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A Comparison of IT Industry Success in Finland and New Zealand

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Abstract
Given the importance of the information technology industry in today's global economy, much recent research has focused on the relative success of the countries within the Asia-Pacific region in fostering IT industries. This article compares IT industry success in one particular country within the Asia-Pacific region (New Zealand) with that of Finland. New Zealand and Finland are alike in many respects, yet Finland's IT industry is more successful than New Zealand's. Three major factors that impact on the development of a successful IT industry are identified: the extent of government IT promotion, the level of private sector research and development investment, and the existence of an education system that produces IT literate graduates.

Keywords: IT industry success, government information industry strategy, IS education in Pacific Asia countries, software industry, New Zealand, Finland

1. Introduction

Much recent research has focused on the relative success of the countries within the Asia-Pacific region in fostering IT industries. This research is important because those countries that can adapt and develop new information based industries will thrive and become significant players in the global economy. Those countries that cannot adapt will suffer and may find themselves as producers of low value products for wealthier nations.

This article compares IT industry success in one particular country within the Asia-Pacific region (New Zealand) with that of Finland. New Zealand and Finland are alike in many respects, yet Finland's IT industry is more successful than New Zealand's. This paper suggests factors that may contribute to the differing levels of IT industry success.

2. Theoretical Framework

Most of the previous research in this area has compared a reasonably large number of countries. For example, Blanning et al. (1997) examined the information infrastructure of twelve Asia Pacific nations; Dedrick et al. (1995) examined reasons for the success of IT industries in nine small countries from around the world; and Kraemer, Gurbaxani, and King (1992) discussed the diffusion of computing use in nine Asia Pacific nations. Generally, these studies have examined a small range of factors that impact on either the success of a nation's IT industry or its extent of IT usage.

In contrast, Ein-dor et al. (1997) examined only three small countries – Israel, New Zealand, and Singapore. These three countries were of similar size and economic development, however, they were experiencing differing levels of IT industry success. They were examined in depth to determine those factors that impacted on the development of a successful IT industry in a small country. Ein-dor et al's (1997) study has been one of the

few pieces of research that has examined only a small number of countries in an in-depth manner. This research study adopts the approach and model as used by Ein-dor et al. (1997) and compares just two countries, New Zealand and Finland.

Ein-dor et al.'s (1997) model was itself largely based on Grossman and Helpman's (1991) macro-economic theory concerning the relationship between technology development, trade, and growth as applied to small open economies. The latter suggested that "growth stems from endogenous technological progress, as far-sighted entrepreneurs introduce innovative (intermediate) products whenever the present value of the stream of operating profits covers the cost of product development." Grossman and Helpman (1991) postulated that the best growth path can be attained with subsidies to both R&D and the production of "intermediates" (those products which are used to produce consumer goods). The second-best growth path can be achieved with subsidies to R&D alone.

In order to study IT industry success in accordance with the above theory, Ein-dor et al. (1997) considered four groups of variables. These variables were as follows:

1. Controlled variables: country size and economic development.
2. Dependent variables - those which define IT industry success.
3. Exogenous mediating factors.
4. Endogenous mediating factors:
    - Domestic IT use.
    - Firm strategies.
    - Government IT policies.
    - Government education policies.

In our study, we considered the same four groups of variables, however we decided to replace "firm strategies" with "level of research and development" (because the latter appear to us to have more explanatory power). The major factors that we considered in our study are represented graphically in Figure 1.

This model was then used to compare and explain IT industry success in Finland and New Zealand. Due to space limitations, data on the exogenous variables (geographical location etc) and domestic IT use have been omitted, although more details are available in Watson (1999).

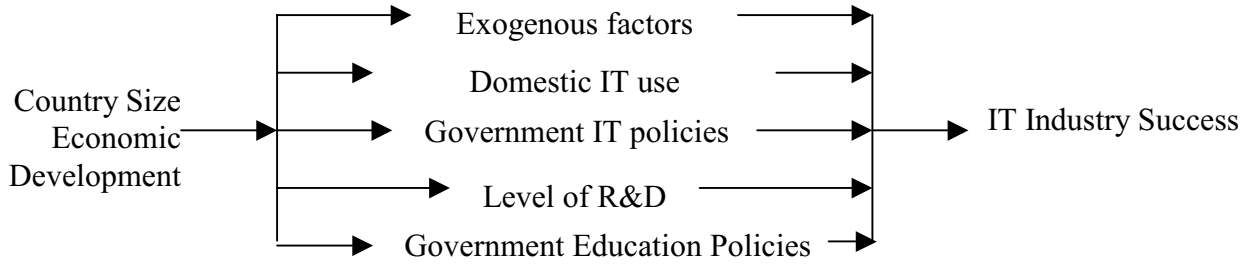

Figure 1. Factors Affecting IT Industry success (adapted from Ein-Dor et al [1997])

3. Methodology

The research methodology involved collecting a range of quantitative and qualitative data about Finland and New Zealand. The data are presented according to the factors suggested by Figure 1 above. Data for this research was collected from a variety of sources including OECD reports, official government publications, industry surveys, newspaper articles, web sites, and international research companies. All monetary figures used in this paper have been converted to US dollars.

4. Country Comparison

Finland and New Zealand share many similar characteristics with regard to country size and economic development.

4.1 Country Size

Dedrick, Goodman, and Kraemer (1995) define a small country as one which has fewer than ten million people. Finland and New Zealand, with populations of 5.1 million and 3.6 million respectively, are thus considered small countries. The physical size of the two countries is also similar which, along with a similar population, means that their population densities are almost identical.

4.2 Economic Development

In the early 19th century, Finland was one of the poorest and most agrarian areas in Europe. Because of the cold climate, agricultural development was limited in most areas except for forestry (Lyytinen and Goodman, 1999). The economy made a turnaround in World War II (WWII) when Finland developed a machine industry. In the fifty years since WWII, Finland successfully changed gear and cut its reliance on producing primary commodities (Information Technology Advisory Group, 1999).

Today, Finland is considered a highly industrialised, largely free market economy. Finland's traditional forestry industry accounts for less than 3% of GDP, despite experiencing growth output. High technology industries account for a significant percentage of the Finnish GDP. Finland has thus transformed itself from a commodity-based economy to one that has embraced new technologies (Information Technology Advisory Group, 1999). As a result, Finland's GNP per-capita has grown to more than $24,000, placing it amongst the world's wealthiest countries.

New Zealand has historically relied heavily on agriculture. This mainstay of the New Zealand economy went through a massive growth period in the late 1800's due to the invention of refrigerated ships. These new ships enabled New Zealand meats and dairy products to reach Britain, which was New Zealand's primary market at that time (Myers, 1996).

New Zealand depended heavily on primary commodity exports to Britain up until the end of World War II. In the early 1980's the government initiated major economic restructuring in order to move from an agrarian economy to an industrialised, free market economy that could compete globally. This dynamic growth boosted real incomes, strengthened business confidence, and increased demand for New Zealand exports in the Asia Pacific region

(Central Intelligence Agency, 1999). Exports also diversified away from dairy, meat, and wool into such industries as forestry, horticulture, fishing, and manufacturing (Myers, 1996).

Today, New Zealand still relies heavily on external demand for its agricultural based products. However, New Zealand's modern agriculture, forestry, and fishery industries produce a large variety of products with added value, catering for niche markets in many countries (Ministry of Commerce, 1996). Whilst these new value-added products have been contributing to New Zealand's GNP per-capita, it has not been experiencing the growth of countries such as Finland.

4.3 Summary

Finland and New Zealand are remarkably alike in terms of country size and economic development. Both Finland and New Zealand entered the 20th century with a heavy dependence on commodity products. Forestry has played the same role in Finland's development as agriculture has played in New Zealand's development. According to our research, the only difference between the two countries is that Finland has moved away from its dependence on forestry and has grasped on to new technologies, whereas agriculture is still a major part of New Zealand's economy.

5. IT industry comparison

Finland's IT industry is far more successful than New Zealand's in terms of both industry development and industry success, as can be seen from Table 1.

5.1 IT Industry Sales

The IT industry is a very important sector of the Finnish economy, with sales accounting for around 9% of Finland's GDP. Sales in the New Zealand IT market are substantially smaller than in Finland, at around 4% of GDP.

5.2 Number and Size of IT Firms

It is estimated that there are about 4,200 IT firms in Finland. The majority of these firms are very small, with 3,700 of them having fewer than five employees (Nygard and Kunnas, 1998). Four IT firms are included in Finland's top 50 companies, with Nokia being the largest company in Finland. Three out of four of these companies sell telecommunications products and services.

New Zealand has just over 2,500 firms in the IT industry, with the majority of firms being in the software or services sector. Like Finland, most of these firms are very small. Telecom New Zealand, the second largest company in the country, is the only IT firm included in New Zealand's top 50 companies. However, there are 13 IT firms listed in the top 200 companies (Deloitte & Touche Consulting Group., 1998).

Table 1. 1998 IT Industry Success

	Finland	New Zealand
IT Industry Development		
IT Industry Sales (billions)	11,087	2,155
IT Sales/GDP	9.0%	4.1%
Number of Firms in IT	4,200	2,500
IT Firms/Largest firms	4/50	1/50
IT Industry Employment	5.5% (1997)	2.6% (1996)
IT Industry Success		
IT Exports:		
Hardware (millions)	7,255	175
Software (millions)	488	123
Total (millions)	7,743	298
High Technology Exports (millions) –1997	8,797	428
High Technology Exports/Manufactured exports -1997	26%	11%
Stock Market Listings:		
Domestically listed IT firms	27	3
Internationally listed IT firms	1	0

Sources: (Computerworld, 1999; Deloitte & Touche Consulting Group., 1998; Ein-Dor, et al., 1997; Finnfacts, 1999; Helsinki Stock Exchange, 1999; March, 1999; Nygard and Kunnas, 1998; Statistics Finland, 1999a; Statistics Finland, 1999b; World Bank, 1999).

5.3 IT Employment

In Finland, 5.5% of persons employed in the private and public domains during 1997 were engaged in jobs in the IT industry. Because of the growth of the IT industry, it accounted for almost 13% of the total increase in the number of employed persons in 1996-1997 (Statistics Finland, 1999a).

In New Zealand, the number of people who were working in the IT industry in 1996 increased by 4% to 41,823. However, as a percentage of the working population, the number employed in the IT industry decreased from 2.9% in 1991 to 2.6% (March, 1999).

5.4 IT Exports

Finland's IT exports have experienced dramatic growth in recent years. Strong export positions have been created in mobile phones, personal computers and software products. In fact, Finland and Ireland are the only two European countries with positive trade balances for IT products and services. Moreover, exports of Finnish IT products and services are expected to double by 2002 (Lyytinen and Goodman, 1999).

Much of this rise in Finnish IT exports has been thanks to global telecommunications company Nokia, which to some has become better known than Finland itself. Nokia's success is partly attributable to its acceptance of the Global System for Mobile Communications (GSM) in 1989, which made Finland the first country to launch a digital mobile network. GSM has since become the standard in all other continents except the Americas (Lyytinen and Goodman, 1999). Nokia's growth has been such that if it continues

at the same pace, its revenues will exceed the budget of Finland some time early next decade (International Telecommunication Union, 1999).

New Zealand's export sector has failed to develop an information technology segment similar to that of Finland (Information Technology Advisory Group, 1999). New Zealand's IT hardware exports represent a fraction of Finnish hardware exports. However, hardware exports are increasing and over the last five years have experienced an average annual growth rate of 25%. Telecommunications hardware has been one of the major contributors to increases in hardware exports. Exports of software and services increased by 56% from 1997 to 1998 (March, 1999).

5.5 High Technology Exports

In 1998, nearly a fifth of Finland's exports were high technology products, up from only 4% a decade ago (Edmondson, 1995). In 1995, the value of high technology exports exceeded that of imports for the first time. Further, much of Finland's high technology production is oriented to foreign markets, as indicated by the fact that 25% of manufactured exports are in high technology sectors (Kraemer and Dedrick, 1992).

Like IT exports, high technology exports in New Zealand are significantly smaller than in Finland. At $428 million, New Zealand exports are equivalent to 5% of Finnish high technology exports. Also, high technology production accounts for only 11% of total manufactured exports.

5.6 Stock Listings

There are 150 firms listed on the Helsinki Stock Exchange. Twenty seven of these firms are in the IT industry, which represents 18% of all firms on the stock exchange. One Finnish firm is listed on international stock exchanges. This is of course Nokia, which is listed on six exchanges including the New York Stock Exchange (Perry, 1999).

New Zealand's stock exchange, the NZSE40, only lists the top 40 public companies. With three of these companies in IT, the industry represents 7.5% of all listed companies.

5.7 Summary

Finland's IT industry is far more successful than New Zealand's. At this stage, most of Finland's rapid rise to success in IT can be attributed to Nokia. Even so, the fact that such a small country can spawn a multibillion-dollar company is a notable achievement. The remaining sections of this paper present the three factors that help explain the differing levels of IT success exhibited by the two countries.

6. Government IT Policies

One of our major findings is that the Finnish government has promoted IT very heavily compared to the New Zealand government. Our research has focused on government promotion in terms of national IT strategies, IT priority, and the existence of government IT organisations.

6.1 National IT Strategies

For a long time Finland has been seeking to play a pioneering role in implementing an information society. In order to do this, Finland's Information Technology Advisory Board (1976 to 1991) deemed that a national information society strategy was necessary. This idea was supported by a country review of Finland's IT and telecommunications policies performed by the OECD in 1990 to 1992. The OECD country review concluded that while Finland had reached an astonishingly high level of IT and telecommunications penetration, the country lacked a clear statement of strategy in these areas. Consequently, the Ministry of Finance was given the task of preparing one. The report, entitled "Finland Towards the Information Society - a National Strategy," said that Finland should aim to use IT to gain and maintain a competitive edge within the world economy (Ministry of Finance, 1996).

Finland's government promotes the utilisation of information networks and the Internet. The government ensures that basic information society skills are available to all. It is also in the process of developing a Information Highway that will eventually reach homes, public services and small and medium-sized enterprises (Ministry of Finance, 1996).

The Finnish government is actively promoting the development of the IT industry. Programmes and grants have been established that seek to strengthen the competitiveness of the industry, to create new products, new businesses, and new jobs (Ministry of Finance, 1996). Further, the government assisted in the creation of Oulu's Technopolis, the world's northernmost science park. Technopolis is home to the world's best telecommunications and electronics technology and to over a hundred new technology ventures (Edmondson, 1995).

Unlike Finland, New Zealand has never had a formal IT strategy, nor are there any plans to implement one. The previous National government rejected the idea of a formal IT strategy because it preferred to let the free market reign. The government believed that support for the IT industry would go against its philosophy of deregulation and would foster a return to the projectionist welfare state of the early 1980's. It also feared that by directly supporting one industry, other industries would be penalised. As such, all industries are supported through wider economic strategies. For example, the Asia 2000 strategy aims to create favourable conditions for New Zealand exporters to move into Asian markets. Further, the government's macroeconomic policies aim to keep inflation low and to maintain a favourable exchange rate (Myers, 1996).

In terms of IT development, government promotion is minimal. There are no special tax incentives, and few loans or grants are available for IT companies (Ein-Dor, et al., 1997). The government also does not insist on purchasing local IT products, even though such decisions can have a tremendous impact on industry development. In one break from its free market stance, the government worked with local businesses to create the Canterbury Technology Park. This park was developed to enable high technology companies to interact with local academic and research institutions (Kraemer and Dedrick, 1993).

6.2 IT Priority

The development and use of IT receives a very high priority in Finland. The fact that Finland created a national IT strategy highlights the importance attached to IT. Also, parallel IT strategy work has been going on in other areas in Finland, most notably in the industrial, educational, cultural, and health and welfare sectors (Ministry of Finance, 1996).

The IT priority in New Zealand remains low, however, a new organisation, the Information Technology Advisory Group (ITAG), was established to provide policy advice to government on IT.

6.3 Government IT Organisations

Finland has one government IT organisation (the Technology Department) that is responsible for developing IT related strategies and policies. Three more government IT organisations provide advice and stimulate discussion on IT related issues. One of these, the Science and Technology Policy Council, discusses important questions relating to the advancement of science, technology, and scientific education. The other two include the National Information Society Forum and a Government Committee for Information Society Issues (Ministry of Finance, 1996).

The Finnish government has also promoted the development of inter-ministerial clusters. These clusters bring together technology developers, public service providers, and policy makers. The clusters partake in IT related policymaking, research, and technology development in an interactive way that creates a fertile ground for innovation (Maenpaa, 1999).

No New Zealand government IT organisation is responsible for setting IT related policies. However, the government does receive advice on IT issues from three main sources. The first is the Information Technology Policy Unit, which resides within the Ministry of Commerce. The purpose of the unit is to provide economic policy advice. Further sources of advice include ITAG and the Electronic Commerce Steering Committee (Information Technology Advisory Group, 1999). All three of these organisations have been established within the last six years.

6.4 Summary

Finland and New Zealand are clearly different in terms of government IT promotion. Finland has a high priority national IT strategy that promotes both IT use and industry development. As a result, Finland is both a heavy user of IT and a significant player in the international IT industry. New Zealand has no IT strategy and IT is treated in the same manner as all other industries. While this lack of government support has not hindered New Zealand's adoption of IT, it has hindered its IT industry success. Government promotion of IT is thus one factor that impacts on the development of a successful IT industry.

7. Level of Research & Development

7.1 Extent of R&D

Research and technological development have been priority areas in Finland for 20 years. As a result, investments in R&D have risen steadily for the past 15 years. The growth in research spending has been among the highest in the OECD countries, at around 16% per annum. The proportion of GDP spent on R&D has risen from 1.8% in 1987 to 2.7% in 1997 (Statistics Finland, 1999b).

Research activity in IT has also been steadily growing over the last decade. Much of the initial increase in IT R&D was due to the Finnish government increasing and reallocating

funding to this area. The Finns have now achieved world class results in areas including neural computing, telecommunications protocols, databases, information systems, and software engineering (Lyytinen and Goodman, 1999).

The majority of Finland's R&D spending is funded by the private sector. This trend has been increasing and in the past few years Finnish companies have raised their R&D investments by about 15 to 20% annually (Maenpaa, 1999). The reason for this increase is that the government has been actively simulating R&D spending in industry in order to decrease its own R&D spending. These efforts have certainly paid off and while the world's top 300 companies spent an average of 4.6% of sales on R&D, Finnish companies spent more than double the OECD average, at 10.4%. Nokia alone spent more on R&D than the whole of New Zealand (Information Technology Advisory Group, 1999).

In terms of total R&D expenditure New Zealand is more than halfway down the OECD country list, with only 0.98% of GDP going into R&D (ITAG, 1999). Though efforts are being made to increase total R&D spending, these efforts are insignificant and are unlikely to make a major difference to R&D as a percentage of GDP (OECD, 1996c). With total R&D expenditures low, it is not surprising that IT R&D spending is dismal. In 1995, a mere $2.86 million of government funding was spent on IT R&D. Total private and public sector investment in IT R&D accounted for only 1.3% of total R&D spending (Information Technology Advisory Group, 1999).

The most significant contributor to this small amount of R&D is New Zealand's government. Even so, only 0.61% of GDP goes into government funded R&D, less than half the OECD average (Information Technology Advisory Group, 1999). Because the majority of the research is government funded, R&D is currently disproportionately skewed towards the agriculture sector. The government's main science fund, the Public Good Science Fund, concentrates on the horticulture, marine, and forestry sectors. Private sector investment is almost insignificant and has declined in recent years (OECD, 1996c). This is particularly unfortunate for the IT industry, which receives little government support and is thus predominantly funded by the private sector. With decreasing private sector R&D investment, it is widely agreed that there needs to be a much greater investment by the public sector in IT related R&D (Ministry of Commerce, 1999).

7.2 Performance of R&D

The majority of Finland's R&D is performed by the private sector, which ensures that research is directed toward commercially viable areas. This large amount of private sector R&D is due to work of the government funded Technology Development Center of Finland (TEKES), which has been fostering industry oriented R&D since 1983. TEKES created a tradition and mode of close industry-university interaction more advanced than most other countries. As a result, R&D and innovations have been encouraged in many industries, including the growing IT industry. TEKES also supports companies in their risk bearing R&D projects with grants and soft loans (Lyytinen and Goodman, 1999).

In contrast to Finland, most of New Zealand's R&D is performed by the public sector, specifically, by nine state-owned research companies, called Crown Research Institutes (OECD, 1996c). These companies tend to concentrate on basic research from which commercial applications can be derived (Ministry of Commerce, 1993). They also focus on primary production industries, which are often not adding any significant value or jobs to the

economy. This tendency to research in traditional industries is likely to change, as a recent alteration to government policy has opened up Crown Research Institute funding to companies and researchers. This change should increase the amount of R&D that is being performed by the IT industry.

7.3 R&D Tax Incentives

The Finnish government encouraged private R&D investment by providing tax incentives. Although these tax incentives have been discarded, they did stimulate R&D when they were introduced (OECD, 1996b).The current tax situation is still favourable to R&D. Finnish companies can fully deduct current business expenditures on R&D in the year incurred, machinery and equipment can be deducted fully in the year incurred, and buildings for research purposes may be depreciated in Finland at 20% per year (OECD, 1996a).

New Zealand's R&D tax situation is the least favourable of the OECD countries. No tax incentives are offered and for every dollar a private company invests in R&D it costs them $1.13 (Information Technology Advisory Group, 1999). New Zealand is also the only OECD country that does not allow current business expenditures on R&D to be fully deducted in the year incurred. This is because the tax law maintains that any kind of R&D expenditure is an investment expense and needs to be capitalised accordingly (OECD, 1996a). The requirement to capitalise R&D investment may lead to an under reporting of R&D, or it may act as a disincentive to such investments (Information Technology Advisory Group, 1999). Even though it has been found that short term tax breaks can help stimulate R&D spending, the former National government of New Zealand opposed allowing any such special treatment to move into the tax system (Myers, 1996). New Zealand is certainly not encouraging increased private sector investment in R&D.

7.4 Summary

Finland and New Zealand have vastly different levels of R&D investment. Finland spends an increasingly significant proportion of its GDP on R&D. Most of this R&D is funded and performed by the private sector. This ensures that it is concentrated in growth industries such as IT. Further, R&D continues to be stimulated through favourable tax conditions and grants from TEKES. In New Zealand, R&D spending is extremely low. The government funds and performs most of the research, which tends to be concentrated into declining agricultural industries. As a result, R&D in the IT industry is minimal. To make matters worse, New Zealand's tax situation does not encourage increased private sector R&D. Therefore, a country's level of R&D appears to effect the development of a successful IT industry. Moreover, a high level of private sector R&D investment seems to be important for IT industry success.

8. Government Education policies

8.1 Total Education Expenditure

It is believed that to a top quality education system is essential to being successful in the information age. Both Finland and New Zealand consider education important. When compared to other OECD countries, they exhibit among the highest education expenditures as

a percentage of GDP. Though Finland does spend slightly more of its GDP on education than New Zealand, both countries have well-developed education systems (Butler and Zwimpfer, 1997).

8.2 School Education

The Finnish education system has actively promoted IT skills, resulting in extensive IT usage throughout Finland's schools. Primary and secondary schools have offered computing since the mid 1980's (Lyytinen and Goodman, 1999). Today, students are exposed to IT at an early age and computer literacy is part of the national curriculum. Every student has access to a computer and every primary and secondary school has fast web access (Information Technology Advisory Group, 1999).

New Zealand's schools are making much smaller investments in IT infrastructure than other OECD countries (Butler and Zwimpfer, 1997). In 1998, there was one computer for every fourteen students in primary schools and one for every eight students in secondary schools, figures that are hardly considered adequate. Further, only 55% of primary schools and 60% of secondary schools have web access from at least one classroom. Fortunately, there have been recent increases on IT expenditure in schools and it is expected all schools will have adequate computer and web access within the next five years (March, 1999).

8.3 Tertiary Education

Finland has around 20 universities or other institutes of higher education. Computing education began in the higher education sector when the first chair in computing was established in 1965. By the end of 1996 IT topics were taught in 15 universities that annually graduate over 600 five-year degrees and 40 doctorates. Finland also has an extensive network of polytechnics that produce over 2,000 degrees each year in computing and engineering (Lyytinen and Goodman, 1999). Reacting to the demand for trained professionals, universities and polytechnics have dramatically expanded their computer and IT related programs over the past few years. Finland now produces five times as many science and technology graduates as law graduates (Information Technology Advisory Group, 1999).

New Zealand currently has eight universities. Most of the universities and the 25 polytechnics offer IT related degrees and/or diplomas (Ein-Dor, et al., 1997). The number of students enrolled in IT related courses have been increasing dramatically over the past decade. However, the 1996 graduates in these areas amounted to only 3.84% of the total number of graduates. There have also been complaints that there is a mismatch between IT graduate skills and those required by the IT industry (Ministry of Commerce, 1999).

8.4 Summary

In terms of the importance of the education system, Finland and New Zealand are very similar. They both have well-developed education systems, indicating that a reasonable level of education is required for IT industry success. However, the Finnish and New Zealand education systems do differ in two main ways. Firstly, Finland has implemented IT and promoted IT use in schools to a greater extent than New Zealand. Secondly, Finland is producing a greater number of IT related graduates. These two findings may even be correlated. Students that are exposed to IT in schools may be more inclined to pursue IT

related courses at tertiary level. In any case it appears that educational policies have an impact on IT industry success. Specifically, a high degree of IT competence at school and tertiary level is associated with a successful IT industry.

9. Conclusion

This paper has identified Finland and New Zealand as being similar in terms of country size and economic development. Despite this similarity, the two countries are experiencing differing levels of IT industry development. Finland's IT industry is far more successful than New Zealand's, particularly in terms of the hardware sector.

Though there may be other factors that have contributed to Finland's success, our research has suggested three major factors – government IT promotion, high levels of private sector R&D investment, and an education system that produces IT literate graduates as being important. These findings are consistent with those of Ein-Dor et al. (1997) and support the macro-economic theory of Grossman and Helpman (1991). It appears that there is an optimal level of government support for IT industries in small, open economies, and that government support for the IT industry (as in Finland) is substantially better than no support at all (as in New Zealand).

Of course, one of the main limitations of this study is that only two small developed countries were studied. Whether these findings hold for other small developed countries requires further research. Despite this limitation, the findings are consistent with earlier work in this area. As such, this paper should be of interest to all policy makers in the Asia Pacific region.

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