

At the mouth of the Gascoyne River is Babbage Island, named after the British mathematician, Charles Babbage (1792-1871).

To the world at large Babbage is just an interesting but minor player in history. In the world of information and communications technology he is recognised as a giant: a genius who first conceived of a computer, a century before one was actually built.

With his design, for what he called a *Difference Engine*, Babbage realised that a computing machine must have an input device (he used a card reader inspired by punched cards used for looms at the time), a memory (which he called The Store), a central processing unit (The Mill), and an output device. He also designed his *Engine* so one set of results could be taken into account in later calculations.

The project had some support from the British Government but Babbage's drive to change and improve the design exhausted the funds and his supporters. The *Difference Engine* was not built in his lifetime but working replicas have been constructed and proven to produce accurate results reliably.

Bill Gates, the founder of Microsoft, owns a section one of these replicas.

While Babbage's drive for improvements meant he did not see his mechanical computer he was responsible for a daunting range of inventions and ideas in many areas. Aside from being a mathematician at Cambridge University and publishing on economics Babbage also invented:

- the first reliable mortality tables, still a mainstay of the insurance industry;
- the first speedometer;
- the locomotive "cow-catcher"; and
- a device to study the retina of the eye.

He also developed "operations research". Babbage rejected the accepted "common sense" view and showed that the cost of charging different sums according to the distance a letter travelled cost the Post Office more in time, labour, and money than a fixed price stamp.

For Charles Babbage - who lived probably a century and a half before his time - the possibilities that he brilliantly imagined are possible.

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FOREWORD

Regions around the world are going through challenging times. Information and Communications Technologies (ICTs) are adding significantly to these challenges. It is becoming increasingly clear that advanced Information and Communications Technologies are an essential part of any region's economic, cultural and social future but, combined with the forces of globalisation, they present some very real hazards.

The Gascoyne region is an intriguing region from this point of view. Although it has a relatively small population it became clear during the course of this project that many of its residents have great faith and a strong attachment to the region. An outward, globally-oriented perspective was also obvious in many people. While distance from major centres and lack of population have been significant hurdles to overcome, that need not be the case in this new era. There are already a significant number of local businesses, organisations and individuals who have implemented sophisticated Information and Communications Technology strategies and others whose planning is well advanced.

This awareness of the positive potential of these technologies and the initiative which has been demonstrated in applying them in the tourism and pastoral sectors in particular is a priceless asset for the Gascoyne. There is the opportunity to build on these existing projects and to expand the region's economic and social capacity substantially. We thank the many people we met during the course of this work for their generosity with their time, thoughts and ideas. We trust the suggestions contained here provide a stimulus to assist the region and its people fulfil their potential.

The Structure of this Report

The findings contained here have been organised into three categories: recommendations, opportunities and issues. Recommendations are projects and other initiatives which the Gascoyne Development Commission either alone or with other organisations may wish to pursue. Opportunities are prospects which, we believe, are not suited to being undertaken by the public sector or through any of the current systems of grants. Issues concern policies, mainly at the federal level, which the GDC is unlikely to have the resources to pursue but which have an effect on the Gascoyne

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region. In many cases these issues also affect many other non-metropolitan regions, both in WA and interstate and so are more logically left with peak regional development bodies (eg. the Regional Development Council) or sectoral groups (eg. the National Farmers Federation or Australian Tourism Commission). In some cases these matters may fall under the responsibility of State Government agencies.

Regional Consulting Initiatives

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EXECUTIVE SUMMARY

Introduction

Information and Communication Technologies, along with globalisation, are rapidly becoming central factors in determining the shape and future of regions around the world.

Virtually all of the Gascoyne Region's major industries - agriculture, mining, fishing and tourism – are highly exposed to global markets. The region's heavy dependence on commodities means it is regularly buffeted by market fluctuations and that its producers can have little influence or control over these forces. The people of the Gascoyne want access to the information services other Australians increasingly take for granted in their business and private lives.

The Gascoyne Region of W.A has a population of 10,500 and comprises an area of 140,000 sq km.

The area is sparsely populated with around 90% of the Region's population living along the coast in the towns of Carnarvon, Exmouth or Denham. Small communities also exist at Monkey Mia, Coral Bay and inland at Gascoyne Junction. Aside from these locations the remaining 1,000 people are spread unevenly over the 140,000 km of coastal and pastoral areas.

The Consultants spent over 20 consultant days within the Region and interviewed over 60 people covering a broad spectrum of social, business and community issues.

Findings

The Consultants found a very high awareness, amongst those interviewed, of the critical importance of communications and its applications. This awareness was particularly evident in the horticulture, pastoral and tourism focus groups.

In general, the majority of the population – those in the Region's major townships - are, from a technical point of view, well served with telecommunications services. A question mark remains over the pricing of some services, particularly the more advanced products. Telstra has optic fibres to the four main population centres which

are also well served by mobile phones. However, the areas outside the main population centres are not well served by modern telecommunications.

Much of the wealth creation sectors including pastoral, mining, fishing and some tourism destinations are not served to the extent needed to fully fulfil their global potential.

The data deficiencies of the Digital Radio Concentrator System and the lack of mobiles outside the three major towns is well documented in the report. The restriction of ISDN to cable distances approximately 5 km from the Telstra exchange is explained and the implications for plantations in the Carnarvon area should not be overlooked.

The report adopts a global long-term, strategic stance and examines the opportunities and threats facing the Gascoyne.

Recent studies by the Federal Government (including *Creating a Clearway on the New Silk Road*, Department of Foreign Affairs and Trade) highlight the absolutely crucial role of ICTs. It says that “micro firms can only gain export market access through using electronic commerce. Therefore micro firms not using electronic commerce do not export”.

The Consultants see local Internet points-of-presence as an important building block in the world of electronic commerce. However, local points of presence alone, can be bridges for global invasion. Low cost local call access will put more Gascoyne residents on the Internet and at the same time accelerate the invasion by external on line businesses. An outline for a Community Network to both lessen the possibility of business “invasion” through e-commerce and to build local business is outlined in detail in the body of the report.

Similarly, there is a thorough examination of the potential of electronic commerce to redress some of the traditional disadvantages commodity producers have suffered in marketing their products and a proposal for using Information and Communication Technologies to more efficiently manage the Region’s fluctuating labour demands.

Proposals to address shortcomings in infrastructure, particularly for the pastoral and tourism industries, are discussed. The Consultants see a strong need for a Telecentre at Denham and the establishment of local Internet service providers at Carnarvon and Denham.

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The study also outlines a range of Government support schemes for telecommunications and recommends continual lobbying of both Federal and State Governments to extend the current Universal Service Obligation. It examines current broadcasting issues and recommends that Carriers and TV operators provide regional areas with more timely information on available services.

Current State Government initiatives such as the State Telecommunications enhancement Program (STEP) have great relevance for the Gascoyne and should not be overlooked.

In late Dec 1998 the State Government called for expressions of interest from interested Carriers for supply of infrastructure to rural and remote areas of Western Australia. It is expected that formal tender documents for the program will be issued in March 1999.

The adoption of the recommendations in this report will enable the Gascoyne Communities to grasp the immense opportunities of the Information Age to ensure population stability and growth and retain and create meaningful employment.

RECOMMENDATIONS

1.1 Introduction

The recommendations fall into two broad categories – project recommendations and policy suggestions. Within these headings they have been broken down into: Globalising Business; Infrastructure; Community; Policy issues and Delivery of Public services. As with any document concerned with such a range of issues there are a significant number of “cross-overs” between recommendations and policy suggestions. In many cases these create synergies which are intended to build on the strength of the total package to deliver a greater result than any one of the parts would individually.

That the GDC liaise with selected grower groups to establish the Gascoyne Electronic Product Exchange (GEPE) either by:

- *Seeking funding from an appropriate government source for the establishment of an appropriate organisation to operate the GEPE; or*
- *Developing specifications for the operation of GEPE and invite expressions of interest from the private sector for its operation.*

That the GDC seek State or Federal funding to pilot a remote power system at selected pastoral stations.

That the GDC work with the Western Australian Tourist Commission, the Telecentre Support Unit (within the Department of Commerce and Trade), tourist organisations in the Region and other relevant groups to develop broad and accessible availability of access points for e-mail users.

That the GDC work with the Shire of Denham to prepare a case for funding to the Department of Commerce and Trade to support the establishment of a Denham Telecentre.

That WIN TV be approached to provide details and timeframes for ground-based transmitters within the region.¹

¹

That information listing the services available on both the Optus and PanAmSat satellite TV platforms be made available to consumers through all satellite suppliers within the region.

That information listing the services available on both the Optus and PanAmSat satellite TV platforms as well as practical advice about rebroadcasting options be circulated to all local government offices within the Gascoyne Region.

That the Regional Council formulate a position paper on this issue (and other similar examples) for presentation to the Federal Government and the ACCC to highlight the difficulties in the sweeping application of competition policy to regional Australia.

That a detailed study of the issues and extent of interoperability of communications between emergency services (including voluntary services) be commissioned.

That the Gascoyne Development Commission involve the State Government in lobbying for an effective data capable replacement for the Digital Radio Concentrator System.

That the GDC in conjunction with the Gascoyne Murchison Strategy group fund a project plan for the Millennium Rangelands Time-share project. This plan should include a communications strategy (with the client group), an operational plan, preparation of necessary legal agreements and a marketing plan.

That the Commission work with the Office of Information and Communication to initiate discussions with the Catholic Education Commission of WA as to ways course offerings may be extended to rural Catholic high schools.

That the Office of Information and Communication be requested to commission empirical research into the performance of telecommunications liberalisation to document the lack of outcomes for the bulk of small businesses, regional users and consumers generally. This research should then be used to lobby the federal government for an improved outcome to benefit all users.

CONSULTANTS BRIEF

Terms of Reference

- 1 Provide an overview of current and planned communications infrastructure of relevance to the Gascoyne region. This should include both desk top analysis of existing material, and consultation with industry and service providers.
- 2 Produce a graphic representation of the current and planned communications infrastructure.
- 3 Report on the level of community use and awareness of the benefits of telecommunications infrastructure, particularly in aspects such as regional business development and service delivery.
- 4 Provide an assessment and report on the potential for more efficient utilisation of existing infrastructure, and the development of inter-organisational partnerships. Specific opportunities should be cited where relevant.
- 5 Recognise and document the deficiencies in access to communications relative to industry and community needs.
- 6 Where relevant, present solutions and opportunities to enhance the communications situation in the Gascoyne, citing specific situations and locations where they exist.
- 7 Recommend longer term strategic approaches to problem solving for Gascoyne communications.

In addition to the above Terms of Reference, the consultants were given a set of specific requirements by the Gascoyne Communications Working Group and these are documented in the appendix.

THE GLOBAL CONTEXT

1.2 Introduction

There have always been disparities between regions, most pronounced between regions in different countries, but more recently regions within countries have begun to diverge economically. The rise of globalisation has had a major impact on regions, particularly in sharpening the differences between them. Where regions within countries used to remain within a relatively tight economic range with their geographical neighbours, globalisation has meant some regional economies have prospered while others, even neighbouring regions, have suffered. In Australia, for instance significant differences have begun to appear between South Australia and Tasmania and much of the rest of the country.

Those regions which are closely linked into political structures, but even more importantly, have an economic power which is part of growing global industry sectors a region is. Globalisation is emphasising the differences between those regions with this profile and those without. The table below identifies the characteristics at each extreme of this relationship between “core” or central regions and those regions which are on the periphery. These differences largely boil down to levels of linkage and access. In the core complexity, technology and control are the norm in terms of economic, cultural and political life. They tend to be active, innovative and the leaders. Peripheral regions tend to be passive, traditional and dependent.ⁱ The challenge for any region, such as the Gascoyne, is to minimise its peripheral characteristics.

Table 1: Characteristics of "pure" core and "pure" periphery

Core	Periphery
Geographical:	
Coupled to all transport, low absolute and relative contact costs, central part of the telecommunications network.	Coupled to a few means of transport, high absolute and relative contact costs, difficult access to other peripheral areas.

Economic:

Finished wares and services produced, complex control systems, importers of labour, adaptable business community, control over capital, contact with other economic agents.

Raw material production, simple processes, one side, vulnerable production, exporters of labour, importer of finished wares.

Cultural

Produces and spreads the symbol system, represents expertise, control the information media, rejects symbols from the periphery as irrelevant and/or unimportant.

Accepts others' language, forced to take others' models of society, consumes symbols created elsewhere.

Political:

Control of strategic resources, concentration of elites, over-represented in formal administrative organs, low costs incurred in assembling and putting forward views.

No strategic resources, absence of [national/international] elites, or only agents of centre of administration. Poorly represented in the centre. High costs incurred in assembling and putting forward views, therefore few initiatives.

Source: adapted from Bivand (1981)ⁱⁱ

The description of a peripheral region, particularly under the “geographical” and “economic” headings, could definitely be applied to the Gascoyne. Used strategically Information and Communication Technologies can overcome some of the disadvantages.

1.2.1 Information Communication Technologies (ICT) and Innovation

In addition to the factors mentioned above, innovation and the rate of adoption of new technology is another important factor in a region's performance, just as it tends to be within companies. The strong tendency for research and development to be undertaken at the core rather than the periphery makes it virtually inevitable that there will be a lag between the centre and regions in terms of technology adoption.ⁱⁱⁱ In a globalising economy where knowledge accounts for an ever increasing portion of products and services this pattern places regions at a further disadvantage. Most importantly for this

discussion, ICTs are and will continue to have substantial impacts on where jobs are located.

1.2.2 Globalisation

The forces of globalisation mean no region, business or community has much choice in terms of adopting and using these technologies as efficiently as it possibly can to maintain its position. Globalisation has a number of well recognised features:

- Simultaneous competition in each market sector between numerous new competitors from numerous countries. This new competition demands extremely rapid structural adjustments;
- Internationalisation of production: components, products, services and capital drawn from a wide range of countries;
- Growing interdependence of various industry activities;
- Increasing cross-border activity by many organisations;
- Foreign investment has become a crucial factor in the worldwide process of industrial restructuring and the development of genuinely global industries;
- The financial sector is even more closely entwined with the industrial sector; and
- Multiplication of regional free trade agreements (e.g. European Union, North American Free Trade Agreement etc).^{iv}

1.3 Regions and Globalisation

The costs and difficulties associated with communication and transport have provided another form of insulation for many regional industries from overseas competition and from other regions within Australia. Western Australia's isolation has made this true for many local industries. Until the early 1980s businesses which were not performing at world's best practice were largely protected. Their future was not guaranteed but it was far more secure when the major competitive threats they had to contend with were in their own backyard. Only a relatively few huge multinational corporations had the resources which enabled them to comb the world looking for the best possible location in terms of costs and conditions. That luxury is no longer confined to Multi-National Corporations. In fact the level of competition facing all industries increasingly make

this approach a necessary survival strategy. Even small businesses in some sectors are finding themselves under global pressure: the reverse to this coin of course is that they also find global opportunities opening up.

These shifts in the structure of the world economy also have significant policy implications. Federal and state governments have control over industrial laws, the regulatory regime for telecommunications and electricity services and provide education, health, social welfare and the tax regime; amongst other responsibilities. Under the traditional model of our three tiers of government state and federal governments determine policy and the regulatory environment while a weaker local government sector is responsible for “roads, rats and rubbish” with only a limited role in economic development. In the new environment outlined above it seems desirable that far greater autonomy should be granted to local government or to regions (within states) to directly manage their position with the other two tiers providing the supporting framework.^v

1.4 Regions and ICTs

There has been a great deal of enthusiasm by some for the idea that ICTs can link even the most distant regions into the centres of activity. A quote from *The Economist* magazine probably sums up this extreme faith in technology to improve the position of all, particularly those on the periphery.

...It will become possible to site any screen-based activity anywhere; and to tap into all sorts of information and advice - from crop prices to university courses to medical help - from anywhere in the world.

...the further a country or a town is from the main centres of economic activity, the more it will gain as a result.²

This techno-optimism is a seriously dangerous and delusory perspective. There is no doubt that ICTs *can* and are delivering the kind of opportunities this quote above suggests. On the reverse are some of the threats outlined in the table below. It is essential that regional economic development planners as well as regional businesses and communities generally inform themselves of these issues and choose their future aware of the implications.

^v

Figure 5.1: Information and Communications Technologies (ICTs) and Regional Development: Opportunities and Threats

	Opportunities	Threats
Economic development	<ul style="list-style-type: none"> • decentralisation and inward investment • regional development • increased competitiveness • telework 	<ul style="list-style-type: none"> • greater external competition • recentralisation • delocalisation
Community development	<ul style="list-style-type: none"> • enhanced quality of life • more efficient delivery of public services • cohesion and integration of remote communities 	<ul style="list-style-type: none"> • financial and technological barriers to uptake of ICTs • possibility of greater social polarisation • loss of face to face delivery of services, lower quality of life
Environmental management	<ul style="list-style-type: none"> • physical flows substituted for electronic • more efficient use of resources 	<ul style="list-style-type: none"> • enhancement - ICT increase opportunities and reasons for travel • greater information flow generates greater flow of physical goods and traffic

ENVIRONMENTAL SCAN

1.5 Social

The Gascoyne region of Western Australia consists of the Shires of Carnarvon, Exmouth, Shark Bay and Upper Gascoyne. The 140,000 square kilometres land area of the Gascoyne represents about 6 per cent of the State's total area and is approximately twice the size of Tasmania. The population of the region is a little over 10,000 with the vast majority living in the towns of Carnarvon, Exmouth and Denham.

1.5.1 Population

Projected Gascoyne Population Distribution

Shire	1996	2001	2006	2011
Carnarvon	6500	6700	6800	7000
Exmouth	2400	2600	2700	2800
Shark Bay	950	1200		
Upper Gascoyne	300	300		
Regional Total	10,100	10,800	11,100	11,400

From: Gascoyne Development Commission

	<i>CARNARVON</i>	<i>EXMOUTH</i>	<i>SHARK BAY</i>	<i>U GASCOYNE</i>
Total Population	8,616	3,908	1,943	309
Population Male	4,478	2,102	1,003	183
Population Female	4,138	1,806	940	126
Aboriginal & Torres Strait Islanders	1,229	30	96	104

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Under 15 years age	1,680	576	231	65
Employed	3,161	1,428	658	167
Unemployed	247	124	52	10
Not in labor force	2,989	1,610	832	54

From: Australian Bureau Of Statistics, *1996 Census of Population and Housing*

Comparing the above data, it appears that the population of the Gascoyne is dominantly focused in the urban areas of Carnarvon and Exmouth. The comparison of GDC and ABS data from 1996 suggests that the population in Carnarvon and Exmouth increase considerably in the winter months.

1.5.2 Education

The region has government primary schools in each town (Carnarvon, Exmouth, Shark Bay/Denham and Useless Loop). Carnarvon has two primary schools and a senior high school. In Exmouth a district high school serves children from pre-primary through to Year 12- approximately 325 in the primary section and 125 in the high school years. A School of the Air also operates from Carnarvon for children learning by correspondence. The School of the Air has about 80 students.

St Mary's Catholic School in Carnarvon has about 370 students from kindergarten to year 10.

1.5.3 Health

Carnarvon has a hospital with between 55 – 75 beds, depending on needs and resources. It has four District Medical Officers (DMOs) and a surgeon on staff. These doctors also service nursing posts at Denham and Useless Loop (operated by Silver Chain) and at Burringurra. The Health Department also maintains a nursing post at Coral Bay. Exmouth Hospital has 12 beds and two DMOs.

The Aboriginal Medical Service employ two doctors in Carnarvon and the town has a General Practitioner in private practice.

The Royal Flying Doctor Service is used when necessary, generally serving the region from its Meekatharra base.

1.5.4 Youth issues

Approximately 17.3% of the region's population is under the age of 15 years. This compares to a State-wide average of 22.5%.

1.5.5 Aboriginal issues

Aboriginal and Torres Strait Islanders make up approximately 13% of the Gascoyne's population, and their population growth rate is currently 2.5% (1% higher than WA average). This population is dominated by young people (GDC, Gascoyne Region Economic Development Strategy).

1.6 Business

1.6.1 Tourism

Tourism is the fastest growing sector of the Gascoyne economy, and based primarily upon natural attractions such as the Ningaloo Reef, Shell Beach, Monkey Mia dolphins, dugongs and Ningaloo whale sharks, Mount Augustus and the Shark Bay World Heritage Area. The region's climate, and superb fishing, boating and surfing conditions hold the promise of strong continued development.

Tourism in the Gascoyne is made up of 65% intrastate, 24% interstate, and 11% international visitors. Over the next 10 to 15 years the tourism industry can be expected to grow based both on domestic demand and on the increase in eco-tourists from Europe and America. Much of the growth in tourism will come from domestic tourism. This will require the region to attract increased public sector investment for transport, especially road development, and growing private sector investment in accommodation and resort facilities.

1.6.2 Horticulture

The climatic advantages offered by the Gascoyne enable the horticultural industry to meet out of season demand both domestically and internationally. The Gascoyne's major produce are bananas, Ruby Grapefruits, mangoes, tomatoes and a wide range of vegetables. New product development continues in the region, with the advancement of grapes and floriculture species.

The horticultural sector is one of the mainstays of the region's economy and is expected to experience sustained growth over the next 15 years. In 1996, \$29 million was generated from the horticulture industry. By the year 2010 horticulture is likely to be one of the region's two largest sectors and have a significant export focus.

1.6.3 Pastoral

The pastoral industry has been one of the mainstays of the Gascoyne economy, and 115,800 sq km of the Gascoyne landmass is allocated to pastoral activity. Wool and meat production are the primary activities, however pastoral stations are diversifying to take advantage of opportunities in goat domestication, floriculture, horticulture, inland aquaculture and tourism.

The pastoral industry's relative importance to the region's economy may decline as other sectors develop at a faster rate. Unless it can find new niche markets, the pastoral industry is likely to be under extreme financial pressure and facing diminishing markets for its products. Future options for the ongoing viability of the pastoral industry may be found in diversification into goat production and the integration of tourism and aquaculture initiatives.

1.6.4 Fishing

The fishing industry continues to be one of the Gascoyne's major industries. Prawns, molluscs, lobster, crabs and a variety of wetline fish are caught in Gascoyne waters, and subsequently processed at on shore operations at Carnarvon and Exmouth.

60% of Western Australia's prawns and scallops are caught in the Gascoyne, with the fishing industry worth \$60 million to the Gascoyne economy. The traditional fishing industry is being increasingly complemented by the aquaculture industry, and this industry will increase in relative importance in future years.

1.6.5 Mining

Mining activity in the region is largely confined to salt mining at Lake MacLeod near Carnarvon, and Useless Loop in Shark Bay, with 30.6% of Western Australian salt produced at these two operations. \$45 million was contributed to the economy from mining during 1994/95.

This figure is likely to increase in the short term. Limestone mining is due to commence near Exmouth, and gypsum mining at Lake MacLeod commenced during 1997 with 1.5 million tonnes to be exported per annum.

1.6.6 Clean and Green

The Gascoyne's pristine environment is a regional feature which is already beginning to produce significant returns and one from which the region can be expected to reap even greater dividends in the future. Its fishing, tourism, pastoral and horticulture industries all have much to gain from this exploitable opportunity. In the first instance this attribute is likely to appeal to international markets before it gains wider acceptance within Western Australia and Australia.

The consultants were impressed by the number of interviewees who made mention of this and their planning to take advantage of this.

1.7 Infrastructure

The telecommunications infrastructure closely follows the distribution of population. The ninety percent of the population living in the urban areas of Carnarvon, Exmouth or Denham are well served by modern digital exchanges with high capacity optic fibre backbones. A full range of services including ISDN are available.

The four Telstra exchanges in the region are Carnarvon, Carnarvon North, Exmouth and Denham. Other communities such as Monkey Mia and Coral Bay are serviced by optic fibre and small remote exchanges known as Remote Interface Modules (RIMs).

Whilst the coastal population are well served the same cannot be said for the pastoral stations. The Gascoyne region contains approximately 85 pastoral stations. The pastoral stations are large, even by WA standards, and typically would exceed 250,000 acres. The task of providing quality communications over these instances is indeed immense. Telstra has worked hard in the past to provide a quality grade service and the design and implementation of the Australian designed Digital Radio Concentrator Service (DRCS) in the mid 1980's was a milestone for remote communities. However the DRCS is now failing to deliver the business and community expectations of the late 1990's.

The shortcomings include lack of data capacity and insufficient channel capacity to cope with long call hold times. In addition the harsh climatic conditions, coupled with long hold internet calls may be contributing to premature failure.

1.7.1 Remote Communications

Lack of 24 hour power is a major issue in the pastoral areas of the Region. Remote from the power grid, pastoral stations use a variety of power sources that vary from wind and solar to diesel power. One station visited by the consultants had a combination wind and solar system to supplement the station diesel which was only run in the evenings. The capital cost of this arrangement which require large battery banks is very high.

Diesel power plants have high running costs but are not overly expensive in terms of capital. Solar and wind systems have low running costs but are expensive to buy. In addition solar and wind are unlikely to provide the full power needs of the station. There is a clear need for independently powered communications systems for Pastoral stations. The equipment to be powered includes answering machines and fax machines. A number of options are possible but the more promising options are 12volt equipment or small solar powered units incorporating solar cells, battery and inverter.

The quantity cost for reliable units of this size is expected to be well under \$1,000. If sufficient quantities are required then it would be feasible to modify equipment and tap into the low volt rail of the fax and answering machines. Equipment designed for vehicle mounted 12 volt use should be quite suitable. The Cooperative Research Centre for renewable energy at Curtin University would be a good starting point for a project of this nature.

Recommendation

Seek State or Federal funding to pilot a remote power system at selected pastoral stations.

1.7.2 Personal Computers

Heat continues to be a serious problem for PC usage in inland Northern Australia. Standard desk top PC's are intolerant of heat. Whilst they will work in 40 degree heat they are not designed to do so and will suffer intermittent faults and reduced component life. Many areas of the Gascoyne are experiencing ambient temperatures

well in excess of this during the day. Notebook computers consume less power and consequently produce less waste heat. They are generally more rugged and more tolerant of demanding environmental conditions.

In extreme conditions it is not realistic to consider the use of computers without artificial cooling.

1.8 Emergency Services

Compatibility of emergency communications remains a problem in non metropolitan Western Australia. The issue of incompatibility came up at focus meetings in Exmouth, Denham and Carnarvon. The technology in use between these Services include high frequency (HF) ultra high frequency (UHF), very high frequency (VHF), citizen band and marine band radios. In discussions it became apparent that mobile radios were the only form of communication that was standard between all users.

The amalgamation of Fire and Rescue with the SES to create FESA will facilitate some rationalisation. However it is believed that only a concentrated approach at State level will achieve a worthwhile result.

Recommendation

It is recommended that a detailed study of the issues and extent of interoperability between emergency services (including voluntary services) be commissioned.

1.9 Low Earth Satellites

With the launch of the Iridium Low Earth Orbit (LEO) system in Sept 1998 the prospect of full state coverage is now a reality. Low Earth Orbit satellites circulate approximately 700 km above the earth's surface compared with 36,000 km for geostationary satellites. Consequently the shorter transmission distance between satellites and handsets places lesser demands on LEO systems requiring lower transmit power which in turn allows smaller handsets and longer battery life. The current costs are high, but will reduce steadily as competitors launch similar systems.

Prices currently being quoted by Iridium are \$3.50 per minute from satellite phones into the Network. Rates for the reverse direction (PSTN to mobile) are more expensive at \$8.50 per minute. Terminals are currently available at around \$5,500 each. Coverage

is fully world wide and is achieved with a network of 66 satellites circling the earth in 6 planes. Special Government rates can be expected in the next 6 months.

1.10 Optic fibre

The main population centers are well served by Telstra optic fibre cables. The main north south optic fibre runs along the north west coastal highway. The fibre cable passes through Carnarvon and has spurs that service Exmouth, Denham and Monkey Mia. Breakout points along the highway serve local communities such as Wooramel.

1.11 Mobiles

Telstra has digital mobile base stations at Carnarvon, Denham and Exmouth. Coverage is affected by terrain but in general extends out approx 25 km for vehicle mounted and less than 10 km for handhelds .

Mobile service is also available at Monkey Mia through a cell extender from Denham. Neither Optus nor Voda phone have any coverage in the area and this is a major cause of frustration to many travellers passing through the Region.

Telstra coverage at Exmouth covers the communications base but does not extend to Learmonth. Again this is a cause of frustration to arriving air travellers. Construction of the new terminal at Learmonth only highlights this deficiency.

1.11.1 Coverage

Coverage from each base station is restricted to the immediate area surrounding the transmitting tower. Since field strength drops rapidly as distance from the base station increases, it is important to retain close proximity for reliable service.

Under favourable conditions car mounted mobiles will provide satisfactory service up to 35 km from a base station. Favourable conditions include an unobstructed line of sight between the base station antenna and the mobile.

Hand held mobiles transmit at significantly lower power levels than car mounted and incorporate lower antenna gain than car mounted. Even under favourable conditions the range for hand held can be less than 5km. In addition, the common practice of using a hand held inside a vehicle can further reduce the range; the steel of the car body acts as a barrier to radio frequency signals and severely reduces efficiency.

There is also another fundamental difference between analogue and digital mobile performance. In marginal areas analogue will continue to work but with degraded performance. In contrast, as signal strength drops, digital will continue to work with high clarity until error rates reach a predetermined threshold. As the error threshold is reached the link fails and the call is effectively terminated.

1.11.2 Code Division Multiple Access

CDMA is a digital cellular system developed in the US which will replace the current Telstra analogue system in Australia. Analogue mobiles are recognisable by their 9 digit numbers (018, 015) whilst digital (GSM) phones have 10 digit numbers; the prefixes being (Optus 0411, 0412, 0413; Vodaphone 0414, 0415, 0416; Telstra 0417, 0418, 0419).

GSM uses a time division Multiple Access technology and consequently its coverage is limited by timing demands (typically 25 km radially). The code division technology is not similarly constrained and can work out to greater distances (similar to analogue).

The range at which a CDMA mobile phone can work from a base station can vary according to the number of users at the time. Consequently it is possible that under light traffic conditions the coverage will exceed that of the current AMPS base stations.

CDMA will be progressively installed throughout Western Australia with priority given to current analogue sites.

Current GSM or analogue (AMPS) handsets will not operate on the CDMA network.

There are no CDMA handsets currently on sale in Australia. However, dual mode handsets will be available mid year that can be used on the existing AMPS network prior to CDMA being available in any particular location.

The CDMA network will be established and owned by Telstra but resale facilities will be available to both Optus and Voda phone.

1.12 Digital Radio Concentrator System

The Digital Radio Concentrator System was designed by Telstra laboratories in the early 80's specifically for outback use. At the time it was a cost effective method of providing telephone service to remote Australia. The system was never designed for

data and consequently the data speed is generally 2400 bps though some systems in Western Australia are delivering data at 4800 bps.

Whilst the systems are heat tolerant, there is mounted anecdotal evidence of heat problems particularly with long held calls (typical of internet use). Day time shade temperatures regularly exceed 42 degrees in these regions placing extreme demands on passive cooling. The additional heat generated by the unit during long phone calls (internet) is likely to push the unit beyond design limits.

Telstra has trialed a number of systems to replace the Digital Radio Concentrator System without success. New services to remote areas are being delivered by satellite and Digital Radio Concentrator System services are being replaced by cable where ever possible. However, the severe limitations of the DRSC continue to restrict the effective use of electronic commerce in these regions.

Recommendation

The Gascoyne Development Commission involve the State Government in lobbying for an effective data capable replacement for the Digital Radio Concentrator System.

1.12.1 ISDN

ISDN is available at all the major centres (Carnarvon, Exmouth, Denham and Monkey Mia). ISDN is not available to DRCS customers (the vast majority of pastoral stations).

ISDN is delivered from main exchanges via copper cable. The copper cable

The Telecommunications Act of 1997 (section 66) requires to ensure that by 31st Dec 1998 at least 96% of the Australian population has access to a basic rate (64kbits/sec) ISDN telephone service. Commercial and competitive influences have ensured that the 4% not having ISDN are concentrated in the hard to get to areas of Australia. At the time of this report the towns of Carnarvon, Exmouth, Denham and Monkey Mia had access to ISDN.

Access is available for connections up to 5 km from ISDN equipped exchange (technical limitations)

Whereas in standard digital telephones the digital to analogue (speech) interface occurs

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customer's business or home. This means that customers who are connected to ONRAMP have the copper connection to the exchange specially "conditioned" to remove sources of noise or degradation to the digital signal. From an Internet perspective, an ONRAMP customer can have a full of 64,000 BIT/sec service back to the local Internet Service Provider (ISP) who must then ensure that this quality and capacity is maintained by also using ONRAMP or equivalent digital circuits back to the wholesale service provider usually located in a capital city.

It should be noted that local ISDN calls are time charged. Consequently it may be preferable to connect to a local service provider over a 33 k bits/ modem (using analogue lines) at 25c per call than to use ISDN at 4c per minute (day rate).

PROJECTS

1.13 Rangelands

1.13.1 Rangelands Communication Development Project

Identified Need

The communication needs of the pastoral and mining areas of Western Australia pose unusual and extremely challenging technical problems, especially if those living in these areas are to have access to anything approaching modern those facilities modern information and communication technologies can provide.

The move to liberalisation of the telecommunications industry has led to a diminution of the direct public service role of the carriers which has meant that those users in remote areas, who do not have substantial resources at their disposal, are not as likely to be serviced as they were under the old regime. This requires a different approach, one which is not solely dependent on the traditional suppliers.

1.13.1.1 Background

Western Australia's great distances combined with its thinly dispersed population, outside the south west corner of the state, has led to the development of many innovative approaches to dealing with communications to isolated areas. The mining sector, in particular, has been a leading developer of high capacity systems which deliver reliable telecommunications services to extremely remote sites.

The turn-key Telecentre or MITE, which has been developed by Imago Cooperative Multimedia Centre with a number of partners, specifically for use in isolated areas is another example of innovations conceived to serve WA's challenging conditions. These transportable installations are attracting the interest of organisations around the world as a simple and cost-effective means of providing communities with access to a range of technologies and information services. This is another example of a technology which has been developed for Western Australian conditions but has wider potential.

Discussions are already under way within the WA ICT industry examining the opportunities for a more systematic development of Remote Products and Services.

1.13.1.2 The Proposal

The purpose of a Rangelands Communication Development Project would be to

- build on the known communication needs of those living in isolated areas of the state;
- identify and assess new and existing communication technologies which can cost effectively meet these needs;
- build partnerships, alliances and joint ventures with groups to undertake the necessary refinement of existing equipment to make it more appropriate to use in isolated areas from a technical, economic and useability perspective;
- liaise with organisations in other parts of Australia and international groups (particularly development organisations) to develop and market these systems off-shore.

Through this work a range of appropriate information and communication technologies³ would be identified and developed further, if necessary, which meet the needs of domestic users while taking into account the often hostile weather and limited market available.

The proposed business model for this project would be similar to that being followed by CASE (the Centre for Applications of Solar Energy) in Perth. This organisation has been jointly funded by the state and federal governments with support from one of the United Nations' development agencies. It serves as a broker and conduit between the cluster of solar energy companies and researchers in Western Australia, users in developing countries and the various international development funding agencies.

As with solar energy, Perth has a solid block of companies skilled in the development and systems integration of these remote technologies and services along with significant numbers of telecommunications engineers, many of which have had experience in the developing world. WA also has professionals capable and experienced in undertaking the social and economic needs assessment and consulting on policy matters which are also an essential component of these projects.

³ This term is a variation on the Appropriate or Intermediate Technology movement, largely popularised

Recommendation

Through the Regional Development Council, the GDC pursue establishment of a working group to oversee a feasibility study into a Rangelands Communication Development Project. (Other members of this working group might include: the Industry Development Team within the Office of Information and Communication, other affected Development Commissions, the Gascoyne Murchison Strategy and relevant industry representatives.

1.14 Primary Produce

1.14.1 Primary Production and General Business Issues

Identified Need

Under the traditional systems used for the sale and marketing of horticultural products producers are, for the most part, price-takers. They pay dearly for their lack of information about production levels and timely market information. As a result they are unable to optimise the price they receive for their produce.

1.14.1.1 Introduction

The relationship between producers, distributors and the retailing of products and commodities differs greatly from industry to industry. These value chains, as they are sometimes called, can explain the relationships between the various participants and identify the relative power each has in the transactions which make up the flows back and forth along the chain.⁴ Distance and the cost of maintaining contact with all the sections of this value chain have meant it has been impractical for most rural commodity producers to have any real impact on the way their products are handled once they have left the farm gate. They have relied heavily on agents and others further along the value chain; this has left many in a very vulnerable position.

This heavy dependence is even more crucial as the nature of the product changes, either due to a product's perishability or through changes in industry structure or market dynamics. As industries become increasingly sophisticated (as demonstrated by quality assurance programs, sophisticated marketing and branding exercises) and push the value

⁴ The business academic and writer, Michael E. Porter in his "Competitive Advantage" and Competitive Advantage of Nations" has developed these ideas significantly. Some of the theoretical concepts raised

of their products or services higher this extra value is not always distributed evenly. This is certainly the case with most primary products.

Changes in technology can also have a massive impact on the relationships and structure of value chains. Information and Communication Technologies (ICT) are arguably the most significant revolution the economy has seen.

1.14.1.2 Value Chains and Information and Communication Technology

Modern ICTs have greatly reduced the costs to enable producers to be far more closely involved along their industry's value chain. By making the gathering, storing, processing and distribution of crucial pieces of information in the value chain much more simple great opportunities exist for producers to gain far greater control over the all-important distribution and marketing stages – increasingly the stages with the greatest value.

1.14.1.3 Gascoyne Opportunities

The consultants were greatly impressed with the significant amount of work a number of industries have already begun to do in lessening their dependence on other organisations. Both the *Sweeter Banana Company* and the *Love Apple* group are two excellent initiatives which provide a strong base from which the next step can be taken. In both cases growers have joined together to cooperate in developing and building a shared brand for their products. An integral part of these initiatives have been putting in place of quality standards and distribution arrangements.

Individuals and groups within other sections of the horticulture and the fishing industries have also done some very useful groundwork in this regard. A successful pilot in this sector should serve as an ideal demonstration site to encourage other producers and other industries to become involved. The human and technological infrastructure required for this project would also have significant applicability to achieve other goals outlined in this report, in particular the Gascoyne Electronic Labour Market (8.2 below) and the Gascoyne Community Network (11.1 below).

In conversations with producers from other industries it was clear that, while they may not have progressed so far toward implementation, they too are thinking seriously about strategies to lessen their levels of dependence on distant marketing organisations.

This coincidence of willingness by many producers to re examine their existing business relationships and the steps they have already taken point to some exciting possibilities. By putting in place a system of product control and coordination, price monitoring, transaction control, logistical support and links to the retailer/end-user there is the opportunity to:

- Support and enhance product branding
- Improved access to logistical information
- Shorten producer to shop shelf times
- Gain rapid access to better product pricing information
- Greater knowledge of (and therefore potential to control) costs
- The potential to participate more actively in other aspects of the value chain, if desired

1.14.1.4 Commodity Pricing Projections

A logical addition to the Gascoyne Electronic Produce Exchange is to utilise the data gathered to provide growers' with predictions of market trends. By processing the data to ascertain price and supply variables it would be possible for growers to know when to offer their products for sale to generate the best price. To demonstrate the possibilities of this type of operation it is probably best to use a practical example.

1.14.1.5 Case Study – Carnarvon Bananas

Carnarvon Bananas have been subjected to sustained competitive pressure from bananas grown in Kununurra and Queensland over the past few years.⁵ The longer shelf life of these varieties and the commercial arrangements the selling agents have for them have all contributed to a situation where Carnarvon Bananas have seen their market share and price decline. At least one major retailer has switched entirely to the Kununurra and Queensland fruit and, according to one industry leader, the Carnarvon product is increasingly seen as a stop-gap; the bananas many agents use to fill dips in supply from Kununurra and Queensland.

⁵ Up until 15 years ago Carnarvon and Queensland bananas had attracted about the same price, there is

The creation and development of the *Sweeter Banana* brand to strongly identify and provide a profile for the unique qualities of the Carnarvon Banana is an excellent step and a crucial element to overcoming this decline.

Building the brand (along with the requisite controls to ensure quality is maintained) provides some insurance against Carnarvon Bananas being used as product which can be dumped.

1.14.1.6 The Gascoyne Electronic Produce Exchange (GEPE)

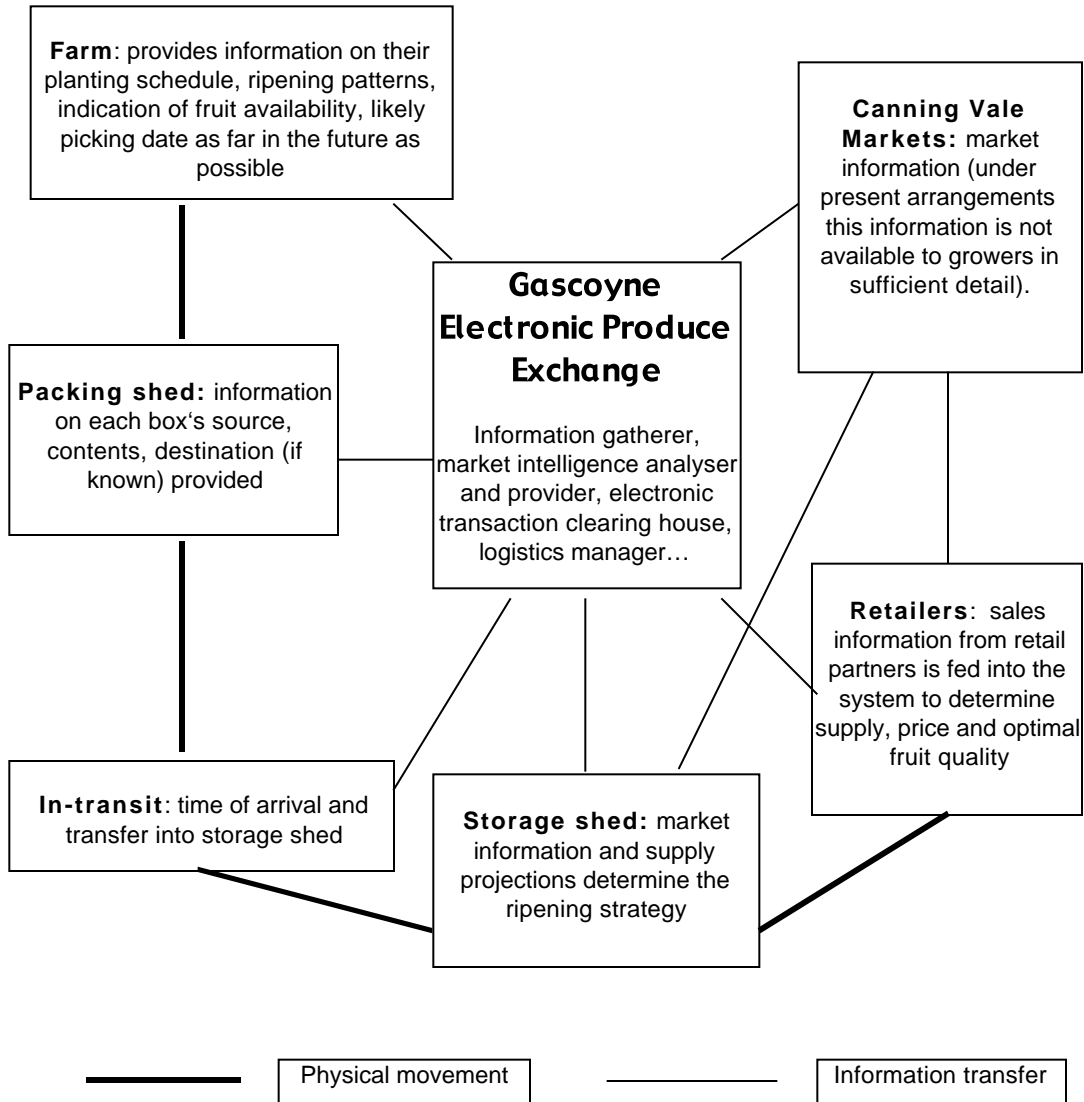
Just as growers have attempted to reduce costs and to hold greater control through pooling their resources to operate packing sheds or trucking operations, Information and Communication Technologies can offer the same opportunity. In fact, structured the right way and with the right management by growers they offer the potential to significantly alter the power relationships between growers, agents and retailers to also have a positive impact on the prices producers receive.

By strategically gathering and processing information, which is readily available to a grower group, they can easily manage the entire distribution chain from farm to store shelf, and so reap the benefits of managing that flow. The crucial issue for the period we are entering is that ICTs are causing the value chains in a whole range of industries to be redrawn. As happens in any restructuring of this scale the balance of power in the various business relationships can be expected to change. The group which can determine the operation of these new systems will be at greatest advantage and, if the restructuring is managed successfully, they will be in the best position to retain this control; probably until the next wave of change comes about.

In the case of Carnarvon Bananas this kind of control offers even greater advantages in being able to manage a significant competitive weakness; their shorter shelf life. The consultants were also told that agents in the Perth markets do not know precisely how many cases they will receive from Carnarvon on any one day. This contrasts with the far tighter commercial arrangements which are in place with Queensland suppliers, in particular, where price and supply are fixed.

An electronic trading system addresses many of these short-comings in the current system and would enable far greater control to be held by Carnarvon producers in determining the movement of their product. This would require collecting, storing and distributing data from each state of the value chain, as illustrated in figure 7.1 below.

Figure 7.1: The Gascoyne Electronic Produce Exchange



1.14.1.7 Broader applications to other industries

Although this scenario has been developed using the banana growers as an example it has the potential to be applied to virtually all the primary products of the Gascoyne – other horticultural products, fish and potentially wool.⁶ The primary criteria are those industries in which a fractured producer group, often operating at a great distance from market, have had to rely heavily on an agent or broker to perform the function of an

⁶ A group of Western Australian wool exporters and processors is reportedly already examining the possibility of developing an electronic system for the sale of wool. The article quoted the president of Wool Council Australia, Rod Thirkell-Johnston as saying, “electronic sales must be a central part of any strategy by the industry to reduce pipeline costs and modernise wool marketing.”

“Electronic wool trade plan gains support”, *The West Australian*, Monday,

aggregator to interface with the market. This invariably leads to significant power (and so value) being ceded to this group.

The example has been drawn with the Western Australian market in mind but the implementation of this system would position Gascoyne producers very well to become involved in supplying markets interstate and overseas. This form of efficient global marketing channel is particularly relevant given the Gascoyne's significant opportunities as a source of "clean and green" produce^{vi}.

Projects such as the Federal Government's Supermarket to Asia Council (<http://www.supermarkettoasia.com.au/>) and its Food Australia On-line (<http://www.foodaust.com.au/>) are significant examples of this type of initiative on an industry-wide scale. The case study below provides an excellent example of how these new technologies can be exploited by an individual grower to significantly improve their position in the value chain. ICTs combined with a considered business strategy have enabled this producer to create his own market and so reap the additional benefits which would have previously gone entirely to an agent.

Case Study: Electronic Commerce in Agriculture⁷

Four years ago, a farming family from the irrigation area of northern Victoria involved in a single commodity producing operation, found this enterprise increasingly unprofitable and set out to examine alternative agricultural enterprises on their land. Working with a consultant, brokers and agents based in various Asian and European markets, the grower decided to produce and supply Asian vegetables, herbs and fresh fruit to meet top-end demand (restaurants and hotels with a regular demand for premium quality products), initially in Singapore.

Size of firm

This is a small enterprise that has expanded from (on average) two to eight employees.

Use of the Internet

The grower developed a model of electronic management which he seeks to further implement and refine. In the evening, an electronic mail order is received from the agent in Singapore, indicating the next day's requirements. Similar-minded farming enterprises combine to fill the order. Before picking begins at 6 am, the grower informs the agent by electronic mail how much of the order can be filled. Then electronic mail is used to inform the transport company of that day's freight movements to Melbourne and Singapore.

The vegetables, using the farmer's brand name, are picked, packed and chilled; strict quality control is essential. The vegetables are freighted to Melbourne at around 10 am and are on the plane to Singapore by 5pm. Payment is made and insurance contracts traded at Tullamarine Airport, where the farmer's liability ends and the agent's begins. Payment is made electronically, directly into the farmer's account, at a pre-agreed and very consistent price.

The key element of this model is that the whole process takes just 24 hours from receipt of order to delivery to market, and full payment is made within that timeframe.

The farmer is currently negotiating to secure European partners to supply the German market with premium fruit and vegetables. The farmer has full organic registration which adds considerably to the market attractiveness of produce.

While this model is driven by electronic communication, it is founded and depends on mutual trust between growers, agents and the agents' clients. This social capital requires continual attention by all parties.

Benefit of electronic commerce

This enterprise, made easy through electronic communication and electronic funds transfer, has enabled a marginal producer (to quote the grower) to regain equity in his property, extend his farm and expand his workforce significantly.

Recommendation

That the GDC liaise with selected grower groups to establish the Gascoyne Electronic Product Exchange (GEPE) either by:

- *Seeking funding from an appropriate government source for the establishment of an appropriate organisation to operate the GEPE; or*
- *Developing specifications for the operation of GEPE and invite expressions of interest from the private sector for its operation.*

1.14.2 Itinerant Labour Market

Identified Need

Most of the Gascoyne's major industries – tourism, horticulture and, to a lesser extent, the pastoral industry – all have fluctuating labour needs. Specifying the needs, locating suitable applicants, recruiting them and then making the necessary arrangements for those travelling from outside the region to arrive at the required time are all time intensive, and so, costly exercises.

Just as the Gascoyne Electronic Produce Exchange (GEPE) significantly reduces the transaction costs in getting horticultural products to market and increases growers' access to strategic market information a Gascoyne Electronic Itinerant Labour Market (GEILM) could perform the same function in meeting the needs of employers in the periods of peak demand. While the two have significant similarities operationally (and could make good use of much of the same technical infrastructure and skilled staff) the Labour Market would have to include some means of quality assurance to ensure employers were being put in contact with employees with the required level of training, experience and approach.

The consultants have held preliminary discussions with representatives from the WA Department of Training and ascertained their interest in facilitating such a project.

As with the Rangelands Communication Development Project (Section 7.1) this project has potential application for other WA regions also.

Recommendation

The GDC, with the Regional Development Council, work with the WA Department of Training to identify options to create an electronic labour market primarily to meet the itinerant labour needs of regional areas.

1.15 Tourism

1.15.1 Tourism Marketing

Identified Need

The Gascoyne's tourism sector covers the range from medium to large firms through to very small operators. For some of these smaller operators tourism is not even their primary business but a sideline or seasonal activity run along side their "core" business. For these operators in particular, as well as some of the larger businesses, marketing is always a challenge. As many of the larger operators and agents have discovered with the growing awareness of the Gascoyne's attractions to an increasing number of international travellers the Internet provides an extremely cost-efficient marketing medium. Fully exploiting this presents technical and strategic challenges for many operators.

1.15.1.1 Background

The Tourism industry worldwide has taken to the Internet as a marketing tool enthusiastically. Its capacity to provide dynamic, detailed and rich information to niche markets efficiently been recognised and exploited aggressively by many operators. This is certainly the case amongst many operators within the region and agents specialising in servicing the Gascoyne market who reported a steady and rapidly growing number of bookings over the Internet.

The Western Australian Tourism Commission (WATC) (<http://www.wa.gov.au/watc/>) has embarked on an ambitious electronic distribution strategy. The centrepiece of this is the transfer of much of its existing electronic information system, known as Travwest, across to the Internet and the World Wide Web. Where Travwest has only been available to staff at the Commission's head office and Tourist Centre in Perth the move to the Internet service – PowerTOUR - will dramatically broaden its availability. All sectors of the industry, as well as consumers, will have access to the information on the site. The new Web site, which is due to be online shortly, uses the same technology as that adopted by the NSW tourist body for its Internet presence.

It provides for a tiered structure in which information will be organised around a number of themes. The Commission is providing general information about the attractions and features of regions around the state which are organised in a hierarchical fashion enabling users to get more and more detail the deeper they go. Users with

particular interests will also be able to search the site on these interests without having to know the region or regions where they might find these features.

The Commission has decided it will not permit links from its site to other sites. This restriction is "hard and fast", according to staff, for two reasons: the WATC does not want to run the risk of losing users of its site elsewhere on the Internet; and it fears links to other, less professionally developed and maintained sites, could reflect poorly on the WATC's image.

Tourist operators will be able to purchase space on the WATC site in much the same way they can currently purchase a listing in a printed directory. The site will have two categories through which operators can have a presence, either as independent or dependent operators. Independent operators will have their own PIN number to access and update their listing on the site, dependent operators are those which do not have a computer connected to the Internet and rely on the local tourist bureau to update information for them. The WATC's Electronic and Information Distribution System (<http://www.cp.global.net.au/watc/index.html>) is part of a national industry project through the Australian Tourism Commission which is working on developing national standards for these services.

The information provided on the WATC's planning for its site raises some significant questions, particularly for smaller tourism operators with significant market development potential in niche markets.

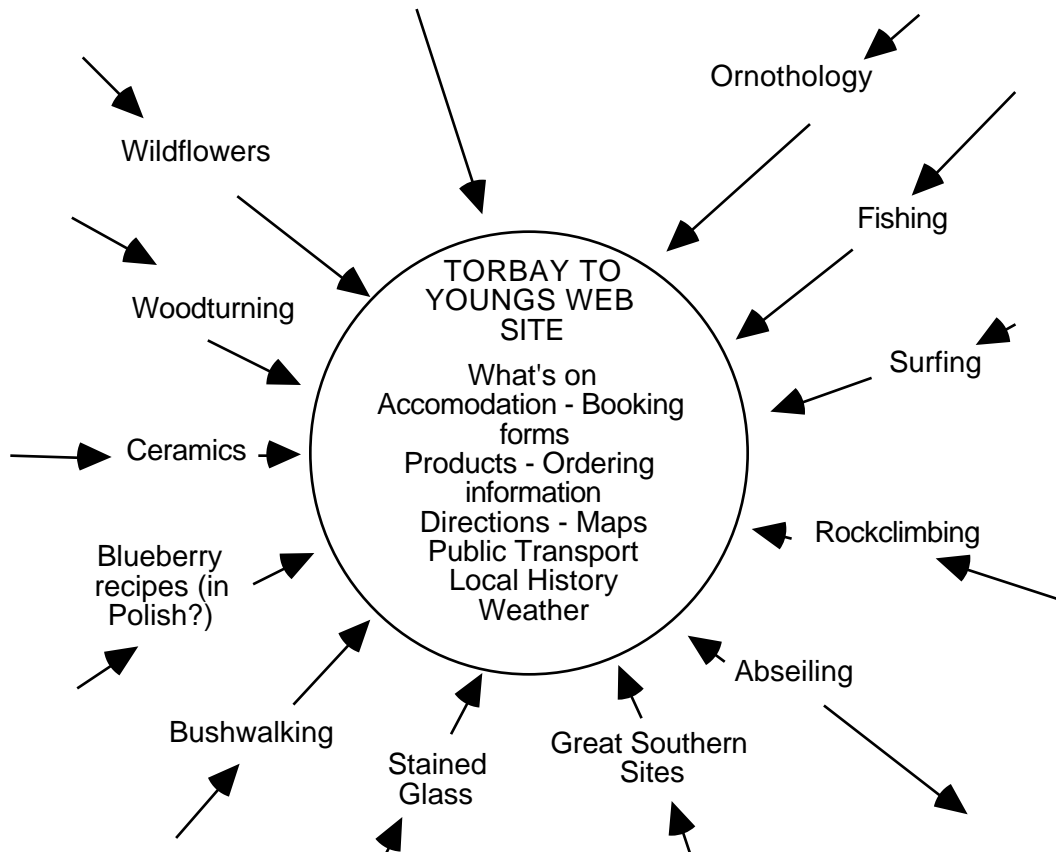
As with many first generation WWW sites, the Commission's plans appear to be based largely on transferring its current modus operandi as completely as possible to the online environment. This fails to take account of the very different dynamics at work in a paper-based information environment compared with working online. Information moves most efficiently in a traditional environment (whether this be a single organisation or within an industry, such as tourism) through a hierarchical structure. Once information goes online it can be stored and distributed more easily and more widely. Related but separate pieces of information can also be linked and "rebundled" in any number of different ways to suit the unique needs of different users. It is no longer necessary to take the "one size fits all" approach that is a practical necessity under the economics of scale demands of paper-based information dissemination. Another important issue is that the barriers to entry in being an information provider

are significantly lowered, as we have seen over the past few years with the avalanche of WWW sites.

1.15.1.2 Case Study: Torbay to Youngs Tourist Association

This Association is made up of a group of small operators running a variety of businesses between Albany and Denmark on the south coast of WA. The area attracts a growing number of visitors drawn by the districts considerable natural advantages and the "homely" , relaxed style of the locals. The proposed web site for this group turns "traditional" thinking on its head by creating a multitude of home pages, each one targetted at particular special interest groups. The strategy calls for each of these specific interest entry points to be linked through to related sites elsewhere on the Internet, wherever possible. So arrangements would be sort with other sites specialising in flowers or wildflowers in particular, with woodturning and abseiling sites to share visitors back and forth. General information regarding accommodation, directions to the district and other shared information is a resource which all the special interest pages tap into (see figure 7.2 below).

Figure 7.2: Schematic of the Torbay to Youngs Web Site



This approach is simple to achieve with the hypertext technology of the WWW. The greatest difficulty is in changing the perspective of the organisation running the site from an inward looking view to one which seeks to accommodate the perspective and the needs of the target users.

The model the WATC is developing presupposes it can maintain its monopoly role as the central player in managing information for the WA industry. A highly questionable proposition, as many formerly dominant "gatekeepers" in other sectors are finding. The success some of the larger tourist operators in the Gascoyne are experiencing with their own WWW sites are excellent examples of this.

As has been mentioned, a feature of the Internet is its capacity to vastly improve users' access to information around the world. In the pre-Internet world, for example, for an overseas traveller to discover the attractions of the Gascoyne took considerable motivation. They would often rely on specialist (possibly hard to access) magazines or newsletters. These are relatively thin and flimsy communication channels. While tourists with a more general interest in Western Australia may seek out general WATC promotional material those focussed on a particular interest, such as dolphins or coral reefs, are less likely to. The World Wide Web is organised to enable people to find their way to the information they want through their particular interest.

For the current primary tourist markets, that is those who have first and foremost decided to visit Western Australia, the WATC's Power TOUR initiative will offer a valuable service. It will provide a way for them to get information about a broad range of possibilities easily. The challenge will be how it can service so many of the exciting niche markets the Internet can provide a window into. The proposed hierarchical site structure and the "no links" policy appear to mitigate against this. Even the hugely dominant Microsoft Corporation's attempts to carve out its own proprietary space on the Internet with its Microsoft Network are largely seen as having failed.

For the Gascoyne tourism industry with its strong attractions in niche markets promoting these attractions over the Internet is ideally suited to them. The challenge is to develop a well targetted strategy to ensure these niche markets are captured. In some cases Power TOUR may offer opportunities but it is our view that all operators should be aware of the online marketing options available to them and make their assessment accordingly.

Recommendation

The Gascoyne Development Commission with the Gascoyne Tourism Association and regional tourist operators examine the advantages and disadvantages of the online options before them for their respective target markets.

1.15.1.3 Electronic Transactions: bookings and e-commerce

As has been discussed in relation to the Gascoyne Electronic Produce Exchange (7.2.1) and the Gascoyne Electronic Itinerant Labour Market (7.2.2) the online economy is radically changing the value chains in an increasing number of industries. Whilst developing and maintaining basic or even mid-level WWW site is no longer a complex nor highly skilled managing the “back-end” often still is. This term refers to a variety of more technically complex operations where the “front-end”, the WWW pages we see and use, interact with a database or an electronic transaction process.

The technical infrastructure and the skills required to operate this have much in common with those necessary for the GEPE and the GEILM. There is also potential cross-over with the Gascoyne Community Network outlined below (7.5.1).

1.15.2 E-mail Post Offices

Identified Need

An increasing number of travellers, particularly younger backpackers, are heavy users of the various free e-mail services which can now be accessed over the Internet. These free e-mail accounts have become the modern version of the poste restante service traditionally provided by post offices around the world. As such they serve as an invaluable link for travellers with friends and family and as a useful tool for planning the next leg of their journey.

1.15.2.1 Proposal Outline

A number of operators already offer an e-mail service to travellers but the availability of access points for e-mail users is inconsistent and “patchy” around the region. In several cases, even where it is available, it is not well promoted. It often remains a piece of local knowledge only.

There is a need for a recognition that this has rapidly become an essential piece of infrastructure for many travellers, particularly younger and more sophisticated and affluent older travellers. The necessity for this service to be made available in a region

such as the Gascoyne, which is seen by many tourists as being extremely remote and isolated, is even greater.

In addition to providing the terminals some consistent logo should be developed (preferably on a state-wide or even national basis) to easily identify for travellers where they can use this service.

Recommendation

The GDC work with the Western Australian Tourism Commission, the Telecentre Support Unit (within the Department of Commerce and Trade)⁸, tourist organisations in the Region and other relevant groups to develop broad and accessible availability of access points for e-mail users.

1.15.3 Rental Satellite Phones

For many overseas and urban visitors to the Gascoyne the vast distances and wide open spaces of the Region are both a fascination and fearful. An important piece of infrastructure to address these concerns and so encourage easy, stress-free travel and tourism to some of these more isolated areas is to ensure the ready and easy availability of satellite phones for short-term rental.

Our investigations have revealed one provider of satellite telephones for hire in the Gascoyne.⁹ Information has been provided by this operator to a number of tourist outlets; it is recommended that this information, and its relevance to promoting self-drive tourism into the pastoral regions, be more widely disseminated.

1.16 Community Needs

Identified Need

As with a number of other coastal towns in the Gascoyne, Denham experiences significant population fluctuations based around the patterns of its two main industries: tourism and fishing.

Its relatively small permanent population have limited access to secondary education and training services and the town relies on its nursing post for health care.

⁸ The Telecentre Support Unit has been working toward developing a system such as this for its network. The roll-out of the service has been delayed by difficulties with gaining legal protection for an appropriate name for the service. Many of the state's Telecentres already offer this service already. The Exmouth Telecentre is the only Telecentre currently operating in the Gascoyne

1.16.1 Education and Training

The town of Denham has had the use of a bus, supplied by Geraldton TAFE, which has been refitted with Personal Computers to provide computer training in smaller centres which have no other access to suitable facilities. Between 60 to 70 people from the town and surrounding district have made use of the bus. Geraldton TAFE is apparently so pleased with the response in Denham that it has effectively hand the bus over to the town.

The majority of the students taking these courses were elderly residents of Denham but the primary school (where it parked) has also made good use of it to provide computer training and familiarisation sessions.

Denham also has a group of between 25 – 30 children completing their secondary education by distance learning. The group are assisted with their correspondence lessons by a teacher on-site.

The consultants also heard from community leaders that there was considerable unmet demand for further technical training, particularly for the hospitality and fishing industries. There was a view that some tourist and hospitality opportunities, particularly those directed at the higher value overseas market, were not being realised due to the lack of suitable training. It was also felt that when these markets are tapped, which they saw as inevitable, local workers would miss out largely because of lack of training.

1.16.2 Health

The town's current health services are provided through a nursing post and regular visits by a doctor. Whilst no specific comments were made about this service it does seem clear that it could be well supplemented by a telehealth presence¹⁰. This would be particularly appropriate in helping to deal with some increased seasonal demand.

⁹ Carnarvon Electronics

¹⁰ Comments were made by some health professionals in the region that some difficulties may arise in relation to the colocation of health services with other, unrelated services. Notwithstanding these reservations it is our belief that the possibility of collaboration to improve a range of services should be

1.16.3 Telecentre

It is the consultants' belief that in terms of community interest and the variety of additional services a Telecentre could provide or enhance existing services there can be few towns with a stronger case. This is based on a number of features of Denham:

- the strong take-up of PC training courses, largely among elderly residents, as mentioned above;
- the advantages a telecentre could offer in supplementing the educational opportunities of the 25-30 high school students currently studying by correspondence;
- the opportunities to support and build the local labour market through better access to training;
- to use the enhanced telecommunications technology to provide telehealth services; and
- furthermore, the Council's decision to upgrade its main building in the near future, including an in principle agreement to making space for a telecentre demonstrates additional, tangible local support for the concept. This deserves matching support from state and federal levels of government.

Recommendation

That the GDC work with the Shire of Denham to prepare a case for funding to the Department of Commerce and Trade and/or the Networking the Nation program (RTIF) to support the establishment of a Denham Telecentre.

1.16.4 St Marys Carnarvon

St Mary's Catholic School in Carnarvon currently offers schooling for children from pre-school to year 10. The consultants were told that a number of families had chosen to leave the town after their children had reached year 10 rather than have them travel away to board or to attend the local public high school. There were also anecdotal reports of workers choosing not to move to Carnarvon to take up positions because of the lack of senior high school education for their children at St Mary's. The view was put that the lack of an alternative senior high school in the town was beginning to affect

The Catholic Education Office is currently examining the viability of adding the two senior years to the school.

Discussions were held with the School's principal, in particular with regard to options for using telematics to deliver some course at the school, supplemented by conventional face-to-face teaching for senior students in the more popular subjects. The experience of Notre Dame University in Fremantle in delivering courses online to students at its Broome campus was mentioned as being a functioning case study within the Catholic education system which could provide valuable lessons and experience for extending course options in more isolated schools around the State, such as St Mary's.

Recommendation

That the Commission work with the Office of Information and Communication to initiate discussions with the Catholic Education Commission of WA as to ways course offerings may be extended to rural Catholic high schools.

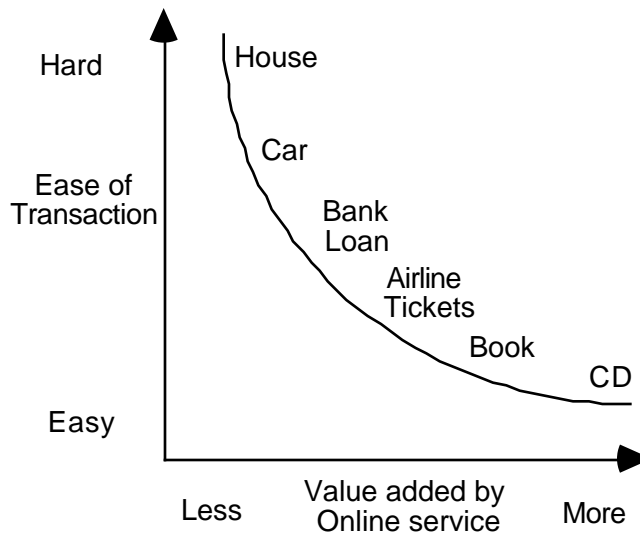
1.17 Business Development

1.17.1 Gascoyne Community Network

1.17.1.1 Introduction

The upsurge in the use of the Internet around the world and the increase in the number of businesses engaging in electronic commerce is rapidly converting the confident predictions of many pundits of a revolution into reality. While some businesses which have taken the step into electronic commerce have failed, an increasing number are prospering. The success stories have been largely confined to a number of specific sectors – books, CDs, airline tickets, company shares etc. – but those which are thriving are spreading into other sectors as well.

Figure 7.2: Online sellers



Source: Microsoft and *The Economist*

A feature of the Internet is that it is distant independent, it costs no more for a user in the Gascoyne to access information stored in a computer in Sydney or New York than it does for someone working around the corner from these machines. This feature of the Internet has been mentioned regularly and enthusiastically by its proponents, often on the assumption that it can only deliver positive outcomes.

1.17.1.2 Pillaging the Global Village

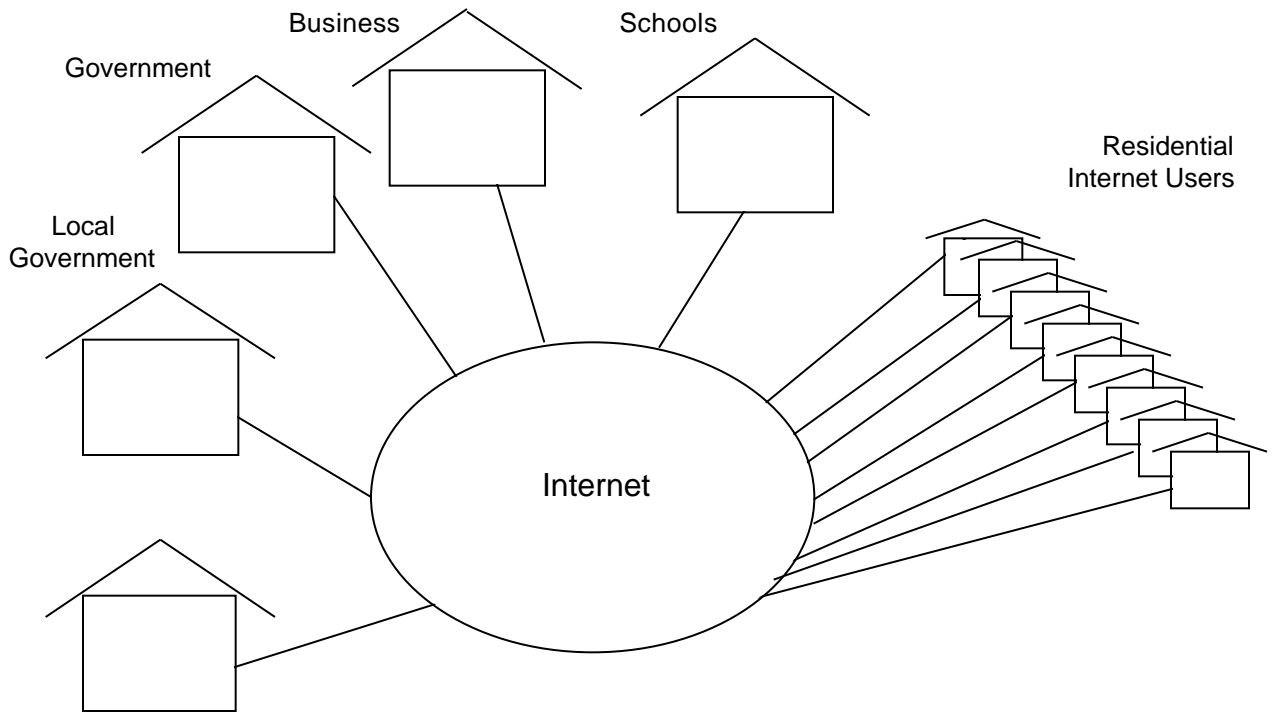
There is no doubt that the Internet *can* provide people in rural areas with access to information, education, entertainment and other services in an accessible and economical way. But the reverse of these positive opportunities is that they will also expose thousands of small, unprepared local businesses to the harsh and aggressive global competition enabled by the Internet. Regional development economists often refer to this as a process of “hollowing out” or weakening sectors of local economies which can occur through technological, industry or government policy changes.¹¹

The vast majority of our small businesses have a primary “catchment” area ranging from a few kilometres in urban areas to hundreds in some more remote regions. Unless they have aspirations to build a global market (such as many tourist operators) the Internet, as it now stands has little to offer them. Even within those communities where Internet use is high there is often little value in businesses going online because

¹¹ The push by governments and many businesses to rationalise their operations through greater centralisation is a very relevant example of hollowing out. The impact on the motor car in providing improved mobility for residents in smaller towns to travel to regional centres to make major purchases

those users quickly disperse, with no more chance for the local travel agent to attract them than any one of the online travel sites (see figure 7.3 below). Under these circumstances the time and effort required to establish a WWW site cannot be justified for most local businesses, they are far better off in the short and medium-term to use those resources on local, geographically-specific information or promotional efforts, such as local media, direct mail, brochures etc.

Figure 7.3: The Triumph of the Global over the Local: pillaging the global village



Nonetheless significant change is occurring. Credit card companies are already reporting significant growth in Internet purchases by Australians and that the bulk of the sales are to businesses in the United States. These specialist, US-based online businesses are using the size of their home market to build their position. Having built to “critical mass” they can use the flexibility of the Internet to “invade” other markets. Australia’s high proportion of Internet users, affluence and the limited number of proactive local businesses makes us an attractive target.

Over the coming year – if they have not already – many small businesses will go online as larger organisations implement Electronic Data Interchange programs. Larger

businesses and governments will increasingly require small and medium-sized businesses to be online to bid for work, for instance. But, by and large, this change is being forced by the larger organisations and as such, it is being implemented on their terms.

From a regional planning or economic development point of view it could be argued that to focus entirely on the technology issues and to build Internet points of presence (local Internet access points) alone runs absolutely counter to the goals of these programs to build local businesses. Without some strategic vision bringing these communities into the global village unprepared could be seriously detrimental. There is the potential for a downward cycle to commence. In this scenario both those small to medium companies which are focussing on generating business online and larger businesses are steadily building their share of Internet business. The first group have identified this as their core business and have global ambitions, the larger companies have the human and financial resources to enable them to absorb early losses with their Internet projects in the knowledge they must establish themselves and preserve some “cyber-territory” for themselves. In the meantime, the smaller, locally-based businesses cannot justify the expense of going online. By the time such a move is worthwhile it may be too late.

The challenge is to be able to achieve both goals: to support and develop local community and business capacity while having on tap the significant positive features widely available Internet access offers.

1.17.1.3 Surf local, buy local

The key to avoiding this decline is to establish a strong and vibrant local online presence which – like any good town/suburban marketplace – accommodates both commerce and community and so attracts local user traffic and justifies the continuing involvement and commitment of local small and medium-sized businesses online. This community site would become a junction for individuals, community groups and local businesses providing local news and business information to draw Internet users in, rather than having them immediately lost to other sites across the Internet.¹² While content is an essential ingredient to establish and build community activity a strategy needs to be developed to “prime the pump” and build user numbers quickly.

¹² It should be emphasised that this plan does not inhibit the movement of Internet users in any way. Once they are online they will be free to access any information they are currently able to. This scheme

At present there are a large number of companies offering Internet users free e-mail accounts. The Community Network model borrows on this idea and extends it. All community members and local businesses can be allocated a free e-mail account (with an appropriate local address, such as name@gascoyne.net.au) and WWW browser software. These free accounts will only provide WWW access to the Gascoyne server, e-mail access will be across the Internet. (Those who wish to have complete access to the Internet will be able to do so through an on-selling agreement negotiated with an Internet Service Provider for the standard rate. They will still be able to retain their community network address.)

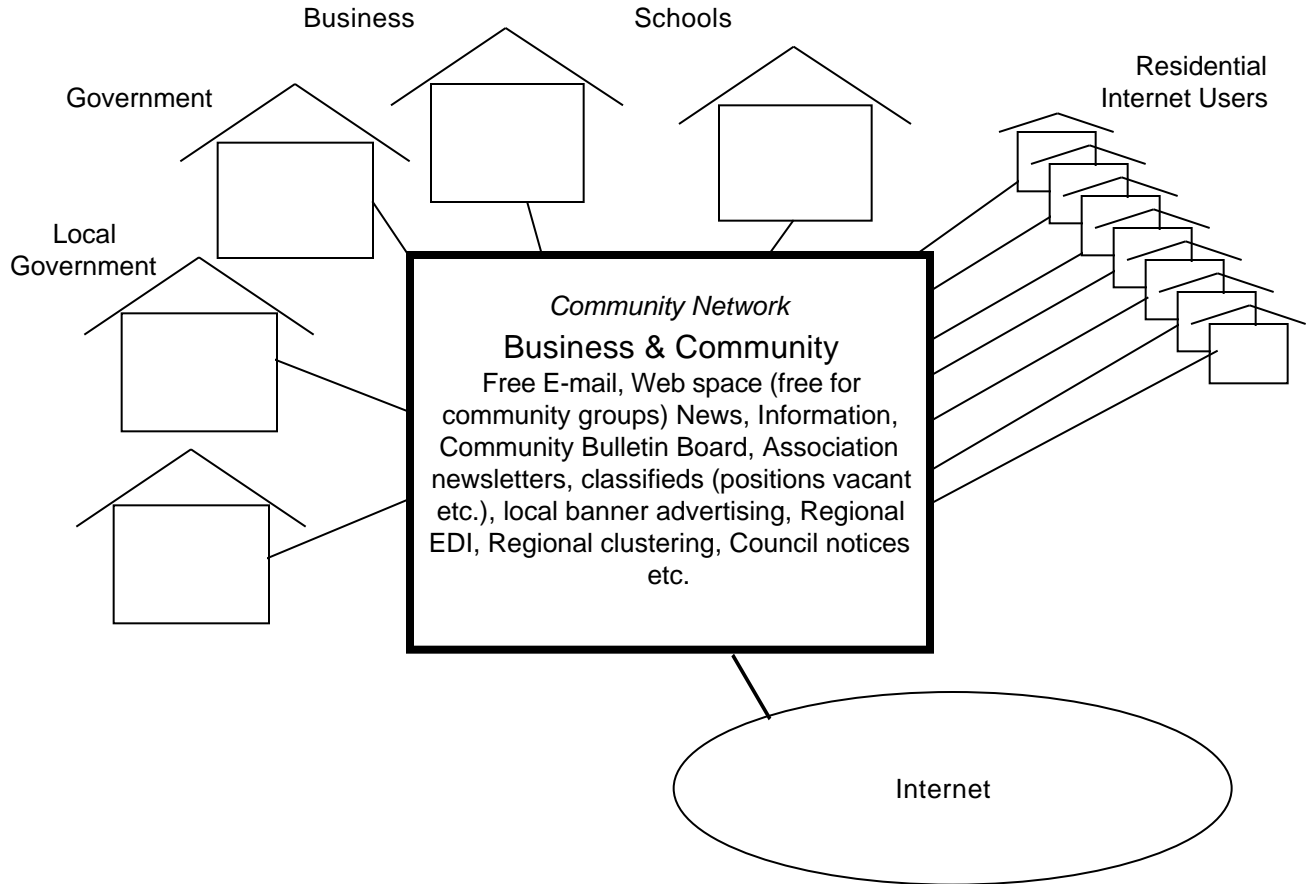
Implementing a local, geographically-based Community Network should not be seen as a purely defensive strategy. The generation of a critical mass of community and local business activity on this site opens up significant positive opportunities also. The Community Network can lessen the impact time constraints place on many people, preventing them from participating or remaining in touch with community, school or sporting groups as they might like. For more isolated members of the community the Community Network is ideal for distributing information or running online discussion groups around particular topics.

It also offers significant local economic development prospects by providing a basis for business-to-business transactions and so encouraging easier local purchasing of supplies by companies and building regional import substitution. While most of the discussion here has been at the retail level the fastest growing and by far the largest sector is in transactions between businesses. Just as the Community Network can enhance the opportunities for local retail, or business to consumer, trade it can perform a similar role at the wholesale level. Taken the next step these regionally-based, business-to-business buying groups also have the potential to serve as the basis for developing regional clusters through distributed networks.¹³

¹³ ICT supports the formation of online networks for distributed economic development and production. Technology allows for continuous communication; work sharing; remote administration and management; and, seamless presentation and marketing of multiple centres as a single entity to the world. This follows the highly successful "flexible networking" model found in Emilia Romagna in Italy or in Appalachia (ACEnet - <http://www.seorf.ohiou.edu/~acenet/>)...

...New types of networked organizations may be created. They could be structured as hubs and multiple self-sufficient nodes. Collaborative specialization, information dispersal and multiple or distributed ownership, decentralized and horizontal support structures, and a high degree of local self-sufficiency (and thus structural redundancy/survivability) characterizes these new organizations. These structures allow for a speed of adaptation, highly efficient (low friction) horizontal rather than vertical information flow, and the economies of mutual rather than functional support. Client needs can be responded to more immediately, both geographically and culturally, creating powerful and globally competitive

Figure 7.4: Surf local, Buy local



The speed with which a substantial amount of information can be distributed widely also offers significant opportunities, not the least of which is in the local labour market to assist employers and employees to find each other. By assisting employers and employees to contact each other or clients and contractors to negotiate an arrangement the efficiency of finding workers and work should be greatly enhanced.

1.17.2 Electronic Commerce Operational Issues

The Gascoyne Electronic Produce Exchange (7.2.1), the Gascoyne Electronic Itinerant Labour Exchange (7.2.2), the Gascoyne Community Network (7.5.1), the Pastoral Electronic Markets and Telecommunications (8.2) and some of the options for

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developing online tourism marketing could all be greatly assisted through shared infrastructure and personnel.

While the technology needed to operate any of these projects is falling in price and becoming more simple to operate there is still a good deal of expertise needed to manage and maintain them at a sufficient standard. This is particularly true if they realise their full potential and become a central part of the cashflow of any of the industries mentioned. For an isolated region such as the Gascoyne finding a solution to this issue is probably a more difficult one than dealing with the technology. It may be desirable to create a service organisation which operates and maintains the central infrastructure. it would also be possible for these projects to operate completely independently of each other, if that was considered desirable.

OPPORTUNITIES

1.18 Millennium Rangelands Time-Share Project

Identified Need

For many isolated families and communities in the region discussions about improved communications services are largely irrelevant due to inadequate existing arrangements for a cheap and reliable form of "clean" power. While they must overcome this problem before addressing communications issues it is clear that communications are central for many pastoral lease holders to improve existing business operations and to extend into others.

1.18.1 Background

Dealing with the Millennium Bug, or Year 2000 problem,¹⁴ has created a great deal of business for Information Technologists. It has also given rise to other "spin-off" industries as a growing number of people decide to be as far away as possible from civilisation and to minimise their dependence on man-made systems during the transition to January 1, 2000. Reports of people making plans to find safe havens,¹⁵ massively increased sales of self-sufficiency tools and equipment¹⁶ and even government reports suggesting people begin planning for major upheavals¹⁷ have begun appearing more regularly. A World Wide Web site dedicated to the problem and providing information on how people can prepare has had more than 350,000 "hits" since it was established in late February 1998, over 300,000 of these in the past six

¹⁴ These terms both refer to the inability of some computers and other electronic equipment to distinguish between dates ending in the year 2000 or any other year ending with "00". While this fault does not matter for some applications in other cases it can create substantial difficulties.

¹⁵ "The Day the Earth Stands Still?", *Good Weekend, The Age*, 7 November, 1998, pp.16-23

¹⁶ Fortune magazine

¹⁷ "Britons told to hoard in case of millennium bug shutdown" (Monday, 14 January, 1998)

A British government agency has warned the country to stock up at least two weeks' food supply in the event of shortages caused by the millennium bug, The Observer newspaper reported today.

The paper said the head of the government's millennium bug Taskforce 2000, Gwyneth Flower, had advised every household to plan ahead, despite government reassurances that food and power supplies would not be affected by computer problems on January 1, 2000.

"We are talking about people having a judicious amount of surplus food in their kitchen cupboards," Flower was quoted as saying. "Anyone sensible would plan for this."

"Because we don't want to see panic buying in the weeks leading up to next Christmas, consumers should think about this in advance."

Computer experts have predicted many systems could shut down with the advent of the next millennium as their two digit date system fails to distinguish between 2000 and 1900. –

months¹⁸. Another site specialising in Y2K news and information¹⁹ suggests that people should put away a 30 day supply of food, water, cash, medicine and heating equipment.

Justifiably or not, it appears that a significant level of fear and uncertainty is developing over this issue and given its complexity and the comments of authorities on the issue, there is little likelihood of it abating. The US Federal Reserve has made a special order for an additional \$US50 billion in bank notes to deal with a possible run on cash supplies at the end of 1999.²⁰

The Gascoyne-Murchison Rangelands is one of the very few extremely isolated but settled regions in the western world. For many people living in the densely populated and technology dependent regions of Europe and North America it would qualify well as an ideal location to escape the uncertainties of the 1999-2000 transition. For many of the pastoralists self-sufficiency is non-negotiable, it is the only way they can hope to have access to the services most of us take for granted.

In discussions with a number of pastoralists the consultants were informed that a solar power/wind generator electricity system, with a bank of batteries cost anything from \$30-80,000 to purchase and install, depending on quality and capacity. By offering millennium refugees a time-share arrangement for a period of two years for \$US10,000 per person (approx. \$AUD16,000), paid up-front, a family would cover the cost of a power system and the rental for transportable accommodation, if required.²¹

The WWW is already the primary information vehicle for people interested in this issue. As a result the Internet is the most obvious media to market this service making it a relatively simple and cheap process. Whilst the marketing portion of this project is relatively simple the organisation and coordination required is more complex; given the short amount of time available a decision will need to be taken as to whether to proceed or not with this project urgently.

Recommendation

¹⁸ <http://www.y2kchaos.com/>

¹⁹ <http://www.y2knewswire.com>

²⁰ "Head for the hills: Y2K bug's are comin'", *Sydney Morning Herald*, 19 December, 1998, p. 22

²¹ It is assumed that any difficulties posed by the Y2K problem will pass within three to six months, at the most, and the time-share owners will return prior to the end of their two year contract. An element of risk is involved in this assumption. The plan, as outlined above, assumes the time-share owners will

It is recommended that the GDC in conjunction with the Gascoyne Murchison Strategy group fund a project plan for the Millennium Rangelands Time-share project. This plan should include a communications strategy (with the client group), an operational plan, preparation of necessary legal agreements and a marketing plan.

1.19 Pastoral Electronic Markets and Telecommunications

Meeting the communication needs of the Gascoyne's pastoral stations is a significant challenge. The size of the leases and their extreme isolation, often in hostile physical conditions, make providing them with a reliable and cost-effective link into the communications network an extremely challenging problem. The growing economic and social imperatives for far more advanced communication services add further weight to finding a solution. The economic demands are to enable those pastoralists wishing to diversify to have a greater range of options before them. There is also the need to have access to better communication to overcome social isolation and to have access to improved services, such as educational services.

The DRCS links, which are discussed in greater detail elsewhere in this report, have provided telecommunications to many of these pastoral stations for almost two decades. The technology's limitations are becoming increasingly obvious as users attempt to make increasing use of more advanced services such as the Internet. Not only is it unsuited to the length of time users regularly spend online when they are using the Internet but the download speeds are unacceptable.

In the liberalised telecommunications market there is little incentive for any of the carriers to upgrade this service. Funding agencies have shown little interest in assisting to address these shortcomings in the current system.

1.19.1 Alternative Funding Options

This impasse requires a rethinking of the traditional funding models. While the pastoralists and their families will be the primary beneficiaries from improved communications there are others who also have a good deal to gain. This proposal leverages off the considerable turnover the pastoral stations have in running their operations.

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It is based around an electronic commerce solution to process orders for many of the major items and services pastoral stations require to run their businesses. If this electronic clearing house dealt with even 50% of a pastoral station's orders this would amount to an average of about \$100,000 in turnover per station per annum. With a target market of several hundred around the state (and there is no reason that such a service would be confined to pastoral leases, or even leases in WA) the revenue of this operation would be substantial.

In return for agreeing to place a minimum value of orders a year a pastoralist would be provided with the necessary communications equipment (most likely a satellite receiver and uplink) to send orders. This system should be configured to also carry voice and Internet traffic.

The business model proposed here is very similar to that which has become standard in the mobile phone market. Consumers sign up with a carrier and receive a heavily subsidised handset on condition that they remain with that network for a set period and spend a minimum amount. This proposal leverages off the significant operational spending of pastoral stations, the reduction in transaction costs such a system would permit for suppliers and the purchasing power generated by the system operator through aggregating this business.

TELECOMMUNICATIONS ISSUES

1.20 Mobile Phone Roaming

Mobile phone “roaming” is the industry term for users to be able to access the network of any mobile phone company with their handset, no matter which company they have an account with. In fact visitors from overseas can “roam” between the three mobile phones with their handset when they are in Australia. This facility is technically possible and is available in many countries. In these cases the various mobile phone networks are linked and exchange calls and the necessary billing information about the calls to manage their accounts.

Australia currently has two mobile phone technologies and four networks operating. The analogue network, much of which is to be phased out by 2000, is owned and operated by Telstra. It leases capacity on this network to the other operators which on-sell it to their customers.²²

There are three digital, or GSM, mobile phone networks. They are run by Telstra, Optus and Vodafone. The coverage of these networks, particularly outside the metropolitan areas differs widely. The two newer carriers – Optus and Vodafone – have concentrated most of their efforts on the cities and their coverage in regional areas can best be described as uneven to nil. Competition in digital mobile phones is very aggressive with market share being far more evenly spread than for other telecommunication services. While Telstra are reputedly the market leaders the other two carriers have at least half, possibly more, of the digital mobile customers linked to their networks.

As neither Optus nor Vodafone have any coverage in the Gascoyne region visitors, who subscribe to these services, are left without a service during their stay. Similarly, residents of the Gascoyne are denied any competition between providers. As mentioned earlier, it is ironic that any visitors from overseas, with a compatible digital mobile phone service from their home country, can use any of the local networks. They are configured to allow foreign customers to roam between the three carriers’

²² A third mobile phone network, based on the CDMA standard, is to be constructed through 1999. This will be owned and operated by Telstra. It has agreed to leasing capacity on this network to the

networks, depending on which has the strongest signal in the particular location they are calling from.

This decision to prevent domestic roaming by all of the carriers has been ratified by the telecommunications industry competition arbitrator, the Australian Consumer and Competition Commission (ACCC). It found that the industry arrangements did not limit competition and so did not intervene.

The position in regions such as the Gascoyne underlines the failure of the ACCC to seriously take into account those areas which are less well served in making its decision. Whilst the arrival of the CDMA network may lessen the importance of this issue the consultants do believe there is an extremely important principle involved in this issue and that it should be used to underline the need for an adjustment in competition policy to account for the radically different circumstances which exist in different areas of the country.

Recommendation

That the Regional Council formulate a position paper on this issue (and other similar examples) for presentation to the Federal Government and the ACCC to highlight the difficulties in the sweeping application of competition policy to regional Australia.

1.21 Video Conferencing

Identified Need

An increasing number of organisations, mainly public sector agencies, are extending the use of video conferencing, primarily as a means to cost effectively provide services to more remote areas of the State. This is not always taking account of the limitations these technologies have in terms of appropriate and inappropriate applications.

All communications technologies have their limitations in terms of the level of meaning they can convey. While video conferencing can communicate far more meaning than a telephone conversation or an e-mail message it is a serious mistake to assume these technologies can or should be a replacement for all situations. For intensive or critical discussions in which a great deal of information needs to be conveyed most people find ICTs significantly limiting.

The manager for a large Gascoyne company told the consultants of an experience he had had interviewing an applicant for a job by video-conference. He described the exercise as “a disaster” as he was unable to get a sufficient amount of tacit information with which to make a reliable decision. He has since met with all applicants face-to-face to make these decisions. Aboriginal legal and medical workers told of similar experiences where people had had hearings or received counselling by video-conference, an experience they had reported as being unsatisfactory. The figure below provides an indicative hierarchy of the successively higher levels of complexity and context required in various types of communications.

The reverse of these experiences were comments from the health sector where these technologies have been used extensively, both for consultations and intra-organisational meetings. They felt that with experience and appropriate sensitivity to the situation and the number of participants, video conferencing had a great deal to offer.

Recommendation

That the Commission work with the Office of Information and Communication to initiate discussions with the Catholic Education Commission of WA as to ways course offerings may be extended to rural Catholic high schools.

1.22 The USO – ACCC Gap

Identified Need

The liberalisation of the telecommunications market and the corporatisation of Telstra has created an important “gap” between servicing the most poorly served users and the areas of greatest competition.

The major benefits of a competitive telecommunications market – greater competition, lower prices, faster better service and a greater range of product offerings – are concentrated in the major markets. This pattern is followed in virtually all liberalised markets. The gulf between those users who are dependent on the Universal Service Obligation (USO) to maintain a decent service and the areas of greatest market competition policed by the Australian Consumer and Competition Commission appears to have been growing steadily. Most Western Australians, not only those in regional areas, find themselves in this position. Most competition is concentrated in the corporate market and some sectors such as mobile telephony, STD and IDD.

The corporatisation of Telstra has meant the removal of its public service charter. As a result decisions about service enhancements are made on commercial grounds, not on community need. For the vast majority of regional sites all Carriers will conclude that their investments are far more cost effective in metropolitan areas, particularly in the larger cities.

Recommendation

The Office of Information and Communication should commission empirical research into the performance of telecommunications liberalisation to document the lack of outcomes for the bulk of small businesses, regional users and consumers generally. This research should then be used to lobby the federal government for an improved outcome to benefit all users.

BROADCASTING ISSUES

1.23 Regional Television

ABC and Golden West Network Services have been the only broadcast television services available in the region. SBS TV is now available by satellite. The second commercial television licensee, WIN TV, will commence transmissions on 1 April 1999. However, access to this new service within the Gascoyne Region will depend on a number of factors, including viewers' location. In addition, the satellite receiving equipment used, the extent of WIN TV's ground-based transmitters and its rollout timetable as well as the capacities of local communities to fund more retransmission facilities for additional services will all determine how widely the second service is available.

1.23.1 SBS Television

SBS TV has no plans to provide ground-based transmitters anywhere within the region for the foreseeable future. Therefore, access to SBS will be limited to those with their own satellite dishes and communities where self-help retransmissions of the service are established and locally financed.

1.23.2 WIN Television

According to WIN TV, the network will place transmitters and translators at every site where GWN already has a transmitter. WIN TV claims that each new transmission facility north of Geraldton will operate within the same frequency band as existing services. That is, where ABC and GWN operate on VHF, the new service will, too. Where existing TV services are on UHF, WIN TV will also use a UHF channel.

Although WIN TV is correct in its assessment that there is no shortage of available VHF frequencies in Northern WA, the Australian Broadcasting Authority's planning criteria for new TV services has been that most will automatically be given UHF frequencies. Whether WIN TV is able to persuade the ABA to make exceptions for remote areas remains to be seen. Should WIN TV transmitters be restricted to UHF, viewers will need to purchase UHF antennas to receive the service and transmission range will be much smaller than that of existing VHF services. People who already have fringe reception of VHF TV will not be able to receive new UHF signals at all as

the range of UHF signals is less than for VHF. It is in the interest of local communities to support WIN TV's efforts to use VHF services where possible.

The pace of WIN TV's transmitter rollout to smaller centres has not been revealed. Certainly, it will be an expensive task, and unlike GWN, WIN TV will not have the assistance of a government subsidy to establish its statewide service. Therefore, it may take some time before transmitters in Carnarvon and Exmouth are established. Persistent lobbying efforts at a regional level may help to speed up the process.

1.23.3 Satellite TV

Satellite television issues continue to be dominated by the existence of two competing delivery and reception systems. The Optus satellite UEC decoder combination will deliver ABC, WIN, Westlink, Horizon, and lower quality signals of GWN and SBS. The PanAmSat satellite transmission with a Scientific Atlanta decoder delivers GWN along with ABC and SBS at lower quality. Therefore, viewers with a PanAmSat/Scientific Atlanta system will not be able to receive WIN TV unless they duplicate the whole system by buying a second decoder and satellite dish. As they are currently configured, the Optus/UEC option offers satellite viewers a greater range of program choice.

1.23.4 Local Self-Help Retransmissions

Existing self-help broadcasters will not be able to retransmit WIN unless they have applied to the ABA for an Apparatus (transmitter) Licence to retransmit the service. A transmitter of equal power to existing rebroadcasting transmissions will also have to be provided. If the local retransmission facility is already utilising the Optus platform as its program source, the same dish can be used to receive the new service signal. However, a separate decoder for WIN will be required.

If a self-help facility is re-broadcasting only PanAmSat signals, a separate decoder and transmitter will be necessary (as above) to rebroadcast WIN TV, plus an additional satellite dish aimed at the Optus B3 satellite.

SBS can be re-broadcast from either a PanAmSat or Optus satellite source, but an additional decoder, transmitter and licence also will be required.

For viewers confronted with this range of options a clear choice is not obvious. Access to more information as to what additional services would be available with each technical option would provide useful assistance in making these decisions.

Recommendation

WIN TV be approached to provide details and timeframes for ground-based transmitters within the region.

Information listing the services available on both the Optus and PanAmSat satellite TV platforms be made available to consumers through all satellite suppliers within the region.

Information listing the services available on both the Optus and PanAmSat satellite TV platforms as well as practical advice about rebroadcasting options be circulated to all local government offices within the Gascoyne Region.

GOVERNMENT SUPPORT SCHEMES

1.24 Universal Service Obligation (USO)

The USO is the requirement placed on a telephone carrier to provide minimum telecommunications services to all Australians. Telstra is currently the sole universal service provider in Australia but additional universal service providers may be appointed in the future. Other new carriers in the Australian market contribute to the maintenance of the USO as one of the conditions of holding a licence.

Telecommunications services - or at least 'telephones' - have traditionally been regarded as a "national good". In other words the government is committed to the provision of telephones to all Australians (whether for private or commercial reasons). As in most other countries the USO has been a common feature which sets a base for service. The setting of this base level is relatively uncontroversial when there is only a single carrier and that carrier is government-owned. The liberalisation of the market and the rapidly increasing range of telecommunications services that are available along with the general recognition of the rising economic and social importance of these services have all contributed to making the USO a far more important and contentious issue.

In the current competitive environment, the USO needs upgrading to cover modern telecommunications requirements eg. data transmission. Whilst the demand for improved telecommunications infrastructure is growing both in numbers and in complexity, the likelihood of services being provided under a USO appears to be diminishing.

Although in theory all competitors are free to work in these regions, the economics of providing services to areas with comparatively few customers are not attractive. In this climate the USO, or some other form of regulation is crucial.

The federal government has recently completed a review of the USO and largely rejected the need for it to be upgraded beyond the provision of services as set in the Telecommunications Act of 1997.

1.24.1 Local Network

A draft decision from the Australian Competition and Consumer Commission (December 1998) has important implications for further telecommunications competition. The decision will require Telstra to provide its competitors with direct access to its customer access network, ie. the physical link between customers and telephone exchanges.²³

This decision is an extremely important one for the next round of competition in the industry. If it is sustained it will reduce a competitor's access costs and potentially reduce customer call costs. The ACCC decision should lead to lower prices for all calls, including local and long distance/international calls.

While this is an important decision its impacts will certainly be felt most quickly and to the greatest extent in the larger, more competitive markets. It is difficult to see it affecting subscribers in regional, rural or remote areas of Australia in the near future.

1.24.2 Regional Telecommunications Infrastructure Fund (RTIF)

A portion of the money from the sale of the first one third of Telstra has been set aside to create a Regional Telecommunications Infrastructure Fund. The rationale for this was to address some of the concerns in non-metropolitan Australia that it would be significantly disadvantaged by Telstra's transition from a government-owned, public service-oriented organisation into a listed company.

Since 1 July 1997, \$250 million has been set aside as a five-year Regional Telecommunications Infrastructure Fund – Networking the Nation – to assist in the development of telecommunications infrastructure in regional, rural and remote Australia. The program is administered by the Department of Communications, Information Technology and the Arts (<http://www.dcita.gov.au>). The sums available to each State vary; Western Australia received only \$26.5 million of the total available.

The federal government is working toward selling an additional portion, which will mean 49% of the company is listed. The future of the remaining 51% currently held by the government is still under review. Public comment has been sought as to the best

²³ The portion of a telecommunications network which links exchanges are called trunk routes. These tend to be the parts of the network in which competition is the greatest which has contributed to the faster drop in long distance and international calls. The customer to exchange portion of the network is invariably the last to see competition and the greatest form of defence for the existing carrier against

way of realising community benefit from the sale as well the need to continue RTIF and it would appear at this stage that the program is likely to be continued. Just what sums will be available to each of the States has not been decided. Some early announcements have already been made that telecommunications infrastructure will be funded but none of this is to apply to WA.

Specific projects funded from this source with relevance to the Gascoyne are:

1. Virtual Learning Environment Project, Central West College of TAFE, Geraldton, applicable to the Midwest and Gascoyne regions;
2. Subsidies provided to purchasers of satellite reception equipment with the transfer of the remote area commercial television service and
3. This Gascoyne Regional Telecommunications Needs project

1.24.3 National Office for the Information Economy (NOIE)

The NOIE was established in 1998 and is part of the Department of Communications, Information Technology and the Arts responsibility.

NOIE will develop, coordinate and overview broad policy relating to:

- The regulatory, legal and physical infrastructure environment for online services, including facilitating electronic commerce
- Ensuring consistency of Commonwealth positions for international organisations
- Overseeing policies for applying new technology to government administration and information and service provision.

As well as these aims, NOIE will have direct responsibility for developing strategies and policies to address the convergence of the information economy, information technology and telecommunications issues driven by the digital revolution.

1.24.4 Office of Information and Communications (OIC)

The OIC was established in March 1998 within Western Australia's Department of Commerce and Trade. The role of the OIC is to lead, facilitate, co-ordinate and work in partnership with other state government agencies, businesses and communities, in order to maximise WA's transformation to the Information Age.

In carrying out this role, OIC will:

- Develop high level policy, principles and strategies
- Be a broker, developer and demonstrator
- Be a change agent, lobbyist and monitor
- Develop and market WA's capabilities in Information and Communications
- Use the OIC and the Department of Commerce and trade as demonstrative models for action.

OIC has developed an Online Services Strategy containing a number of elements of importance to regional and remote Western Australia.

The Statewide Telecommunications Enhancement Program (STEP) is currently out to tender. Expressions of Interest are sought from suitable organisations interested in building and operating advanced telecommunications services in remote and regional areas of the State. Services sought include:

- Core services
- Network services
- Higher level services (such as facilities management)
- Support services.

Considerable study has preceded the Expressions of Interest in estimating the nature of and likely aggregated demand for services. Studies have involved 15 government agencies with networks of branches, large networked corporations and organisations and small towns of less than 500 populations.

The thinking behind this approach is that the larger drivers of telecommunications demand will be aggregated as an incentive for service providers. The OIC seeks to enhance existing infrastructure that is currently uneven and, in places, inadequate. Ultimately it is hoped to provide western Australians in all regions with affordable and convenient access to a wide range of services such as voice, data, image and video-conferencing. The intention is initially to improve the provision of government

services by meeting currently unmet needs such as telehealth and greater choices in remote schools.

Another element that has special application for regional WA, namely the Networked Communities WA project. The project aims to raise awareness of the possibilities of the Information Age and the Internet by creating a broad based web-based network that will demonstrate how effective the online environment can be for rural and regional communications, information and service delivery. A specialised website will be created that will allow rural people to “talk” to each other, despite distance, and cheaply.

Initially three pilot sites will be selected including the Avon Online (Toodyay, Northam and York), Rural Net (based around three government initiatives – *Doing More with Agriculture*, *Future leaders Program* and *Rural Women’s Network*) and possibly in the future, a Community Economic Development Network.

1.25 Communications Audit – Where to Next?

The Boshe Group completed the *Communications Audit: the Needs of Regional Western Australians* in May 1997. Since this time there have been telecommunications advances. Mobile systems have now been installed in Exmouth. Shark Bay and Exmouth now have digital phones. Exmouth Telecentre has been established and one is likely to open in Shark Bay. The Geraldton ISP provider has expanded to Carnarvon and is considering extending further into the region.

The purpose of this project is to identify and develop further telecommunications projects.

APPENDIX A: Additional Terms of Reference

Gascoyne Communications Working Group

Regional Consulting Initiatives – Scoping.

The *scope* of the consultation should incorporate:

1. continuance of subscriber telephony service.

Quality of service including time for installation, time to repair and line quality must be maintained in the current commercial environment, bearing in mind that country areas are not profitable in a user-pays scenario.

2. the effectiveness of the DRCS for subscriber telephony.

The consultation should investigate the current quality of service of the DRCS, operating cost, its expected life and cost of replacement. The value of remote telephony should be appraised using “benefitter-pays” methods, including placing a value on inhabiting the land and the value generated from the property. A replacement for the DRCS should work on the basis of the subscriber providing power and exchange-with-base maintenance.

3. provision of mobile services to townsites, Shark Bay fishing area and the highway.

CDMA mobiles will become available shortly, to be installed in all existing sites. This will largely answer range issues, with the only remaining issues being cross-vendor arrangements to enable tourists to use limited regional towers, and provision of mobile towers at fibre repeater stations for safety and emergency services.

4. local broadcasting of free-to-air TV at townsites.

Communities expect more TV and radio channels to be delivered free-to-air.

Communications Solutions Gascoyne Region

5. availability of TV and radio channels for remote reception through satellite receiver/decoders.

Free-to-air services available to towns should also be available to private viewers with their own satellite receiver/decoders.

6. availability of data services to all telephony subscribers at a minimum 33.6 kbps.

The internet is becoming an important component of doing business and must be available to regional and remote subscribers.

7. enhancement of local points of presence to provide bulked trunk services.

Telstra rents semi-permanent ISDN connections to capital cities to most Government departments. Many businesses also rent long distance ISDN, DDS or DDN data connections. The rental cost varies from \$5000 to \$18000 per year. All these services are trunked onto the optical fibre in Carnarvon. If a service provider installed equipment to trunk all the local traffic, there would be great cost savings over the current total rent. However, Telstra would immediately offer competitive rates to put the service provider out of business. Some means to force local trunking (eg through the OIC) should be brought in.

The *interested parties* in the scope include everyone in the region. Focus groups for individual items are:

1. GCWG, Shire, Chamber of Commerce?
2. WAFF, PGA, ICPA, Distance Education, rural service businesses.
3. Chamber of Commerce, NW Seafoods, Fisheries, Marine & Harbours, P & O, Customs.
4. Shire.
5. WAFF, PGA.
6. WAFF, PGA, ICPA, Distance Education, rural service businesses, NTN.
7. Commonwealth & State Departments, Chamber of Commerce

ⁱ Buswell, RJ, Easterbrook, RP and Morphet, CS, *Geography, Regions and Research and Development Activity: the case of the United Kingdom*, in Thwaites, AT and Oakey, RP in "The Regional Impact of Technological Change", Frances Pinter, 1985

ⁱⁱ Bivand R., *Regional Policy and asymetry in geographical interaction relationships*, in "Polarised Development and Regional Policies", ed. by Kuklinski, Mouton, The Hague, 1981

ⁱⁱⁱ McNamara, John, *The Economics of Innovation in the Telecommunications Industry*, Quorum, New Yor, 1991

^{iv} Hatzichronoglou, T., *Globalisation and Competitiveness: Relevant Indicators*, STI Working Paper No. 1996/5, OECD, Paris, 1996

^v *Lead local Compete Global: Unlocking the growth potential of Australia's regions*, McKinsey and Co., for the Office of Regional Development, Department of Housing and Regional Development, Canberra, 1994

^{vi} This terms refers to the existence of Learmonth and its ability to accept the largest sizes of freight carrying aircraft is another integral piece of infrastructure to realising this possibility.