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COMMUNICATIONS
A CROSS IMPACT STUDY

by

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A CHEM 305 CLASS REPORT

CONTENTS

PREFACE

This study was undertaken as part of the course work for the CHEM 305 class. It uses appropriately modified techniques developed by the Centre for Future Studies in California, USA, and explored during 1981/2 in New Zealand. In presenting this piece of analytical research as a contribution to further thinking about New Zealand's policy in this area, I hope that others will be stimulated to recognise those critical choices which lie ahead of us.

J. F. Duncan

SUMMARY

Using Cross Impact Techniques, an analysis is made of the major policy alternatives available in the field of 'Communications'. Having first specified the major events likely to affect the outcome, some eight scenarios are developed from the Cross Impact Matrix of major events versus sensitive areas. The ability of four Contexts for Development in handling these scenarios are assessed, from which appropriate policies are derived. The consequences of these policies are then discussed in relation to the criteria for success over a 15 year time scale, and the stakeholders. The following are concluded as the policies most likely and realistically to meet New Zealand's needs in the future.

1. A comprehensive communication network would be provided to service all New Zealand's diverse needs.
2. It would be owned and maintained by Government.
3. It would provide for the needs of information industries, trade and industry, training schemes in the communication field, free access of electronic communication to the whole community, public education, re-education for re-employment, initiation and support of work creation schemes, social concerns, introduction of appropriate technology in all areas, and public participation in government.
4. Although publicly owned, an independent corporation covering all forms of communications technology would reduce the risk of government interference in content. Independence would be more likely if members of the corporation (or at least some of them) were elected by public franchise.
5. Some role for private enterprise to compete for purveyed material would be highly desirable.

1. INTRODUCTION

The purpose of this report is to examine policies for communications available to New Zealand in the future and to identify the most appropriate. Account is taken of predictable technologies (1,2) and also to the needs, values and aspirations of New Zealanders.

A definition that encompasses all facets of communication is elusive. However "an interactive imparting and receiving of information" captures the essential nature of the concept (1). This definition includes a large variety of different communications techniques identified in the next section.

The methods used in this paper, also described in the next section, have developed out of long term studies by the New Zealand Commission for the Future (CFF). It is important in the methodology used here to recognise a number of features as follows:

- The conclusions drawn must inevitably depend upon the assumptions made in the treatment, which in turn depend upon the experience and values of the participants. For this reason the conclusions cannot be a final answer for all situations. Other groups could well come to different conclusions depending upon their outlook and experience.
- Before the work could be done effectively it was necessary to understand the present state of the art and the likely developments with respect to communications in New Zealand. To this end, CFF publications were used as the source material (1). In addition two people expert in this field discussed aspects of the problem with the class (Marie Keir, DSIR, and Colin Boswell, Computer Centre, Victoria University of Wellington). Visits were also paid to ICI Tasman Ltd, NZPO, and Feltex Limited at which the influence of communications on these three organisations and on the wider interests of society generally were explored.

2. METHODOLOGY

2.1 Material Considered

The following areas of communication (2), were taken into account in the work leading to this report.

Telegraph
Telephone
Newspaper
Radio
Television
Telex
Computer data flow
Broadcast Videotex (e.g. Oracle)
On-line Videotex (e.g. Prestel)
Electronic mail
Videophone

2.2 Treatment of Material

In considering the different areas of communication in the future, the consequences of changes that can occur and the likelihood of the possible effects need to be explored. This requires a technique of analysis to connect long term goals i.e. what society wants, to immediate planning i.e. what is done now.

The technique used is cross impact analysis (4). A number of potential events, and the likelihood of occurrence can be estimated over the period of time of interest. The actual occurrence of any one event, will affect the subsequent probability of occurrence of any other event. The degree of effect of one event on another is called the "cross impact". A set of scenarios is then constructed for each major probable event, and the effect of these on sensitive areas analysed. Policy options are then identified and those likely to succeed in meeting the needs of stakeholders and the criteria for success under each scenario are specified. From these the major practical policy decisions are formulated.

2.3 Time Horizon

In this study, a time horizon of around fifteen years is used. The reasons for this choice are that technology is changing very rapidly so that it would be difficult to look beyond this horizon; and present day decisions are likely to make the most impact during the next fifteen years.

2.4 Use of CFF Contexts

To whom does it matter if there is success or failure of communications in the future? This question can be answered by looking at the four possible contexts for New Zealand's development developed by CFF (5). The basic assumptions of the four philosophies can be summarised as follows:

1. Prolonged World Recession. This could result in slow introduction of new technology because of the expense.
2. Restriction of Government Expenditure. Post Office cutbacks for improving equipment and services are included.
3. Inadequate Economic Growth in New Zealand. Less finance will be available for improving telecommunications equipment and services.
4. Economic Union with Australia. This is likely to give New Zealand access to greater resources and technology, necessitating and allowing the development of an extensive communication system.
5. Unemployment. Fewer people could afford to take advantage of improved services to ensure success of such services.
6. Rising Transport Costs. It will become increasingly uneconomical to travel unnecessarily, thus creating the need for an efficient and extensive telecommunication network.
7. Union Resistance to New Technology. Unions are likely to resist the introduction of any technology which will affect the employment of their workers.
8. Changes in Regional Health Services. Smaller community could make use of a system with computer links to provide immediate information for diagnosis.
9. Inadequate Training Courses. New and sophisticated equipment needs specially trained operators and services for the system to operate effectively.
10. New Technological Developments in Communications Affecting New Zealand. This would enable New Zealand to build an efficient communication network with reliability, and low capital and maintenance costs.
11. Inadequate Appreciation of Communications by Management. The full capabilities of any system should be made known to everyone it affects if it is to be used efficiently.
12. Inadequate Appreciation of Communications by Workers. As for management, item 11.
13. Development of New and Cheap Major Energy Resources in New Zealand. This may lessen the desire and need for a more extensive communication system.
14. Abuse of Practices by Management, Government or Unions. An efficient communication network means an increased volume of information flow and danger of invasion of privacy by unlawful access to private information, together with the use of the network as an effective propaganda medium.

15. Higher Salary Relativities for Information-related Workers
Specialised, trained and necessary workers, as in any other industry, tend to be higher paid.

16. Emergence of Monopolies in New Zealand. A monopoly of the communication network could control the system and abuse it. Others would see monopolies as providing for an efficient communication system.

17. Changes in Legislation. Laws can affect the way in which a communication system is allowed to develop, and the way it is to be used, so that it will not be abused.

18. Inadequate Supply of Technicians and Technologists. New and specialised equipment require trained operators and servicemen.

19. Public Resistance to Change. People generally dislike any rapid alterations to their lifestyles, which may include the introduction of an extensive communication system.

20. Changes in Values. People's values change with their environments and lifestyles, and the demand for any product including communications, depend on what people want.

21. Major War with New Zealand Participation. This would affect the extent and emphasis on the way in which any communication system is developed in New Zealand.

22. Nuclear Disaster in the Northern Hemisphere. Although New Zealand is unlikely to be directly affected, communications to the rest of the world will be important and will affect New Zealand's development.

23. Major Natural Disaster in New Zealand. In any civil emergency, an efficient and reliable communication system is essential for emergency services and for maintaining order.

24. Major Epidemic in New Zealand. When physical isolation is necessary, telecommunications become very important.

These events are listed on the left hand side of the Cross Impact Matrix (Table 1). The relative importance of them was established using the following symbolism:

* likely to occur

** highly likely to occur

† a highly significant event which would have a major impact on most of the other events if indeed it did occur.

TABLE 1

Possible Critical Events Likely to Affect Communications

* Likely
** Highly likely
† Significant

+2 Highly likely
+1 Likely
-1 Unlikely
-2 Highly unlikely

	Importance	A Inadequate Economic Growth	B Economic Union with Australia	C Rising Transport Costs	D New Technological Developments	E New Energy Resources in New Zealand	F Emergence of Monopolies	G Inadequate Supply of Technicians and Technologists	H War with New Zealand Participation
1.	Prolonged World Recession	*†				-1			-1
2.	Restrictions in Government Expenditure	*†	(+2)	-1		-1	-1		-1
3.	Inadequate Economic Growth in New Zealand	**†	X	-1	(+1)	-1	-1	(+1)	-1
4.	Economic Union with Australia	**†	(+1)	X	-1	(+1)	-1	(+1)	
5.	Unemployment	*	(+2)	-1	(+1)	(+1)	-1	(+2)	-2
6.	Rising Transport Costs	**†	(+1)		X	-1	-1		(+1)
7.	Union Resistance to New Technology	*†				(+1)		(+1)	-1 -1
8.	Changes in Regional Health Services	*†	(+1)		(+1)	(+2)	-1		-1 (+1)
9.	Inadequate Training Courses	†	(+2)			-1	(+1)		-1 -1
10.	New Technological Developments in Communications affecting New Zealand	**†	-2	(+2)		X	(+2)	(+2)	-1 (+2)
11.	Inadequate Appreciation of Communications by Management	*†		-1	-1	(+1)		-1	-1
12.	Inadequate Appreciation of Communications by Workers	*†			-1	(+1)		(+1)	-1
13.	Development of New and Cheap Major Energy Resources in New Zealand	**†	-1	(+1)	(+2)	(+2)	X		-1 (+1)
14.	Abuse of Practices by Management, Government or Unions	*				(+1)		(+2)	(+1)
15.	High Salary Relativities for Information-related Workers	*†	-1		(+1)	(+1)		-1	(+1)
16.	Emergence of Monopolies in New Zealand	**†		-1	(+1)	(+1)		X	(+1)
17.	Changes in Legislation	**	(+1)	(+2)		(+1)	(+1)	(+1)	(+1)
18.	Inadequate Supply of Technicians and Technologists	**†	-1		(+1)	(+1)	(+1)	-1	X -1
19.	Public Resistance to Change	*†		-1	-1	(+1)	-1		-2
20.	Changes in Values	*†	(+1)	(+2)	(+1)	(+1)			(+1) (+2)
21.	Major War with New Zealand Participation	**†				(+1)			X
22.	Nuclear Disaster in Northern Hemisphere	*†				(+1)			(+2)
23.	Major Natural Disaster in New Zealand	*†							
24.	Major Epidemic in New Zealand	†	(+1)		-1	-1			(+1) (+1)
	Summary		+12 -5	+7 -6	+9 -5	+18 -6	+5 -7	+10 -4	+4 -6 +13 -12
	Frequency		17	13	14	24	12	14	10 25

Those items with **† were thus identified as events likely to have an important cross impact effect and to lead to scenarios which would have important differences in the policy options likely to be proposed. These events subsequently called scenarios and labelled A, B, C ... H were then the basis of subsequent analysis. They were listed seriatum across the top of the matrix in Table 1 (although the titles have been shortened for convenience). They are as follows:

A Inadequate Economic Growth in New Zealand

B Economic Union with Australia

C Rising Transport Costs

D New Technological Developments Affecting New Zealand

E Development of New and Cheap Major Energy Resources in New Zealand

F Emergence of Monopolies in New Zealand

G Inadequate Supply of Technicians and Technologists

H Major War with New Zealand Participation

Next it was assumed that each of the events in the scenarios actually did happen. For instance if there were war (scenario H) what would be the effect of war on all the other events from prolonged world recession (item 1) to major epidemic (item 24). These questions were analysed in terms of a five-point scale (+2) highly likely, (+1) likely, -1 unlikely, -2 highly unlikely. Blanks were left for those cases where either the effect was regarded as being minimal or not applicable. To identify the scenarios which were most likely to be significant, two arbitrary computational methods were used. In the first the absolute value of all the numbers (without regard to sign) in the columns were summed. In the second the total positive and negative numbers were summed. The first gives the estimate of the frequency with which the scenario concerned affects the other events and to some extent a measure thereof. The second gives an idea of the spread of responses possible in the events concerned. It is important at this stage to note that these numbers are simply convenient means of assessing the effects of the scenarios on the events. They can in no sense represent absolute measures of likelihood. Incorporated in them must necessarily be the value judgements of the group doing the work. Nevertheless, we believe that they give an indication of the relative importance of the scenarios and of the events which they will affect.

3.2 Major Events Likely to affect the Outcome

From the cross-impact analysis table the major events in order of significance emerge as follows:

H Major War with New Zealand participation

D New Technological Developments in Communications affecting New Zealand

A Inadequate Economic Growth in New Zealand

C Rising Transport Costs

F Emergence of Monopolies in New Zealand

B Economic Union with Australia

E Development of New and Cheap Energy Resources in New Zealand

G Inadequate supply of Technicians and Technologists

These events formed the basis of scenario construction described in the next section. Detailed aspects have been described so that readers may get a feel for the kind of society which could develop if the major events in fact came to pass. However, only the three most significant of these have been used in section 3.4 to analyse further the ability of the context to handle the major events. And it is only these three (the first three in the list above) which are the basis for the appropriate policies developed (in 3.7) and their consequences (3.8).

3.3 Likely Consequences of Major Events

In this section we describe the scenarios which would arise if each of the eight major events in fact occurred. The basis for this is an analysis of the consequences of the possible events which might occur. It is important at this stage to note that scenario construction, although based upon a realistic appreciation of the way things could change, are nevertheless highly imaginative constructs. On the one hand they should not be regarded as predictions or on the other as established consequences. They are merely descriptions which will allow readers to get a feel for the kind of communications society which might emerge in each case. The value of scenarios is that they provide a basis for assessing the suitability of proposed policy options and this is the way they have been used in the later parts of this report.

3.31 Inadequate Economic Growth in New Zealand (Scenario A)

Inadequate economic growth brings about a reduction in both Government and private sector spending. This in turn leads to a reduction in the workforce (including the number of technicians and technologists required in communications) and produces higher unemployment. This reduction in spending also reduces the number of training courses and results in little technological development in the communications field.

People's values are likely to change as they become conditioned to the economic climate. Major epidemics could become a reality with less money being provided to restrict their occurrence. To alleviate these problems, the government may look at ways of changing legislation to bring about less hardship. With the depressed economy, transport costs are likely to rise. The high salary relativities enjoyed by those working in communications may no longer be able to be sustained.

3.32 Economic Union with Australia (Scenario B)

Economic union with Australia would probably cause increased economic growth within New Zealand. This could be accompanied by a higher level of Government expenditure and a reduction in unemployment. While there will be less chance of New Zealand-owned monopolies emerging the likelihood of multi-national ones being established would increase. Constant contact with another country may diminish public resistance to change, and a shift towards money-oriented values may also occur.

Shared communication systems may also bring about changes in legislation (e.g. where censorship laws differ in the two countries).

Union with a country that already possesses extensive expertise in mineral-based industries would inevitably promote the development of new mineral resources (including gas, coal and oil) within New Zealand.

The physical separation of the two countries would make an efficient network imperative, particularly at management level. Shared technological information and expertise would add to the sophistication of the network and also allow rapid introduction of innovations.

3.33 Rising Transport Costs (Scenario C)

The most likely result of high transport costs would be the reassessment, and consequent development of our own major energy resources. Financing and development of such resources would probably fall heavily on Government, and in all likelihood result in restricted Government expenditure elsewhere.

Further financial strain would be placed on Government by transport-related increases in the price of imported goods. The cost of our exports would also rise, making successful competition on world markets more difficult. Consequent reduction in Government revenue could bring about changes in the nature, and quality of our health services. Financial restrictions would also result in cutbacks to training schemes, which would, in turn, lead to shortages of technologists.

The cost of commuting to and from work may become prohibitive for some, thus contributing to unemployment. The inability of small concerns to withstand increased costs would further add to this problem. Monopolies may emerge as these small businesses disappear.

All these problems would highlight the advantages of an efficient communication system, and those associated with that field could expect increased sales and services and improved salaries.

While some changes in values may accompany these altered circumstances, the nature of those changes is largely conjecture.

3.34 New Technological Developments in Communications affecting New Zealand (Scenario D)

New and improving technological developments in the communications field, including cheaper equipment, as well as innovations, would have a widespread effect on New Zealand.

From a financial point of view, its effects would include increased economic growth and improved standards of living, as technology increases the general efficiency of trade and industry. A possible negative effect of new technology is the displacement of existing workers, although workers will generally be displaced to alternative jobs after retraining. Also new technology needs trained operators and specialised servicemen.

3.35 Development of New and Cheap Major Energy Resources in New Zealand (Scenario E)

Development of a major energy resource would lead to savings in overseas funds and would allow the Government to increase expenditure in other areas. General economic growth could also be expected, and with this a decrease in the numbers unemployed. More finance would be available for technological development, but progress in this area may be hindered by a shortage of technicians and technologists.

be hindered, and general economic growth would be restricted.

More people would be encouraged to undertake technical training, particularly as such workers would tend to be higher paid.

3.38 Major War with New Zealand Participation (Scenario H)

The most probable effects on New Zealand in the event of a major war would be (a) the breakdown of public resistance to technology, (b) a change in values, and (c) an increasing appreciation of communications in all sectors of the workforce.

A war would stimulate New Zealand's economic growth. The unemployment figures would drop as the country works towards a common goal. This would also be apparent on an international scale, bringing the world out of any recession.

During wartime, demand for fuels would greatly affect transport costs; and with a greater probability of nuclear disaster in the northern hemisphere, the call for self-sufficiency would mean the development of new major energy resources in New Zealand. Petrol and fuel rationing would probably be introduced.

Previous experience suggests that great technological advances would probably result from war. These would be accepted with less reluctance in the post-war era. Communications technology is likely to be exploited for propaganda during the war, but for other purposes after the war.

3.4 Ability of Contexts to Handle Major Events

Since the four Contexts for Development (5) emphasise different aspects of our national life and have a different implicit and explicit value base, they will also be different in the way they are affected by and can accommodate the major events which form the basis of the developed scenarios. This section considers these differences.

3.41 Context A

In Context A, the success of the communications network depends heavily on how well it provides a support service for trade and industry. Its ability to function as intended relies on a buoyant economy and a Government policy which encourages development of New Zealand resources and growth in

both these areas, and the network should benefit from the increased demand for its services. Technological innovation should allow greater sophistication of the network, which in turn will enhance its ability to bring international, social and cultural information into New Zealand.

Major war (Sc H) on the other hand, would adversely affect successful operation of this network. Its ability to provide international trade links, exchange technological information; and to import social/cultural material would be severely hampered. Conversely, within New Zealand the network would be in an excellent position to maximize internal trade links, aid in industrial development and improve the efficiency of existing concerns.

Inadequate economic growth (Sc A) would have a negative effect on almost every aspect of this communication system. Trade, both national and international would decline, industrial development would slow down and consequently the requirement for communication support services would also diminish. Financial strain on the network would ensue, resulting in possible withdrawal of its social contribution (e.g. distribution of sporting, cultural, and arts information and support).

The network would cope well with technical innovation (Sc D), but because of its heavy emphasis on trade and industrial growth, it is highly sensitive to political and economic fluctuations at both national and international level.

3.42 Context B

Technological developments affecting New Zealand are likely to have a positive effect on the communications network as a whole in Context B. Communications in this model are important so that individuals become well informed and then pursue their own best interests (Sc C).

Major war (Sc H) is likely to have a mixed effect on the communications network. Under war conditions, it is very hard for the country to diversify its outlook away from the war situation. The war is likely to encourage development of rapid and effective communications; assist economic growth in industries using indigenous resources; and help the network act as a support system for government and private industries involved in extraction and processing of information. The war requires the government to keep strict control of the network.

Inadequate economic growth (Sc A) is unlikely to have a favourable impact on the communications network. While inadequate economic growth does

not affect information flows and accessibility of the network, it does affect import of communication technology and reduces technological sophistication.

3.43 Context C

The impact of technological development in this Context depends on whether the network can afford to implement the new technology. Technological innovation allows greater control of the network. It is very successful in areas such as farming and other agricultural industries. All stakeholders should benefit from the enhanced social services of the network (Sc C).

In major war (Sc H) the network proves its importance in its assistance in maximising industry and in the allocation of resources to the necessary areas. The capability of the network for exchanging information away from main centres is vital as the network could be geared to co-ordinate the country in working towards a common goal.

In the event of inadequate economic growth (Sc A) a marked decrease in the support for the network is noticed as industry becomes sluggish, finds the network less in demand and a financial burden. For the network to survive, all but essential services are cut back as far as possible.

3.44 Context D

In this society, the emphasis is on providing an efficient and reliable communication network for the benefit of the whole community, by servicing information, education and leisure requirements as well as supporting business, agriculture and industry.

Under conditions of low economic growth (Sc A) financial constraints on the network may limit its social contributions to the community in order to maintain its support to trade and industry. In the same way, if a major war occurs (Sc H), the government provides a network but the way in which the network is used is restricted by the demands of war, to the detriment of community services. However, if a communication network is set up now, in the event of restricted resources due to low economic growth or war, the established community services might well continue to operate.

A network which is required in this context to be effective, frugal, durable and reliable can only benefit from the use of appropriate technology. This is also true of attempts to maximise its capabilities, which are best done by proper training of technical people to service the network and educating the community (Sc C).

3.5 Criteria for Success

Depending on which of the four contexts (5) are the basis of analysis, different criteria for success will be evident. In Table 2 these are summarised. They are used in a later stage of the analysis for assessing the validity of the proposed policy options.

3.6 Stakeholders

The identified stakeholders common to all contexts (see Table 3) are as follows:

Workforce
Health Services
Education Services
Children
Government
Electors
Industry

This list is primarily used in judging the likely success of proposed policy options. Each context, however, does not benefit all stakeholders equally. These are also listed in Table 3, and must be borne in mind in devising suitable policy options.

3.7 Policies

The policy options were formulated in the following way:

The communication systems suggested in each of the four contexts were evaluated in terms of their ability to handle likely major events. Any obvious shortcomings provided the basis for policy options which would improve the capability of that network to deal with such occurrences.

Detailed consideration led to the identification of the following major policy options which could affect the viability of the various contexts.

1. A comprehensive communication network could be set up.
2. Government could provide the network.
3. The communication system should support -
   a) information industries
   b) trade and industry
   c) training schemes in the communications field
   d) free access of electronic communication to the whole community

TABLE 2

Criteria for Successful Networks in Each Context

Context A	Context B	Context C	Context D
ommunication system which primarily a support service Industry and Trade.	A communication system which is environmentally benign and promotes information industries.	A communication system that supports economic growth of the agricultural sector, and also self-sufficiency.	A communication system which furthers social interaction and care of environment.
CRITERIA FOR SUCCESS	CRITERIA FOR SUCCESS	CRITERIA FOR SUCCESS	CRITERIA FOR SUCCESS
reased overseas trade ks	Network with low energy requirements.	Economic growth of industries based on agriculture.	Network durable and frugally designed.
de maximised within Zealand	Industries involved in extraction and processing of information (both government and privately supported).	Efficient (including small scale) farming.	Maximum participation of all.
ustrial development aides.	Economic growth from industries using sustainable resources.	Best utilization of energy resources.	Isolated rural communities linked.
hange of technology from rseas available.	Public participation in decision making by improving information flows made possible.	Political and social education of public enhanced.	Export of agricultural surpluses made more efficient.
iciency and profitability industries based on ural resources improved.	Access of network to all. Communication is a legal right.	General education improved.	Network used as support system in decision making and community affairs.
rting, cultural, and tistic events from all er the world brought to Zealand homes.	Level of education of society enhanced.	Leisure and recreational services improved.	Small scale activities viable.
ivate ownership of network.	Economic growth from export of communication technology.	Network spreads decision-making.	Growth of industries which make low demands on finite resources.
	Technological sophistication to meet social and economic needs.	Work and exchange of information away from main centres possible.	Educational and leisure needs of community met.
	Government control of network.	Government provides research and information service on New Zealand and overseas economic trends.	Government provides the network.
	Balance of communications capacity leased to private enterprise.	Government controls network.	

TABLE 3

Stakeholders in each Context

Context A	Context B	Context C	Context D
Workforce	Workforce	Workforce	Workforce
Health services	Health services	Health services	Health services
Education services	Education services	Education services	Education services
Children	Children	Children	Children
Government	Government	Government	Government
Electors	Electors	Electors	Electors
Industry	Industry	Industry	Industry
Manufacturers	Manufacturers	Manufacturers	
Farmers	Farmers	Farmers	
	Public	Public	Public
Technologists	Technologists		
Information workers	Information workers		
Private enterprise	Private enterprise		
Exporters of primary products	Exporters in the information industry	Exporters of primary products	
Importers of raw materials and machinery	Importers in the information industry		
		Small scale industry	Small scale industry
Network owners			

e) public education in technological fields

f) re-education for re-employment

g) initiation and support of work creation schemes

h) introduction of appropriate technology in all areas

i) social concerns

j) public participation in government

From these considerations two general conclusions emerged:

* Since transport costs are likely to continue to rise, a communication network is likely to be used to reduce the need to travel. The network would then also be used to provide other community services, so that an extensive network freely accessible to the whole community would be needed.
* If the network is to be beneficial to the entire community it needs to be provided and controlled by an independent body which has the community's interests at heart. The most likely solution is for the government to provide the network and for the network to be controlled by a specially appointed board or corporation.

3.8 Consequences of Policies

To evaluate the significance of these policies, the needs of stakeholders, and the criteria for success in each of the four contexts were next analysed.

The above policies would meet the needs of all stakeholders (Table 3) all of whom would benefit. There was only one area where conflict with the criteria for success occurred - government control of the network. Context A advocates private ownership of a communication system while the other three contexts support Government ownership. The latter was the policy option chosen, the reason being that the CFF Televote results (3) indicated that contexts B and C most closely reflected the philosophies of the majority of New Zealanders.

These policies would also lead to less travel being needed; the social fabric could be improved; and national security and defence could be enhanced. Also the tourist industry would benefit significantly from enhanced potential for advertising and operation.

4. CONCLUSIONS

Having analysed the possible policy options available for communications in the future, we now draw the following conclusions.

The major policy choices involve ownership of the communication network and how extensive it would be. It is our view that to contribute to meeting the expected needs of industry, government, education, technology, democracy and social concerns, it is vitally important that in New Zealand the network should be publicly owned, funded by government and controlled independently of government by a (preferably elected) body. Without these, communications systems would either be developed solely by free enterprise or conversely be autocratically controlled by central government.

As communications technology and services are becoming diverse, it is clearly artificial to subdivide the different forms of service. For this reason we favour the establishment of a single authority for all services. This does not preclude any profitable use of the network by free enterprise but does make it available to public services like education, health and library services with enough of the available time to make a useful contribution to society. Such a policy would allow the communication network to make a worthwhile contribution to social harmony, defence, tourism, business, and trade. It would also, in our view satisfy the criteria for success, the stakeholders and a number of specific interest groups, and it would guarantee flexibility and diversity as a protection against future surprises.

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