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### Intellectual capital system perspective: A case study of government intervention in digital media industries

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# Intellectual capital system perspective:

# 9

A case study of  
government intervention  
in digital media industries

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## **Introduction**

This research examines a case study of government creative industries development interventions in South Australia [SA]. The intervention was focused specifically in improving firms (such as those in advertising, art, crafts, design, fashion, film, music, publishing, video games and TV) which use digital media tools. O'Connor and Greene (2007) suggest that government intervention in entrepreneurship is grounded in two schools of thought. The first addresses information asymmetry and adopts a resource-based view (Barney, 1991), while the second relates to market failures (Parker, 2004) where government intervention substitutes for, or simulates, a market response.

The resource-based view of government intervention follows the argument that governments need to provide resource support to fill knowledge-gaps. These knowledge-gaps may include a lack of awareness of available resources or poor capabilities due to insufficient experience, skills or knowledge to undertake certain tasks or capitalise on opportunities. By contrast a market failure occurs when there is

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knowledge but insufficient incentive for a market response. O'Gorman and Kautonen (2004) have argued that market failure policy measures, such as those that respond to a financing market failure for early-stage ventures, for instance, are ineffective without the entrepreneurs who perceive or discover market opportunities. This suggests that there may be interdependencies between the knowledge-gaps and the market failure policy drivers. For example, knowledge-gaps or information asymmetry such as poor entrepreneurial capability may underpin the failure of a market response. That is, the market will respond without knowing there is a capability gap. Similarly, failures of market response may exacerbate a knowledge or capability gap or deficiency that remains unfulfilled while there is no market driver. This opens up the need to analyse government interventions by adopting a systems perspective.

We analysed the case study using system perspectives to show how government interventions interlink to support the financial, relational, physical and human resource gaps/market failures. We argue that government plays a critical role in facilitating links between resource sources that would not connect without a structural system and incentive to bring them together. Further, by conducting a systems analysis we highlight the need for strategic engagement between stakeholders which provides focus, intent and competitive direction.

We address our study through two main research questions:

1. What role does government play in forming regional system interventions?
2. How would these interventions intersect with an intellectual capital [IC] analysis framework if they were conducted at a regional level?

In this chapter we first introduce the case in focus for this study before briefly reviewing the literature on the two main interventions to exhibit the logic behind these interventions and illustrate the known limitations. Next we discuss an overview of a systems perspective for complexity sciences, and we overlay and present the IC approach as a means of providing specific tools for an industry development system analysis. We then discuss how an IC systems analysis may inform governments that wish to embed interventions in the active market place.

### **The SA Government intervention**

The Government of South Australia promoted an intervention in 2009, the Digital Tomorrow program, to stimulate the growth of the creative industries in South

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Australia. According to the Creative Industries Catalyst, the growth rate of the digital media industry across Australia was 138 per cent over the three years prior to the intervention, while in SA that growth rate had been 14 per cent. Further, Parker, Tims, and Wright (2006) highlighted the social inequity encountered by 'creative' individuals moving into the workforce. Essentially they argued that those rich in financial and social capital succeeded ahead of those poor in these areas. Furthermore, the report suggested that the education and training provided by traditional education models left graduates in the field short on commercial, entrepreneurial and networking skills.

The intervention had two main aspects. The first involved addressing the perceived resource gap intervention in terms of education and training. The second focused attention on the Digital Tomorrow Studio (a digital media business incubator), which in effect was a market failure intervention where the government provided small grants, business accommodation and networking support for fledgling digital media businesses. The intervention initiated the development of entrepreneurship education to facilitate regional development and remedy a perceived information asymmetry for intending participants in the higher education sector. This part of the program supported education for both active and potential start-up business founders to increase their skills and capabilities in capturing opportunities and improving their chance of success.

A second part of the intervention was to provide business incubation and funding support through the Digital Tomorrow Studio. Hackett and Dilts (2004) acknowledge business incubation as a means to help minimise the risks while maximising survival and growth of new ventures. In effect, the business incubation intervention was designed to meet a market failure whereby funding and early-stage business development support were unavailable to promising young businesses in the creative industries. Furthermore, the incubator provided companies with the possibility of collaborating with other companies in the same industry, creating synergies in innovation activities. It is well-recognised that innovation results from the interaction of different actors (Corsaro, Cantù, & Tunisini, 2012) and from unique combinations of resources (Cantù, Corsaro, & Snehota, 2012). Westerlund and Rajala (2010) describe the innovation development as a co-creation process.

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## *Rationale for the adopted government interventions*

In the following sections, we discuss the rationale and a brief literature review for each of the types of intervention (entrepreneurship education and business incubation) adopted by the government.

### *Entrepreneurship education*

Keogh and Galloway (2004) claim that tertiary education institutions have an obligation to provide appropriate education that prepares students to operate and contribute to an economy. Further, to stimulate industry development, policy makers may turn to entrepreneurship education and training as 'an efficient mechanism for increasing entrepreneurial activity' (Martinez, Levie, Kelley, Sæmundsson, & Schøtt, 2010, p. 43). Adcroft, Willis, and Dhaliwal (2004) argue that education in entrepreneurship, like management, should not be considered alone and without deference to the contributions of other segments of the community that create industry structures, market conditions, labour-cost factors and general resource conditions. These authors promote the idea of the need for entrepreneurship educators to consult broadly with institutional and sectoral stakeholders to identify issues of information asymmetry and strategic resource building when concerns for regional development are priority.

O'Connor (2009) — also one of the authors of this chapter — claims that left to its own devices, the education sector will follow economic rules of supply and demand in response to pressures exerted by potential students and industry. However, as Etzkowitz (2003) points out, '... the interaction in university-industry-government is the key to improving the conditions for innovation in a knowledge-based society' (p. 295). This implies that if universities are to fulfill broad socio-economic aims, relying on industry demand pressures to prompt development of education will be ineffective. Responses to failures in the dynamics for regional development require instead a proactive engagement between government, industry and tertiary education if regional strategic initiatives are to be conceived and successfully driven.

Carey and Naudin (2006) have examined the need for research to improve the enterprise curriculum for creative industries students. One conclusion they have drawn is that 'more research is required in order to identify how faculties can more effectively share their specific knowledge and work together to make better use of

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existing internal as well as external resources' (Carey & Naudin 2006, p. 529). Similarly, Laukkanen (2000) has also called for the need to better understand university-based mechanisms that support regional evolution. In essence, entrepreneurship education can be considered as part of a regional innovation system and yet little is understood with respect to questions about how this education links to the innovation system.

### *Business incubation*

Hackett and Dilts (2004) advocate business incubation as a means of overcoming some of the problems of market failure and, to some extent, information asymmetry. They define a business incubator as a shared facility that provides its incubatees with

a strategic, value-adding intervention system of monitoring and business assistance. This system controls and links resources with the objective of facilitating the successful new venture development of the incubatees while simultaneously containing the cost of their potential failure. (p. 57)

Business incubator programs also serve different purposes. Grimaldi and Grandi (2005) suggest that the incubator concept promotes an effective means for incubator participants to integrate the acquisition of resources and start-up management techniques. The business incubator program is also recognised as a mechanism for uplifting the economy by encouraging development of new practical entrepreneurial ideas, and also increasing the likelihood of a person establishing companies (Aeroudt, 2004; Grimaldi & Grandi, 2005). O'Connor, Burnett, and Hancock (2009) also suggest that a business incubator program can be part of an entrepreneurship education system, and de Foite, Henry, Johnston, and Van Der Sijde (2003) add that they can act as a structured training program. Smilor (1987) summarises the incubation process to illustrate the different inputs and outputs in Figure 9.1.

In the context of new or emerging industries where there are few commercial backers, governments have been stepping in as investors in business incubation, as can be seen in Figure 9.1, which shows government affiliation for some incubators. However, there is paucity in the literature on research that investigates whether the incubation process is actually effective (Hackett & Dilts, 2004), and past studies have highlighted this deficiency. For instance, the OECD (Organisation for Economic Co-operation and Development, 1999, p. 1) found that 'despite the investment of significant public funds, few science parks in Australia are credited with success'. Business incubation plays a part in the regional innovation system but, like

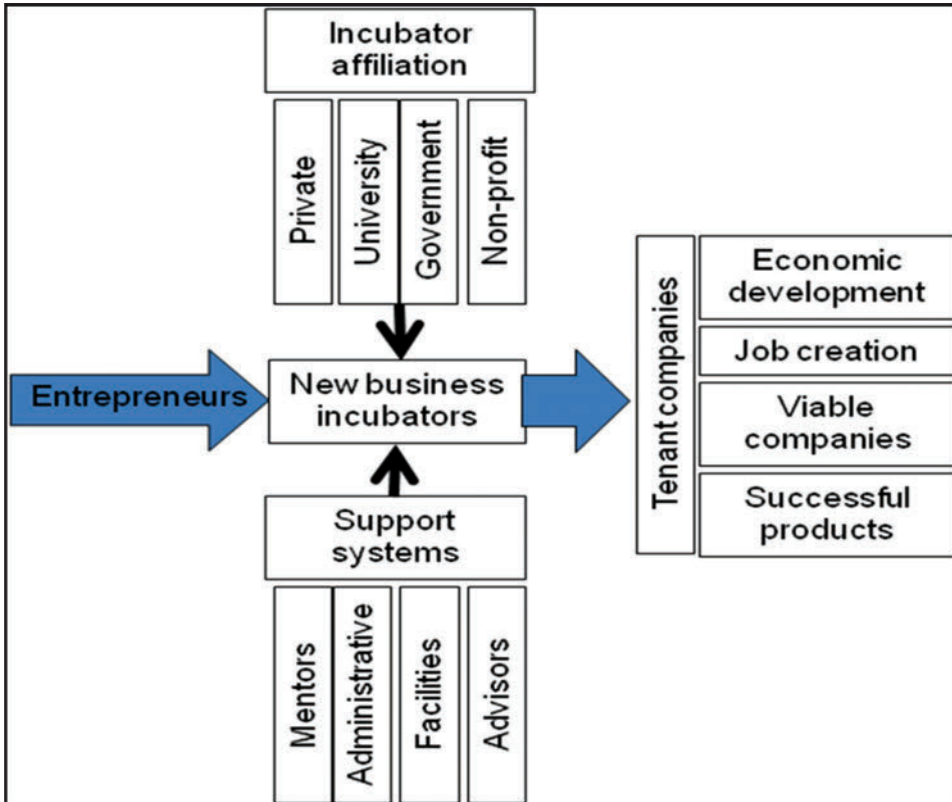


Figure 9.1: A summary of the incubation process.  
 Source: Courtesy of the authors, adapted from Smilor, 1987.

entrepreneurship education, how it plays a part in the growth of innovation within a region is less understood.

### Systems analysis and intellectual capital [IC]

There is a significant amount of literature connected with IC and National Innovation Systems [NIS] which addresses differences between innovative and competitive capacities (Hervas Oliver, Rojas, Martins, & Cervello Royo, 2011). Lin and Edvinsson (2008) recognise that knowledge assets are essential for regional development. Also, regional innovation systems theories can be used as a framework for policy makers where regional resources are used to improve firms and region growth

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(Doloreux & Parto, 2005, pp. 1-2). Gertler (1995) also recognises that proximity brings advantages for knowledge dissemination at inter-organisational level, while collaboration is essential in contemporary business (Gulati, Nohria, & Zaheer, 2000; Westerlund & Rajala, 2010).

The IC perspective focuses on country or region differences in outputs from the intangible point of view (Bontis, 2004; Stahle & Bounfour, 2008). This suggests that a systems approach to understanding failures within the market dynamics is important for government if it is to formulate policies that will be effective. However, there is limited beneficial research that assists a systems perspective. For instance, Corsaro, Cantù, and Tunisini (2012) argue that not many studies have focused on actors in innovation networks, and furthermore, given the heterogeneity among these actors, there is a need for more theoretical and empirical research.

In seeking to understand the roles and differing perspectives of government, industry and the education sector, the Triple Helix Model [THM] provides a useful reference that is embedded within the discourse on the NIS. The THM is described as a model useful for analysing innovation activities in a knowledge-based economy. It emphasises the importance of the relationships between firms, government and universities on the transfer of knowledge which is the key factor inherent in innovation systems (Cooke & Leydesdorff, 2006; Etzkowitz, 2003; Etzkowitz & Leydesdorff, 2000; Leydesdorff & Etzkowitz, 1998). The THM recognises the important role that universities play in knowledge-based economies (Etzkowitz & Leydesdorff, 2000). Importantly, though, for our purposes, the THM is an accepted framework that suggests the importance of a system within a region with respect to expanding innovation activity, although we argue that it falls short as a tool for providing deepening understanding of the system elements and behaviours.

Building on systems theory (notably Ashby's [1956] law of requisite variety) and theories of economic demography, Roos (2012) argues that in the context of a small economy, markets are less developed and hence less efficient. While some factors such as job creation and infrastructure investment (or the lack of these) may be obvious indicators of market failure and poor resource endowment or allocation, in certain industries, the intangible and more intellectually focused factors are less obvious and hence harder to track and detect. Scholars such as Lin and Edvinsson (2008) and Stewart (1997) describe non-monetary and non-physical resources as associated with knowledge, intellectual property and experience. Edvinsson & Malone (1997) put it



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another way, saying that we can view these intangible resource as the basis for future capabilities. They form part of what is known as intellectual capital and we extend Roos, Pike, and Fernström's (2005, p. 19) definition of intellectual capital at the organisational level as 'all nonmonetary and nonphysical resources that are fully or partly controlled by the organisation and that contribute to the organisation's value creation' to apply it at an industry development level.

Because they are non-additive in nature, intellectual capital resources behave differently from monetary and physical resources and should be managed differently. In application, the approach to IC analysis that we adopted for this chapter emphasises clusters of similar marginal utility behaviour<sup>1</sup>, which are divided into three categories as follows:

- relational: the social capital associated with individuals and organisations
- organisational: a firm's infrastructure, processes, culture and so on
- human: the skills, knowledge, attitude and intellectual capacities of individuals.

Other grouping approaches have been used to distinguish an organisation's assets and capabilities; however, these have been criticised for lack of clarity in distinction of asset or resource classes, which leads to overlaps (Leliaert, Candries, & Tilmans, 2003; Stewart, 1997) or missing components of value creation (McElroy, 2002).

Past authors such as Peppard and Rylander (2001) have adopted the IC marginal utility for a commercial case, and O'Connor, Roos, and Vickers-Willis (2007) have adopted it for a government case, to illustrate the development and implementation of an organisation's strategy. We argue that industry development takes on similar properties to organisational growth and development strategies, and intellectual capital is critical to addressing the problems that the creative industries sector faces when it comes to market failures and securing resources efficiently and effectively. As such, there can be a role for the government to intervene. The aim of this chapter is to expose the roles of government and to overlay an IC systems perspective on an empirical case to identify the benefits that an IC approach may have for informing government market system interventions.

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<sup>1</sup> Marginal utility behaviour is an economic term that refers to the extra benefit gained from an incremental increase in the asset. It has its roots in consumer behaviour theory; however, here we apply it to the returns that accrue to an organisation through the growth of a particular asset. The economic behaviour may exhibit either diminishing or increasing returns.

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## *System perspectives of government intervention*

From the perspective of complexity sciences, in order to understand systems and system interactions, McKelvey (2004) suggests that four types of analysis can be undertaken.

The first type of analysis seeks to identify the actors and boundaries of the system. The second type of analysis is based on efficient economic and other market theories, which provide a causal level of analysis that assumes rational behaviour. This analysis does not so much predict (because the rules of this form of behaviour are influenced by non-rational inputs that are not accounted for by these methods) as suggest the types of input and output relationships that might be expected if all conditions were universally equal. It is upon these sets of conditions that failures are perceived in market response, whereby non-rational economic behaviour can confound the market economic system.

A system(s) examination also needs to take into account a third analysis of the material and localised conditions to comprehend information asymmetries and the ability of the entrepreneur to acquire the skills, knowledge, capabilities and networks necessary to create any certain form of differentiated products/services. For example, if local conditions do not provide access to expertise and knowledge in a particular new technology, then it is unlikely that a local entrepreneur would engage in a new venture creation related to that expertise and knowledge, and the entrepreneur would find opportunities in areas better supported under the local conditions by education, facilities or capabilities. This level of analysis focuses on information asymmetry, which provides the basis for government's reactive intervention.

The fourth type of analysis requires an examination of the structural and institutional drivers that provide the organisational means for actors to interact within and across different system levels. In terms of hierarchy, this analysis, for instance, examines the bottom-up push that may come from industry, which provides a mechanism for actors, legitimises behaviour and creates connectivity between the system levels. Similarly, from a top-down perspective, government may provide structural support by introducing programs and incentives that provide a platform for interconnective behaviours. It is this fourth level of analysis that identifies the infrastructural gaps and the potential policies and programs that are required to fill the market failures and resource gaps not addressed by current infrastructural mechanisms.

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## *IC analysis perspective*

While there are various means and methods for innovation system analysis, the tools of analysis are less defined than the models (for instance, the THM; see Etzkowitz & Klofsten, 2005) or the process (see for instance Bergek, Jacobsson, Carlsson, Lindmark, & Rickne, 2008). Intellectual capital, on the other hand, when used as an interpretive lens or research perspective on an organisation, acts as either a measurement tool for establishing intangible value or a strategic management tool for building and deploying knowledge (Pike, Rylander, & Roos, 2002; von Krogh, Nonaka, & Aben, 2001); and it is the latter that is of interest in this research. Peppard and Rylander (2001) suggest that an intellectual capital approach to strategy analysis and development also has four stages.

The first stage is to operationalise the value creation pathway, which entails identifying the stakeholders and the value they seek from the venture. The management team would then seek to prioritise among the stakeholders in order to surface strategic priorities. This is akin to Stage One of a systems perspective of actor identification and defining boundaries. Stage Two of an IC analysis brings into focus the specific strategic intent that the firm needs to follow in order to satisfy the value creation expectations of the dominant or selected stakeholder position. Similar to the second stage systems analysis, this IC analysis stage provides the direction and the coherent and consistent view of the organisation and defines the expected inputs and outputs that would satisfy the value creation system, framing the analysis for the remaining stages.

The third stage of an IC analysis articulates the value creation pathway by describing how the organisation creates value through its use and deployment of resources. Through this process the strengths and weaknesses of the resource base are identified along with the critical priorities for development of particular resources within the context of how they add or create value toward the organisation's strategic intent. This, too, takes on aspects of system analysis in its third stage, which examines the local conditions (or local resource base) as a means to locate areas of information asymmetry, knowledge or resource gaps. Similar to a regional analysis, a firm seeks to maximise its value creation system by identifying and building a functional resource base.

The fourth and last step in an IC analysis framework is to articulate the IC Navigator, which is a diagrammatic tool that visualises and exposes the value

creation pathways and resource transformation system. In a similar fashion to the McKelvey system analysis, the concern with this level of analysis is the transformation processes which may be driven from either bottom-up or top-down. The management team of an organisation needs to ensure that the organisational dimensions enable the support of the value creation system in the same way as governments respond to their analysis by formulating programs and policies that provide the structural backdrop to value creation within a region.

The systems view of complexity science and IC analysis techniques therefore have similar stages and are concerned with similar issues, although the IC set of tools is generally applied to a firm level. In the following sections, we seek to overlay the IC tools of firm-level strategy analysis by adapting them to the regional system level. We first review the development of the digital media industry intervention from a THM and systems perspective and then detail how an IC approach would be applied and the outcomes that may follow from such an approach.

### **Applying the system analysis perspectives to the SA Government intervention case**

We first frame the case of the development of the creative industries government intervention within the systems analysis perspective, as suggested by McKelvey (2004), and then adopt an IC analysis approach. Contrasting the two methods helps to understand the system and the type of government response to the failures suggested by each analysis.

#### *A complex systems analysis*

The priority of a systems analysis from a government's perspective is to determine the different active stakeholders within the system to understand and frame the inputs and outcomes that are necessary and desired from an intervention. In this analysis from a regional perspective, we aggregate the stakeholders into the three sectors of government, industry and university that comply with the THM (Cooke, 1998; Etzkowitz, 2003; Etzkowitz & Leydesdorff, 2000; Leydesdorff & Etzkowitz, 1998). These three actors are organised in independent institutional spheres (Zhou, 2008).

In the SA context, the state government initiated the discussion in 2009 and set the agenda with respect to purpose and participant inclusion. The state government was looking to provide opportunities for creative industries (more specifically,

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digital media) participants to improve their social capital and network participation with respect to stimulating further entrepreneurship within the sector. The state government wanted to develop the creative sector through improving the sector's access to different resources. A key objective and motivator for the government was to remediate the slow growth of the sector in SA and position the industry as a key economic contributor to the state. The intervention process was entirely stimulated and driven by the state government's Department of the Premier and Cabinet, which was responding to a broader agenda designed to increase employment opportunities and economic growth within SA. SA's Strategic Plan (Government of South Australia, 2007) outlined several targets which fit together like a mosaic to frame the particular IC intervention. For that purpose the government involved industry members and the university sector, and through them, enhanced collaboration for development of the industry sector.

The industry sector was consulted and played a relatively minor but important role in the development of the intervention. For instance, nineteen industry representatives participated in the education development forum that provided insights into expectations of how education might fill the knowledge-gap in their industry. As the Tomorrow Studio developed, industry became progressively more involved in terms of providing support to the young digital media businesses. The primary aims of the industry as a group were to adequately resource the sector for growth and reach a critical mass that could sustain a skilled and knowledgeable workforce in SA.

The third stakeholder engaged by the initiative was the university sector. There are three substantial universities within SA: the University of Adelaide, the University of South Australia, and Flinders University. There are also a number of smaller outpost campuses from interstate and international universities that offer specialised or niche programs. The SA Government initiation of engagement with the university sector was enacted via agreement with the Entrepreneurship, Commercialisation and Innovation Centre at the University of Adelaide, where two of the authors of this chapter work. The role of the Entrepreneurship Centre became one of facilitator, as a representative from the centre met with stakeholders from each of the main three universities. As a result of this consultation, it was clear that the primary and overarching motivation for the university sector to participate in this initiative was the desire to offer a better student experience and improved student outcomes.

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### *Perceived gaps in the industry prompting government intervention*

In sum, the analysis of stakeholders suggested that each had different drivers that motivated a commonly agreed and preferred outcome. The state government subsequently undertook an analysis on the industry issues which it perceived as needing some response, and this resulted in the following list of key issues:

- a lack of global business relationships
- the perception that local business people were not generally risk takers
- entrepreneurial cultural problems within business and government
- the difficulty of attempting to expand out of the local region
- limited creative use or clever use of technologies
- limited creative problem-solving capabilities
- the transition for an individual between being creative and being commercial being thought to be often too difficult.

These points contribute to a lack of industry participation in the creative industries (digital media) — or, to put it another way, there was a low relative proportion of industry in this sector. From a human capital perspective, there are too few appropriately skilled people and there is a lack of entrepreneurial drive among those who enter the sector.

In ideal circumstances the digital media sector would respond to local and global demand, and certainly there were some SA businesses within the sector which had become global players with international reputations. An example is Rising Sun Pictures, which has won industry awards and lucrative international contracts for digital animation in Hollywood blockbuster films; another example is Resin, which specialises in digital effects and animation in the advertising and movie industries. However, this relatively small group of leading-edge industry players was insufficient to fuel high levels of sector growth.

### *Reviewing local conditions and resource gaps*

The local conditions suggested that the industry was poorly supported, and the majority opinion was that the lack of state dynamics in terms of infrastructure and human capital was both a market- and resource-based failure. Despite the presence within the sector of private financial investor networks, government-backed

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business enterprise support centres and some highly successful businesses, these were insufficient to kickstart growth. From this context the state government could conceive the particular initiatives that formed part of the Digital Tomorrow program.

The first order of business was the need to overcome the market failures in terms of early-stage financing and support for new and emerging businesses within the sector. There was a notable absence of local early-stage financing for ventures in this sector and no dedicated infrastructural support to nurture young businesses. This suggested a need for a place where like-minded young businesses could share ideas, concepts and knowledge with a view to creating a focal point for critical mass. The size of the local market also suggested that private enterprise and local new business-support infrastructure would not substantially support such a narrowly based sector, and therefore government intervention was warranted.

Perhaps more notable was the lack of awareness of opportunities within the sector, specifically the lack of skills in identifying and exploiting entrepreneurial opportunities. The second part of the program would need to involve developing the human capital of the sector, which meant addressing both awareness levels and the entrepreneurial skill shortage problem. It was generally found that there were sufficient technical knowledge and skills-based opportunities through undergraduate courses and programs in digital media offered in the local region, but the missing elements were the entrepreneurial flair and industry readiness of the graduates and anything specifically available at the postgraduate course level.

Government intervention through the education and training systems can improve entrepreneurial skills and motivation (Lundström & Stevenson, 2005). Education and training allows knowledge to be transferred between actors. The government plays an important role in these systems, as sometimes actors are required to exchange information and come together to find innovative solutions through sharing knowledge. In this case, initial discussions between the government and the university stakeholder group centred on the development of a specific postgraduate entrepreneurship study program for creative industries students. Further discussion led to a more refined focus — instead of focusing on creating a *program*, concentration shifted to a tailored and specific postgraduate *course*. From this perspective, the intention was also not that any one tertiary education institution should be dominant, but instead that each university would fit entrepreneurship

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within their own institutional education objectives and agendas, which were primarily undergraduate offerings.

### *Creating structural and institutional drivers*

In essence, the Digital Tomorrow Studio initiative was designed to fill the gap left by the market failures in terms of early-stage financing and support for new and emerging businesses within the sector. Given the absence of local early-stage financing for ventures in this sector, the program included small competitive grants that aimed to give promising businesses the opportunity to finance the initial stages of business and market establishment. In addition, the Digital Tomorrow Studio provided a place for like-minded young businesses to share ideas, concepts and knowledge. The Studio also ran workshops and invited guest speakers in response to the particular needs that the surveyed participants raised. The overarching aim of this program initiative was to generate new industry entrants and assist in securing the survival of the firms to help the sector achieve critical mass.

Interestingly, as a by-product of the development of the initiative, the industry group itself decided that it could at least attempt to rectify some of the industry barriers. Subsequently, therefore, the industry group involved in consultation with the initiative arranged to meet on a regular and informal basis. The industry participants were sufficiently motivated to continue working collaboratively to address concerns they had that they felt neither government nor universities could satisfactorily address.

The Digital Tomorrow program responded to the perceived resource-based failure by sponsoring the development of a postgraduate Digital Media Entrepreneurship course. In addition, five scholarship places were funded to attract candidates who were not engaged in formal university study to attend the course. The scholarships successfully attracted eighteen high-calibre applicants. In addition the university sector stakeholders agreed to continue working together to make available courses that were both relevant in objective and pedagogy to their particular institutions and would prepare students for further studies in a Digital Media Entrepreneurship postgraduate course if they so desired. From the initiative, a reference group formed with members from different educational settings, who committed to preparing students for the potential of a career in entrepreneurship in the digital media industry sector.



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## *Outcomes and contributions*

From the outset it was apparent that the digital media industry faced some difficulties in developing human capital capable of surviving and thriving in the dynamism of the sector. Further, there was the perceived need for the industry to reach critical mass, whereby the networks and opportunities were sufficient to sustain the sector and nurture growth.

From the education sector's perspective, the primary outcome was the recognition that most of the entrepreneurial education and training required by the industry sector already existed. However, it was highlighted that what was missing was a component of entrepreneurship education framed within the context of a rapidly changing and diverse industry such as the digital media sector. This shifted the emphasis of development from that of a program containing a suite of courses to one of a single course developed specifically to fill this knowledge-gap, which became known as the Digital Media Entrepreneurship course embedded in a postgraduate Master of Applied Innovation and Entrepreneurship at the University of Adelaide. The first Digital Media Entrepreneurship course was delivered during Semester One in 2010 (March to May) and today it has evolved into a highly popular dual offering at both undergraduate and postgraduate levels.

The Digital Tomorrow Studio (business incubator), despite creating a small but vibrant start-up business community for the sector, closed at the end of 2011 due to funding restrictions. In total, the Studio supported thirty-one tenant businesses, of which thirty were start-ups (H Park, personal email correspondence, 26 September 2012). Interviews with the tenants revealed that among the incubatees, the value of the incubation experience included the experiential learning and the development of shared experiences and a sense of community (O'Connor, Seet, Ahmad, & Mukhtar, 2011). The businesses found support among their peers in terms of social capital, knowledge and expertise and even sharing of work to generate income. Regrettably, no follow-up work has been conducted but it would be difficult to imagine that none of these relationships would have endured.

## *Applying an IC system analysis perspective*

Applying the above systems perspective to the digital media sector suggests that both the Studio and the education initiatives provided by the SA Government were

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appropriate responses to the weaknesses in the industry system. However, neither intervention reached full potential with respect to influencing the growth of the industry sector. Ultimately, government funding is limited, and while the programs were achieving good but modest outcomes the investment needed was much more long-term than the government could sustain. This section attempts to provide an IC analysis framework to the problem, with a view to identifying whether a differing perspective may lead to different types of intervention which might be more enduring.

### *Stakeholder considerations and dominant perspectives*

The first stage of an IC analysis operationalises the value perspective. In this case, the three primary stakeholders were aggregate sectors: government, industry and higher education. The value from the government's perspective can be summarised as seeking to increase employment opportunities and economic growth within SA. From the university sector's viewpoint, the value of this initiative was in the creation of better student experiences and improved outcomes, particularly through additional employment opportunities and employment-ready graduates. The industry sector, however, was seeking to gain critical mass to sustain business and a skilled and knowledgeable workforce in SA. From this perspective, it is clear that government was dependent upon industry meeting its aim, while industry relied on the university sector to prepare the human capital of the sector for growth. If the industry sector is vibrant and competitive, world-leading and in high demand, then, by default, government will meet its objectives and the demand placed on universities to fill industry needs will drive the better student outcomes desired. Therefore, rather than industry taking a minor and advisory role, an IC analysis suggests that industry is the dominant stakeholder with a value perspective that drives other stakeholders to achieve their aims.

From this standpoint, the next stage of an IC analysis establishes a strategic intent. The government, as the sector recognising and initiating the drive, has a critical function to provide leadership by assisting both the industry and university sectors to focus on the common goal.

Roos, Pike, and Fernström (2005) suggest that a strategic intent should provide an aspirational statement and should envision a desired future leadership position that provides direction and suggests a means by which the strategic intent could be achieved. A strategic intent is an expression of a principal strategy that focuses

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attention on the essence of winning, which motivates people by communicating value. It also guides resource allocation, while providing stability under changing circumstances but leaving room for contribution from other stakeholders. Such a strategic intent might be structured as follows: 'Build SA as a leading destination for digital media business, employment and learning, attracting major capital investment and contracts from international private and public sectors'.

This strategic intent immediately focuses on the long term and rules out such interventions that may fill gaps as temporary measures. An IC approach at this point forces stakeholders to examine the resource and capability base it has and examine ways of building the resources and capabilities to achieve the strategic intent. Therefore, as far as government intervention goes, the priority should be on how to build strength within the system, rather than on providing any unsustainable and/or relatively short-term remedy to substitute for market action/reaction.

At the third stage of an IC analysis, attention turns to the value creation pathway — that is, the ways and means that value is created. Clearly, the value sought is the growth and flourishing of the digital media sector for its employment and economic wealth creation potential. The missing elements identified through the earlier analysis were organisational, relational and human capital issues within the sector. A major perception was that, culturally, the state lacked entrepreneurial drive. Relational capital was deficient around global and national business opportunities, and the human capital issues raised were insufficient creative abilities, commercial astuteness and entrepreneurial flair.

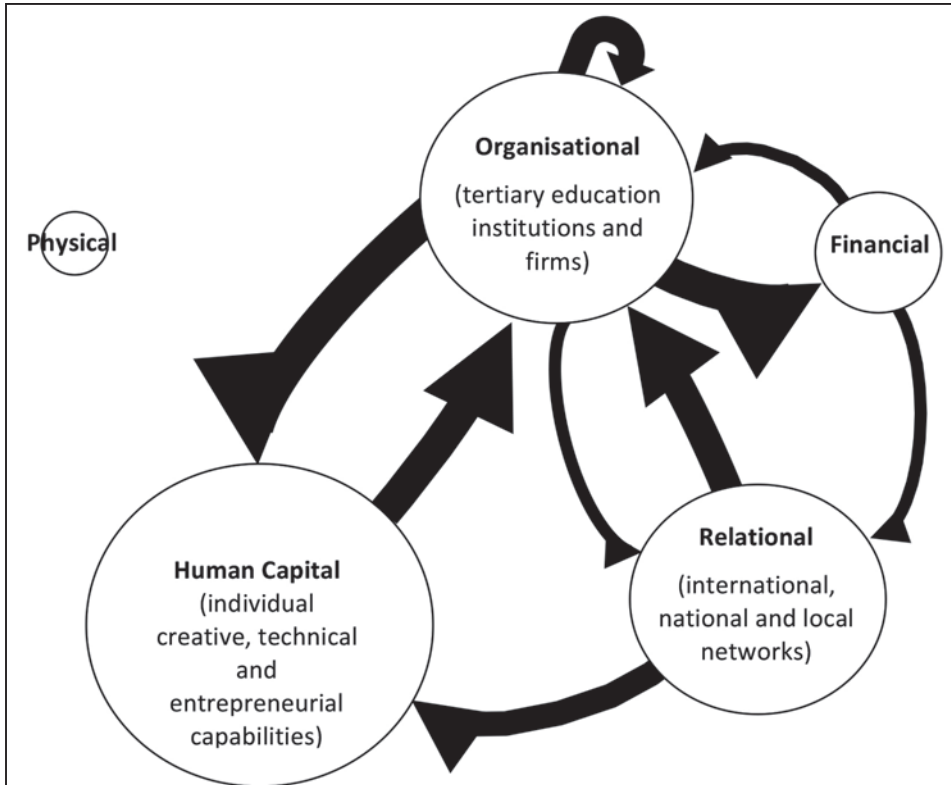
Aligning with the strategic intent, these deficiencies suggest a few alternatives that would address these weaknesses and draw upon the strengths of the state digital media sector. Assuming in the first instance that the government could overcome any entrepreneurial inertia (lack of entrepreneurial culture), a priority would be to stimulate the firms in the marketplace to grow their international contacts. As one approach, this may be achieved through financial incentives based on matching funds for firms to seek international business with success bonuses paid to offset some of the risk to international partners or contracts. Addressing the human capital issues would involve working closely with the providers of human capital (the university and tertiary technical education sectors) to strengthen industry links and technical capabilities within the education and training sector. Attracting leading international talent as educators may be an alternative. The commercial and entrepreneurial

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deficiencies could also be overcome within the tertiary education sector by ensuring that entrepreneurial opportunities are embedded within the system. This implies that digital media incubators and courses would be established and supported within the relevant institutions rather than being outside a government-backed add-on to the system. Industry could be incentivised to contribute to the operations and development of the businesses that could emerge from this sector initiative. Adopting approaches such as these would build the digital media industry system by strengthening the resources and capabilities that were found deficient.

The final stage of an IC analysis constructs the IC Navigator to visualise the system. Although stakeholder input is required in order to construct the system diagram, the above analysis suggests that the intellectual capital in the system will, by far, dominate the Navigator in terms of relative importance. Figure 9.2 is a mock-up to illustrate how an IC Navigator might be interpreted for a region, and in this particular case what the system stocks (or circles) of organisational, relational, human, financial and physical resources and capabilities, and the flows between these stocks (the arrows), may be. A feature of the IC Navigator would be the organisational resources in terms of the tertiary education sector courses and programs and the government programs and incentive schemes that consume financial resources. Of interest is the flow back to financial resources generated by a region's organisational resources, principally the firms and institutions. The objective of the industry development department of the government is not to make money, but the wealth generated by the organisational contributors (firms and institutions) to a system should flow back to the government indirectly through taxes which can again be reinvested in various needs of the region (for example, health, transport and education).

The relational resources that exist within and between the education sector and national and international business sectors will also be critical to value creation within the digital media industry system. Human capital, with its creative, technical and entrepreneurial capabilities, is likely to be the dominant and most highly important resource to the system. Finally, physical resources will be of relatively little importance given the nature of the industry sector. Although clearly some physical resources (computer equipment and offices) will be needed, these are relatively static requirements without the intellectual capital to create and facilitate the software (organisational and human capacity) that drives the system.



**Figure 9.2: An interpreted regional IC Navigator.**

Source: Courtesy of the authors.

## Discussion and conclusions

By adopting the IC lens, the analysis of the industry system draws attention to the system elements, roles and the interactions among the elements. The alternative system analysis instead highlights the symptoms of the system, which subsequently tend to draw responses that are inadequate for long-term transformation of the system. However, simply adopting the organisational level IC analysis tool to the regional level reveals a number of shortfalls.

First is the issue of definition of the elements involved in the analysis, which, although suitable for the firm level of analysis, does not easily translate to the regional level. For example, what is meant by organisational capital at a region? Is

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this all soft organisational infrastructure embedded within the region regardless of the level of analysis, or is it, more simply, the organisational infrastructure provided by governments and public institutions? Similarly for human capital: is this the capabilities of the inhabitants of the region or is it the number and type of people who reside in the region? Both have a meaning for regional-level analysis which is less problematic than at an organisational level. Therefore the definition of what is meant by each of these terms when transposed to the regional level is critical.

A second issue is in understanding the operation of the system where there are both flow and transformations that need to be dealt with. For instance, the financial resource element in a firm-level analysis would normally refer to the monetary resources employed by the firm. At the regional level there are two issues that we encounter when considering the financial or monetary resource — that of flow of financial resources and that of transformation of monetary resources. At the firm level, the movement of monetary resources toward other resource forms represents a transformation, as investments of money have a direct influence on the state of the receiving resource (that is to say, money invested in training increases the level of human capital). At a regional level there exists a flow of monetary resource (from a government department to a firm) which results in a subsequent transformation at another level of analysis (in other words, money granted to a firm is subsequently used by the firm to enact a transformation like the purchase of equipment or services). Therefore, while an IC Navigator analysis uses transformations between resources at the regional level, further analysis is required to look at both the flow and the consequential transformations.

A third issue that needs attention is sorting out the different types of investment that might be integrated at one level but might remain distinct at another level. For instance, the intervention of a business incubator is both an investment in soft infrastructure (such as mentors, like-mindedness and training support) and an investment in hard infrastructure (such as a physical space, computer hardware and laboratory equipment). At the regional level an investment in an incubator results in a mixed investment at the (firm-) level of the incubator. Therefore, a regional IC analysis requires a much more careful and articulate distinction between the types of investments than may be crudely observed generally at the regional level.

## Further research

As an exploratory study of the role that government plays in forming regional innovation system interventions, this research suggests that the type of analysis of the system alters the perception of the role. Further work could explore the potential variance to an organisation-level representation of an IC Navigator and how the analysis influences the role and intervention design by government.

A system analysis that adopts an approach to understand the system and its failures seems to lead government to design interventions that treat only the symptoms, and the result may fail to leave a lasting change within the system. Adopting a far more structural approach such as the IC Navigator forces the focus onto the behaviour of the system elements, and the role of government shifts from treating the symptoms to embedding deep-seated changes within the system itself and its actors and institutions.

We suggest that further research examining different approaches is required to improve government intervention assessments. We also recommend that researchers work at deeply understanding the element definitions and characteristics of the systems as well as the flows and transformational connections at regional level. Empirical tests will help to assess the use of the IC Navigator at the regional level.

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