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IT Investment Strategy for Development: an 'Instrumental Analysis' Based on the Tasmanian and New Brunswick Information Technology Strategies[1]

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ABSTRACT *In April 1997, Tasmania (Australia) adopted the reputably successful New Brunswick (Canada) industrial strategy to build an information technology (IT) industry of significance. The strategy aims to overcome isolation in small regional economies and structurally change from declining natural resource industries. Both plans reject neo-classical economics-based industry policy, opting instead for a strong state-based investment planning approach. An analytical framework is set out, using Adolph Lowe's 'Instrumental Analysis', to examine implementation of both IT strategies. Implications of this analysis are drawn for any attempts at developing IT regional plans and, more generally, as a guide for broad strategic-based national industrial strategies.*

Keywords: investment, innovation, information technology, industrial policy, structural change, regional economies.

Investment in the Digital Economy and Systemic Failure

Information is becoming digital. The technology behind this is the modern computer which stores and sends information across the world at the speed of light. The information technology (IT) industry based on this digital technology is becoming the leading industrial sector by converging computing services with communications (telephone cables, satellites, wireless, internet) and content-based providers (entertainment, publishing, interactive multimedia). IT is the commercial driving force behind the establishment of a global integrated 'digital economy' that is altering the operation of all sectors of modern capitalist economies.

The rise of the digital economy has been a product of market forces innovating and expanding upon publicly provided infrastructure.[2] In the rapidly changing digital economy, private firms are entering the IT industry by investment in innovation. Fixed capital investment in IT consists of hardware and software technology and integrating physical mechanisms embodied in capital equipment that is needed for firms to be able to take advantage of IT. For example, wine producers need to develop standard categories with globally accepted characteristics to market wine. This requires capital investment in production and distribution based on such standards.

Two basic problems of systemic failure 'discordance' have resulted from private sector investment in IT-based innovation. The first is massive inequality arising between information-rich and -poor, leading to profound organisational, legal, moral and econ-

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omic contradictions.[3] All major structural changes throw up greater inequalities. Depressed isolated regions and disadvantaged groups *within* advanced nations, and less developed nations all struggle to take advantage of the new economic developments. The rise of the digital economy has exposed a large number of information-poor that exist in all these identified sectors of the world,[4] and while the internet does lend itself to organised mass action it can not prevent the information-rich from conducting their global internet money-making activities.[5]

The second is the instability of private investment with much susceptibility to over-investment (creating undesired excess capacity that is not sustainable) and business failures.[6] This is particularly a problem in the emerging IT-based industries that experience increasingly more quickly technological obsolescence, yet with lock-in to specific technological systems. The result is shorter payback periods and discounting the future strongly with shorter foresight, producing more pronounced investment cycle volatility.[7] This instability seems to be the experience of Europe and Japan in the 1990s, whereas the USA as the leading IT innovation-based economy has had a powerful investment cycle expansion, but with strong *susceptibility* to over-investment and a sharp, deep contraction.[8]

The instability of investment and path-dependence of technological innovation lead to concerns at the practical and conceptual levels.[9] At the practical level, there are intractable problems in identifying and measuring (or even guestimating) rates of return calculations for investment projects extending into the unknowable future. Market signals are not able to provide the necessary data or prevent myopic selection pressures. At the conceptual level, technological change embodied in new investment alters 'the extant institutional configuration' which is taken as given in neoclassical economics.[10] Technological investment has an evolutionary focus that is endogenous to the entrepreneurial process of investment decision-making. This denies any static equilibrium solution and involves technical change at the centre of the endogenous process of instability.

Investment Strategy for the Digital Economy

IT investment strategies have been the domain of private business in its efforts to gain economic rents in an emerging innovative industry. The state in capitalist economies has been generally *ad hoc* reactive in its IT strategies for handling the problems of discordance. A state's ability to intervene in such an *ad hoc* fashion is totally inadequate due to reaction, decision and administrative lags that become more serious as the digital economy proceeds extremely rapidly in propagating itself.[11] The new state approach to IT investment is proactive, with the state itself taking a strategic position in establishing a broad-based national investment plan for IT. This approach is based on neo-Schumpeterian economists who argue for a 'national system of innovation' that incorporates direct strategic co-operative links and supportive structures between universities (and other tertiary education providers), businesses, governments and unions.[12]

Two reports to the Australian Commonwealth Government in mid-1997 support the proactive strategic approach. The Goldsworthy Report on the Australian IT industry sees IT as the key to the wealth of nations in the next century, but with Australia playing a declining role under the current reactive state approach. It notes that Australia has 2% of IT global users and only 0.3% of IT global producers, which has resulted in a severe IT trade deficit. Goldsworthy argues for a 'strategic, proactive national information industries policy' with an investment strategy that attracts major foreign IT firms by tax incentives and lower tax regimes. This is in line with the Mortimer Report that also supports the need for the state to focus on encouraging productive investment

through more intervention via incentive packages and tax cuts, while nominating telecommunications as an industry that needs an 'action agenda'.[13]

Direct public policies aimed at altering private investment decisions in the IT industry have been the focus of some national governments recently. Like the two reports quoted above, these governments have rejected *ad hoc* reactive policies and have set out indicative government planning of business investment in the IT industry to support corporate investment planning by ameliorating susceptibility to over-investment or business failure.[14] An Australian commissioned study on IT has nominated Singapore, Britain, Israel, Ireland and Malaysia as the leaders in IT state support for business investment. Of these, Ireland (in terms of tax incentives) and Malaysia (with its 'Multimedia Super Corridor' [MSC] special technology clusters) have been the most ambitious.[15]

These national and international developments in relation to IT signify a move away from the neo-classical ('level playing field') paradigm and non-state intervention. The next section develops an analytical framework in historical time as a template that is overlaid onto actual IT investment strategies for critical implementation analysis. A snapshot of two small regional economies, traditionally based on natural resources but with a relatively large unemployed population, is set out in summary form following the IA template. Both these regions adopted similar strategic interventionist models for IT-enhancement and provide a manageable preliminary study of IT strategic initiatives for economic development.

A section follows that examines the implementation of the proactive state IT strategy in the province of New Brunswick, Canada. Tasmania is a small geographically isolated State of Australia, and it exhibits many characteristics that are similar to New Brunswick. In April 1997 the Tasmanian State Government announced an IT investment strategy very closely fashioned on the New Brunswick (NB) strategy. A further section uses the template to compare the Tasmanian implementation to the original NB strategy. General findings and a conclusion are then presented on how the NB strategy can be adapted to form the basis of an effective IT investment strategy, delivering economic benefits to the majority and to the unemployed in regions exposed to massive structural change.[16]

Instrumental Analysis

Adolph Lowe established an analytical framework designed to enable rules of formal logic to be applied to economic cause and effect sequences over real historical time. This framework is particularly aimed at using such cause–effect principles to set up state structural adjustment policies that can deliver sustainable and equitable economic growth. Lowe calls this '… the search for the economic means suitable for the attainment of any stipulated end. To this procedure I have assigned the label of instrumental analysis'.[17] The procedural essence of this instrumental analysis (IA) is to initially identify the objective(s) and then to design causal means consistent with achieving the objective(s). The IA process is 'regressive inference', in that it aims to generate effects sought using means revealed over time as practice produces results that are compared to the objective(s) and allows reformulation of the objective(s).

Investment is the central element of any path to economic growth. There has been much analysis and evidence to show that investment in the 'mistake-ridden private sector' leads to uncertainty and investment instability that undermines any smooth effective path to economic growth.[18] Private investment in the digital economy, as has been argued above, is discordant, lacking sufficient order and coherence for IT to be

effective via the private sector in producing strong economic growth in economic regions or nations that are information-poor and currently lack the relevant infrastructure.

IA is the policy template for implementing IT investment strategy as set out below.

Assumption

Investment instability is inherent in advanced capitalist economies, such that instability leads to problematic growth paths. Information inequality and instability in investment creates major difficulties for the private sector in developing flexible investment strategies based on new technological systems.

Objective

Order and coherence in investment by maintaining an appropriate rate of capital stock growth to ensure that the growth path is less problematic. Specifically this involves creating more equitable information access and a relatively more stable investment climate.

Method

1. Use regressive inference to derive necessary links back to the motivational patterns of firms *vis-à-vis* investment.
2. Develop 'secondary controls' which alter behaviour to enable economies (regional or national) to reach generally accepted goal-adequate paths.

Strategy

1. Establish the human agency elements inherent in private investment decision-making to understand how public policy can influence the business sector.[19]
2. Secure the co-operation ('voluntary conformity') of entrepreneurs and all other agents involved in the investment strategy process (e.g. university technology centres, state bureaucracies, union/employee delegates, training schools) to alter investment behaviour towards a more stable, but strong investment path.
3. Introduce into this path, dynamic diffusion of new technology systems to reach specified and accepted investment goals by implementing investment perspective planning.[20] The requirement is for long-term investment strategies to be based on short-term goals, eventually adding up to the specified long-term goals. The plan is continually assessed at every short-term end-point to see whether it is necessary to revise both short and long-term goals and the strategy of reaching them.

Secondary Controls

These are the specific public policies introduced to achieve the strategy.[21] These controls have the following conditions:

1. dynamic (specified over a nominated period of time) and directly operating on motivation to *innovate* through market behaviour;
2. sufficiently large *economies of scale* exist to generate benefits from modern technology and management skills;[22]
3. *expectations are constrained* by the generally accepted choice of macroeconomic goals (employment growth, unemployment rate, inflation rate, external balance);

4. *microeconomic action directives* related to information agreements and investment planning that are consistent with the agreed macroeconomic goals.[23]

All secondary controls must have two elements. The first are technical engineering rules that govern the path of investment given the current technological limits. The second are motivational substructures based on agreed microeconomic goals. These two elements enable investment decisions to be made with minimum exposure to systemic failures of over- (and under-)investment, financial over-commitment, information inequity and large profit instability. Then, investment decisions depend on constrained expectations that reduce uncertainty and the susceptibility to large turning points on the investment cycle. A relatively more stable investment cycle and growth path should result.

This framework will now form the basis for evaluating the objectives and implementation of NB and Tasmanian IT strategies. Outcomes of both strategies are not explicitly evaluated or compared, since the time period of analyses and the institutional settings are vastly different. IA specifically evaluates how strategies are implemented.

Note that this is a *political economic* analysis, in which the ability to implement the objective not only depends on getting the economic business 'fundamentals' right, but also ensuring that the business decisions are made within the context of a particular political context. A politically workable strategy incorporating the above methods, rules and controls provides the motor-force dimension to bring it to fruition.

Snapshot of Two Small Regional Economies

As the large national economies adopt various approaches to developing their digital-based information economic sectors, small sub-national peripheral economies (SSNPE) exhibit specific IT problems of their own in *relative* terms to core regions: physical, cultural and institutional isolation; low skilled workforce; poor infrastructure; political, financial and information inequities. These systemic problems are the reasons for strategic intervention at the SSNPE level. This study examines New Brunswick (Canada) and Tasmania (Australia) in their attempts to implement one specific model of IT strategic planning.

Background to the two regions under study is presented in summary form in Table 1. The table shows in snapshot form some pertinent elements of these two SSNPE.

Table 1 shows remarkable similarities between these two SSNPE, notably:

1. low and declining population with poor economies of scale;
2. high relative unemployment;
3. declining traditional sectors with high public debt;
4. dependence on domestic demand and low cost labour;
5. dependence on grants and subsidies from core to periphery leading to political support for public interventionist policies across the political party spectrum;
6. IT plan 'ends' with change of government and initial uncertainty on how to continue supporting the digital economy without seeming to give credit to initiators of the IT plan.

There are a few notable differences between the two:

1. much stronger NB investment (but also much more volatile: see next section);
2. gross production in Tasmania declined by 0.6% for 1998–99 revealing political uncertainty following change of government;

Table 1. Snapshot of New Brunswick and Tasmania, 1999

	New Brunswick (NB)	Tasmania (Tas)
Population	752,351 (June 1998)	474,000 (June 1997)
Population, annual net change	− 2800 (1998–99)	− 4000 (1997–98)
Unemployment rate (annual %)	9.7 (June 99): 2% > nat. av.	8.9 (June 99):1.5% > nat. av.
Traditional industries	forestry, agriculture	forestry, mining, agriculture
Exports	67% to USA	26% to Japan
Net public debt ($A1 = C0.94)	$C7205 per capita. (June 99)	$A6725 per capita. (June 98)
Investment (annual % change)	+ 7.0 (Dec 98)	− 2.5 (June 99)
Retail sales (annual %change)	+ 5.1 (June 99)	+ 2.7 (June 99)
Gross production (annual % change)	+ 2.1 (Dec 98)	+ 2.8 (June 98)
Average wage earnings (% national average)	85.7 (May 99)	95.1 (June 98)
IT plan start	September 1993	April 1997
IT plan Premier and government control	F. McKenna (1987–October 1997) with absolute majority	T. Rundle (1996–August 1998) with minority government
Political spectrum	conservative interventionist	conservative interventionist
Current IT plan situation	Progressive Conservative party defeated McKenna's replacement, June 1999: state of plan uncertain	Labor party defeated Rundle-led Liberals, August 1998: initial uncertainty, now recasting plan in broader terms

Sources: compiled from various references.[24]

3. longer implementation time for the IT plan in NB before elections brought on change of government.

The New Brunswick IT Strategy

The New Brunswick IT strategy first needs to be placed within the Canadian political economy context. In the late 1980s there emerged in Canada a 'new interventionist' approach to public policy at the national and provincial levels. This approach related to a post-Keynesian proposal for a 'social contract' (or accord) between labour and capital and a neo-Schumpeterian thrust towards an innovative economy. Both arose out of concerns that neo-classical intervention in terms of macro-'inflation-first' and micro-'deregulation and privatisation' policies through the 1980s resulted in the loss of international competitiveness which '… weakened the links between market and state essential to the country's innovation capacity'.[25] Assessment of the 'new interventionist' approach was that '… it was never able to undergo the transformation from a good idea to viable practice'.[26] Essentially, the strategies failed at the first hurdle set up in the IA, with a distinct lack of 'voluntary conformity' by all parties.

The NB IT strategy is notable as an early protagonist in this Canadian 'new interventionism', and was touted in 1997 as a remarkable success and a blueprint for Tasmania to follow. To what extent did New Brunswick defy the broad Canadian experience and follow IA procedures? Evaluation of this question is based on a strategic assessment of how close the objectives of the strategy and its implementation conform to the IA template.

There is an implicit viewpoint that the NB strategy began in 1987. This viewpoint comes out from reports that use economic indicators to assess the NB project from 1987 when Frank McKenna became Premier of NB.[27] These reports show that the economic indicators provide a mixed result since 1987, with the best results appearing in annual

employment growth (4.8% in 1998–99) and increased annual participation rates (1987–99: rate went from 58.6 to 61%). Structurally, the NB economy remained a strongly resource-based economy, but its low-earning workforce moved from declining manufacturing jobs to expanding IT jobs.

During the first McKenna term (1987–91), a comprehensive economic development strategy outlined goals and initiatives to improve the climate for investment.[28] In relation to IT, the strategy stressed profits from the use of the province's newly emerging IT infrastructure. A business plan established orthodox 'corporatising of government' that reflects neo-classical static market analysis. The plan depended on the previous 20-year build-up of telecommunication infrastructure by NBTel, the provincial telephone company '… that took its universal service mandate seriously'.[29] What the province had when McKenna took office was a cheap equitable basic telephone service, with state-of-the-art service for large business customers. NBTel was already well down the track of installing digital switches, the key enabling technical move to make the convergence between the three sections of the modern information industry a reality.

McKenna's neo-Schumpeterian IT plan began in September 1993, when a steering committee was appointed to '… develop a strategy for government to accelerate evolution of the information highway in New Brunswick'.[30] The 1994 IT report from that committee was the blueprint, with three key components: accessibility of modern IT to all NB citizens, with the training to use it; the call centre capital of North America as the critical IT mass; and to encourage large companies to base their IT work in NB.

Researchers who have examined the NB strategy identify both positive and negative outcomes.[31] The positive outcomes were primarily:

1. increased labour participation rate—indicating an improved confidence in the community on the back of what has been considered an excellent marketing campaign by McKenna and his small IT secretariat (e.g. IT graduates out of NB colleges expanded from 500 in 1996 to 1705 in 1998 and they were still not covering demand);
2. strong call centre expansion—with over 55 centres established (17 in 1995 and 1996, while only six in 1997–98 July-to-June year), employing more than 7000 people;[32]
3. increased public sector employment to place online the required public information needed for traditional industries to integrate into the digital economy;
4. greater IT accessibility to the NB citizens (181 community access centres with training component, 40% of households IT-connected via tax rebates on PC sales and subsidised training, all schools linked to Internet with computer literacy and hardware established, distance learning, information and applications to government services—especially Health Net health delivery link).

The negative outcomes were primarily:

1. limited integration of IT with declining traditional industries;
2. increased barriers to entry for smaller local companies as a result of IT-based large companies establishing in NB;
3. fall in IT *intended* investment in 1997 (to $2.3b) compared to rising actual investment through 1994–96 (1996: $2.7b), reflecting greater tension in the build-up of investment orders and accompanying instability of investment which was not addressed by the NB IT strategy;[33] (subsequently investment increased by 7% in 1998 over the previous year[34]);
4. call centres attracted were North American domestic-based business, not international-based which provide 'higher order operations' (e.g. help desk, Asian languages component);

5. quality of jobs remained low paid relative to the communications industry average, with low skill transfer and career opportunities in the newly created IT area.[35]

Using the IA framework, a strategic assessment incorporating the above outcomes is conducted on the structure and conduct of the NB investment strategy in IT.

The NB IT-enhancement strategy met the first requirement of the IA template by specifying policy aims that were consistent with the 'order and coherence' objective. The genesis of the strategy was the province's April 1993 economic development report that identified investing in, and managing IT as the targeted focus which would increase value for NB through innovation.[36] Recognition that the market on its own would not convert a structural change into a strong growth path without a long, problematic and unstable trajectory of private investment underlies both the genesis 1993 report and the actual IT strategy report a year later.

The method of achieving this aim had two IA elements; regressive inference and secondary controls. Again to the credit of the NB strategy, it closely followed the IA method. The McKenna Government in its first term set up a business plan for the province in the strategy report, *Toward 2000*. This report lacked a specific investment strategy, but aimed at encouraging IT business to the province (and IT adoption by local business). This was a necessary first step in a 'regressive inference' required by the IA framework. Businesses began to see the strategic advantages of a province with sophisticated IT public infrastructure already established. The motivation was based on understanding the human agency of entrepreneurs in terms of providing a co-operative economic environment, with workers and public servants that supported IT investment decisions within the province.[37] The April 1993 report was the next step, where the identified need for an interventionist IT investment strategy was followed by the full-blown IT investment strategy in the 1994 IT report.

Secondary controls were introduced in the 1994 IT strategy, both in terms of technical engineering rules governing investment in IT and motivational substructures. NB began the strategy with a 'well-endowed' IT public infrastructure which provided 'an array of services unknown in other provinces'.[38] The motivational substructure was supported by an array of dynamic microeconomic operational factors as 'incentives' from the public sector: only official bilingual province outside Quebec, educated workforce, low or zero tax conditions (payroll, sales, property, import duties), forgivable loans, investment credits and re-location allowances.[39]

At the specific strategy implementation level the NB strategy diverged from the IA framework. On the positive side, the NB strategy developed a strong 'voluntary conformity' across virtually all agents of change in the province: public servants, local business, media, education and training providers and their students, community groups. Two publicly dissenting 'voices' were unions in traditional industries, which saw the strategy as a neglect of their structural change predicaments; and the National Anti-Poverty (not based in NB) Organisation supported this view.[40]

The other positive aspect related to the human agency elements of investment behaviour by entrepreneurs, which were anticipated in the sense that the strategy ameliorated tensions in committing large amounts of dollars into an uncertain future. Brian Freeman, acting director of the IT secretariat in NB said, '… what we're selling is a business environment', not by incentives alone, but by offering a stable business and workplace environment to which the IT function of large firms can develop strategic advantages.[41]

Three factors existed on the negative side. One was the lack of perspective planning to the strategy. There was no publicly nominated revision of the strategy to assess the

path and rate of diffusion of investment and technology. Short-term goals in the process of achieving the long run investment and economic development goals were not specified. Without short-term goals, and their revision according to circumstances, the strategy relied on a few determined individuals only. To the credit of the IT secretariat in the NB government, there were four such individuals who persevered with the strategy of attracting large company IT-based call centres and 'back offices' for a long time before achieving any success. This, however, is not the blueprint for a general investment strategy.

The second factor specifically related to the individuals who were instrumental for the IT successes in NB. Apart from the determination of the four-person team (three from NB government and one from NBTel), there was the energy, charisma and leadership of Premier McKenna with virtually no opposition political party as a distraction from his long-term strategy. A general application investment strategy cannot be based on such efforts by a specific small band of individuals. The 'voluntary conformity' element of the IA analysis remains only superficial and is linked to the specific (often-charismatic) nature of a few individuals at the command, leading to political uncertainty if the leaders depart. This then has the hallmarks of a *dirigiste* regime familiar in South-East Asia with strong powerful leaders of developing economies.[42]

The third factor related to the contradictions in the deregulatory approach to secondary controls. The NB strategy aimed to foster private investment in the relatively unregulated IT growth sector and away from the regulated and protected mature and declining traditional sectors. Once the IT firms were attracted to NB, a static neo-classical economic perspective applied, arguing for the market economy to take advantage of a low cost competitive advantage. Yet the plan also wanted to keep this advantage through state support for maintaining low turnover/skills/earnings labour force, public infrastructure and tax expenditures which 'socialise the costs of production'. This deregulatory approach was a further threat to 'voluntary conformity', essential to the participatory mechanisms of the IA framework.

The McKenna 'market-based' secondary controls placed strains on agents' co-operative participation and community support in the strategy. The IT sector tended to discount rates of return on investment projects over a short payoff period due to the quick obsolescence rates. International evidence indicates that such short foresight results in increased uncertainty and pronounced volatility in investment behaviour.[43] This raises the spectre of uncertainty concerning the longevity of the IT-based investment by large firms from outside NB. The neo-classical perspective argues that call centres would migrate in the next generation of investment decisions to the new lower cost regions with appropriate multilingual human capital skills, probably in South-East Asia where the English language and industrial clusters like the Malaysian MSC will be highly developed. The fall in intended NB investment noted above showed increased investment susceptibility to such market uncertainty.

Economic and regional disparities emerged between IT and traditional sectors in NB.[44] The deregulatory approach lacked any overall investment strategy that included management of these disparities arising from structural change. The 'running government as a business' and 'customer focus' of the McKenna Government further exacerbated inequalities. People involved in the IT sector experienced the benefits of state support from the IT strategy (for the short-term at least). People closely aligned with the declining sectors were not able to access these benefits and were indirectly subsidising the IT sector. Inequalities that emerge can only break any community consensus and 'voluntary conformity'.

Comparison with the Tasmanian IT Strategy

The centrepiece of the *Directions Statement* (DS) by the Tasmanian Government in April 1997 was an IT strategy explicitly modelled on the NB strategy. The details of this strategy and its links to NB are set out in a separate document entitled *Directions for Information Technology and Advanced Telecommunications* (DIT) issued with the DS.[45] The physical and economic similarities between NB and Tasmania provided the attraction for telecommunications equipment manufacturer Nortel to form a strategic alliance with the Tasmanian government in order to deliver the IT-enhancement strategy. Nortel also agreed to provide the technological equipment for the NBTel/NB strategy in IT. This section provides a strategic IA assessment of the investment strategy specifically in relation to the NB strategy, which DIT was modelled on.

NB and Tasmania are both small isolated members of a federation where economic growth stagnated as the traditional resource extracting industries experienced long-term declining prices and protected small manufacturing industries closed due to sharp reductions in effective protection rates. Both NB and Tasmania have relatively large public sector employment, but with consistently higher than national average unemployment rates and emigration of young people to the nearby strong business centres of Toronto and Melbourne, respectively. The regional-based labour force in both that remain are stable, committed, homogenous (very little recent immigration), with basic education and a relatively low wage structure in a low housing cost environment.

The first strategic assessment comparison shows a vastly weaker IA-based methodological starting point for an investment strategy in DIT relative to NB:

1. two strong initial IT competitive advantages by NB of state-of-art telecommunication public infrastructure[46] and only bilingual workforce outside secessionist Quebec were not in existence in Tasmania;
2. expensive internet access in Tasmania relative to NB: higher cost Tasmanian service providers relative to major mainland centres and with metered long distance (not local) rates outside 22 Tasmanian locations.[47] NB community access centres received 2 years of free electronic access from NBTel, but unavailable under DIT;
3. no 'regressive inference' occurred in Tasmania before the IT strategy launch. A phone call from Nortel to the Tasmanian government around New Year 1997 started the DIT strategy that was launched in April 1997.[48] There was no preparation of the local business community into the advantages of IT over a lengthy period as in NB;
4. lack of integration by Tasmanian business prevented them from linking into the IT network. Products and services were not standardised enough and the producers had no basis for networking.[49] The IT industry itself was fragmented with no systems integrators. Recent research suggests that integration is difficult since local small and medium size enterprises have little faith, ability and confidence in using IT.[50]

The second comparison is based on the ability of the Tasmanian government to effectively implement strategic policies (secondary controls) relative to NB. Tasmania's ability to implement the similar model IT strategy was less than NB in terms of the following points:

1. Australian States have only limited fiscal powers to structure attractive incentive packages (no control of fiscal instruments like sales tax, import duties, investment allowances off income tax). Together with Tasmania having the highest public sector debt in the Commonwealth, this fiscally constrained any incentives at Tasmania's disposal (NB had balanced budgets and more fiscal powers) and severely inhibited operation of dynamic motivational incentives in Tasmania;

2. minority government in Tasmania towards the end of a lacklustre term is a different situation to that of McKenna with a powerful parliamentary position and a consistent (if very narrowly focused) vision on IT;
3. local Tasmanian business community's inability to grasp the positive implications of the IT strategy even after 6 months of promotion (business expressed their concerns with the IT strategy that the Premier had 'lost the plot'[51]). Stagnation through 1997 in Tasmania compared to national expansion intensified business concerns over the DIT strategy,[52] compared to the closer linkage between the expanding North American economy in 1994 and the NB economic climate;
4. lack of highly qualified and experienced managers and team leaders in the private sector to supervise the implementation of the DIT plan (with the accompanying difficulty of attracting such people from other States and overseas).[53] Human resource management in Tasmania required reconceptualising as a business service strategy within the DIT plan;
5. Tasmanian public servants were divided in their commitment to the IT strategy, with only a small team based in the Department of Premier and Cabinet having evident strong ability and faith in the strategy.[54] A stronger motivational private and public sector substructure developed over a longer time period in NB compared to DIT.

Tasmania did develop some policy-induced IA strengths over NB in implementation.

1. Most important was the expressed view that DIT formed an integral part of the larger overall DS strategy, encompassing all sectors of the community. The IT base linked into these other sectors when appropriate (e.g. Land Information System Tasmania LIST project combined all land information into a single multimedia model for all diverse users of land information: emergency services, real estate, environment, etc.). Broad based 'voluntary conformity' and industrial synergies develop, but only after the implementation lag for these links are established.
2. DIT did not have the strong deregulatory focus of NB, arguing from a Keynesian perspective that the '… Government believes that applications drive demand which supports investment in physical infrastructure and not the other way round'.[55] This provided a more supportive microeconomic action directive consistent with a Keynesian macroeconomic employment goal strongly supported by the community.
3. Major Projects Tasmania (MPT) was a team concentrating on attracting large corporations to set up call centres (and back office work) with strong business plans based around various advantages available in Tasmania.[56] This emphasised the need to develop economies of scale. Options included choice of different regional locations with and without technology park cluster centres. MPT put together case-by-case incentive packages (government business as 'anchor client', rate and rent subsidies, removal of payroll tax, training support and relocation assistance) to supplement business plan options.

The policy-induced strengths of DIT provided a stronger IT 'jump start' than NB had at the same 18-month interval, this is despite the more stagnant economic situation in Tasmania over this interval. In Tasmania, the Keynesian demand–push perspective and the strong Premier Department team (including MPT) provided the basis for:

1. large call centre employment creation;[57]
2. electronic commerce establishment through the State as anchor client, University of Tasmania link with research and training, support for business incubators;
3. social capital 'top-down' development of public IT accessibility through access

centres, school programs, community networking and public service networking to customers.[58]

The relatively weaker structural elements in Tasmania raise serious concerns about its ability to maintain this implementation momentum. Further, the lack of public review processes undermined any IA perspective planning. The IT division in the Tasmanian Department of Premier and Cabinet conducted regular reviews internally, but they had both no public scrutiny and no clearly specified mechanisms that led to adjustments of the strategy as perspective became clearer. This further exposed the lack of broad-based voluntary conformity and consequent minimal participatory mechanisms, forcing the State Government to produce some public participatory processes 7–12 months after launch, but by then it was too late.[59] The government was voted out on 29 August 1998, only 15 months after the launch of DS.

General Findings

Strategic assessment based on the IA framework conducted on the NB and Tasmanian IT investment strategies in this paper suggests that there were a few more crucial hurdles for the latter version to overcome in implementation compared to NB. More general concerns emerged from the comparison about developing investment strategies and implementing them from a neo-Schumpeterian perspective. Such concerns provide the basis for applying IA for more efficacious investment policies. These public policies aim to address directly volatility, uncertainty and consequent low level of investment in advanced capitalist economies; problems that neo-classical economics, in its indirect market-oriented approach, has found difficult to handle.

Five general findings can be derived from the IA case studies in this paper.

1. The deregulatory (neo-classical) approach to investment planning is at odds with IA. Secondary controls by the state require intervention in areas identified as systemic failures. This is particularly the case with the unstable nature of investment. To base such intervention on 'imitating the market' through low cost (e.g. cheap wage) and deregulatory (e.g. 'free' trade) policies undermine investment strategy through tensions, disparities and longer-term atrophy of the type discussed in the NB plan.
2. Both plans lacked any *processes* by which participatory and perspective planning mechanisms could be built into the strategies as they evolved over time. The long-term is only made up of many short-term periods in which participatory adjustments are made, keeping in perspective the long-term goals (and even altering these long-term goals as a result of short-term adjustments).
3. Both plans lacked a specific approach to managing structural change that the IT strategies imply. A detailed approach to how all sectors in the economy are going to manage change due to global corporate dictates (of which IT is only part) is required. The Tasmanian DS made an effort to address all these sectors in the document, but there were no guidelines for managing change in these sectors.
4. Human resource planning strategy is needed to complement any investment plan that threatens to alter the labour skill requirements of a community. Both plans had built-in short-term training needs that needed to be addressed by education administrators. What the plans lacked, however, were ongoing skill development and career opportunities outside of obtaining the first (usually) low paid job. There must be a determination in the participatory mechanisms to create a long-term labour resource-base that becomes so institutionally and culturally embedded into the community that

it survives and prospers despite new IT development bases in other States and nations.[60]

5. A national (and even international) focus on the structural changes and the systemic failures that arise provide a much stronger basis for developing effective investment strategies. It is easier to write a plan for a small region, as well as being easier to analyse it. Small SSNPE regions, however, lack the political and structural powers to implement many aspects of needed investment plans.

Conclusion

Applying these findings produces a plan with strong voluntary conformity, motivational force, flexibility and institutional support that ensures longevity and stability for the strategy. This is essential for holding on to private business interests within the region, when other regions within the nation and other national economies are also developing proactive investment strategies. 'Footloose investment' is thus dissuaded, with regions and nations beginning to work out how their plans can effectively complement each other by developing co-operative synergies. That is a separate study in itself. Specifically, from discussions with both regions' IT experts, more of the NB plan seems to have survived relative to the DS plan after both regions changed government, reflecting the comparative assessments made in this paper.

The case studies of investment plans in these two small peripheral regions indicate that with some adaptation such state interventionist plans can be a more successful approach to creating businesses and jobs than the neo-classical market approach with all its systemic failures and disparities. Failures in these plans can be accommodated by more flexible arrangements to needed adjustments in a dynamic global economy. The IA approach by Adolph Lowe provides a framework with which to devise, assess and improve on participatory strategies. This is the policy challenge opposing neo-classical orthodoxy for the new digital economy in the next century.

Notes and References

1. The author would like to thank the following who helped make the world of information technology and its application to New Brunswick and Tasmania more understandable: David Bruce, Peter Dowling, Bruce Felmingham, Peter Hay, Simon Himson, Chris Keen, John Lamp, Tony McCall, Colin Richardson, Margaret Thurstans, and an anonymous referee. Earlier versions of this paper were presented to the Conference of Economists '97, Hobart, Australia, 29 September 1997, and University of Tasmania, School of Economics seminar, May 1998. I thank participants in both forums for stimulating comments.
2. The Internet began in 1969 by the USA defence department, funded virtually completely by the USA taxpayer. Only when the World Wide Web was overlayed on the Internet around 1990 did the private sector recognise the commercial viability of innovation in IT. D. Tapscott, *The Digital Economy: Promise and Peril in the Age of Networked Intelligence*, McGraw Hill, New York, 1995, sets out in detail the various elements of this IT industry and how it developed.
3. *Ibid*, pp. 66–8.
4. For detailed statistics on the information-poor, see United Nations Development Program, *Human Development Report 1999*, United Nations, New York, 1999.
5. L. C. Thurow, *Building Wealth: The New Rules for Individuals, Companies and Nations in a Knowledge-Based Economy*, Harpercollins, New York, 1998. World Trade Organisation (WTO) mass action protest in Seattle in December 1999 was organised over the Internet.
6. J. Courvisanos, *Investment Cycles in Capitalist Economies*, Edward Elgar, Cheltenham, UK, 1996, in Chapter 7 outlines patterns of investment instability in many case studies of manufacturing

industries in capitalist economies. The instability patterns are more pronounced in emerging and infant industries. This pattern is being reproduced in the IT 'service' industry.

7. On the empirical evidence that shorter foresight creates greater instability, see C. Hillinger, M. Reiter and T. Weser, 'Micro foundations of the second-order accelerator and of cyclical behaviour', in C. Hillinger (ed.), *Cyclical Growth in Market and Planned Economies*, Clarendon Press, Oxford, 1992, p. 179.
8. See H. Hollanders, L. Soete and B. ter Weel, 'Trends in growth convergence and divergence and changes in technological access and capabilities', MERIT Research Memorandum 99–019, Maastricht University, Maastricht, 1999.
9. J. R. Stanfield, *Economics, Power and Culture: Essays in the Development of Radical Institutionalism*, Macmillan, London, 1995, pp. 26–7.
10. *Ibid*, p. 27. An example is the handing over to a few private sector companies of the original Internet backbone (NSFNet) that had been progressively developed to deliver higher and higher speeds by the publicly funded National Sciences Foundation. Investment and embodied technological development ground to a halt while the new owners concentrated on capturing economic rents through fees to businesses and households scrambling to connect to the network. NSF and the universities became so concerned about the consequent performance degradation of the network that they have banded together and obtained public subsidies for investment in a parallel (and even faster) backbone network (Internet 2) exclusively for their own use. Thanks to Colin Richardson for providing this example.
11. See policy challenges to the nation state as a result of IT-based expansion in L. Soete, 'The new economy: a European perspective', paper presented to the European Socio-Economic Research Conference, Brussels, 28–30 April 1999, pp. 17–23.
12. See, for example, R. Nelson, 'Neoclassical vs. evolutionary theories of economic growth: critique and prospectus', *The Economic Journal*, December 1974, pp. 886–905; C. Freeman, 'The "National System of Innovation" in historical perspective', *Cambridge Journal of Economics*, 19, 1995, pp. 5–24. The report: OECD, *Technology and Productivity: The Challenge for Economic Policy*, Organisation of Economic Co-operation and Development, Paris, 1991, has endorsed this investment strategy approach.
13. A. Goldsworthy (Chairman), *The Global Information Economy: The Way Ahead*, The Information Industries Task Force for the Department of Industry, Science and Tourism, Commonwealth of Australia, Canberra, August 1997. D. Mortimer (Chairman), *Going for Growth: Business Programs for Investment, Innovation and Export*, Commonwealth of Australia, Canberra, July 1997.
14. For discussion of all possible public policies aimed towards ameliorating instability in private investment planning and establishing basis for long-term productive investment and growth strategies, see Courvisanos, *op. cit.*, pp. 225–30.
15. D. Charles, R. Allen and R. Buckeridge, *Spectator or Serious Player?: Competitiveness of Australia's Information Industries*, Allen Consulting, Melbourne, 1997. On the 8 December 1997, the Howard Coalition Commonwealth Government in Australia presented its policy response to the studies referred to above in the policy document, *Investing in Growth*. It was a first tentative step towards a proactive strategy by a government which historically and philosophically is non-interventionist and only responds to systemic failure in a reactive manner. The policy identifies one industry; IT. It establishes a Minister for Information Economy, but sets up only minor programmes related to test-bed facilities and removal of tariffs on some computer inputs. The policy is generally non-industry specific, with expansion of R&D support, setting up a case-by-case 'investment promotion and coordination' unit, and providing some trade/custom duty support.
16. Reflection on both regions' IT strategy is appropriate at this stage, since the government parties and their administrative leaders that established these strategies have been completely removed from the policy-making scene in both regions as a result of both government parties being voted out of office.
17. A. Lowe, *The Path of Economic Growth*, Cambridge University Press, Cambridge, 1976, pp. 11–12. Allen Oakley was 'instrumental' in guiding me through Lowe's work during my Ph.D. studies. His own exposition of Lowe's work in A. Oakley, 'Introduction: Adolph Lowe's contribution to the development of a political economics', in A. Lowe (ed.), *Essays in Political Economics: Public Control in*

a Democratic Society, New York University Press, New York, 1987, is an excellent introduction to this form of analysis, and this section borrows heavily from it. See also A. Lowe, *On Economic Knowledge: Towards a Science of Political Economics*, various editions (originally published 1965), especially Chapters 5, 10, 11 and 12.

18. Courvisanos, *op. cit.*, pp. 190–2.
19. Such understanding needs to be based on realism in theory stemming from 'satisficing' under fundamental uncertainty in H. C. Simon, *Administrative Behavior*, 3rd edition, Free Press, New York, 1976; rather than the abstract neo-classical investment modelling of A. Dixit and R. Pindyck, *Investment Under Uncertainty*, Princeton University Press, Princeton, 1994. The latter allows for only 'as if' statements with homogenous capital and ability to establish future rates of return on calculable uncertainty.
20. As identified and clearly set out in Michał Kalecki, *Selected Essays on Economic Planning*, Cambridge University Press, Cambridge, 1986.
21. Lowe applies the term primary controls to orthodox macroeconomic demand management policies (see Oakley, *op. cit.*, pp. 17–18). Such public policies will not, on their own, deliver appropriate goal-adequate paths due to systemic failures in market economies with specific technological systems.
22. These controls specifically eschew structural change through deregulation and privatisation which destroy scale economies and only address market structure without appreciating the nature of firm (and worker) conduct in deregulated markets that lead to discordance. A classic example of this is the major 'discordance' arising from financial deregulation in the 1980s. This occurred in all economies that undertook major financial deregulation; for Australia, see S. P. Martin (Chairman), *A Pocket Full of Change: Banking and Deregulation*, House of Representatives Standing Committee on Finance and Public Administration, AGPS, Canberra, November 1991 and T. Anderson, 'Financial deregulation: why did competitive markets fail?', *Journal of Australian Political Economy*, 31, June 1993, pp. 57–73; for USA, see M. Mayer, *The Greatest-ever Bank Robbery: The Collapse of the Savings and Loan Industry*, Charles Scribner's Sons, New York, 1990 and L. R. Wray, 'Commercial banks, the central bank, and endogenous money', *Journal of Post Keynesian Economics*, 14, 3, Spring 1992, pp. 297–310; for Canada, see T. Perrin, *Short-Changed: Victims of the Canadian Financial Crisis*, Western Producer Prairie Books, Saskatoon, 1989.
23. For details on how investment co-ordination by information agreements and industrial concentration would assist such micro-goals in policy-oriented strategies, see G. B. Richardson, *Information and Investment: A Study in the Working of the Competitive Economy*, Oxford University Press, London, 1960 (second edition, 1990).
24. Stats Can. June 1999; ABS, June 1999; New Brunswick Budget Paper 1999–2000; Tasmania Government Budget Papers 1998–1999; J. Loundes, 'The states', in Mercer–Melbourne Institute, *Quarterly Bulletin of Economic Trends*, Issue 3.99, University of Melbourne, Melbourne, 1999, pp. 27–35; T. McCall, 'Call centres in regional Australia: panacea or poor relation of the information economy', paper presented at the 3rd National Conference on Sustainable Economic Growth for Regional Australia, Sunshine Coast, 16–17 September 1999.
25. M. Howlett, S. McBride and M. Ramesh, 'The new interventionism in Canada: an assessment', *Journal of Australian Political Economy*, 37, June 1996, p. 98.
26. *Ibid*, p. 107.
27. Examples include J. W. Rose, 'The selling of New Brunswick: fibre optics or optical illusion', in D. M. Brown and J. W. Rose (eds), *Canada: The State of the Federation 1995*, The Institute of Intergovernmental Relations, Kingston, 1995, pp. 171–87; R. Scott and K. Nichols, 'Re-inventing Tasmania: the New Brunswick experience', *The Examiner*, 28, 29 & 30 May 1997.
28. Government of New Brunswick, *Toward 2000: An Economic Development Strategy for New Brunswick*, 1989.
29. Rose, *op. cit.*, p. 174.
30. Government of New Brunswick, *Driving the Information Highway: The Report of the New Brunswick Task Force on the Electronic Information Highway*, Information Highway Secretariat, Department of Economic Development, Fredericton, 1994, executive summary.
31. All the economic indicators referred to in the following three paragraphs are derived from Rose *op.*

cit., Scott and Nichols, *op. cit.*, and Statistics Canada, *Historical Labour Force Statistics* (Cat 71–201), *Employment Statistics* (Cat 71–529) and *Capital Expenditures* (Matrix 3114), various issues and T. McCall, *op. cit.*

32. McCall, *op. cit.*, p. 10. Unemployment rate in NB remained the highest in Canada throughout most of the period of this IT strategy: average 1994 12.4%, August 1997 12.5%. By June 1999 it stood at 9.7%, two percentage points above the national rate, but now Newfoundland had 16.6% (Statistics Canada, June 1999). This was in a period when North America generally improved on its unemployment rates. The IT-related employment from the positive effects may have simply prevented the unemployment from being worse as a result of the decline in traditional industries like ship-building (job displacement).
33. Statistics Canada, *Capital Expenditures*, Matrix 3114, 23 July 1997.
34. McCall, *op. cit.*, p. 5.
35. Rose, *op. cit.*, p. 181.
36. Government of New Brunswick, *Toward Self Sufficiency: Strategy for Economic Development*, Department of Economic Development and Tourism, April 1993, p. 6.
37. M. Altman, *Human Agency and Material Welfare: Revisions in Microeconomics and their Implications for Public Policy*, Kluwer Academic Publishers, Boston, 1996.
38. Rose, *op. cit.*, pp. 174–5.
39. See Government of New Brunswick, 1994, *op. cit.* In NB, '… companies pay only 22 cents for every $100 of payroll. This compares to the $6.34 paid in Ontario'. Rose, *op. cit.*, p. 182.
40. Scott and Nichols, *op. cit.*, provide a case study and general observations from the NB community's attitude to this IT strategy.
41. *Ibid*, 28/5, p. 10.
42. See I. Islam and A. Chowdhury, *Asia–Pacific Economies: A Survey*, Routledge, London, 1997, p. 39. McKenna resigned from parliament in October 1997. His party lost the election in June 1999, leaving the IT strategy in political uncertainty.
43. See C. Hillinger *et al.*, *op. cit.*, p. 179.
44. Rose, *op. cit.*, pp. 181–3.
45. Department of Premier and Cabinet, *Directions Statement*, Government Communications Office, Hobart, 10 April 1997 [DS]; Department of Premier and Cabinet, *Directions for Information Technology and Advanced Telecommunications*, Government Communications Office, Hobart, 10 April 1997 [DIT].
46. DIT, *Ibid*, p. 22 states that '… the State does not yet have access to all the powerful communications services that it needs to take advantage of the full range of potential telecommunications and information applications'. The Networking Tasmania Project (NTP) and the Regional Telecommunication Infrastructure Fund (RTIF) are aimed at addressing this with the support of federal funding from the Telstra partial sale.
47. N. Clark, 'Net in state "costly" ', *The Examiner*, 24 October 1997, p. 5; 'Access costly in Tasmania', *The Examiner*, 27 October 1997, p. 15. Telstra provided Australia-wide Internet Protocol bandwidth at 19 cents per megabyte downloaded. This remains a costly barrier to community access for the information-poor.
48. P. Collenette, 'In search of a new direction', *The Examiner*, 31 May 1997, pp. 4–5.
49. N. Clark, 'Firms urged to act together', *The Examiner*, 17 June 1997, p. 11.
50. K. Lawrence, 'Factors inhibiting the utilisation of electronic commerce facilities in Tasmanian small-to medium-sized enterprises', *Proceedings of the Eighth Australasian Conference on Information Systems*, Adelaide, September 1997, pp. 587–97.
51. Examiner, 'You've lost the plot', *The Saturday Examiner*, 9 August 1997, p. 1.
52. See J. Courvisanos, 'Region in transition: Schumpeterian road to recovery in Tasmania', *Journal of Economic and Social Policy*, 4, 1, Summer 1999, pp. 45–62.
53. Lawrence, *op. cit.*
54. Based on personal confidential discussions with various Tasmanian public servants.
55. DIT, *op. cit.*, p. 22. This quotation continues by explicitly noting demand will be driven by: '… the Government's efforts as model user and anchor client, expenditure from the RTIF and other public investment must be directed at the development of applications'.
56. See Major Projects Tasmania, *Tasmanian Call Centre Capability Document*, Government Communications Office, Hobart, January 1998.

57. NB took 18 months to attract its first call centre (email with MPT, 21 January 1998), while Tasmania attracted 1100 call centre staff positions after 15 months—2% of all call centre positions in Australia. This figure however includes some 100 call centre positions by Ansett in Launceston which had been secured before the April 1997 DS launch. See J. Caples, 'Huge jobs boost', *The Examiner*, 6 February 1998, p. 1; N. Clark, 'North wins Westpac Call Centre', *The Examiner*, 2 January 1998, pp. 1–2; M. Simmonds, '200 jobs for Hobart Call Centre', *The Examiner*, 11 October 1997, p. 4.
58. For details on all these three dot points up to August 1998 (when the government party lost office) see Business North, 'The information economy', *Northern Economic Bulletin*, Northern Tasmanian Regional Development Board, 3, December 1998, pp. 3–6 (www.businessnorth.com.au).
59. This became evident in initial meetings on the DS strategy, when leading politicians, public servants and strategically aligned businesspersons (e.g. Nortel and NBTel) stated the importance of community participation but then proceeded to undermine it by presenting the IT plans as a *fait accompli*. Towards the end of 1997 and in early 1998 a participatory strategy began to emerge in relation to facilitating public IT access ('Opportunities open', *The Examiner*, 27 October 1997, p. 15) and IT integration of local businesses and community organisations ('Getting started workshops', throughout Tasmania, 2–6 February 1998).
60. This might require a change of focus so that the IT strategy is merely a means towards creating a strong (say) tourist economy.