

Refereed Paper

**Regional Economic Development:
Exploring the ‘Role of Government’ in Porter’s Industrial Cluster
Theory.**

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ABSTRACT

Porter’s Industrial Cluster Theory (ICT) is a theoretical framework that achieved prominence in Australian economic policy development. Despite its widespread adoption, however, Australia has remained significantly below the OECD average in terms of its industrial clusters’ contributions to real wealth creation. In order to understand the positive role that (Australian) governments can play in the development of industry clusters, this paper analyses the 25-year history of the Tasmanian Light Shipbuilding Industry cluster. This analysis provides an insight into the set of government policy roles that facilitated the development of this internationally competitive industry cluster. This paper also proposes a re-conceptualisation of ICT that will potentially increase its value as a predictive tool for regional economic development.

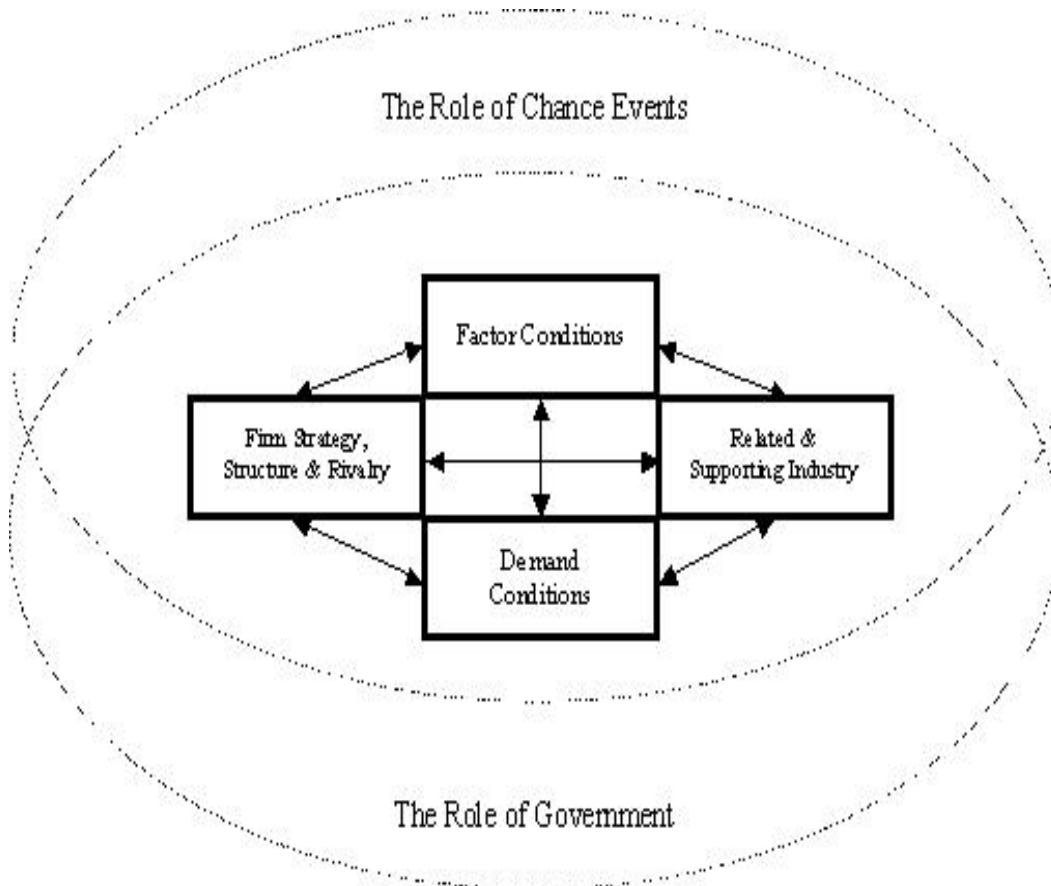
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Introduction.

Since the 1970s, the onrush of globalisation in Australia’s markets has presented significant economic policy challenges to the country’s federal and state governments (Everett, 2002; Goldfinch, 1999; Moustafine, 1999). A major concern for Australian legislators was (and remains) the question as to how to make a nation previously protected by a ‘fortress’ of tariffs and subsidies more productive and competitive in world markets (Brown, 2000; Edwards, 2002; Martin, 2000; Quiggin, 1999). One theoretical framework that achieved prominence in Australian economic policy development since its inception in 1990 is Porter’s Industrial Cluster Theory (ICT) (see Australian Manufacturing Council, 1994; Bureau of Industry Economics, 1991; Keating, 1994; Kelty, 1993; McKinsey & Company, 1994). As part of his book *The Competitive Advantage of Nations*, Porter developed the notion that innovative industrial clusters are integral to export earnings and the generation of national competitive advantage. Porter’s ICT argues that a nation’s industry will be internationally competitive if a synergistic interrelationship exists between four important variables collectively known as the Diamond Factor Model: ‘Factor Conditions’; ‘Local Demand Conditions’; ‘Related and Supporting Industries’; ‘Firm Strategy, Structure and Rivalry’; and the two influencing roles of ‘Chance Events’ and ‘Government’. (See Porter (1990) for a discussion of the Diamond Factor Model, and Figure 1 for a diagrammatic representation).

Figure 1: Porter's (1990) Diamond Factor Model.



Since the adoption of Porter's Diamond Factor Model (DFM) as a basis for policy development, however, there has been considerable debate concerning its effectiveness, and indeed its appropriateness as a policy framework for Australia (see for example, Boddy, 2000; Gordon & McCann, 2000; Lyons, 1995; Wejland, 1999; Yla-Anttila, 1994). The debate has arisen due to the observed disconnect between the country's numerous (and expensive) attempts to incorporate the DFM as a policy framework, and the fact that despite these efforts, Australia remains significantly below the OECD average in terms of its industrial clusters' economic contributions to real wealth creation (Brown, 2000; OECD, 1998; Porter, 2002, cited in James, 2002).

An examination of the literature identifies three main issues that account for the observed failures and under-performance of Australian industrial cluster policy. The first major issue is that Australian government policy development has largely been focused on descriptive information gathering rather than on achieving either business participation in, or greater understanding of the complex industrial clustering process

(Davies, 2001). In many of the failed or under-performing IC developments, researchers noted that the associated government policy ignored the local and inter-regional industrial linkages and/or the channels of technology and knowledge transfer that existed, instead relying on relatively simple measures (such as 'industry size') to detect potential industry clusters. These simplistic measures are a common feature of Australian industrial cluster policy, and formed the basis upon which expensive and complex resource allocations were made (Gordon & McCann, 2000).

The second major issue surrounds an assumption by Australian policy-makers that the facts explaining the existence of industry clusters around the globe are readily generalisable to the Australian context (Boddy, 2000). Of particular concern has been the assumption of Australian policy makers that simply replicating the policy choices of governments associated with successful clusters (such as Silicon Valley) will be successful despite the lack of evidence to support this contention. Boddy (2000) suggests that there are clear dangers in attempting to reproduce significant policy direction from a relatively small number of specific cases, especially those whose economic performance is inherently atypical. One of the major dangers of incorporating a 'carbon copy' approach to policy development is that of misunderstanding the specific origins and competencies inherent to a region's economy (Boddy, 2000). Without the specific insight into how the relationships and networks between firms and industry is created and maintained, government policy directed at merely 'locating firms together' appears to omit and/or ignore the most important and dynamic aspects of the industrial clustering process.

The third issue concerns the record of Australian governments' resource allocation as it pertains the development of industry cluster formation. Feser and Bergman (2000) note that, at least at the regional level, the approach frequently adopted by policymakers involves little more than the identification of current regional specialisations as targets for traditional development initiatives. In such cases, a cluster strategy serves more often as a means of allocating scarce resources than as a way to build the linkages and future inter-industry synergies documented so frequently in successful industrial districts (Feser & Bergman, 2000). For example, in Europe, the US and Australia, many 'planned' clusters have failed to materialise despite heavy investments by government into 'the required infrastructure'. The implication is that although setting up the infrastructure may be paramount to the diffusion of industrial clusters, it is not sufficient in of itself to ensure a cluster's formation and development.

Underpinning these issues is the observed difficulty of Australian policy-makers to conceptualise their role within Porter's DFM (Brown 2000; Enright & Roberts, 2001). Indeed, Brown (2000) suggests Australia's poor IC performance is almost entirely predicated on the 'confused role of government and its policy makers', a statement echoed by Porter when he stated that:

...in Australia, what is less understood is that the government has some positive roles, like innovation and training, infrastructure, and things like that. I think that the real frontier is [understanding] the positive roles to be played by government whilst avoiding the distortion or intervention in competition (in Trinca, 2002:39).

In order to understand the positive roles that a government can play in the support of entrepreneurial activity and the development of innovative industrial clusters, this paper reports upon an examination of the 25-year history of one of Australia's most innovative and internationally successful industry clusters, that of the Tasmanian Light Shipbuilding Industry (TLSI) cluster. Since its inception, the TLSI cluster has grown substantially in terms of its sales volume, innovative output, and impact on the industry's overall development as a world-class maritime producer (Industry Audit, 1998). At its peak between 1996 and 1998, the TLSI cluster generated an annual turnover of AUD\$400 million (accounting for 25 percent of the state's merchandise exports), and was fundamental in the development of an industry council that represented and coordinated the majority of the state's maritime industry (Industry Audit, 1998). Given its demonstrable importance to the regional Tasmanian economy, an examination of the TLSI cluster's development provides an opportunity to observe the role that government played in the development of an innovative and internationally competitive industry cluster.

Method.

This research comprised a series of semi-structured interviews with all of the key informants within the TLSI cluster and the state government during the period 1977 to 2002. In particular, interviews were conducted with each of the state Premiers during the TLSI cluster's formation, the managing directors of the TLSI cluster firms, and the heads of government departments and agencies with which the TLSI cluster had significant interactions. In total 25 semi-structured interviews were conducted, each lasting between 60 and 90 minutes. The interview questions posed to the participants were derived from an extensive collection and analysis of historical data pertaining to the TLSI cluster's development. As such, the interviews contained both standardised interview questions (i.e. common to all informants) and specific interview questions (i.e. aimed at the key informants' specific involvement in the TLSI cluster's history), and were formulated to elicit the primary data required to answer the research questions posed in this inquiry.

Both the standardised and specific interview questions were formulated to facilitate the aggregation, analysis, and validation of information, and enabled the researcher to interrogate the evidence gathered from other sources. These questions were designed to cover the necessary issues, but were framed in an open-ended manner, to allow the interviewees sufficient latitude for introspection and open reporting of their own perspectives. As a result, the informants were free to pursue those matters that they considered important.

This collection of primary data using a semi-structured interview method allowed the informants to tell their own story in their own way, thereby allowing the researcher direct access to the experience of the case (Clandinin & Connelly, 1994). These individualised recollections aid to strengthen the inquiry by counteracting the bias that may exist in the secondary documents (Burgess, 1982), by adding matters of fact or detail that may only be recorded in individual memory (Samuel, 1982), and by giving voice to those not usually heard (Fontana & Frey, 1994). The semi-structured interviews assisted this inquiry in each of these areas, as they enabled the researcher to

access facets of the case that would not have been available by any other data gathering technique. The interpretation of the data, and the verification of the conclusions, were facilitated by the use of the QSR NUD*IST software package. The interview transcripts were imported into the NUD*IST software database, following which the categories (i.e. the coding of the data) were established as a series of nodes. These nodes were initially generated from the themes highlighted in literature review process, formed part of an index system that allowed the researcher to categorise respondent data in terms of extant theory. Each node was then reviewed in order to identify common themes necessary for the researcher's second-round coding that underpins the discussion and conclusions in this paper.

One of the most prevalent concerns surrounding the reporting of longitudinal industrial cluster research concerns the evolutionary nature of the industrial life cycle. Peters and Hood (2000) discuss how the industrial life cycle notion can influence the effectiveness of a government's industrial cluster policy platform. A growing literature base suggests that 'who innovates' and 'how much' innovative activity is undertaken by an industry cluster is closely linked to the phase of the industry life cycle, and is of vital importance to effective policy implementation (Klepper, 1996; Leigh, 2003). It is therefore necessary for this research to report on the longitudinal variation in government policy development, and link them to the needs of the TLSI cluster over its life cycle.

Results.

The role of government during introductory stage of the TLSI cluster's life cycle.

During the introductory stage of its life cycle, three key government roles positively influenced the TLSI cluster's development. The first was the state government's initial non-committal stance towards the specific development of the state's burgeoning shipbuilding industry. The second role surrounded the enhancement of the state's reputation within the domestic market as a centre for maritime research. The third role was the government's support for the entrepreneurial activities undertaken by Incat, when it became apparent that the company was a potential source of significant economic growth for the regional economy.

The state government's initial non-committal stance towards the state's burgeoning industry was not a deliberate one, as its policy focus at the time was on the macro-economic restructuring of the state's economy away from its dependence on hydro-industrialisation. Due to this focus on the macro-economic restructuring process, the Tasmanian government did not at any stage pre-empt the growth requirements of the potential industry cluster. As such, the Tasmanian government avoided the issues surrounding many of Australia's industrial cluster failures of the 1990s in which governments built up the infrastructural support to potential industries in the hope that this would attract firms, as for example, the federal and South Australian government did with the failed multi-function polis planned for Adelaide. Consequently, the development of the innovative technologies (i.e. the development of elements of Porter's 'firm strategy, structure and rivalry') remained the sole responsibility of the private sector firms that existed during the industrial cluster's initial formation (i.e. Clifford and his maritime friendship network).

The second key role was the state government's development of the region's reputation within the broader domestic maritime market as a national centre for maritime research. The Tasmanian government implemented a series of lobbying initiatives that resulted in the federal government providing additional funding to the Australian Maritime College and relocating its national maritime research institute (the CSIRO) to Hobart. These state government lobbying efforts were largely aimed at the federal government rather than the private sector, but their success had implications for the region's 'Factor Conditions', 'Related and Supporting Industry', and 'Local Demand Conditions'. The regional economy's factor conditions were advanced by developing the region's supply of human capital through both the generation of specialised employment and education within the broader industry. The regional economy's related and supporting industry factor was advanced by the increase in the sophistication of supply of inputs to the private sector firms (in terms of products and world standard maritime research). The Tasmanian government's enhancement of the region's reputation helped to develop the demand conditions faced by the private sector shipbuilding firms, most significantly in the form of customers ready to import their products from interstate. It was only after the domestic exporting success of Incat's innovative semi-aluminium catamarans in the early 1980s were realised that the Tasmanian government undertook its third key role, that of accommodating the growth requirements of the innovative cluster firm.

Although the Tasmanian government did provide its first direct support for Incat's innovative management in the introductory stage of the TLSI cluster's life cycle, it did so only after the firm was able to demonstrate the potential in the domestic Australian market for fast-ferry transportation. The Tasmanian government's support for Incat's innovative capacity was provided only when the firm could demonstrate that it did not possess the resources required for its continued expansion. The Tasmanian government also required evidence that their support of Incat's expansion would result in additional jobs being created within the firm. This initial government support is consistent with the recommendation of Porter's ICT, as it allows for the challenges facing the burgeoning industry to be overcome whilst avoiding the inefficiencies associated with the government's direct involvement in private sector enterprise.

The role of government during the growth stage of the TLSI cluster's life cycle.

During the growth stage of its life cycle, three key government roles positively influenced the development of the TLSI cluster. The first was the Tasmanian government's continued effort to enhance the reputation of the regional economy, although the focus of these efforts changed from a focus on the domestic maritime market to one that encompassed the international market for Incat's fast-ferries. The second was the Tasmanian government's direct involvement in Incat's sales and negotiation processes with their international customers. The third was the Tasmanian government's policy initiatives that served to maximise the synergistic relationship that existed between Incat and its 'supplier firms'.

The first of the state government policies that positively influenced the development of the TLSI cluster was the continued enhancement of the region's reputation as a centre

for maritime excellence, although the policy's focus changed markedly to encompass the international marketplace. This change in focus was driven by the continued success of Incat's innovative product line in the domestic ferry transportation market. Through the use of government sponsored trade missions and the associated negotiation activities, the Tasmanian government used the success of Incat to illustrate the region's maritime competency to international buyers of these products, in turn facilitating an increase in the international demand conditions for Incat's production. The Tasmanian government also applied pressure on the remainder of the TLSI cluster firms, and indeed the region's maritime industry as a whole, to similarly increase the quality of their production in line with the growing international reputation of the region. The Tasmanian government helped the region's shipbuilding and maritime manufacturing firms to achieve high quality production by maintaining its existing lobbying efforts for additional infrastructural funding for the industry.

Specifically, the Tasmanian government undertook political action to secure additional funding for the educational and R&D requirements of the industry. As with its direct support for Incat's needs, however, the Tasmanian government only lobbied for additional federal government funding after its need was recognised by the private sector, and where the private sector firms could demonstrate that these needs were necessary for their future growth. The Tasmanian government's reputation enhancement strategy served to increase the Demand Conditions enjoyed by the state's shipbuilding industry, and in particular, for the output of the regional industry's innovative firm, Incat. It also served to apply a degree of pressure upon the Incat's suppliers to similarly improve their production output in line with the growing prestige of the region.

The second role undertaken by the Tasmanian government was that of direct support during Incat's sales negotiations with their potential international customers. This was directed by the incumbent state Premier at the time, through his department of economic development, most notably in the form of funding for international customer visits to Incat's factory, but also by having the Premier accompany the potential customer during their visit. As a result of the state government's policy initiative to become involved in Incat's sales negotiation process, it provided a level of prestige, moral support and sales expertise that was otherwise beyond the ability of the hub-firm to provide. Indirectly, this policy also served to highlight the supplier firms within the TLSI cluster, as their inputs into Incat's final product were also supported by the state government's involvement in the sale.

In terms of advancing the Diamond Factors, the Tasmanian government's second policy initiative served to develop the regional industry's firm strategy, structure and rivalry by state Premier's personal endorsement of the TLSI cluster's output. It also served to align the TLSI cluster firms' goals with that of the state government by pressuring all of the individual firms to innovate their products in line with the requirements of the innovative Incat. In terms of advancing the Demand Conditions enjoyed by the regional industry, the Tasmanian government's involvement served to enhance the legitimacy of Incat's product to potential international customers.

The third key role undertaken by the Tasmanian state government was to undertake measures to deliberately maximise the synergistic relationship that existed between

Incat and its supplier firms. Inherent in Porter's ICT is the notion that within a clustered network of firms, some forms of scale or scope economies exist through which the industrial cluster develops an internationally competitive advantage. Through its development of marine parks and industrial councils (in which firms complementary to Incat's operations can more easily interact) the Tasmanian government deliberately enabled the realisation of the synergies of both scale and scope inherent to the region's natural industry. The third state government role served to advance the diamond factors by developing the 'firm strategy, structure and rivalry' and the 'Factor Conditions' enjoyed by the TLSI cluster firms in residence at the Prince of Wales Bay marine park in Hobart. With the TLSI cluster firms in close geographic proximity, the individual firms were better able to communicate and coordinate their interrelated production and training activities, as well as allowing them to access the advanced and specialised (and expensive) infrastructure developed for the marine park.

The role of government during the maturity stage of the TLSI cluster's life cycle.

During the maturity stage of its life cycle, three key government roles positively influenced the development of the TLSI cluster. The first key role was the continued enhancement of the regional economy's reputation as a world centre for maritime manufacturing excellence, although the focus of its efforts changed from the singular promotion of Incat's success to incorporate the production of the entire set of industry members, be they cluster firms or otherwise. The second role was to formalise the relationships that existed within the regional shipbuilding and marine manufacturing industries. The third role was the government's deliberate strategy to dilute Incat's importance and impact upon the regional economy.

The first key government role was its continued enhancement of the regional economy's reputation as a world centre for maritime manufacturing excellence. During the maturity stage however, the focus of the Tasmanian government's reputation strategy in the world shipping vessel market changed from the singular promotion of Incat's success to incorporate the output of the entire industry, be they TLSI cluster firms or otherwise. The functional strategies incorporated by the Tasmanian government included trade missions, direct involvement in the international sales negotiations process, and the provision of marketing assistance to the industry. The marketing assistance provided to the industry was specifically targeted at generating a consistent message for all of Tasmanian firms in the international marketplace.

The policy to incorporate the entire set of cluster firms developed the demand conditions for the regional industry, with the region now marketed as a 'one-stop-shop' for a wide variety of innovative and high-quality maritime production, not simply fast catamaran production. The state government could afford to undertake this marketing strategy given the success that the TLSI cluster firms had enjoyed both individually, and as a network, during the growth phase. For example, by the end of the growth stage of the TLSI cluster's development, each of the supplier firms had secured their own export sales independent of those associated with their alliance with Incat. Further to this, two additional TLSI cluster firms, Lifteraft Systems and Richardson Devine, emerged within the industry and enjoyed immediate export success, largely due to their association with Incat and the innovative and valuable nature of their output.

The second key role was to formalise the relationship between the region's entire set of shipbuilders and maritime manufacturers (TLSI cluster firms or otherwise) and the state government. After the Prince of Wales Bay maritime park was established by the Tasmanian government, the private sector firms, along with the Aluminium Welding School, formed the Tasmanian Maritime Network (TMN) within which the TLSI cluster could better develop its communications and lobbying efforts. After the Bacon Labor government's industry audit program of 1998 was completed, the TMN was restructured to form an 'Industry Council' that represented approximately 85 percent of the region's shipbuilding and marine manufacturing firms. The Industry Council program sought to provide the region's shipbuilding industry with a direct communication and lobbying channel between the industry as a whole and the Tasmanian government. The Industry Council arrangement also helped to ensure that the set of firms within the industry could better incorporate the success factors of the TLSI cluster into their operations, and therefore become involved in the process of further developing the regional industry's 'Firm Strategy Structure and Rivalry' to comply with world-best standards.

The third key role was the Tasmanian government's strategy to dilute Incat's importance and impact within the regional economy. The policy was implemented through the attraction of additional innovative shipbuilding firms to the region (producing vessels unlike those of Incat) in the hope that the TLSI cluster's supplier firms would have alternate sources of sales opportunities incremental to that of Incat. The Tasmanian government was able to attract additional innovative firms through marketing the region's advanced infrastructure, support that was initially provided solely for the benefit of Incat. Where needed, the Tasmanian government also provided the option to undertake an equity arrangement with the new hub-firms, an arrangement that involved funding of the new firms' relocation and start-up costs, but did not involve the state government intervening in the innovative process of the firm. This policy initiative had a direct impact on the diamond factors enjoyed by the TLSI cluster (and indeed the entire industry) by effectively driving incremental demand from the international marketplace for region's maritime production. In addition, it allowed the TLSI cluster's supplier firms to develop exponentially greater linkages within the industry, and more importantly, with firms of similar importance as the original hub-firm in terms of their innovative ability and supply requirements.

The travel and trading needs of the isolated Tasmanian community necessitated the development of an advanced and innovative shipbuilding industry evidently capable of dominating the domestic market. This historical dependence resulted in the growth of the island population's human capital in terms of a competency in innovative shipbuilding and design. More specifically, the interest in shipbuilding and design within the state was shared amongst a rather close network of individuals that enjoyed a long association with the industry. As such, the development of the island population's innovative shipbuilding competencies (i.e. human capital) aligns closely with Coleman's (1988) concept of social capital, whereby a population invest in a closed social network through which they gain access to embedded resources and knowledge that serve to enhance the returns of their common activities. This is demonstrated by the latent shipbuilding competencies that remained within Tasmania's shipbuilding industry despite its decline to virtually nil export production during the 1970s.

Despite the observed failure of Australia's protectionist policies in the globalising environment of the 1970s and 1980s, after the consequences of the Tasman Bridge tragedy became apparent (see Clarence City Website, 2005), Tasmania's shipbuilding industry managed to grow its exports sales from virtually nil in the 1970s, to 40 percent of the global market for fast ferry transport. The implication of this contextual analysis suggests that chance events (here represented by the Tasman Bridge tragedy) may be viewed as 'economically relevant' given that the implications of its occurrence align closely with the human (and in this instance, social) capital that had developed within the region.

Discussion.

The implications for the role of government in the development of a regional economy's industrial clusters are five-fold. The first implication surrounds the state government's initial response to the potential formation of an industrial cluster. In the TLSI cluster case study, the research indicates that the state government's initial support for any emergent entrepreneurial activity must be commensurate with its relevance to the region's natural advantages (and/or historical dependence) and the likelihood of their commercial success in export markets. The reverse holds that state government need to be aware that supporting entrepreneurial activity that does not closely align with the region's natural advantages and store of social capital may be likely to relocate their activity as more cost effective opportunities arise.

The second implication surrounds the importance of the government's role within Porter's DFM. The research indicates that the government of a regional Australian economy needs to position itself as an endogenous variable within Porter's (1990) DFM. That is, the government of a regional Australian economy cannot positively and effectively influence economic growth as an exogenous variable as assumed in the Porter's original theory. Instead, the government of a regional Australian economy has a significant role to play in its development (given its relative size to the region's gross domestic product), and the Diamond Factor Model requires some alteration to reflect this central role (see Figure 2). Despite the intrusive role required by the government in the regional economy, it is important to note that at no stage did the state government seek to influence the innovative nature of the industry, which was always left in the hands of the private sector and its entrepreneurs.

Similarly, the incorporation of chance events into a government's industrial cluster policy framework is also reasonable. In Porter's original ICT, chance events, alongside the role of government, are viewed as exogenous variables that may impact on an economy's diamond factors from time to time. Given the findings of this research, chance events that align closely with the human and social capital generated within an economy may be viewed as 'economically relevant', and therefore, play a boundary setting role within which internationally competitive industrial clusters may be effectively developed by the government's interaction with the diamond factors.

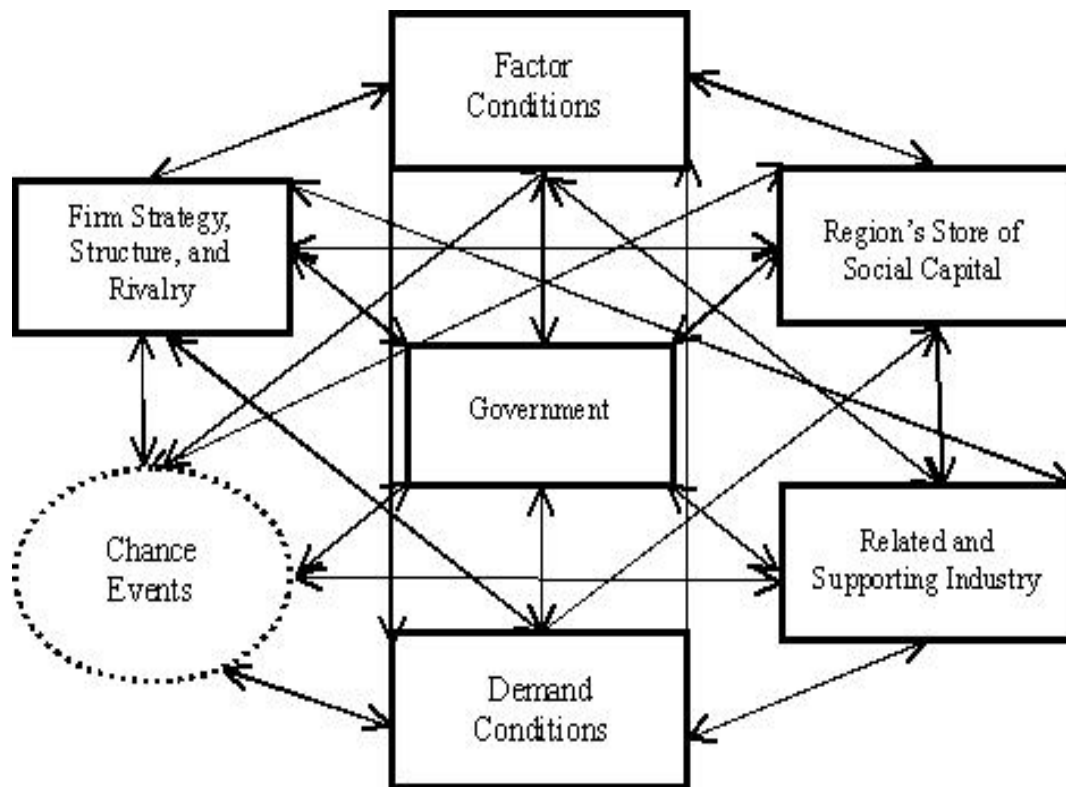
The third implication is that the role of the government in a regional Australian economy is necessarily variable over the life cycle of the industry cluster, and as a result it needs to have the capability to identify and monitor the set of natural industries that exist within the region, and their stage of development. It is also important for the government to avoid the adoption of a 'one size fits all' policy regime for its set of industrial clusters, as each will have its own requirements given their own particular stage of development. Central to this point is the need for government to be able to recognise the existing and potential synergies that exist within the industry cluster, and therefore be better able to aid the optimisation of this idiosyncratic relationship, however at all times aware not to artificially create the synergy within the industry cluster.

The fourth implication of this research is that government must provide the required infrastructural needs of the developing industrial cluster, however, the manner of its provision is clearly demonstrated by the Tasmanian government in this case. Firstly, the needs of the industrial cluster were never pre-empted by the government. Instead, the government awaited a claim from the private sector firms, with demonstrable evidence that without its provision, growth and employment within the industry cluster would decline.

The fifth implication is the need for the government to actively dilute the importance of the original hub-firm to the regional economy as the sophistication of its supplier firms similarly advances. It is necessary to safeguard the hub-firm's suppliers (and indeed the region's entire set of industry members) against reliance upon one major entity for their sales growth. Possible methods to achieve this end include the introduction of new hub-firms to the region such that they can benefit from the advanced diamond factors that exist there (creating a set of hub-firms for the supplier firms to interact with), and to apply a positive influence upon these firms to take steps in securing their own discrete export sales.

Given the above discussion, Figure 2 presents a plausible alternative DFM for industrial cluster development in a regional Australian economy. In line with the research findings, the 'Role of Government' is altered from an exogenous variable to one that is central, and necessarily intrusive in the regional economic development process. As demonstrated in the discussion section, the key to an effective government role centres on the timing of its policy initiatives and the changing life cycle needs of the industry cluster. Similarly, 'Chance Events' are incorporated into the adapted model, and although they are represented here as an important variable, their occurrence is not considered essential to the development of internationally competitive industrial clusters. Instead, 'Chance Events' are characterised as occurrences that serve to initiate industrial clustering activities. The region's store of social capital is also incorporated into the adapted model. Although it may lie dormant for some considerable length of time, the variable represents the set of intangible economic assets possessed by a region's labour market, which may also serve as a basis for the formation of the regional economy's internationally competitive industrial clusters.

Figure 2: Porter's Diamond Factor Model adapted for a regional Australian economy.



Conclusion.

The findings of this research indicate that the role of government in a regional Australian economy is far more significant than the exogenous one theorised by Porter (1990). Indeed, an analysis of the TLSI cluster's development indicates that the role of an Australian government is an endogenous, and arguably central to the machinations of the DFM for a regional Australian economy. As such, for the purposes of providing a role for an Australian government in a regional economy, the variable cannot be considered exogenous to the diamond factors associated with Porter's ICT. Rather, the role of government must be considered fully integrated within the original diamond factors, indicating that it is directly involved in their development, and indeed very generation over time.

The findings of this research also indicate that theorising the role of chance events within a regional economic model also requires some attention. Under Porter's original DFM, chance events are similarly considered exogenous to the diamond factor's interaction, and the role that the government has to play in the development of industrial clusters. This research indicates that the role of the government may be directly influenced by those chance events that serve to amplify the commercial importance of regional economy's Diamond Factors. As such, the adapted model for a regional Australian economy includes an integrative link between the original diamond factors, and the occurrence of 'Chance Events' that serve to amplify their commercial value in the international market. It similarly indicates that the region's policy makers should view chance events that do not coincide with the 'natural advantages' or the advanced social capital developed within the region with some caution. The research also

indicates that the adapted model must consider the region's store of social capital as an important variable in the development of internationally competitive industrial clusters. Unlike the economy's factor conditions, which refer largely to physical assets, the region's store of social capital refers to the latent or tacit knowledge possessed by an economy's labour market, their cultural understanding (based upon the region's historical dependencies) and their belief that efforts to leverage this knowledge and understanding in the marketplace will lead to commercial success.

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