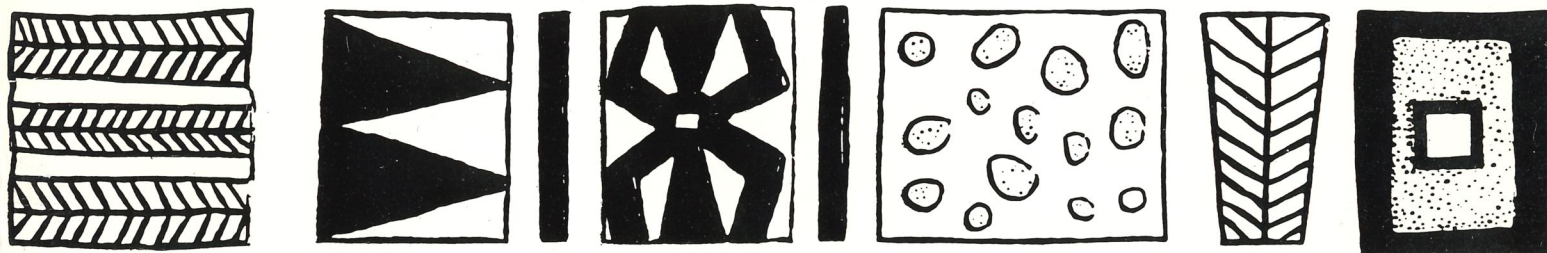
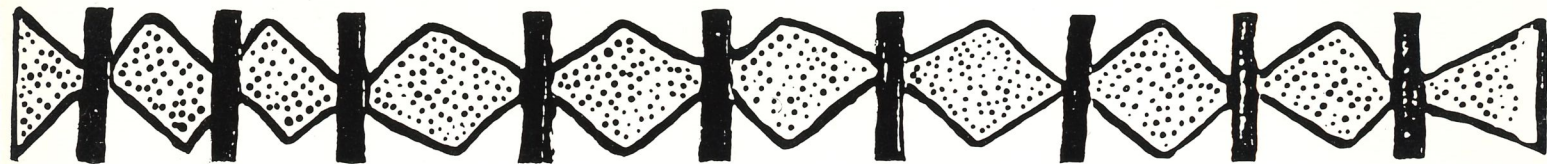
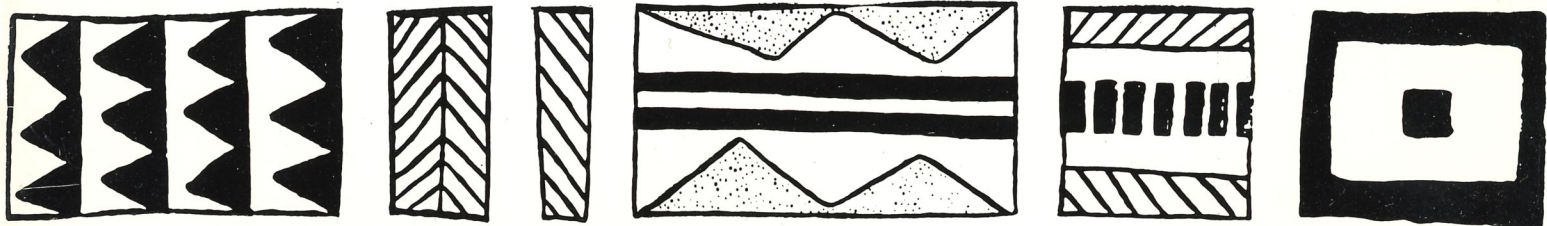
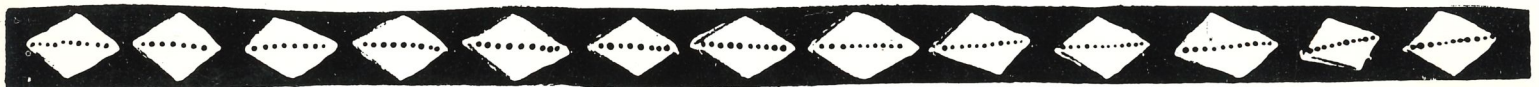
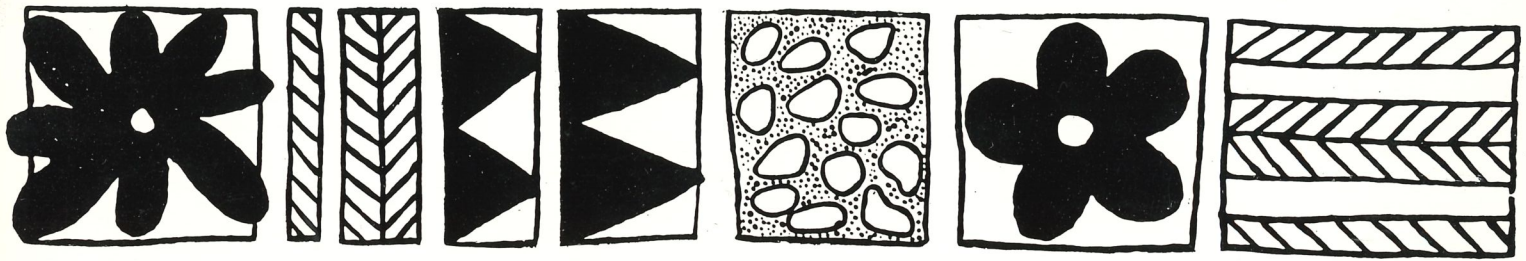


# Tomorrow's Skills



NEW ZEALAND  
**Planning  
Council**

*Te Kaunihera Whakakaupapa  
Mo Aotearoa*

*Paul Callister*

# Tomorrow's Skills

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Paul Callister

New Zealand Planning Council  
Wellington  
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## Foreword

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The prosperity of New Zealand depends substantially on the efficient use of natural resources. In the past, natural resources would bring to mind the quality of our farmland, our offshore gas reserves, the abundance of our fisheries, and our hydro-electricity. While each of these is important to Fletcher Challenge, increasingly we see that a highly skilled and motivated workforce is our single most important resource. This is a view shared by business leaders in high income, high growth countries such as Japan and Germany.

Many New Zealanders believe that we already have a highly educated, highly skilled workforce, equal to any in the Western world. Yet the reality is that close to half of our workforce has no formal school qualification and 60 percent has no tertiary qualifications. A massive effort in training and retraining across the whole of the nation will be required to bring about a fundamental improvement. Business, government, unions and, ultimately, individuals all must play their part.

*Tomorrow's Schools* has a vital role to play in ensuring that the new entrants into the workforce bring with them a high level of skills. Despite recent improvements in the numbers of students staying on at school and then moving to further education, our participation rates place us closer to Turkey and Greece than to the top performing OECD countries.

The dramatic changes required will not come about simply by pouring more government money into education and by parents telling students that they should stay on longer. What is also required is for boards of trustees, teachers, parents and, most importantly, students to see the value of upgrading skills.

The New Zealand Planning Council, in its *Tomorrow's Skills* publication, clearly shows the need to upgrade skills across the whole economy. The booklet identifies potential growth areas in the economy and the types of skills required to ensure that growth does take place. It does not predict the number of accountants, chefs or computer programmers needed in the future, but instead gives a broad outline of the types of jobs which are likely to grow.

Boards of trustees, teachers, parents and students would do well to consider these overall trends. Responses to the information will naturally differ from school to school, and between students. But overall, if we are to return to a high income, high employment society, each of us needs to think carefully about the skills we will need in the new economy. *Tomorrow's Skills* provides vital and timely information to help us all come to a clearer decision about our future.

Hugh Fletcher  
Chief Executive Officer  
**Fletcher Challenge Limited**

# Contents

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Introduction	1
The new economy	2
Composition of world trade	2
Which market segments will we sell into?	3
Who will we sell to?	4
How will we produce the goods and services?	5
Other factors shaping the new economy	5
Employment in the new economy	6
The move to service sector employment	7
The move away from manual work	9
The move to information-intensive jobs	11
The move to jobs requiring higher levels of education	11
Other significant movements	12
Skills for the new economy	13
How successful have we been in the past?	16
Responses from business, community, and government	19
The challenge for <i>Tomorrow's Schools</i>	20
Improving participation rates	20
Making what is taught in schools more relevant to the new economy	21
Conclusion	23
References	24

## Introduction

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*"There's plenty of office jobs — executives and all that — advertised in the paper but no actual physical work. But I've worked everywhere with a shovel and a pick in my hand and you can't go into an office with a shovel and a pick."*

Michael, 54, *New Zealand Listener*, April 1989.

Since the 1950s, when New Zealand was effectively the United Kingdom's farm, our economy has undergone a process of radical change. Over the last decade this has been particularly dramatic with few people not personally affected. For the farming and manufacturing communities, major and traumatic changes began early in the 1980s; for education providers a set of major changes — *Tomorrow's Schools* — is now well underway. The forces driving this change are complex and endlessly debatable.<sup>1</sup> They include unsustainable levels of New Zealand's overseas debt, removal of protectionist policies, the need to bring inflation down, the globalisation of the world economy, technological innovation, and so the list goes on. However, one thing is certain — this process of change will continue and possibly speed up.

The rapidly changing economies of New Zealand and the world present new opportunities for business expansion and, ultimately, employment creation. Whether we have the ability to take advantage of these new opportunities depends on a wide range of factors, but a crucial issue is whether *Tomorrow's Schools* is teaching the most appropriate skills for the 'new economy'. To make this judgement requires some view on how the economy could develop in the future.



# The new economy

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*"Predictability is a thing of the past."*

Tom Peters, *Thriving on Chaos*, January 1988.

Predicting the future is becoming increasingly difficult. Ten years ago, who would have thought about the greenhouse effect, the idea that hand-held telephones linked via satellite could make telephone lines redundant, or the idea that pages of print would be routinely sent round the world electronically? Only five years ago, who would have thought New Zealand sailing technology was of a world class standard and, perhaps more importantly, that the America's Cup could help sailing provide up to \$1 billion extra income in the early 1990s? Who now believes New Zealand can compete in electronics manufacturing with the Japanese and Koreans? The DSIR do.<sup>2</sup>

With the increased uncertainty, detailed predictions of growth for specific industries, products, and occupations (such as the number of occupational therapists, shearers, and electrical engineers required in the year 2000) are therefore guaranteed to be wrong. However, very broad trends based on historical events, patterns in more advanced overseas economies, and some reasonably sophisticated 'crystal ball gazing', can be identified with some confidence.

Something we do know for certain is that New Zealand's prosperity will continue to depend on successfully selling our goods and services into highly competitive world markets. So what could these markets look like?

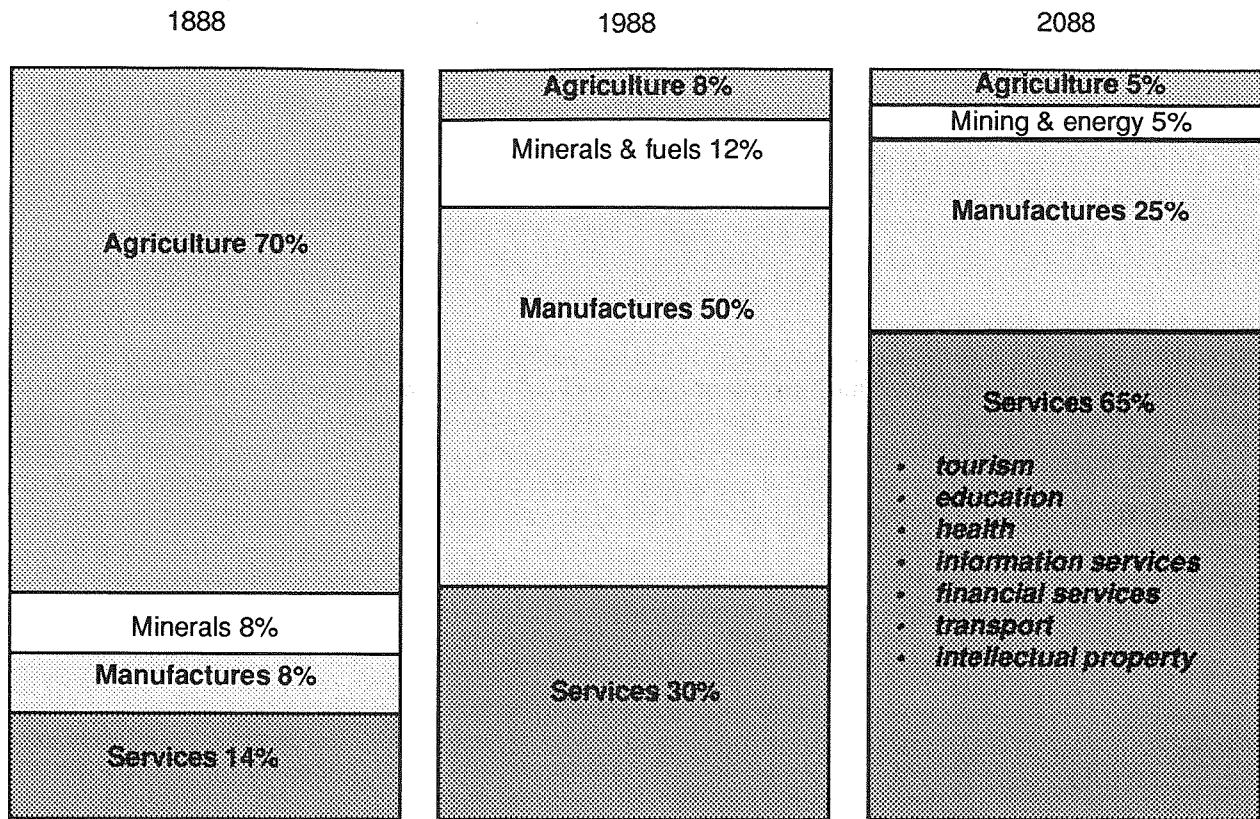
## Composition of world trade

A common theme running through predictions of the future is that of an emerging 'information and knowledge' based society. Although trade in actual physical goods — such as food and clothing — will obviously continue to be of major importance, it is trade in 'non-physical' goods which is seen as the growth area in the world economy. These include tourism, communications, business services such as advertising/market research/design, and community services such as health care/education.

A large proportion of these 'services' are in fact adding value to a physical commodity. For example, market research, advertising, transport, finance, insurance, and retailing of a carcass of meat all fall into the service sector. Infogram 1 indicates the likely extent of changes in the value of world trade over the long term.



Estimated Value of International Trade



Note: Guideline percentages only, to show paradigm shift  
 Source: Directions in Foreign Exchange Earnings, NZ Market Development Board

Which market segments will we sell into?

New Zealand has a small economy so we appear to have some choice as to the areas of international trade we wish to compete in, and on what basis. Broadly we have two options.

The first is to be a low cost producer of resource based commodities. This strategy would include trying to match the wages of workers in countries such as Chile, Thailand, China or Fiji. It would also see the majority of our exports targeted at the relatively slow growing, unprocessed agriculture commodity, and the semi-processed manufacturing sectors.

The second option is to compete on the basis of how quickly and how well we can transform our resources and ideas into high value products aimed at wealthy niche markets. This strategy would see us trying to match the wages of workers in countries such as Sweden, Japan or Germany. The majority of our exports would be targeted at niche agricultural markets, the rapidly growing 'added-value' areas of manufacturing, and at the service sector.

This second option requires a highly skilled, highly creative, motivated and adaptable workforce. In general we have been trying to pursue option two and it is clearly the preferred development strategy for New Zealand, but it places

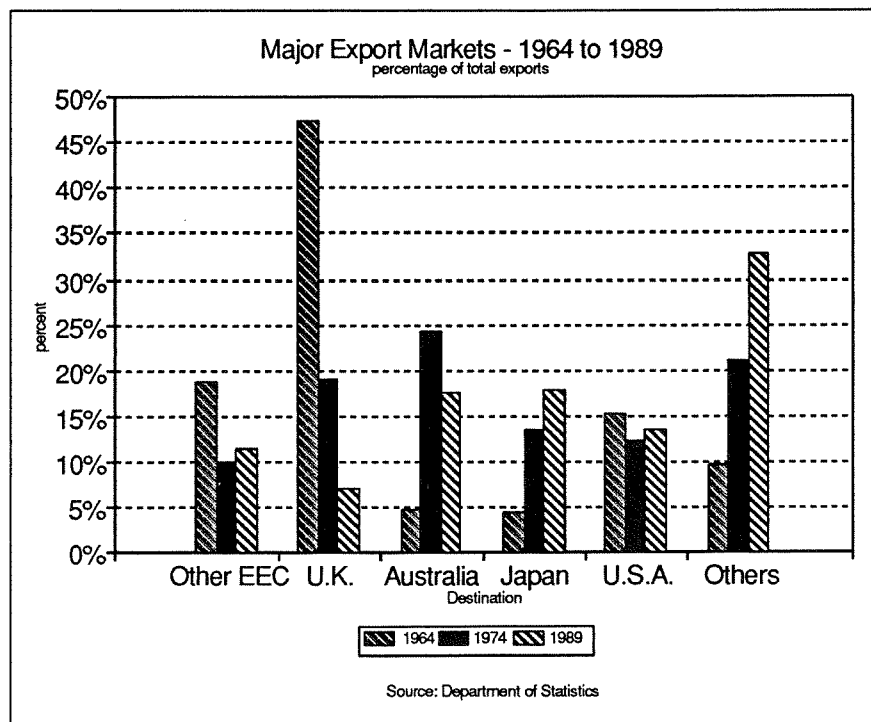
particular emphasis on the quality of our education system. According to Ken Douglas, President of the Council of Trade Unions,

"New Zealand's strength, in economic terms, arises out of the relative quality of our education system and the possibilities of a highly skilled and flexible workforce that it creates. In other words, we can not prosper by trying to outdo low wage economies in an assembly line production approach which is based on breaking work down into simple tasks, and having it performed by unskilled or low skilled workers. What we can do is develop a highly skilled adaptable workforce which concentrates on quality (rather than quantity) production, and innovation."<sup>3</sup>

## Who will we sell to?

The direction of world trade, as well as its composition, is changing. The post-war rise in the strength of the Japanese economy in particular has altered trade patterns for most countries and New Zealand is no exception. For New Zealand the changes have been particularly dramatic largely because of our almost complete dependence on the United Kingdom for export markets until the 1950s. Infogram 2 shows the changes over the years 1977-89 in the destination of New Zealand exports.

### Infogram 2



The infogram shows a strong decline in the proportion of exports going to the United Kingdom, but with increases to Australia, Japan, the United States and 'others'. This 'others' category includes the rapidly growing and increasingly wealthy Asian economies which are seen by many commentators as the key growth area for New Zealand exports.<sup>4</sup>

New Zealand has always sold the majority of its products to wealthy nations. Wealthy buyers have always demanded high quality products. What has changed is that increasingly these 'rich' nations do not have English as a first language, nor do they share

our cultural/religious heritage. While in the past we have obviously met with some success in these markets by using interpreters, or dealing with importers who have a grasp of English, in order to fully exploit these markets we need New Zealanders who can speak different languages and who are sensitive to a wider range of cultures.



## How will we produce the goods and services?

For New Zealand to prosper in the new economy some other factors will be necessary. For a start businesses within New Zealand will need to be internationally competitive, whether they are taxi companies, designers, sports people, researchers, freezing works, or educational institutions. The quality, price, and timeliness of delivery of goods and services will need to be comparable with (or preferably better than) the best producers in the world. If not, consumers will simply turn to an alternative source of supply.

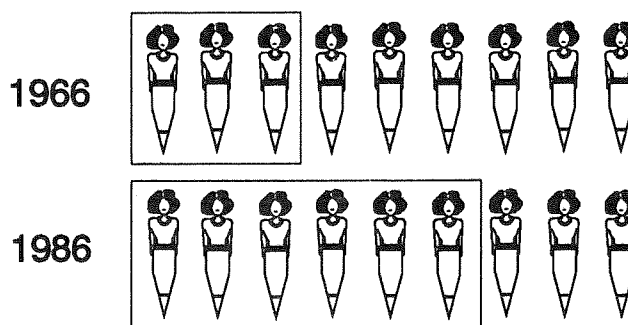
In relation to this there will be a constant need to improve productivity. This continual cycle of improvement is the key factor in returning New Zealand to a high income, high employment society. Productivity can be improved through innovation, co-operation, competition, creativity, commitment to excellence and, above all, flexibility of attitude.<sup>5</sup>

At the workplace, as well as for *Tomorrow's Schools*, this may require new institutional arrangements to ensure that the full potential of all workers is utilised. In the wider society it will require more interaction between different groups such as business people and educationalists, artists and manufacturers, scientists and marketing specialists. *Tomorrow's Schools* has a role to play in this process of breaking down artificial barriers.<sup>6</sup>

## Other factors shaping the new economy

While economic forces are a major influence in shaping the new economy, there are also social, cultural and demographic changes which will play their part. Examples of these include the ageing of the population, the increasing participation of women in the workforce and, linked to this, the switch between unpaid and paid work (such as childcare at home versus paid childcare), and changing family structures. These and other factors will help to shape future employment prospects and patterns.

Proportion of Women aged 15-64 in Paid Work



# Employment in the new economy

In 1988 the Planning Council produced a set of forecasts for the economy out to 1997.<sup>7</sup> These were based on a combination of industry consultation and economic modelling. The forecasts suggested a slow return to economic growth in the early 1990s, led by an increase in exports. Infogram 3 shows forecasts of exports and the resulting total economic activity by sector. For convenience the economy is divided into three major sectors — primary, manufacturing and services — with the industries in each shown in the following chart.

## Industries by Major Sector

### Primary

- Agriculture
- Forestry (logging/harvesting)
- Fishing
- Mining

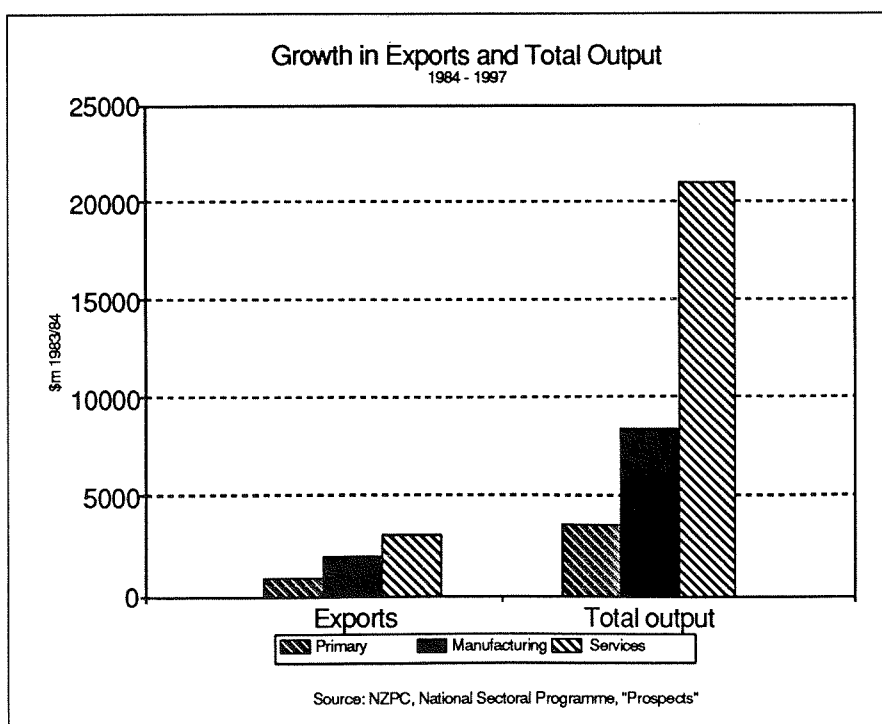
### Manufacturing

- Food, beverages and tobacco
- Textiles
- Wood and wood products
- Pulp and paper, and printing
- Chemicals
- Ceramics
- Base metals
- Machinery/fabricated metals
- Other manufacturing

### Services

- Electricity, gas, water
- Construction
- Retail and wholesale trade/restaurants/hotels
- Transport
- Communications
- Business services/finance
- Community, private and social services

## Infogram 3



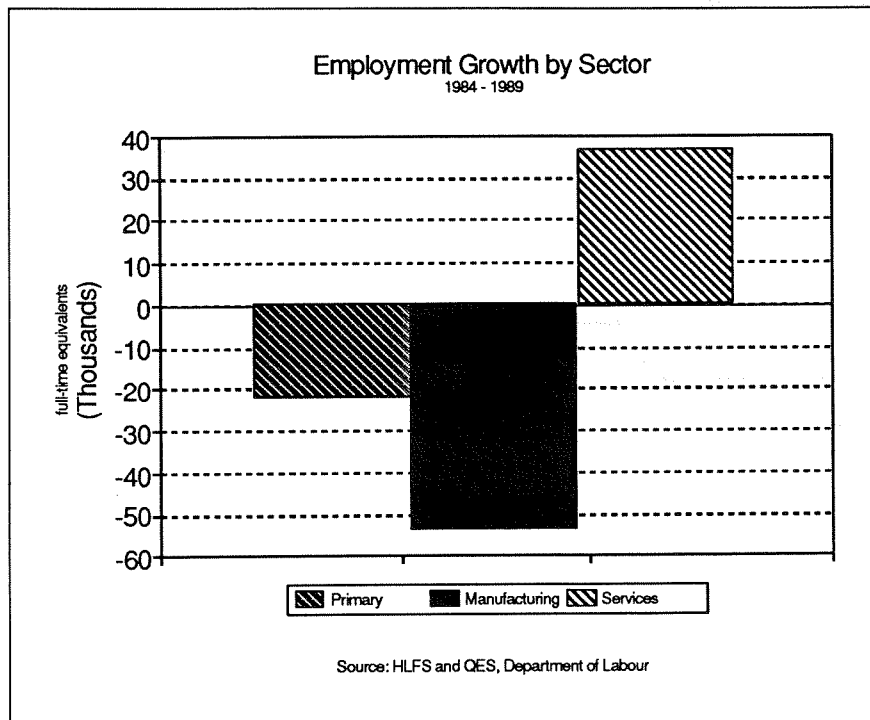
## The move to service sector employment

The major export growth in the primary sector is expected to come from horticulture and fishing, with some increase in dairy exports. In the manufacturing sector growth is forecast in the wood product area, pulp and paper, food processing, machinery and textiles. Much of this growth comes of course from 'adding value' to basic primary products.

A key element in service-sector export expansion is tourism, but it also includes growth in communications, finance, business services, transport, education and insurance, either as individual items or as a component of exports originating in the primary or manufacturing sectors.

This process of adding value through the use of knowledge and information in both the manufacturing and service sectors is a key feature of the new economy. We may not be able to compete, for example, with the Chinese in making carpets (from our wool) in terms of the costs of factory floor labour, but

### Infogram 4



in an increasingly capital intensive industry we may be able to produce superior designs, better advertising and marketing techniques, better delivery schedules and, ultimately, a higher quality product. Most of these added value activities use skills most commonly found in the service sector, but of course the whole production/sales process moves between all three sectors.

The wood-products export industry also indicates an increasing reliance on knowledge and information, with many of the inputs coming from the service sector. Already over one-third of inputs into the industry come from the service sector — for example, electricity, transport, engineering consultancy, and finance. If logs are to be further processed into

products such as quality packaging, specialist furniture, or high technology laminated structures, then design, chemical and mechanical engineering, computer technology and marketing skills will be increasingly needed.

However, looking at exports tells only part of the story of employment change. While exports may be the driving growth in the economy, they only form about 15% of total output. The other 85% is domestic trade, of which already over 50% can be classified as being part of the service sector. This domestic service trade includes activities such as education, health care, getting your hair cut, and eating out.

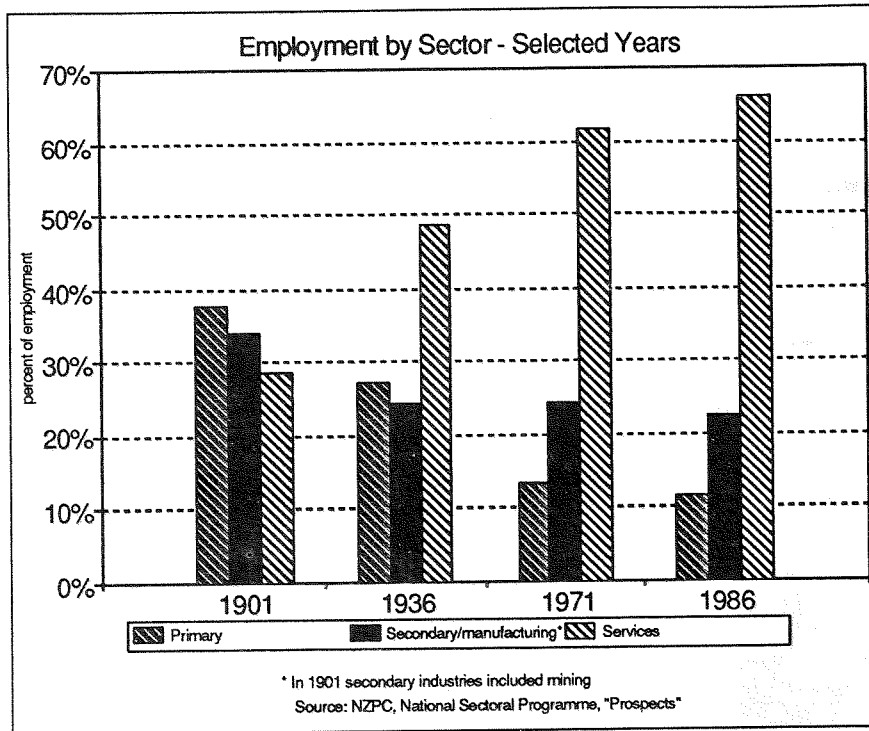
The translation into employment forecasts requires an additional, and extremely important, step in looking at changes in the productivity of labour.

In general, and in line with patterns in other developed nations, productivity has been increasing at a greater rate in the primary and manufacturing sectors than in the service sector. The replacement of handweeding and handpicking of tomatoes by chemical weed control and mechanical harvesters illustrates the move away from labour intensive employment in the primary sector. It is,

however, more difficult to replace doctors, teachers or waiters — all service sector employment — with machines. This trend is forecast to continue into the next decade. This means that proportionately the increase in service sector jobs will be even greater than the growth of output.

The pulp and paper industry provides a classic example of the employment effects from increasing productivity. Over the next decade output and earnings are expected to increase dramatically. But with increased mechanisation direct manual factory floor employment is expected to remain relatively static.

## Infogram 5



Instead the employment will be created in areas such as engineering, market research, sales, and transport, all inputs to the industry. But also of importance is the employment which is able to be created from the increased income from the sales of pulp and paper. Increasing output in primary and manufacturing industries is therefore still as vitally important as producing 'pure' services in terms of income generation, but not in terms of direct employment creation.

Between 1984 and 1989 one of the major ways used to increase productivity in both the primary and manufacturing sectors was through staff lay-offs. The shift to the service sector has therefore been particularly dramatic in this period. Although the changes have

been particularly pronounced over the last five years (and in fact over the next decade our forecasts indicate some return to growth in employment in both the manufacturing and primary sectors), the move to service sector employment is part of a long-term trend.<sup>8</sup>

Despite the current restructuring in service areas such as health services, our forecasts indicate that most of the growth in employment will continue to be in the service sector, but with some return to growth in primary and manufacturing industries once interest rates and *real* exchange rates decline. By the end of this century over 70% of jobs are expected to be in the service sector, with the traditional manual/resource based industries *directly* providing a very small proportion of jobs. While this may seem a large amount of people in the service sector, already in the United States over 75% of employees are classified as service workers and this proportion is still expected to increase.

## The move away from manual work

Changes in employment patterns can be further analysed by broadly dividing occupations into manual and non-manual. The definition of manual and non-manual work, however, is not simple.

Manual workers are often highly skilled, their skills based in large part on their physical abilities. Some examples of manual workers are farmers, plumbers, painters, carpenters, miners, forestry workers, drivers and most factory workers.

Non-manual workers are quite mixed — they are often highly skilled but with different kinds of skills from manual workers. Some examples of non-manual workers are salespersons, typists, managers, scientists, teachers, preachers, cooks, journalists, photographers, economists, hairdressers and housekeepers. Communication skills are very important in non-manual jobs — teachers, preachers, journalists, salespersons, managers and photographers are obvious examples. Presentation skills are often very important too — for salespersons in the way they present their products and themselves, for cooks in the way they present their meals, and for preachers in the way they present their sermons. Analytical skills are important in many non-manual occupations — managers, scientists, economists, journalists need well developed analytical and in many cases numerical skills.

Clearly the distinction between manual and non-manual work is one of degree rather than one of kind. All jobs require some manual and some non-manual skills. Perhaps the easiest distinction for our purposes is that manual workers tend to work up a 'sweat' in their work, non-manual workers tend not to. The distinction between manual and non-manual yields some valuable insights into how work is changing.<sup>9</sup>

### Some Manual and Non-manual Occupations

Manual		Non-manual	
plumbers	labourers	salespeople	hairdressers
drivers	miners	scientists	economists
painters	carpenters	cooks	journalists
factory workers		clerical workers	photographers
drivers	farmers..	nurses	teachers..



## Infogram 6

Occupations	Industries		All
	Primary & manufacturing	Services	
Manual	34*	10	44
Non-manual	10	46*	56
All	44	56	100

Infogram 6 divides employees by two categories, whether or not the work is manual, and in what sector it is carried out. The numbers show the percentage of people falling into each category — for example, in 1976 34% of all people in paid employment were in manual jobs in either the primary or manufacturing sectors. The big changes over time occur in the two key categories (marked with \*).

## Infogram 7

Occupations	Industries		All
	Primary & manufacturing	Services	
Manual	23*	11	34
Non-manual	11	56*	66
All	34	66	100

Infogram 7 shows the pattern ten years later. (This is the latest date for which information is available.) Focusing on the two key categories (\*), it can be seen that between 1976 and 1986 the proportion of people working in manual jobs in the primary sector decreased dramatically, down from 34% — over a third, to 23% — under a quarter. Over the same time the proportion of people working in non-manual jobs in the service sector increased to well over a half — from 46% to 56%.<sup>10</sup>

So what is likely to be the pattern moving towards the year 2000?

Infogram 8 is based on Planning Council economic forecasts plus an element of guessing. The infogram shows that nearly 70% of future jobs are expected to be in the service sector, with the majority of these being of a predominantly non-manual nature.

## Infogram 8

Occupations	Industries		All
	Primary & manufacturing	Services	
Manual	19*	10	29
Non-manual	12	60*	72
All	31	69	100



## The move to information-intensive jobs

Linked very closely to the move to more non-manual work is a shift towards 'information-intensive' jobs. While all jobs involve some use of information, information workers in this context are people using and transferring significant amounts of data. Australian research shows that between 1971 and 1981 the fastest employment growth was in those industries with the highest information intensity, and the lowest growth was in those with the least information intensity.<sup>11</sup> With the same industry growth pattern in New Zealand the trend towards information-intensive jobs will be similar.

Most predictions point to work becoming more information-intensive:

"New Zealand's economic future may very well rest upon its appreciation of the true meaning of the word 'information'. The nation's farmers and industrialists, bankers and retailers, scholars and students must recognise that the information era is more than merely a world in which word processors replace typewriters and computers replace calculators. It is an era in which information is the raw material out of which value and wealth is created."<sup>12</sup>

### Infogram 9

Information Intensity of Queensland Industries 1981	
Industry information workers	Percent
Finance, insurance, business services	72.1
Community services	52.1
Public administration and defence	47.2
Wholesale, retail	38.8
Electricity, gas, water	37.5
Communication	33.9
Transport and storage	31.8
Recreation and personal services	30.2
Construction	25.6
Manufacturing	25.3
Mining	23.7
Agriculture	2.8

## The move to jobs requiring higher levels of education

The move to non-manual and service sector work is relatively easy to document. Less easy, but of more direct relevance to *Tomorrow's Schools*, is the increasing skill requirements of the new economy.

In a New Zealand context this shift can be simply illustrated by looking at the fastest growing occupations in the decade 1976 to 1986 (see Infogram 10). All of these occupations either require, or substantially benefit from, higher levels of education.



## Infogram 10

### Fastest Growing Jobs 1976-1986

Statisticians, systems analysts	+125%
Professional, technical	+108%
Economists	+106%
Government administrators	+104%
Broadcasting	+91%
Managers	+78%
Clerical supervisors	+76%
Working proprietors	+67%
Jurists	+55%
Authors and journalists	+47%
Artists and photographers	+51%
<b>(All occupations)</b>	<b>+10%</b>

It could, however, be argued that some of these fastest growing jobs still employ relatively small numbers. Not everyone is going to be an author or a statistician. But a similar pattern emerges when the absolute numbers employed is examined. Managers rise to the top of the list with over 31,000 new positions created between 1976 and 1986, while the largest loss of jobs occurred in the occupations of labouring and construction workers. Since 1986 growth in professional/managerial occupations has continued, but with large losses in the manufacturing/labouring areas.

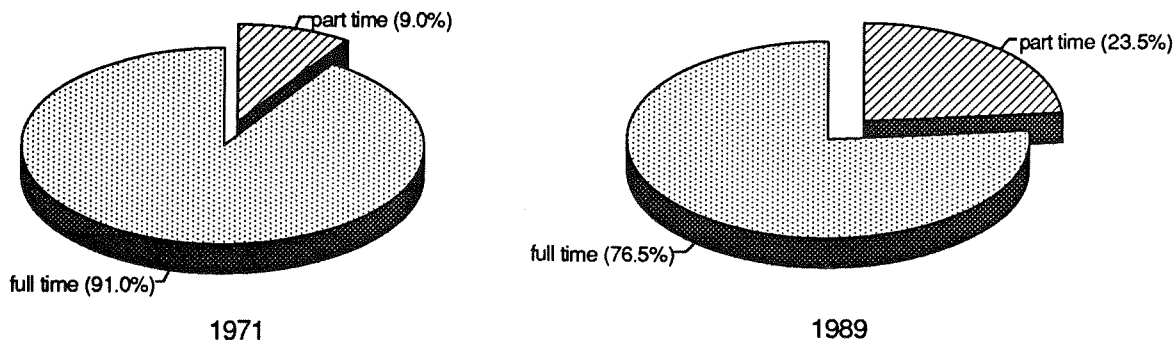
These movements indicate a clear trend — the fastest growing occupations require higher levels of education. These trends are, however, not unique to New Zealand. Work by the Hudson Institute in the United States indicates that towards 2000 the jobs that are expected to grow the fastest are the ones with higher levels of communication, reasoning and number skills than average.<sup>13</sup> The ones that are expected to decline or grow only slowly are those requiring fewer than average of these skills. To obtain jobs people will therefore need higher levels of initial skills. Other overseas studies show similar trends.<sup>14</sup>

## Other significant movements

While most people working in paid jobs are full-time employees, there has also been strong growth in the numbers of self-employed, and the numbers of people working part-time. In the case of the self-employed this can require a different mix of skills from those people working as employees. Infogram 11 shows the increase in part-time workers from 1971 to 1989.

## Infogram 11

### Part-time Workers 1971-1989 % of total workforce





# Skills for the new economy

The analysis so far indicates that most new jobs in the future will be of a non-manual nature, will be in the service sector, and will require a higher level of skill. But what skills? Analysing the characteristics of the fastest growing industries in the economy gives some idea.

Between 1976 and 1986 the fastest growing industry group, in percentage terms, and the third fastest in actual numbers, was the business services/finance area. The largest absolute growth was in community/personal services, followed by the trade/hotel/restaurants area.

## Infogram 12

Fastest Growing Industries 1976-1986 total employment	
Business and finance services	+47%
Trade/restaurants/hotels	+21%
Community/personal services	+21%

In the decade from 1976 these three industry groups created over 85% of the new employment in the economy. Our forecasts suggest that despite the current restructuring going on in these industries they will still continue to be the largest creators of jobs through to the turn of the century. In absolute numbers the largest growth is expected in the trade/restaurants/hotels area, reflecting the expected increase in overseas tourist arrivals and leisure within our own society, followed by the business services/finance area, reflecting the growth of knowledge and information industries.

## Infogram 13

Employment by Industry 1986 Census all ethnic groups		
	Full-time	Part-time
<b>Business services and finance</b>		
Finance	34,257	3,411
Insurance	13,035	1,422
Real estate	9,345	1,362
Legal services	10,089	1,587
Accountancy	10,974	1,641
Data processing	5,805	699
Engineering, architectural	9,645	1,179
Advertising, market research	4,917	1,134
Business services (security, typing, management consultancy)	8,727	2,154
Machinery rental	1,455	147
<b>Sector total</b>	<b>108,249</b>	<b>14,703</b>
<b>Wholesale trade, retail trade, restaurants and hotels</b>		
Wholesale trade	78,579	6,954
Retail trade	113,100	33,690
Restaurants, eating places	22,125	12,108
Hotels, motels, guest houses	17,382	8,193
<b>Sector total</b>	<b>231,186</b>	<b>60,945</b>

An analysis of the types of businesses in these industrial groups also gives some idea of skill requirements (see Infogram 13). Note that the figures represent the number of employees in *specialist* finance, engineering, architectural, market research etc, businesses. Many other businesses throughout the economy will of course employ such people within their own enterprise with, for example, many engineers required in the manufacturing sector.

Both sectors shown in the infogram are very much in the service area, with a high level of contact with customers, often on a face-to-face basis.

In the restaurants/hotels area much of this contact will be with overseas tourists — communication/interpersonal skills and often language skills are therefore important. In the last few years Japanese and Germans, in per-

centage terms, have been our fastest growing tourist segments, while in the future the Japanese and American markets appear to hold the most potential for growth. Growth in the Japanese market may be enhanced if more bus drivers, helicopter pilots or waiters could speak Japanese. In addition both these potential growth markets require high quality service — with a difference between service and subservience.

Other skills are also increasingly required in this area of employment. Information skills, for example, are needed to organise itineraries, or manage a hotel complex; technology/computer skills are needed for computerised reservation/billing systems; number skills for converting currency; and problem solving skills are handy for retrieving baggage from Hong Kong when Mt Cook was the correct destination. If we are to compete with other tourist destinations on our quality of service, rather than price, we need a high level of expertise in the industry.

In the business services/finance area information skills, technology skills, computer skills and number skills are all in high demand. But again communication/interpersonal skills are also important. A market researcher, for example, hired by a board of trustees to find out community ideas about subject choices in school, will utilise these and other skills. They will need strong communication/interpersonal skills, including strong report writing abilities, in information gathering and dissemination of the findings; they will need number and probably computer skills for analysing and interpreting statistical data; they will need problem solving skills in designing the project; and they will need excellent business/managerial skills to keep to the board's very limited budget. These same skills are vital when looking for overseas markets for our products.

The business/managerial skills are particularly important in both industry groups as each has a relatively high level of self employment. (In the case of the retail trade/restaurants/hotel sector 20% of people are self-employed.)

Finally, most jobs in these industry groups require continual upskilling or reskilling. An engineer, for example, will need to continue learning to use new material or new computer assisted design techniques, while shop assistants need to be constantly learning about the new products passing through their shops.

"The difficulty is that the half-life of people's knowledge is contracting so fast that it now almost equals the time taken to acquire it. Take an electronics engineer or computer scientist graduating in the summer of 1987. Whether from Caltech, Stuttgart or Tokyo, half the knowledge he (or increasingly she) has acquired over the past four years at university will be old hat by 1992. The engineer will then have to go back for 'repotting' if the employer is serious about keeping abreast of competitors."<sup>15</sup>

In the industries we have looked at, high levels of reading, writing and arithmetic are a good starting point in the education process, but clearly other broad skills are needed. These basic skills, on which specialist skills can constantly be added, are also increasingly needed in *all* areas of the economy.



The list below shows the *generic* skills required within the two major industry groups.

### Types of Generic Skills for the New Economy

- Ability to continue learning/adapting throughout life
- Communication/interpersonal skills
- Information skills
- Business/managerial skills
- Technology/computer skills
- Language skills
- Thinking/creative/problem solving
- Number skills

Bank officers, for example, more than ever need to use all of these generic skills to understand a wide range of complex products including floating and fixed rate mortgages, deposits from debentures to unit trusts, foreign exchange transactions including swaps, forward contracts and futures, and insurance products. They also have to master rapidly changing technology, improve interpersonal skills, and in some cases learn new languages to deal effectively in a global environment.

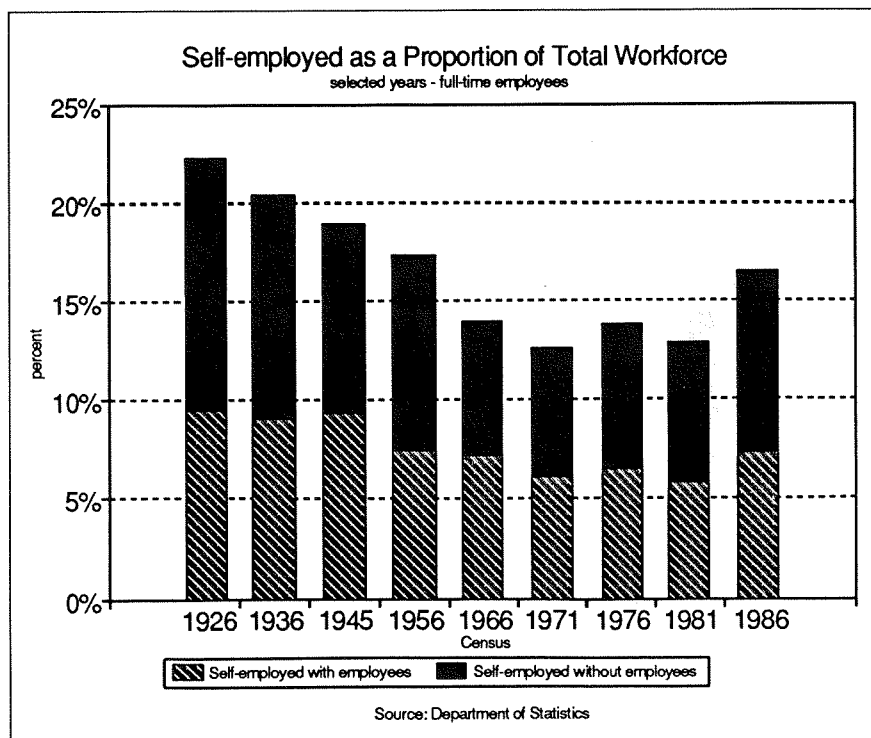
In the primary sector kiwifruit farmers need to become computer literate, understand basic chemistry and hydrology, and be financial wizards when dealing with subjects such as vine loading calculations, fertiliser and irrigation requirements and budgeting. As pressures build to reduce the use of pesticide sprays they are also becoming amateur entomologists and plant pathologists. To do so they will make use of many of the basic generic skills, and a range of specialist areas of knowledge.

In manufacturing, such as on the traditionally low skilled car production line, workers now need to learn basic statistical methods for quality control, and if working in a team situation require strong interpersonal skills. The electronics engineer, who in the past may have been seen as a difficult to talk to 'boffin', needs an increasing ability to communicate with all areas of the production

process, while at the same time keeping up to date with rapidly changing microchip technology.

Across all these industries there is also an increasing need for entrepreneurial attitudes backed by business and managerial skills, whether it be a research scientist organising contract work, or an owner-operated truck driver finding new business and dealing with the complexities of GST and road user taxes. While the need for these skills is increasing within existing business operations, a significant rise in self-employment across almost all areas of the economy is placing particular emphasis on having a good *basic* level of business and managerial skills (see Infogram 14).

## Infogram 14



If this move towards self-employment/small business continues, then people will increasingly need to look at creating their own jobs, which further emphasises the need for business skills.

Different groups argue for dramatic improvement in the levels of specialist skills, such as science and maths expertise in emerging high technology industries,<sup>16</sup> but for New Zealand as a whole to be successful in the new economy, *everyone* needs to lift their level of *base generic skills*. Specialist skills, such as the use of complex mathematics in genetic engineering, the speaking of Korean to sell genetically engineered water melons, or a chef's ability to present the watermelon attractively for a German tourist, need to be continually built on this base.

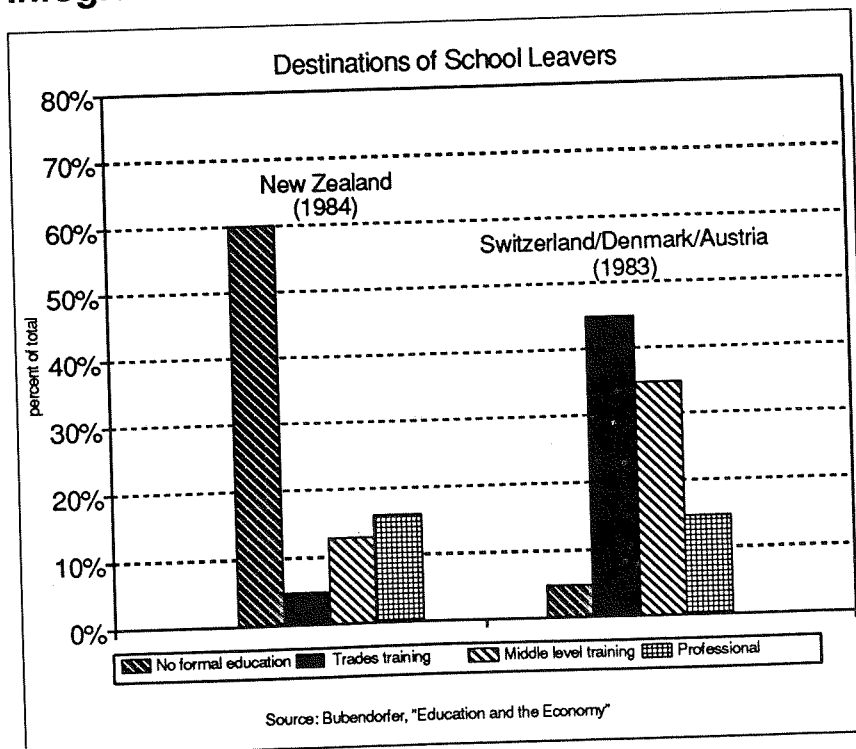
## How successful have we been in the past?

So how successful is New Zealand in equipping our current and potential workforce in these sorts of skills? In terms of the numbers of professionals we train we seem to be in line with the trends in similar sorts of countries. It is in the provision of a solid base of skills for the majority of the workforce that New Zealand falls behind other nations. Infogram 15 compares New Zealand with three small trade-dependent European countries.

In this infogram trades training covers not only traditional industrial apprentices, but also service sector training including wordprocessing, communications, tourism and design. Equally, middle level training covers a range of technicians, again including many skills which will ultimately be used in the service sector.

One contributing factor to this difference, both in the past and in the current situation, is indicated in Infogram 16 where the proportion of the New Zealand population still remaining in formal education at particular ages is compared with other countries.

Infogram 15



## Infogram 16

### Education Participation Rates % of age group, full-time and part-time combined

	16 years	17 years	18 years	19 years
Australia [87]	85.8	60.6	46.4	41.3
Austria [85]	85.6	78.1	47.7	23.0
Belgium [86]	92.3	81.9	69.0	55.6
Canada [86]	94.7	77.3	53.1	38.8
Denmark [86]	89.6	74.4	66.6	51.2
Finland [86]	92.1	83.3	64.8	26.3
France [86]	87.1	77.9	55.6	38.7
Germany [86]	100.0	99.7	83.8	55.9
Greece [85]	69.7	56.1	43.2	29.0
Ireland [85]	80.3	63.2	39.6	23.6
Japan [80]	84.0	84.0	-	-
Netherlands [86]	89.5	75.7	58.8	43.3
<b>New Zealand [88]</b>	<b>78.0</b>	<b>50.2</b>	<b>34.6</b>	<b>33.2</b>
Norway [86]	85.1	76.5	62.6	31.9
Sweden [80]	87.4	78.4	44.7	23.5
Switzerland [86]	81.9	81.6	73.2	53.3
Turkey [86]	35.3	28.9	14.9	7.9
United Kingdom [81]	68.0	52.8	36.3	27.7
United States [86]	94.0	87.9	58.6	44.4
<b>NZ ranking</b> (out of 19 countries)	<b>16th</b>	<b>18th</b>	<b>18th</b>	<b>11th</b>

Note: Figure in brackets next to each country is for the year the latest data is available

Source: Department of Education

Despite a considerable improvement in participation rates over the last couple of years, in 1988 over 20% of New Zealand 16-year-olds were out of the education system. By age 17 nearly 50% were no longer in a formal learning situation, and by age 18 only one-third were left.<sup>17</sup> Meanwhile the vast majority of German, Japanese, Swiss (and even Australian) teenagers were still being trained, potentially moving further ahead in terms of gaining work skills (and possibly general life skills). At age 17, of the OECD countries, only Turkey had less people than New Zealand in formal training.

Hopefully in 1989 and 1990 the figures will be higher through the 'Give School Another Go' and the 'Back to the Future' campaigns. But the increase needs to be dramatic, particularly as other countries are also lifting their commitment to education. Our own increase between 1982 and 1988 is less notable when we find that we actually slipped in OECD participation rankings in that period.

If New Zealand's commitment to both formal and informal (on the

job) education throughout adult life was significantly better than for competing nations, then this imbalance may have been redressed. But this does not appear to be the case. If education participation rates are examined in early adult life the same pattern emerges (see Infogram 17).

The result of these low participation rates over time means that currently 46% of New Zealand's workforce has no formal school qualification, and 60% has no tertiary qualification.<sup>18</sup> We conclude that our current workforce is ill-equipped for the challenges of the new economy.

For the United States, which in all age groups from 16 to 24 years has significantly higher education participation rates than New Zealand, Tom Peters suggests

"Workforce training must become a corporate (and indeed national) obsession. It is not. And it is on this variable that the outcome of the overall competitive struggle may most strongly depend".<sup>19</sup>

## Infogram 17

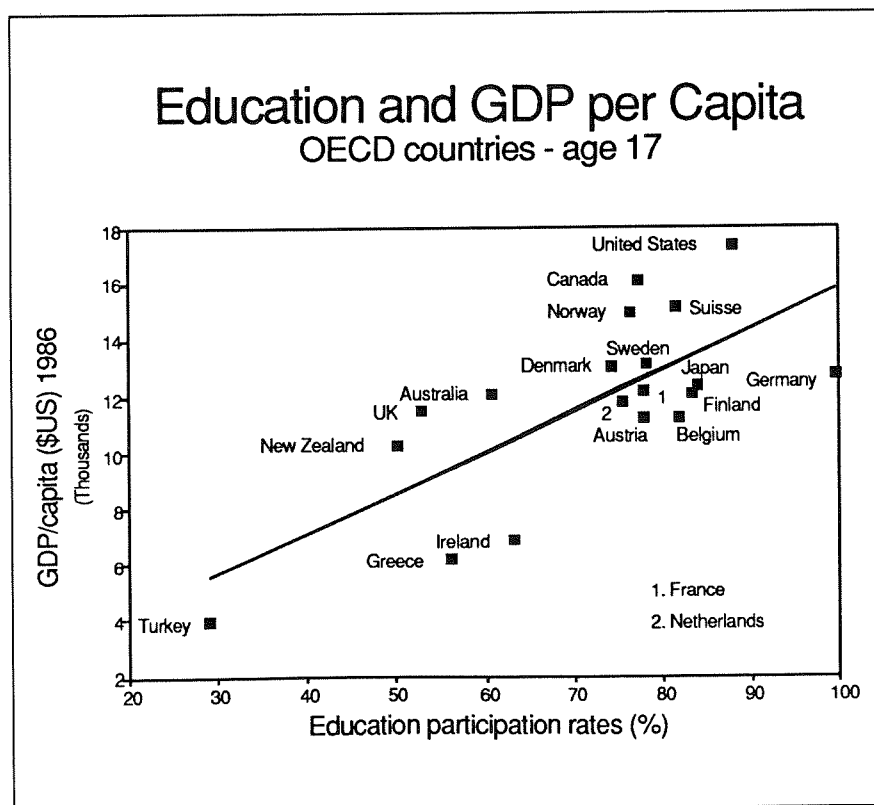
Education Participation Rates 1985/86 % of age group, full-time and part-time combined					
	20 years	21 years	22 years	23 years	24 years
Australia	31.6	25.0	20.1	16.9	15.2
Austria	16.2	14.6	13.7	13.2	12.5
Belgium	47.6	28.2	21.6	16.9	13.3
Canada	34.1	23.8	18.6	13.5	10.0
Denmark	36.6	27.3	23.7	20.7	18.9
France	25.5	18.5	13.3	9.8	7.4
Germany	34.8	25.5	26.9	16.7	16.5
Ireland	15.4	9.8	5.5	3.3	2.0
Netherlands	31.3	22.7	17.0	13.3	11.2
<b>New Zealand</b>	<b>26.5</b>	<b>21.6</b>	<b>16.5</b>	<b>12.9</b>	<b>9.7</b>
Norway	23.7	24.4	22.6	19.8	16.6
Switzerland	29.6	20.6	16.9	15.0	13.9
United States	37.1	33.2	22.0	15.1	13.2
<b>NZ ranking</b> (out of 13 countries)	<b>9th</b>	<b>9th</b>	<b>10th</b>	<b>11th</b>	<b>11th</b>

Source: Department of Education

The links between time spent in formal training and the economic performance of a nation are of course complex, but a comparison of participation rates at age 17 against GDP per capita indicates that the relationships are worth exploring (see Infogram 18).

Obviously comparisons between *quality* of education are as important as *quantity* comparisons. But New Zealand's quality would have to be significantly better than other countries to counter the low education participation rates both at school and later in life.

## Infogram 18



# Responses from business, community, and government

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The traditional New Zealand reaction to a perceived problem is to lobby government to spend more money, but responses to lifting skill levels are required at many levels.

The United States and other countries have already recognised the importance of a skilled workforce in maintaining productivity and international competitiveness. At both the central government and local community levels there have been joint initiatives to tackle the skills deficiency, each group recognising that the issue is far too important to be left to one group alone. For example, at central government level in the United States, the Departments of Labor, Education and Commerce recently held a conference and produced a publication in an effort to increase the community's awareness of the problem.<sup>20</sup>

Similarly in 1987 the Curriculum Development Centre in Australia held an industry/education conference. This established a set of ongoing co-operative projects on issues such as work experience development, career counselling, developing regional co-operative programmes often around particular industries (such as the textile industry), a job/training youth guarantee, and other associated areas.<sup>21</sup>

At the community level in several areas of the United States, schools and local businesses are entering co-operative ventures which aim to ensure that all school leavers have acquired minimum basic skills, and to reduce dropout rates. For example, in Prince George County, Maryland, the public school system established the Business and Advisory Council. This group has set up a magnet school programme to attract gifted students, and has developed a set of employability skills, and a school leavers certificate which ensures leavers have these skills.

In addition, businesses have developed incentives for teachers — such as discounted removal services, free legal services and restaurant discounts to enable the area to recruit and retain good teachers — and have developed and funded television advertisements to promote positive images of schools in the community. Many local businesses participate in the Partners in Education programme for joint education and work experience ventures. Teachers are offered a summer employment programme which provides part-time temporary employment and business experience for teachers who seek it. The school system, which in 1984 was functioning close to average for students of all measured grades, is now in the top third at all levels.

Clearly there are examples of very successful local business and school joint initiatives in New Zealand too, particularly in the transition education area. However, there is scope for much greater development of these ventures within most communities. There is also scope for greater cooperation within central government. It could play a role in providing communities with ideas and information on developments both here and overseas, and in increasing community awareness of the importance of skills in the new economy.



## The challenge for *Tomorrow's Schools*

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There are a multitude of theories about the process of education — what should be taught, how it should be taught, by whom, and even what shaped or coloured room it should take place in. The Planning Council claims no special expertise in this area. However, our analysis of the changing economy raises a number of issues which boards of trustees and education policymakers need to consider.

### Improving participation rates

The Government and individual schools are already trying to tackle our low post-compulsory participation rates in a number of ways. The 'Back to the Future' and 'Give School another Go' campaigns were designed to encourage students to stay on at school. Changes to the unemployment benefit in the 1989 Budget should also encourage further attendance at school. Ultimately, however, the most effective means of encouraging students to continue learning is for schools and other post-compulsory institutions to provide interesting, stimulating courses. Schools need to encourage this desire to continue learning at an early age.

Recent New Zealand research indicates that attitudes towards learning and potential vocations are formed well before the legal school leaving age is reached.

*"At an early stage in their education, childrens' vocational/ educational aspirations are based upon "fantasy" rather than realistic notions of what is involved in their stated options. As they get older, their aspirations become based more upon realistic ideas, and by form two most children have "realistic" ideas of their future options."*<sup>22</sup>

This would indicate that parents and teachers need to start communicating ideas to children about employment options and skill requirements at a very early age. In turn economists and the business community need to educate parents and teachers to changes occurring in the economy.

Participation rates will also of course vary according to the type of school and the socio-economic/ethnic characteristics of its students. Research indicates that whilst New Zealand participation rates are low, Maori participation rates are even lower.<sup>23</sup> Boards of trustees, parents, and teachers therefore need to complement national participation campaigns with school based programmes targeted at groups with low participation rates. These school based programmes are most likely to succeed if they are centred on research within the individual school and community, but where research has been carried out in other schools this may provide a useful role model.<sup>24</sup>





## Making what is taught more relevant to the new economy

Both developers of the national curriculum, and schools in choosing which non-compulsory subjects to offer to students, have a role to play in making education more relevant to the new economy. In the past developers of the national curriculum have not explicitly linked curriculum to the requirements of the economy. For example, the 1988 draft National Curriculum Statement made no reference to the changing economy or altering employment patterns.

In more recent times there has been more effort to link into the world of work with, for example, transition courses being developed. In the future more input into curriculum development from the business world would be useful. This is now becoming standard practice in many overseas countries.<sup>25</sup> Individual schools can initiate changes in a number of areas.

When the performance of schools is assessed by boards of trustees, parents, and teachers, they will need to examine whether the basic generic skills are being well picked up by students to the standard required to make our workforce the most highly skilled and adaptable in the world. International comparisons would, for example, indicate that we fall well behind in some areas of mathematics.<sup>26</sup>

Is this due to poor curriculum content, or to the inability to attract and retain enough talented science and maths graduates? Does this in turn relate to our recruiting/selection policies, or the inability of schools to offer different pay scales for different subjects? Linked to this, can we devise systems to allow easier movement between the teaching profession and the business world?

We have argued that in order for New Zealand to be more internationally competitive, we need a more adaptive, flexible, and enterprising workforce. Is there room to make the teaching profession more responsive to changing skill and subject requirements by having more flexible conditions of employment? Boards of trustees and parents can influence policymakers in these areas, but they can have much more direct influence in the choice of subjects within schools.

In terms of choosing subjects to be taught in schools, not only should reference be made to changes in the overall economy, but regional differences should also be of some significance.

Should girls, for example, be studying shorthand typing while little attention is given to office management and business administration? Or perhaps all students should be learning wordprocessing early in their education?

Are woodwork and metalwork as relevant as computer technology or industrial design? Or in forestry areas such as Rotorua, should woodwork be linked to chemistry and physics to encourage an interest in sophisticated wood processing?

Should cooking be related to homecraft, or should it be linked to chemistry and biology as the basis of food technology needed to turn our primary products into high value niche products?

Should all students be encouraged to study maths and science, in recognition of our new 'high tech' society, through to the sixth or even seventh form?

Should school libraries be given more resources so they can be used to teach a wide range of the new information gathering skills required in the new economy?



And should schools develop programmes to encourage entrepreneurial skills and attitudes in students?

The range of questions, and possible answers, may be different for each school, but looking at trends in the international, national and local economies will help to clarify these issues.

One area of teaching which does appear to be well out of touch with changes in the economy is that of languages. The teaching of French is a prime example. In 1976 France represented just under 1% of our export markets and in 1986 just over 1.5%. Yet in 1976 21% of third form boys and 35% of third form girls studied French, increasing to 24% for boys and dropping slightly to 34% for girls by 1986.<sup>27</sup> By 1988 other non-English speaking countries such as Korea, Malaysia, Germany, Italy, Belgium, Iran and, of course, Japan, individually took more of our exports than France, but this is still not widely reflected in the choice of subjects at school.

Yet New Zealand is substantially a trading nation. Figures from 1988 indicate that approximately one-third of employment is in enterprises that either export or import goods and services. The fact that we have developed trade well with many non-English speaking countries in the past is in part a credit to *their* education systems not ours. An awareness of their culture and customs (often closely linked to consumer preferences), combined with an ability to converse in the trading partners' language, would certainly help our trading initiatives.

In speaking of the Japanese market, Roger Peren, director of Massey University's Japanese Studies Centre, states

"We need a core of people with sufficient knowledge of Japanese language, history, economics, politics or sociology to be able to analyse, interpret and assess new situations, to offer insights, to spot opportunities for New Zealand businessmen or scientists, and generally to advance New Zealand interests."<sup>28</sup>

But it is not only external markets that are changing. Within New Zealand there is also an increasing need to recognise cultural/language differences, particularly Maori culture and language.

Schools not only need to consider which language to teach, but when they should be introduced. Learning any language, but in particular difficult ones such as Chinese, Russian or Japanese, is significantly easier if instruction is started at an early age, preferably in the initial years of primary school. European countries have long recognised this, and the teaching of second or third languages from early school days is standard practice. Te Kohanga Reo embodies these principles.

To boost the amount of Japanese, Korean, or Chinese taught in schools would require a large increase in the number of language teachers. This in itself raises issues about new routes into the teaching profession. There could be exchanges between teachers in different countries, or perhaps part-time teaching between polytechnics and schools, or an alternative training procedure to get New Zealand based, foreign language speakers into the classroom more quickly.

While each school needs to consider ways of making their own teaching programmes and subject choices more relevant to the new economy, again other schools may provide useful role models.<sup>29</sup>



## Conclusion

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With the current high levels of unemployment, it is perhaps natural that many people are gloomy about the economic prospects for New Zealand — in particular the outlook for employment. In order to change this outlook movement is needed across a broad range of fronts. But the Planning Council is confident such change is possible. A return to a fully employed, high income economy is achievable, but as we have argued, only if all New Zealanders have a strong commitment, individually and as a community, to improving skill levels. And the improvement needs to be dramatic; we need to match, and hopefully surpass, the skills of the Germans, Japanese, Swiss, and the many others who currently out-perform us.

Members of boards of trustees, parents, and teachers all have a crucial role to play in the upgrading of skills. This publication gives some guide to the likely areas of employment growth in the economy, and ultimately the broad skills required for them. We hope that it provides some basis for each individual school to ensure that its students gain 'Tomorrow's Skills'.



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"There has recently been a considerable amount of publicity about the reduction in Electronics Manufacturing in N.Z., and in particular the closing down of production lines involved in T.V. and Audio manufacturing with, in some cases, their associated professional electronics activities.

However, information in this report shows that a number of electronics manufacturing firms have shown real growth in production, exports, and employment, during the difficult climate that has existed for business in N.Z. during the last few years. These firms comprised about 25% of the industry in 1980, and would currently account for about 70% of output. They are exporting on average about 50% of production. A projection of the likely output of these firms over the next few years using the real growth rates prevailing during the past three years shows that the total industry output should now begin to slowly expand. If our business climate begins to improve in 1989/90 (as is currently being predicted) output may well be expected to grow reasonably rapidly. It is significant that the growth in these firms has resulted in a doubling of the employment of professional engineers in the industry since 1980 while total electronics manufacturing industry employment has halved in this period.

An analysis of the factors that these firms consider to be most important for future growth identifies areas such as R & D, developing better marketing capability, improving the quality of products, prevailing interest rates, productivity, and inflation."

R & D, developing better marketing capability, improving the quality of products, and improving productivity all depend substantially on having a highly skilled, highly creative and highly motivated workforce.

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'Tapa Cloth'

Papier Maché 1820 x 1365

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