]: _____

04 Workforce size

How many people work in your organisation?

- ☐ One
- ☐ 2 – 5
- ☐ 6 – 20
- ☐ 21 – 50
- ☐ more than 50

05 Revenue

What is your organisation's annual gross revenue?

- ☐ Less than \$100,000
- ☐ \$100,000 -- \$250,000
- ☐ \$250,001 -- \$500,000
- ☐ \$500,001 -- \$1,000,000
- ☐ \$1,000,001 -- \$5,000,000
- ☐ \$5,000,001 -- \$20,000,000
- ☐ \$20,000,001 -- \$50,000,000
- ☐ more than \$50,000,000

06 Payroll

What is your organisation's total payroll?

- ☐ Less than \$100,000
- ☐ \$100,000 -- \$250,000
- ☐ \$250,001 -- \$500,000
- ☐ \$500,001 -- \$1,000,000
- ☐ \$1,000,001 -- \$5,000,000
- ☐ \$5,000,001 -- \$20,000,000
- ☐ more than \$20,000,000

07 Performance

In the 2001-2002 year did your business:

- ☐ Make an after-tax profit
- ☐ Break even
- ☐ Make an after tax loss

08 Staff composition

What percentage of your organisation's staff are full-time staff?

09

What percentage of your organisation's staff are employed on a permanent [rather than casual] basis?

10

What is the approximate percentage break-down of the fulltime staff in your organisation?

	1– 10%	11– 20%	21– 30%	31– 40%	41– 50%	51– 60%	61– 70%	71– 80%	81– 90%	91– 100%	N/A
Senior management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Project management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Creative/editorial	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Programming/technical	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sales/Marketing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Administrative support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11 Staff compensation

In addition to salary, what forms of reward or remuneration are available to each category of staff (indicate as many forms of reward as apply)?

- ☐ Vehicle
- ☐ Equity in the business
- ☐ Commission
- ☐ Profit-share
- ☐ Other [please specify]: _____

12 Staff Recruitment

Which staff category is most difficult to fill with appropriate people?

- ☐ Senior management
- ☐ Project management
- ☐ Creative/editorial
- ☐ Programming/technical
- ☐ Sales/Marketing
- ☐ Administrative support

13 Location of Your Business

What is your organisation's:

street number: _____

14

street name: _____

15

street type: _____

16

suburb: _____

17

postcode – VERY IMPORTANT: _____

18 Location Drivers

How important were the following factors in selecting your business's current location?

[score 1 – unimportant; 2 – slightly important; 3 – moderately important; 4 – important; 5 – very important]

	1	2	3	4	5
Affordable rent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall cost of doing business	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall quality of life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proximity to market	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proximity to employees	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proximity to competitors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proximity to suppliers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Suitable facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to necessary infrastructure and services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Appropriate image	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to creative/skilled staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to managerial staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to financiers/investors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to government agencies/regulators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to universities, R&D organisations, etc.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19

To what extent does your current location meet the needs of your business, with respect to these factors?

[1 – not at all; 2 – minimally; 3 – moderately well; 4 – well; 5 – very well]

	1	2	3	4	5
Affordable rent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall cost of doing business	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall quality of life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proximity to market	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proximity to employees	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proximity to competitors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proximity to suppliers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Suitable facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to necessary infrastructure and services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Appropriate image	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to creative/skilled staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to managerial staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to financiers/investors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to government agencies/regulators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to universities, R&D organisations, etc.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20

What were the three most important locational attractors in the above list?

21

Are there any other reasons for your current location [not included in the above list]?

22

What are the three main disadvantages of your current location?

23

Is your business considering a move of business location?

- ☐ yes
- ☐ no
- ☐ don't know

24

If yes, why? [Specify]

25 Your industry role

How would you describe your current main role [i.e. position in the value chain]?

- ☐ Provider of in-house skills
- ☐ Provider of skills to other organisers
- ☐ Partner or collaborator
- ☐ Other [please specify]:

Part 2: Linkages and Partnerships

26

How do you hear about new products, ideas, market opportunities, etc.?

(1 – almost never; 2 – sometimes; 3 – often; 4 – usually; 5 – almost always)

	1	2	3	4	5
From other people within my business	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
From suppliers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
From customers/clients	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
From industry or professional associations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
From government agencies or regulators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
From R&D organisations, universities, etc.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
From partner organisations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
From public patent documents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
From consultants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
From competitors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
From the media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
From the internet or other data networks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
From professional/technical publications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
From conferences, industry exhibitions, etc.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

27

Do you find out about new developments in your field from any sources other than those listed above? [Please specify]

28

Where was your largest customer/client of the last three years located?

- ☐ Melbourne
- ☐ Elsewhere in Victoria
- ☐ Elsewhere in Australia
- ☐ Overseas

29

What industry sector was your largest customer/client of the last three years in?

- ☐ Manufacturing
- ☐ Financial services
- ☐ Media, including new media
- ☐ Telecommunications
- ☐ Marketing, advertising
- ☐ Tourism
- ☐ Government business enterprises
- ☐ Other government services
- ☐ Other [please specify]: _____

30

Where are MOST of your customers/clients located?

- ☐ Melbourne
- ☐ Elsewhere in Victoria
- ☐ Elsewhere in Australia
- ☐ Overseas

31

For each type type of organisation, how frequently did you collaborate over the past three years? [1 – never; 2 – sometimes; 3 – often; 4 – very frequently]

	1	2	3	4
Universities, CSIRO, R&D organisations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Customers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Industry or professional associations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Government Agencies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competitors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Suppliers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

32

Where were the organisations with which you had contact or collaborated with over the last three years MOST OFTEN located?

	Melbourne	Elsewhere in Victoria	Elsewhere in Australia	Overseas	Not applicable
Universities, CSIRO, R&D organisations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Customers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Government Agencies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competitors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Suppliers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Industry and Professional Associations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Part 3: Innovation Processes and Barriers

33

Did your organisation engage in or contribute substantially to at least one significant innovation in product or processes in your industry over the past three years?

- ☐ Yes
☐ No

34

When engaged in significant innovation-related activities over the past three years [whether successful or not] did your organisation collaborate with any or all of the following partners?

	Yes	No	Not applicable
Government Agencies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Universities, CSIRO, R&D organisations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Suppliers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Commercial consultants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competitors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Customers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Business or professional associations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

35

Focusing on your organisation's MOST SIGNIFICANT innovation over the past three years, how was the new product or process funded?

[Choose more than one funding source, if applicable]

- ☐ Self-funded
- ☐ Family/friends
- ☐ 'Business angels'
- ☐ Venture capital
- ☐ Equity market [stock exchange]
- ☐ Commercial loans
- ☐ Government grants or subsidies [including tax benefits]
- ☐ Customers ([e.g. pre-paid purchase])
- ☐ Not applicable
- ☐ Other [please specify]:

36

In your experience how important are the following factors or forces in DRIVING INNOVATION in your industry?

	unimportant	fairly important	very important
access to collaborators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
access to skilled labour	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
access to finance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
government regulation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
competitive pressures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

37

With respect to your organisation's most significant innovation over the past three years, what were the MAIN BARRIERS to its successful introduction?

[Choose more than one response, if applicable]

- ☐ High cost of innovating
- ☐ Lack of appropriate financing avenues
- ☐ Lack of managerial skills
- ☐ Lack of technical skills
- ☐ Lack of relevant technical information
- ☐ Lack of relevant market information
- ☐ Constraints imposed by the existing regulatory environment and/or standards
- ☐ Actions by competitors
- ☐ Lack of awareness/interest among customers
- ☐ Not applicable
- ☐ Other [please specify]:

38

Looking in THE BROAD SENSE at your industry, what would you say are the three largest barriers to successful innovation?

- ☐ High cost of innovating
- ☐ Lack of appropriate financing avenues
- ☐ Lack of managerial skills
- ☐ Lack of technical skills
- ☐ Lack of relevant technical information
- ☐ Lack of relevant market information
- ☐ Constraints imposed by the existing regulatory environment and/or standards
- ☐ Actions by competitors
- ☐ Lack of awareness/interest among customers
- ☐ Other [please specify]:

39

Does your organisation make use of the following methods to protect intellectual property?

(1 = never; 2 = sometimes; 3 = systematically; 4 = don't know)

	1	2	3	4
Patents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Complexity of design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Registration of designs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Speed to market	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Secrecy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Registered trade marks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Copyright	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

40

In your experience, how important is spatial proximity (close location) to potential collaborating partners in achieving successful innovation outcomes?

- ☐ Not important
- ☐ Fairly important
- ☐ Very Important

41

Overall, what are your views on the future economic prospects of (a) your organisation and (b) your industry over the next five to ten years?

	Your organisation	Your industry
Optimistic	<input type="radio"/>	<input type="radio"/>
Pessimistic	<input type="radio"/>	<input type="radio"/>
Uncertain	<input type="radio"/>	<input type="radio"/>

42

What changes or additions to government policy do you think would facilitate innovation and encourage faster and more sustainable growth in your industry?

43

Is there anything else you would like to say about innovation processes, drivers or barriers in your industry?

44

Do you want to be informed of future lab.3000 events, programs and publications?

- ☐ Yes
☐ No

Submit

THANK YOU for your interest and participation. Please check our website from September onwards to see the results of this research project.

IN ORDER TO GO INTO THE DRAW FOR THE PALM PILOT, please add your name and contact details (email) below. Thank you once more for your help.

Your questionnaire responses will automatically be submitted when you hit the button below. Once you have done so it will not be possible to retrieve or change your responses.

In choosing to submit the information contained in this questionnaire, you agree to its use in this study under the conditions specified in Part 1, above

46

If you are willing to be contacted for a follow-up interview, please indicate by ticking "yes".

- ☐ Yes
☐ No

Appendix 2: Interviewees

A number of people active in the digital design field agreed to be interviewed for this study. The author wishes to express his thanks for their participation and frank and helpful comments. The interviews took place in the second half of 2003. The list below notes their digital design segment or business focus but (as agreed) does not identify them personally.

Interviewee 1 – interactive games
Interviewee 2 – interactive games/industry association
Interviewee 3 – digital media
Interviewee 4 – new media/broadcasting
Interviewee 5 – multimedia
Interviewee 6 – digital media/government
Interviewee 7 – university/R&D
Interviewee 8 – telecommunications/policy
Interviewee 9 – architect
Interviewee 10 – graphic design
Interviewee 11 – ICT/smart manufacturing
Interviewee 12 – ICT/smart manufacturing

In February 2004 a follow up workshop or focus group was held at lab.3000. Initial results of this study were presented and discussed. The author wishes to thank participants for their interest and comments advanced at this forum. The digital design cluster segments represented at the workshop were as follows:

Design professional association – 1
Design practitioners – 3
Broadcasting and publishing – 3
Museum services – 1
Smart manufacturing – 2
Digital media – 1

Many of the comments and ideas that were offered in the interviews and at the workshop informed the analysis presented in section 4, above.

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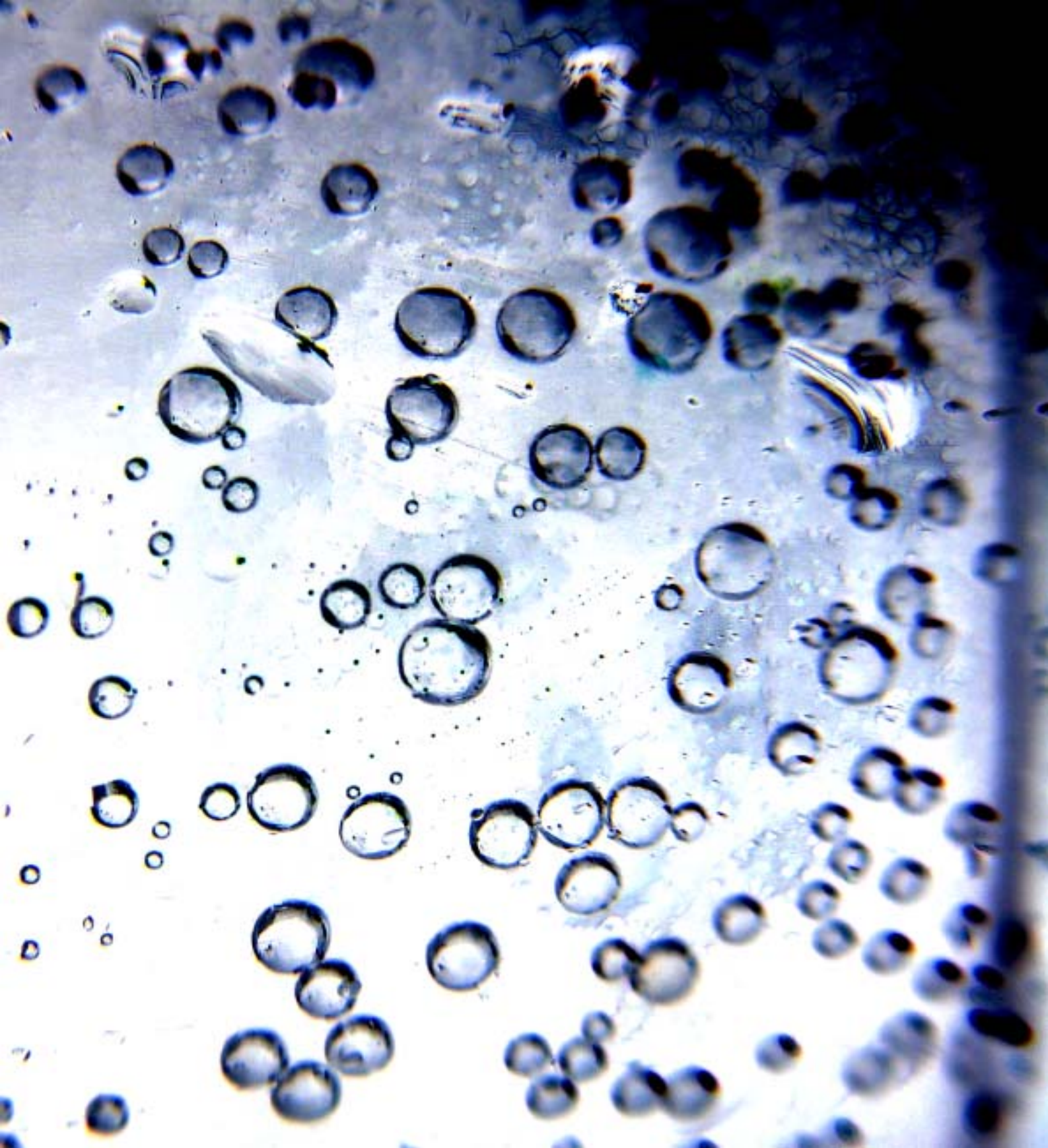
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MB, June 2004

Growing Digital Design: Melbourne's Emerging Cluster

PROFESSOR MIKE BERRY SENIOR RESEARCH ASSOCIATE lab.3000 June 2004

Mike Berry is Professor of Urban Studies and Public Policy at RMIT University and a Senior Research Associate at lab.3000, where he is conducting major research into innovation, digital design and regional economic performance. Professor Berry has extensive expertise in urban, regional and environmental policy studies and was the Foundation Executive Director of the Australian Housing and Urban Research Institute. For almost 20 years he has worked with designers across a range of disciplines at RMIT, which has helped inform his current research into the factors driving innovation in design-focused industry clusters.

Professor Berry has advised policy makers at all levels of government and was a member of the Federal Government's National Advisory Committee on Housing and Urban Development. He currently serves on the external experts panel to the Victorian Department of Sustainability and Environment and on the editorial boards of a number of academic journals including Urban Policy and Research. He is also a regular media contributor on matters of economic, social and environmental policy.



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