

**The Role of Government in Facilitating the Innovative Capacity of Industry:
The Case of the Tasmanian Light Shipbuilding Industry.**

Dr Mark Wickham
University of Tasmania

Abstract.

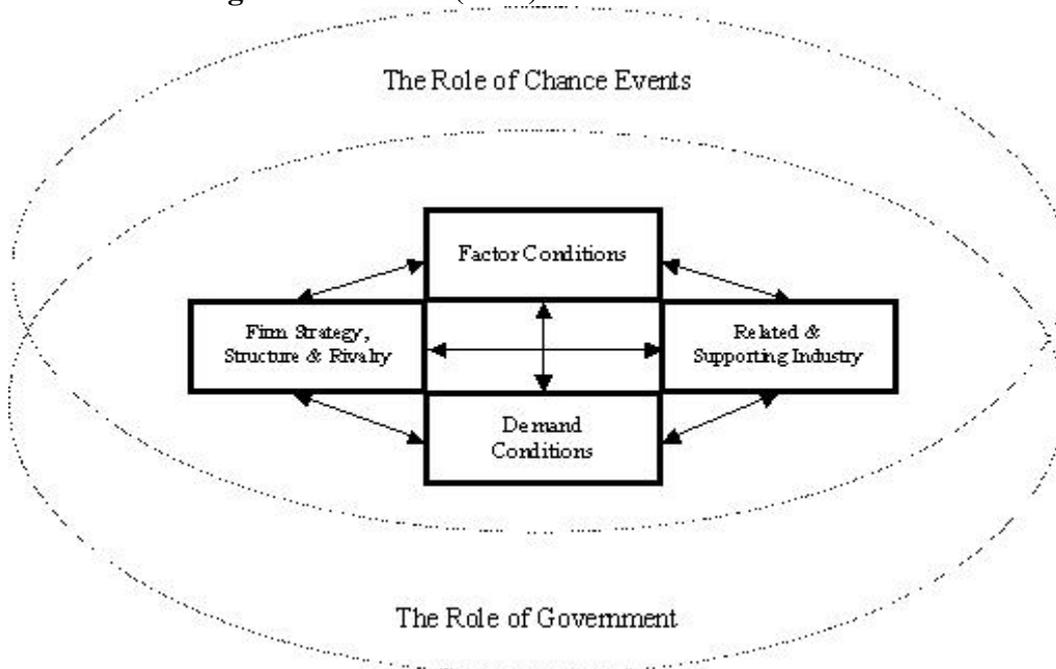
In order to understand the positive role that regional governments can play in facilitating the innovative capacity of its industries, this paper analyses the 25-year history of the Tasmanian government's interaction with the Tasmanian Light Shipbuilding Industry. The research findings indicate that unlike governments of major economies, regional governments play a central and necessarily intrusive role in the facilitation of an industry's innovative capacity, and that this role is necessarily changeable over its life cycle. This paper provides a discussion of the policy implications, and presents a reconceptualisation of Porter's Diamond Factor Model for policy makers in regional economic settings.

The Role of Government in Facilitating the Innovative Capacity of Industry: The Case of the Tasmanian Light Shipbuilding Industry.

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-based governments (Everett, 2002; Goldfinch, 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 innovative and competitive in world markets (Brown, 2000; Edwards, 2002). One theoretical framework that achieved prominence in Australian innovation policy development is Porter's Industrial Cluster Theory (ICT) (see Australian Manufacturing Council, 1994; Keating, 1994). As part of his book *The Competitive Advantage of Nations*, Porter developed the notion that the innovative capacity of industry was integral to export earnings and the generation of national competitive advantage. Porter's ICT argues that a nation's industry will be both innovative and internationally competitive if a synergistic interrelationship exists between six important variables collectively known as the Diamond Factor Model (DFM): (See Porter (1990) for a discussion of the DFM, and Figure 1 for a diagrammatic representation).

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



Since the adoption of Porter's DFM as a basis for innovation-policy development, however, there has been considerable debate concerning its effectiveness as a framework for facilitating the innovative capacity of industry in the economic regions of Australia (see Boddy, 2000; Gordon & McCann, 2000). The debate

has arisen due to an observed disconnect between the country's numerous (and expensive) attempts to incorporate the DFM as a policy framework, and the fact that Australia remains significantly below the OECD average in terms of its industries' innovative capacity and economic contributions to real wealth creation (OECD, 1998).

An examination of the literature identifies three main issues that account for the observed failures and under-performance of Australian industrial innovation 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 innovation process (Davies, 2001). The second major issue surrounds an assumption by Australian policy-makers that the facts explaining industry innovation around the globe are readily generalisable to the regional Australian context (Boddy, 2000). The third issue concerns the record of Australian governments' resource allocation as it pertains the development of industry innovation. 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, innovation policy development strategies served 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 highly innovative industrial districts (Feser & Bergman, 2000).

In order to understand the positive roles that a regional government can play in the facilitation of an industry's innovative capacity, this paper reports upon an examination of the 25-year history of the Tasmanian Light Shipbuilding Industry (TLSI). The origin of the TLSI can be traced back to 1984, and the development of the world's first aluminium welding technology by the innovative firm 'International Catamarans' (hereafter 'Incat')(Industry Audit, 1998). Some years before, Incat's managing director Robert Clifford, had identified an opportunity to construct high quality fast ferries for the world market, but required the assistance of a number of his 'maritime network friends' to help develop the lightweight technology needed to construct such a vessel. The integration of a number of different product lines from the other industry members (i.e. light-weight life raft equipment, light-weight fire safety equipment, lightweight fit-outs, innovative engineering products etc.) became central to the industry's international success. Over time, the industry was able to forge a dominant position in the global market for fast ferries (and the associated technology), and by 1998 accounted for 40 percent world market for passenger ferries (Wickham, 2005). The innovative capacity of the TLSI is also demonstrated by the fact that by 2000, firms that had once solely existed to supply Incat's specific needs managed to forge significant export sales and R&D alliances with shipbuilding firms from around the globe.

Method.

This research comprised a series of semi-structured interviews with key informants within the TLSI and the Tasmanian government. In particular, interviews were conducted with each of Tasmania's Premiers during the TLSI's formation (1977- 2002), the managing directors of the TLSI firms, and the heads of government departments and agencies with which the TLSI had significant interactions. In total 25 semi-structured interviews were conducted, each lasting between 60 and 90 minutes. 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. The interpretation of the data, and the verification of the conclusions, were facilitated by the use of the QSR NUD*IST software package. In the method literature, it has been emphasised that computer software programs such as NUD*IST, are of significant value in qualitative analysis and any subsequent theory building (Weitzman & Miles, 1995).

One of the most prevalent concerns surrounding the reporting of longitudinal industrial innovation 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 policy platform. A growing literature base suggests that 'who innovates' and 'how much' innovative activity is undertaken by an industry is closely linked to the phase of the industry life cycle, and is of vital importance to effective policy implementation (Leigh, 2003). It is therefore necessary to report on the longitudinal variation in government policy development, and link it to the innovative capacity of the TLSI over its life cycle.

Results.

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

During the introductory stage of its life cycle, three key government roles positively influenced the innovative capacity of the TLSI. The first was the Tasmanian government's initial non-committal stance towards the specific development of the region's burgeoning shipbuilding industry (see Wickham, 2005 for details). The second role surrounded the enhancement of Tasmania'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 the industry's most innovative firm at the time, International Catamarans (hereafter 'Incat'), when it became apparent that it was a potential source of significant economic growth for the region.

The Tasmanian government's initial non-committal stance towards the region's burgeoning industry was not a deliberate one, as its policy focus at the time was on the macro-economic restructuring of the region's economy (away from its dependence on hydro-industrialisation which had dominated the region's economic development since the 1960s). 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 region's 'new' innovative shipbuilding industry. As such, the government inadvertently avoided the issues surrounding many of Australia's innovation-policy failures of the 1990s in which governments built up infrastructural support in the hope of attracting innovative firms, as for example, the 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 industry's initial foray into aluminium-welding technology (i.e. Incat and the maritime network in which it had operated).

The second key role was the Tasmanian government's development of the region's reputation within the broader domestic maritime market as a national centre for maritime research. The 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. The 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 'Demand Conditions'. The region'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 region's 'Related and Supporting Industry' 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 revenues from interstate customers. 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 firm driving the aluminium-welding innovation within the TLSI.

Although the Tasmanian government did provide its first direct support for Incat's innovative management in the introductory stage of the TLSI'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 innovation was provided only when the firm could demonstrate that it did not possess the resources required for its continued expansion. The government also required evidence that their support of Incat's expansion would

result in additional jobs being created within the industry. This initial government support is consistent with the recommendation of Porter's DFM, 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 government's role during the growth stage of the TLSI's life cycle.

During the growth stage of its life cycle, three key government roles positively influenced the innovative capacity of the TLSI. The first was the Tasmanian government's continued effort to enhance the reputation of the regional economy's maritime capabilities, 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 aluminium fast-ferris. The second was the government's direct involvement in Incat's sales and negotiation processes with their international customers. The third was the government's policy initiatives that served to maximise the synergistic relationship that existed between Incat and its similarly innovative 'supplier firms'.

The first of the Tasmanian government policies that positively influenced the innovative capacity of the TLSI 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 customers, in turn facilitating an increase in the international demand conditions for Incat's production. The Tasmanian government also applied political pressure on the remainder of the TLSI firms to similarly increase the quality and innovation of their production in line with the growing international reputation of the region. The government helped the region's shipbuilding and maritime manufacturing firms to achieve high quality production by maintaining its existing lobbying efforts for additional federal infrastructural funding for the industry.

Specifically, the Tasmanian government undertook political action to secure additional funding for the TLSI's educational and R&D requirements. As with its direct support for Incat's needs, however, the Tasmanian government only lobbied for additional federal government funding when the firm could demonstrate their provision was necessary for its continued expansion. The Tasmanian government's reputation enhancement strategy served to increase the 'Demand Conditions' enjoyed by the region's shipbuilding industry, and in particular, for the output of the regional industry's most innovative firm, Incat. It also served to apply a degree of political pressure upon the Incat's suppliers to similarly improve their innovative 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, 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 regional 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 Incat to provide. Indirectly, this policy also served to highlight the supplier firms within the TLSI, as their inputs into Incat's final product were also supported by the regional 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's output. It also served to align the TLSI firms' goals with that of the regional government by pressuring all of the individual firms to innovate their products in line with the requirements of 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 government was to undertake measures to deliberately maximise the synergistic relationship that existed between Incat and its supplier firms. Inherent in Porter's DFM is the notion that within a network of firms, some forms of scale or scope economies exist through which the industry 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' (again, see Wickham, 2005). The third role served to advance the Diamond Factors by developing the 'Firm Strategy, Structure and Rivalry' and the 'Factor Conditions' enjoyed by the TLSI firms in residence at a dedicated marine park in Tasmania's capital city of Hobart. With the TLSI 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 government's role during the maturity stage of the TLSI's life cycle.

During the maturity stage of its life cycle, three key government roles positively influenced the innovative capacity of the TLSI. The first key role was the continued enhancement of the regional economy's reputation as a world-class centre for maritime manufacturing, although the focus changed from the singular promotion of Incat's success to incorporate the production of the entire set of industry members, be they directly involved in Incat's aluminium innovation

processes 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 TLSI.

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 fast-ferry market changed from the singular promotion of Incat's success to incorporate the output of the entire industry. 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 TLSI 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 Tasmanian government could afford to undertake this marketing strategy given the success that the TLSI 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'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 firms, Liferaft 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 (firms directly involved in the development of the aluminium technology or otherwise) and the Tasmanian government. After the Prince of Wales Bay maritime park was established, the private sector firms, along with the government-run Aluminium Welding School, formed the Tasmanian Maritime Network (TMN) within which the TLSI could better develop its communications and lobbying efforts. After the Tasmanian government's industry audit program of 1998 was completed, the TMN was restructured to form an industry council that represented 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 and the Tasmanian government. The industry council arrangement also helped to ensure that that the set of firms within the industry could better incorporate the success factors of the most innovative firms 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 on the TLSI. The policy was implemented through the attraction of additional innovative shipbuilding firms to the region (producing innovative vessels unlike those offered by Incat) in the hope that the TLSI's supplier firms would have alternate and incremental sources of sales and innovation opportunities. The government was able to attract additional innovative firms through marketing the region's advanced infrastructure, support that was initially provided for the benefit of Incat. Where needed, the government also provided the option to undertake an equity arrangement with the newly invited firms, an arrangement that involved funding of the new firms' relocation and start-up costs, but did not involve the regional government intervening in the innovative process of the firm. This policy initiative had a direct impact on the innovative capacity of TLSI by effectively driving incremental demand from the international marketplace for region's maritime production. In addition, it allowed the Incat's supplier firms to develop exponentially greater linkages within the industry, and more importantly, with firms of similar importance as Incat in terms of their innovative ability and supply requirements.

Discussion

The implications for the role of a regional government in the facilitation of an industry's innovative capacity are four-fold. The first implication surrounds the government's initial response to the potential formation of an innovative 'new' industry. In the TLSI case, the research indicates that the regional government's initial support for any emergent entrepreneurial activity must be commensurate with its relevance to the region's 'natural advantages' and the likelihood of their commercial success in export markets. The reverse holds that regional governments 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.

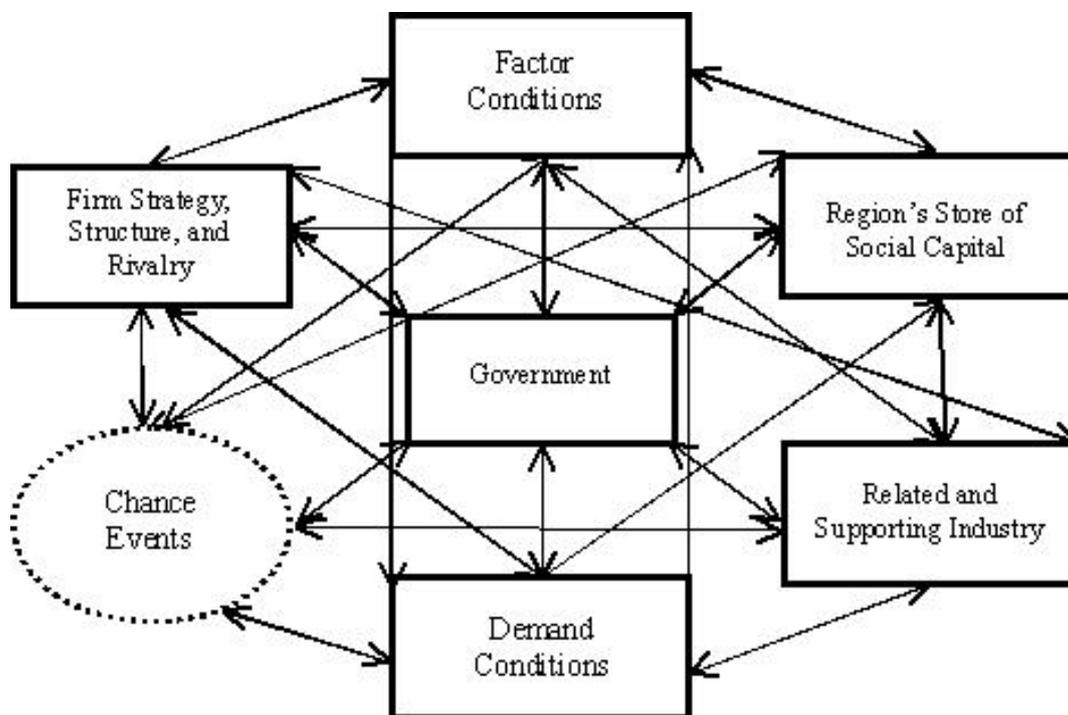
The second implication surrounds the importance of the regional government's role within Porter's DFM. The research indicates that the government of a regional Australian economy needs to position itself as a central variable within Porter's DFM. That is, the government of a regional Australian economy cannot positively and effectively influence innovative capacity as an exogenous variable as assumed in the Porter's original DFM. 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 DFM 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 regional 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 innovation policy framework is also reasonable. In Porter's original DFM, chance events, alongside the role of government, are viewed as exogenous variables that may impact on an industry's innovative capacity 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 innovative industries may be effectively developed by the government's interaction with the other Diamond Factors.

The third implication is that the role of the government in a regional economy is necessarily variable over the life cycle of an industry, and as a result it needs to have the capability to identify and monitor the set of innovative 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 industries, 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 an industry, and therefore be better able to aid the optimisation of any idiosyncratic relationships.

The fourth implication of this research is that government must provide the required infrastructural needs of the developing industry, however, the manner of its provision is clearly demonstrated by the Tasmanian government in this case. Firstly, the needs of the industry 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, innovation and productivity within the industry would decline. Given the above discussion, Figure 2 presents a plausible alternative DFM for the facilitation of industry innovation in regional Australian economies. In line with the research findings, the 'Role of Government' is altered from an exogenous variable to one that is central, and necessarily intrusive. As discussed, the key to an effective government role centres on the timing of its policy initiatives and the changing needs of the industry over its life cycle. 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 innovative industries. Instead, 'Chance Events' are characterised as occurrences that serve to initiate innovative industrial 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, and serve as a basis for any significant increases in the innovative capacity of an industry within an economic region.

Figure 2: An Adaptation of Porter's DFM for the Facilitation of Industry Innovation in a Regional Economy.



Conclusion

This paper presented a longitudinal case study that included interview data from an array of policy makers and private sector managers directly involved in the TLSI over a 25-year period. Although admittedly a single case with all the problems of generalisability that are implied, the wealth of data gathered lends its argument some authority and carries advisory messages for regional governments worldwide. This research adds a fine-grained view to Porter's (in Trinca, 2002) comments that emphasised the need for both researchers and practitioners to better understand the government's role in developing the innovative capacity of industry. The success of the regional Tasmanian government in developing the innovative capacity of the TLSI suggests that governments should ideally encourage any innovative activities that closely align with a region's social and economic strengths. The need to vary the type and strength of government policy assistance over time was also emphasised, for example by providing training only after needs had become apparent and infrastructure and training could be specifically targeted. Overall, the TLSI case study provides an object lesson for government policy development that positively facilitated the innovative capacity of a burgeoning industry, whilst simultaneously avoiding the perils associated with the creation of *de facto* protectionist policy regimes.

REFERENCES

- Australian Manufacturing Council. 1994. *The wealth of ideas: How linkages sustain innovation and growth*. Melbourne: Australian Manufacturing Council.
- Boddy, M. 2000. Technology, innovation, and regional economic development in the state of Victoria. *Government & Policy*. 18(3): 301-319.
- Brown, R. 2000. *Clusters, innovation and investment: Building global supply chains in the new economy*. Canberra. Australian Project Developments Pty Ltd.
- Davies, T. 2001. Enhancing competitiveness in the manufacturing sector: Key opportunities provided by inter-firm clustering. *Competitiveness Review*. 11(2): 4-16.
- Edwards, M. 2002. Public sector governance – Future issues for Australia. *Australian Journal of Public Administration*. 61(2).
- Everett, S. 2002. Deregulation, competitive pressures and the emergence of intermodalism. *Australian Journal of Public Administration*. 61(3).
- Feser, E.J. & Bergman, E.M. 2000. National industry cluster templates: A framework for applied regional cluster analysis. *Regional Studies*. 34(1): 1-25.
- Goldfinch, S. 1999. Remaking Australia's economic policy: Economic policy decision-makers during the Hawke and Keating Labor governments. *Australian Journal of Public Administration*. 58(2): 3-20.
- Gordon, I.R. & McCann, P. 2000. Industrial clusters: Complexes, agglomeration and/or social networks? *Urban Studies*. 37(3): 513-540.
- Industry Audit. 1998. Marine manufacturing. *Tasmanian State Government Report*.
- Keating, P. 1994. *Working nation: Policies and programs*. Canberra: Australian Government Printing Service.
- Leigh, A. 2003. Thinking ahead: Strategic foresight and government. *Australian Journal of Public Administration*. 62(2): 3-10.
- OECD. 1998. Boosting innovation: The cluster approach. *OECD Proceedings*. Paris.
- Peters, E. & Hood, N. 2000. Implementing the cluster approach. *International Studies of Management and Organisation*. 30(2): 68-89.
- Porter, M.E. 1990. *The competitive advantage of nations*. New York. Free Press.

Trinca, H. 2002. Absolute Porter. *Boss - The Australian Financial Review*. September Edition.

Weitzman E. & Miles, M. 1995. *Computer Programs for Qualitative Data Analysis*. California: Sage.

Wickham, M.D. 2005. Entrepreneurship and the management of innovation in the global marketplace: The Incat story. *The Management Case Study Journal*. 5(2): 83-93. Available at <http://business.unisa.edu.au/mcsj>