

A Preliminary Evaluation of Online Access Centres: Promoting Micro E-Business Activity in Small, Isolated Communities

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Abstract

This paper reports on a study of 18 of the 20 first round of community online access centres introduced in Tasmania, the only island state of Australia. The access centres were designed to redress some disadvantages of living and working in rural regions of Tasmania, such as isolation and economic inequity. The investigation aimed to determine and evaluate trends in micro e-business activity associated with use of the centres. Statistical data collected over a two year period in eighteen community online access centres were utilised. Comparisons were made of five communities with populations of 2 000–15 000, and thirteen with populations below 2 000. Differences were found in micro e-business activity generated in the two population categories. In centres in the larger communities, micro e-business activity was more uniform over the period. However, this was in marked contrast to the surge in micro e-business activity noted in the smaller population centres over the investigation period. It is proposed that differences in micro e-business activity may be explained by more limited opportunities outside the online access centres in the smaller communities. The findings of this foundation study suggest that online access centres do promote e-business activity in small, isolated communities, and they may offer potential to address limited business opportunities in geographically remote areas.

1 Introduction

Technological advancements and the convergence of information technology and telecommunications have facilitated the emergence of an Information Age (Ministerial Council for the Information Economy, 1998), in which information has supplanted capital as the key resource (Bell, 1979). An increasingly global society has meant that historical barriers previously imposed by location and time difference have been eliminated, allowing the access and transmission of information worldwide on a real time basis.

While in theory this new age may be advantageous for society, some areas of the world's population are unable to share its benefits. Developing countries and isolated and rural regions of more developed nations may find it difficult to join the information age. The problem is that of the digital divide, a term that has evolved to describe the gap in access to information available to those described as the "information poor" and the "information rich". Some individuals or organisations in small, remote and/or rural communities may not be able to afford to purchase equipment or the costs associated with maintaining access to an information infrastructure. Information infrastructure describes the linking of computer equipment and telecommunications network with internet servers

that collectively form the world wide web (WWW) (ZDNet, 2000). Even though access to the information society may not be essential at the present time, in the long term it could preclude large pockets of population from being able to participate fully in society (Mehlman, 2000). The Organisation for Economic Co-operation and Development (OECD) warned against inequitable access in the information age:

...most participants [of the OECD Working Party on the Information Economy] underscored the importance that the benefits of the information society be widespread. Amidst the turmoil of globalisation and technological change, we must avoid creating a society of haves and have-nots, or know and know-nots... At a minimum, there must be ...access for all to the information infrastructure (OECD, 1999:20).

Telecentres have evolved to reduce the digital divide. While Share (1997) considered the term “telecentre” to be imprecise, a founding practitioner in the area defined it simply as “...a common meeting place where people can be exposed to the tools, skills, attitudes and values of information and network technologies” (Fuchs, 1998:2).

Within this paper, Fuchs’ definition of a telecentre will be adopted. The term can be applied equally to the alternative terms, “access centre”, “community cyber point”, “community online access centre” and “online access centre”(OAC).

2 Background

Telecentres provide public access to information and communication technologies (ICTs) for educational, personal, social and economic development (Harris, 1999). Centres vary in the range of services they provide (Harris, 1999; Hudson, 1999), their location and their business models (Hudson, 1999). Services offered in telecentres can vary from basic telephone communication to full internet connectivity (Harris, 1999; Hudson, 1999) while locational factors can range from urban to rural, community size and other community demographics (Hudson, 1999). Telecentres can be based on profit making, cost recovery or subsidised business models (Hudson, 1999).

Information infrastructures may be based on two dimensions of access, physical access and economic access (OECD, 1999). Physical access to information infrastructures can prove problematic in remote and rural regions. Because of small populations and distance, people living outside major population centres may be disadvantaged by lack of access to a telecommunications network. Moreover, where access to a telecommunications network does exist, economies of scale can result in limited competition between service providers and monopolies. As cost is market driven, when compared with larger centres in urban regions, isolated communities may have to contend with inflated prices for access to information infrastructures. Consequently, restricted economic access implies that purchase of equipment and/or the cost of access in geographically isolated communities can prove beyond the financial resources of many members of such communities (OECD, 1999).

Telecentres provide access to technologies for a range of community groups that would otherwise not have opportunity to become involved in such experiences (Crellin, 1995). The establishment of telecentres can remove many of the barriers traditionally imposed by the tyranny of distance and geographical isolation. In particular, access to the WWW can open up an unlimited source of

information and communication contact. As a result, telecentres have potential to improve the social well-being of these communities by fostering group cohesion and interaction through the provision of a previously unavailable activity. At the same time, the opportunity to become proficient in the application of ICTs and access to a wider information base can break down parochial views that can develop in some geographically isolated regions.

Telecentres also have potential to improve the economic well-being of small and remote communities. While local businesses are the lifeblood of the economy in rural communities, many have limited potential for expansion due to geographical isolation and restricted access to markets. Even though some business owners may be capable financially of purchasing equipment and linking with the telecommunications network, they may need support to gain the technological skills required to realise benefits from their capital outlay. Telecentres can be used in a transitional phase where small business proprietors can gain exposure and training in the application of ICTs which can later be used to their economic benefit (Share, 1997). Assistance in mastering the technology may enable these people to gain first hand experience of ICTs, which in turn may demonstrate how they can be applied to advantage in their own business. In this way, micro-businesses may recognise the WWW as a significant tool that can be used to achieve increased business through access to world markets. Micro businesses have been defined as those that employ less than five people (Australian Bureau of Statistics, 1998a).

2.1 The Case for Tasmanian Online Access Centres

The Telecentres Program was established in Australia through funding of A\$2.8 million released in the 1992–1993 Federal Budget. This initiative was based on an assumption set out below.

If, with the aid of online technologies, Australia can nurture communities whose economic and social well-being is not affected by how close they are to major cities and markets, then investment, employment and skills in regional and rural Australia will be boosted (Ministerial Council for the Information Economy, 1988:3).

While Australia is generally regarded as an innovative leader in the uptake of ITCs (Ministerial Council for the Information Economy, 1998), there are a number of factors that set Tasmania apart from the remaining national states and territories. Tasmania is the sole island state within the Australian states and territories. In June 1998 the Australian Bureau of Statistics reported the total Australian population to be 18.7 million people, of which only 472 000 (approximately 2.5%) were resident in Tasmania. However, in 1999 Tasmania's gross product of under A\$10 billion represented only 2.1% of the Australian total (Industry Audits, 1999b).

Largely due to its geographical isolation from the Australian mainland, small population and inability to attract large industry development, Tasmania has been incapable of being economically self supporting. It has the highest rate of unemployment (9%) against a national average of 6.6%, where the rate for the other states and territories ranges between 5.2% and 8.2%. Many people have been forced to leave the state to gain employment (Department of Employment, Workplace Relations and Small Business, 2000). This has resulted in communities losing large numbers of its youth population, while many of those who remain are reliant on a social welfare income.

When compared with the Australian average and other states, Tasmanians have the lowest computer ownership and home internet access. The Australian average home computer ownership for households outside state capitals is 36.4%, yet it is 29% for Tasmania. The Australian average home internet access outside state capitals is 13.5%, but it is only 8% in Tasmania. (Australian Bureau of Statistics, 1998b).

These characteristics suggest that parallels may be drawn between the digital divide in Tasmania and similar small pockets of population in less developed countries. While Tasmania does have the benefit of an established telecommunications infrastructure, for a large proportion of its citizens in rural communities, often this is limited to basic telephone and/or facsimile services. On this basis, it is proposed that an examination of telecentres in Tasmania may be useful as a lesson of experience for less developed countries engaging in the earlier stages of movement into the information society.

2.2 The Establishment of Tasmanian Online Access Centres

The Tasmanian Communities Online Project was established through funding obtained from the Australian Government's Networking the Nation project. A grant provided a total of A\$6.1 million to the project, spread over a 2.5 year period commencing in 1998. The investment enabled the incremental establishment of a network of OACs. The main goals of these centres were to deliver free training in basic computing as well as to provide free access to the WWW and e-mail to all Tasmanians living outside of Hobart, the state capital. Two other key objectives sought from the establishment of these centres were to drive economic growth through assistance to micro businesses and to encourage social and cultural development in rural and regional communities throughout Tasmania (Timbs, 1999).

To coincide with the release of funding, communities were invited to submit a proposal to receive a financial grant designed to support the establishment of a telecentre in their region. The invitation to submit proposals and the granting of funds to establish online access centres were undertaken in three rounds, the first of which was advertised in May 1998, the second in November 1998 and the third in August 1999.

The successful community applicants were categorised into four levels, largely depending on their population size and the availability of government facilities in their region. The last criterion was implemented as a cost saving measure. The establishment of centres as an adjunct to existing government facilities (usually co-location with schools or libraries) meant a saving of between \$A15 000 to \$A20 000 per annum for each OAC that would otherwise have been incurred for telecommunication, accommodation, rental and power costs. The four OAC levels were defined as follows:

Level 1 populations in excess of 15 000 people

Level 2 populations of between 2 000–15 000 residents

Level 3 populations below 2 000 people

Level 4 as for level 3 but having no access to existing government infrastructure

The 20 Tasmanian community access centres in the first round were opened in the period between 25th May 1998 and 7th September, 1998. This initial round was limited to the first three levels as

Level 4 centres were not introduced until after Round 1. Two of the Round 1 OACs were originally established as pilots. In Round 2 a further 25 centres were established between 29th May, 1999 and 6th December, 1999. Fourteen “Round 3” centres opened between 16th December 1999 and 23rd March, 2000. Subsequently, two further centres began, so that by the beginning of August 2000, 59 OACs had been established in small towns and regional centres throughout Tasmania.

Each OAC operated independently and has a local management committee that oversaw the day-to-day affairs of the facility. During the first year of operation, government funding covered expenditure for staff, furniture, insurance, publicity, additional software, educational resources and public training courses. While each Level 1, 2 and 3 OAC employed a paid co-ordinator, volunteer staff were pivotal to the success of the centres. For example, many OACs have extended opening hours through the use of volunteers.

2.3 Research Framework

Figure 1 presents a contextual framework of the issues involved in the development and operation of community telecentres. It has been adapted from frameworks proposed by Harris (1999) and Whyte (2000). The purpose of this modified framework is two-fold. Firstly, it serves to acknowledge the main factors involved in the development and operation of telecentres. Secondly, as indicated by the shaded boxes, it locates the present study in the broader contextual background.

The framework shows the environmental factors that influence policy adopted in the establishment and operation of telecentres. Policy drives two measures, input and output measures. The range and extent of input measures will be determined by the activities the centre will offer (Harris, 1999). Some examples of general input measures are suggested in the framework. Output measures relate to the accountability that is required in view of public funding and the investment in input measures. Output measures are determined by the range of activities the centre provides, termed “Telecentre Performance”, in Figure 1. Ultimately telecentres have the potential to contribute benefits to the community in terms of social and economic well-being. To maintain these benefits, it is important that the centres remain in operation after funding has ceased. This aspect of the development and operation of telecentres introduces the final factor of the framework, self-sustainability.

As the second objective of the framework was to position the research presented in this paper, Figure 1 indicates that the study encompasses aspects of telecentre performance and the output measures related to them.

2.4 Research Objective

The objective of this research was to evaluate whether micro e-business activity was generated as a result of some of the first Tasmanian OACs. For the purposes of this study, e-business activity is activity undertaken electronically, designed to promote business outcomes. In order to evaluate micro e-business activity generated by the telecentres, it was necessary to determine and evaluate trends in user registration and internet usage. As telecentres aim to increase access to information and encourage its transmission, along with providing increased opportunities for business development, establishing and appraising trends in micro e-business activity is a subset of the evaluation of the effectiveness of telecentres. As was indicated in the framework in Figure 1, the

focus of this investigation has been limited to a number of aspects of telecentre performance and output measures.

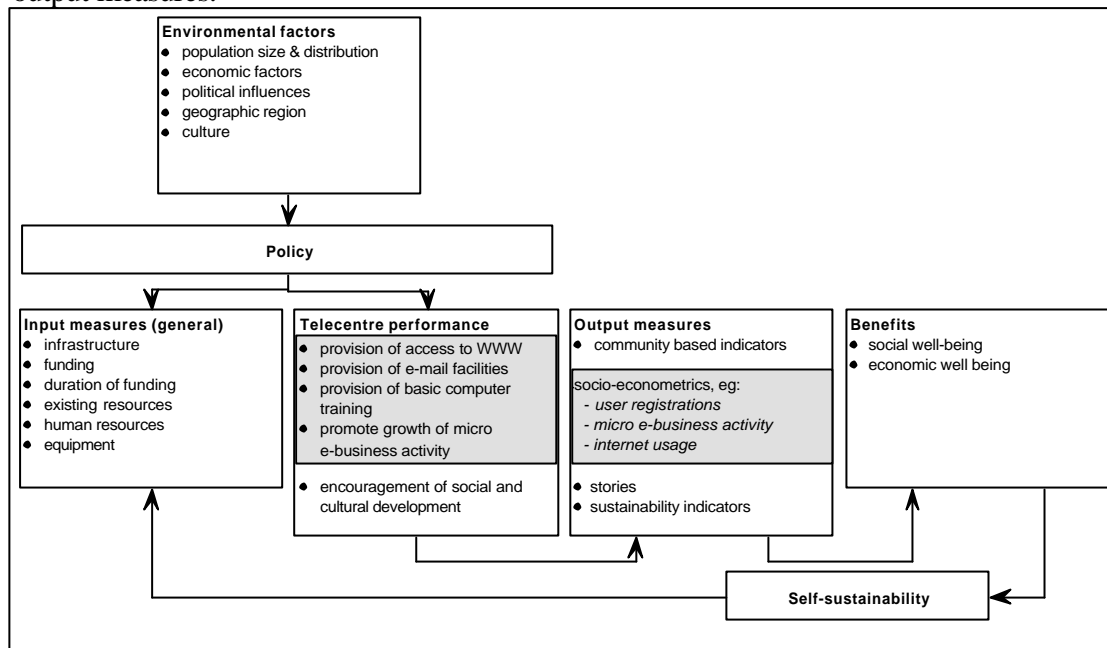


Figure 1 Research Framework of the Context for Telecentre Evaluation, Development and Operation

3 Methodology

3.1 Research Design

The study was carried out within a positivist epistemology (Orlikowski & Baroudi, 1991). As a condition of the funding agreement, each community access centre has an obligation to keep and submit regular reports. OACs collect numeric data on a range of issues relating to usage of the centres over time. As these data were utilised in this study, quantitative research methods were used. Consequently, as a result of the nature of the data and because this study appeared to be the first of its kind to evaluate aspects of Tasmanian OACs, a descriptive, quantitative analysis was employed.

3.2 Data Sources

Secondary data sources were used in this investigation. The data were provided by Tasmanian Community Online Access Centre Project administration. It was assumed that the quality of statistics collected and/or overseen by an employed co-ordinator of the Tasmanian Communities Online Project was acceptable. Statistics collected over a two year period on three areas of telecentre performance, user registration, internet usage and micro e-business activity, were analysed. The statistics were drawn from a subset of the 59 OACs, that is, from Levels 2 and 3 in Round One. These centres were chosen for the following reasons:

- Round One centres offered opportunity to examine performance over a full two year period, while Round Two and Three centres could only provide data for a shorter period;

- To determine whether there were general trends that transcended different levels of OACs and their characteristics, more than one level of OAC centres needed to be examined;
- Data from the two Level One centres in Round 1 were purposefully excluded as they did not fulfill the criteria of being small population communities in remote areas. Based on their Level One classification, as indicated earlier, these three centres each had a population in excess of 15 000 residents.

An assumption of the research was that it would be difficult to determine the overall growth in micro e-business activity in a region in which a community access centre was located. Firstly, it is unlikely that there was a means of obtaining data for geographic areas that coincided with the same geographic areas of community access centres. Secondly, growth in micro e-business activity would need to be linked to use of OACs. As there was no obvious way of measuring micro e-business growth outside the community access centres and linking it to use of the centres, micro e-business activity that was generated outside the centres was excluded. However, it was assumed that only micro-businesses were likely to use the online access centres for business activities. It was also assumed that larger businesses were more likely to use their own facilities.

In the smaller centres, it was assumed to be more likely that the majority of micro e-business activity in the region would arise in the access centres. However, in the largest centres, such as Launceston and Devonport, it seemed likely that other opportunities existed to generate e-business activity that were not linked to the access centres.

3.3 Data Analysis

To fulfill the research objective, the following data from Round One, Level 2 and Level 3 OAC reports were analysed:

- number of user registrations;
- usage of the internet based on the following activities:
 - self development;
 - economic objectives;
 - communication;
 - online transactions (for explanations of these categories see Appendix A)
- micro e-business activities comprising:
 - number of local business pages hosted;
 - number of visits to local business pages;
 - number of web site ads on hosted pages for local business.

It is acknowledged that the micro e-business activities examined were unlikely to represent all activities of this nature undertaken by micro businesses at the access centres. Instead these three measures were used as indicators of micro e-business activity.

For the categories of OACs specified, number of user registrations, internet usage and micro e-business activity at the centres over the two year period were collated at intervals. For the first year, as data were available less frequently, totals were calculated after three, six and then twelve months

of operation. Averages for each of these three periods were then calculated on a monthly basis. For the second year, data were totalled monthly.

The results of the number of new user registrations over the two year period were presented in a table format to indicate the profile of usage uptake in the five Level Two centres and thirteen Level Three centres. Results were produced to show year one, year two and total new user registrations.

Graphs were generated that allowed comparison of the internet usage and the micro e-business activity over the period for both the Level 2 and the Level 3 online access centres. Then a correlation test was undertaken for Level 2 and 3 to determine the nature of the correlation between internet usage and micro e-business activity.

4 Results

4.1 Registered Users of the Online Access Centres

Table 1 provides a demographic summary of the eighteen Tasmanian community online access centres that were investigated. The figures presented in this table were extracted from OAC reports. This shows the number of new user registrations in each OAC at the end of the first and second year of operation and totals at the end of this period. These results have also been presented to show the percentage of participation in the access centres, based on the population in each district. Note that rounding error accounts for small discrepancies in some of the totals.

Table 1 A Summary of Demographics of Round 1 Community On-line Access Centres in Tasmania

District	Population	Registered users					
		Year one		Year two		Total	
		count	% population	count	% population	count	% population
Level 2							
(n=24019)							
Queenstown	2631	322	12.2	82	3.1	404	15.4
Smithton	3313	761	23.0	249	7.5	1010	30.5
Sorell	10114	512	5.1	216	2.1	728	7.2
Deloraine	2477	220	8.9	280	11.3	500	20.2
George Town	5484	512	9.3	140	2.6	652	11.9
Level 3							
(n=9209)							
Winnaleah	850	289	34.0	85	10.0	374	44.0
Yolla	595	295	49.6	46	7.7	341	57.3
Bruny Island	581	169	29.1	58	10.0	227	39.1
Sheffield	1016	331	32.6	59	5.8	390	38.4
Maydena	331	296	89.4	63	19.0	359	108.5
Geeveston	1217	329	27.0	118	9.7	447	36.7
Rosebery	1439	256	17.8	54	3.8	310	21.5
Bothwell *	300	200	66.7	34	11.3	234	78.0
Oatlands	550	248	45.1	135	24.5	383	69.6
Ringarooma	506	191	37.7	52	10.3	243	48.0
St Marys	571	150	26.3	271	47.5	421	73.7
Flinders Island	853	184	21.6	58	6.8	242	28.4
Meander *	400	156	39.0	34	8.5	190	47.5
Grand Totals	33228	5421		2034		7455	22.5

* estimated population

The total population of the eighteen districts was 33 228 which represented approximately 7% of the Tasmanian population. Of this proportion of Tasmanian residents, 22% became registered users of the online access centres over the two year period of operation.

Apart from Deloraine and St Marys, Table 1 shows that the majority of new users registered during the first year following the establishment of the centres. For Deloraine the increase was small (2.4%) while at St Marys, however, membership in the second year was nearly double that in the first year.

In the first year of operation the proportion of the population registered in the individual centres ranged from 5.1% to 67%. Sorell, the largest population centre in Level 2 with over 10 000 residents, attracted the minimum percentage of 5.1% of registered users. In contrast, Bothwell, with an estimated population of 300, achieved almost a 67% increase in registered users.

In the second year of operation the range of percentages of the populations registered as users in the centres was much narrower. Again Sorell had the minimum number of new membership registrations with only 2% of the population. Over the two year period Sorell was the least popular of the online access centres studied, with only 7% from a population of 10 114 taking advantage of membership.

St Marys was at the upper range of registered users for the second year of operation with 47% of new users registered.

The importance of the community online access centres in the smaller population centres can be seen from Figure 1. For the thirteen locations examined at Level 3, nearly half achieved support from almost 50% of their population. A further three centres attracted approximately one third of the local population as registered users. Maydena reported 359 registered users, which exceeded its 331 residents. However, this population did not include people who lived outside the town centre. It is likely then that people who lived around Maydena also registered with the OAC there, which contributed to the exceptional result for that centre.

4.2 Internet Use and Micro E-Business Activity

Readers need to be reminded that the data for the first 12 months for both the Level 2 and 3 online access centres were recorded at 3, 6 and 12 months after the opening of each centre, not monthly as occurred during the second year of operation of the Round 1 centres. Rather than discarding this valuable data, the data were averaged over a 3 month period for the 3 and 6 month figures, and over a 6 month period for the 12 month figures. As a result, the bars for the first 12 month period for the two graphs that follow have a stepped appearance. If monthly totals had been available for the first 12 months, it is likely that there would have been greater variations in the internet usage and micro e-business activity during this period. However, despite this limitation, the order of magnitude of the results for both internet usage and micro e-business activity for the Level 2 and Level 3 centres within the 1 to 3, 4 to 6 and 7 to 12 month period of the first year of operation is likely to be accurate.

Not all Round 1 centres opened at the same time. As a result, some missing values occurred for some offices during the first 3 months for both Level 2 and Level 3. This limitation explains some of the lower values for both internet usage and micro e-business activity during the first 3 months only, for both Level 2 and Level 3 results.

Results from Level 2 Online Access Centres

Figure 2 represents the total internet usage recorded in the five Level 2 centres from Round 1 over the two year period to July 2000. It also displays the investigated micro e-business activity initiated at the same centres over the period.

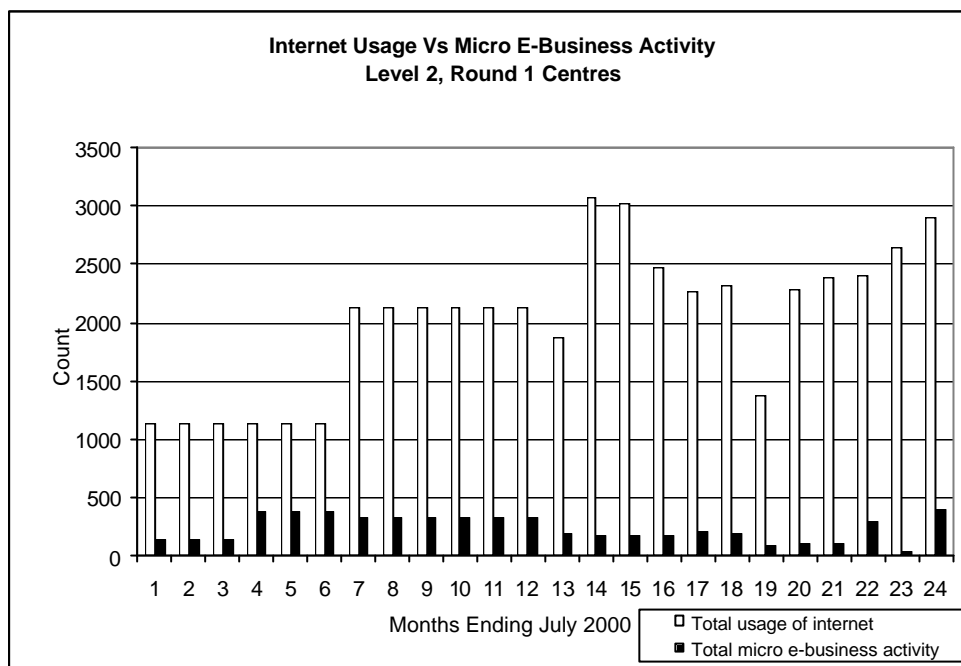


Figure 2 Comparison of Total Internet Usage and Micro E-Business Activity for the 5 Round 1 Level 2 Online Access Centres for the 24 Month Period Ending July 2000

It can be seen that total usage of the internet in the five Level 2 online access centres in Round 1 increased from approximately 1 100 counts at the start of the two year period to almost 3 000 at the end. In the middle of the period internet usage exceeded a count of 3 000. Apart from an aberrant result in Month 19, over 1 700 counts were recorded for each month after the first six months of the period.

Total micro e-business activity in the centres was much lower than internet usage, and ranged from a low of less than 100 counts in Month 23, to a high of approximately 400 counts in July, 2000, Month 24. In general, however, micro e-business activity was highest during the middle to the end of the first year of the investigation period.

Pearson's product moment correlation coefficient was calculated for the Level 2 results. As expected from the shape of the graph, no meaningful level of correlation between internet usage and micro e-business activity was found, with $r=0.1215$.

Results from Level 3 Online Access Centres

Figure 3 shows the total internet usage recorded in the 13 Level 3 online access centres in Round 1 over the two year period to July 2000. It also displays the total micro e-business activity that arose at the same centres during the same period.

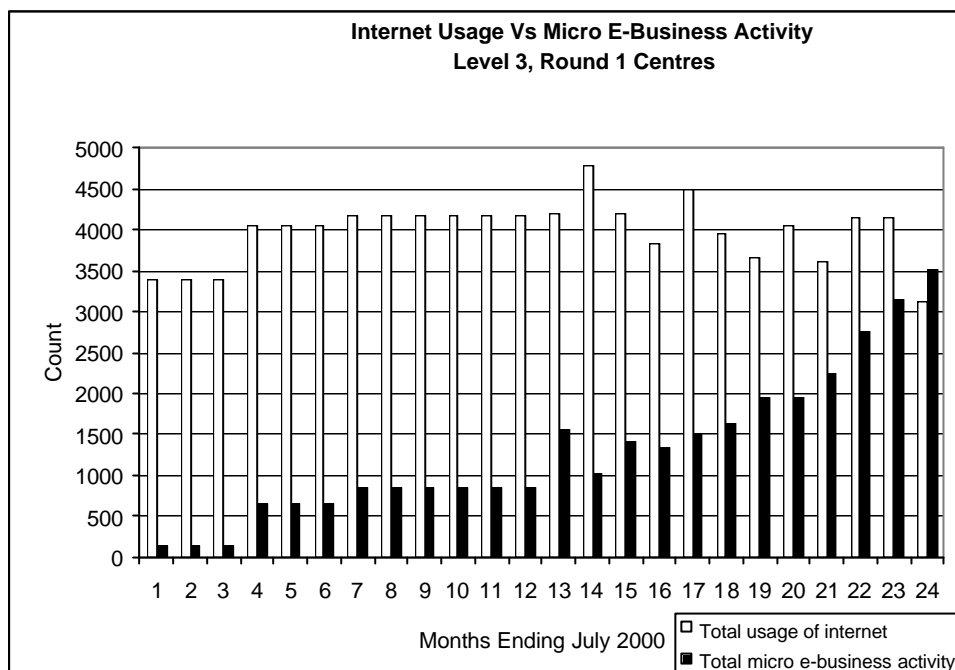


Figure 3 Comparison of Total Internet Usage and Micro E-Business Activity for the 13 Round 1 Level 3 Online Access Centres for the 24 Month Period Ending July 2000

The results presented in Figure 3 are distinctly different from those shown in Figure 2. Firstly, the counts are higher for both the total usage of the internet and the total micro e-business activity recorded. However, this is to be expected as Figure 3 plots each set of activities in 13 centres, rather than the five in Figure 2. Accordingly, it will be noted that the average Level 2 centre recorded a higher count for total internet usage than was the case for the Level 3 centres.

In Figure 3, the total internet usage over the two year period ranged from a maximum of over 4 700 counts in Month 14, which was also the highest month of internet usage in the Level 2 Figure 2 graph, to a minimum of approximately 3 400 during Months 1, 2 and 3. In general, however, the total internet usage was fairly consistent during the period, in contrast to that found in the Level 2 centres examined.

It can be seen in Figure 3 that considerable growth in micro e-business was recorded in the Level 3 centres during the period, again in contrast to the situation noted in the Level 2 centres. Approximately 100 counts of micro e-business activity were recorded in each of the first three months of the period as a minimum for the period. In Month 24, which was July 2000, around 3 500 counts of micro e-business activity were recorded at the centres. It will be seen that in Month 24, the count of micro e-business activity for the first time during the period exceeded the total internet activity, a circumstance that did not occur for any month for Level 2 centres.

The correlation between internet usage and micro e-business activity for the Level 3 results was calculated using Pearson's correlation coefficient. Again as anticipated from Figure 2, no meaningful level of correlation was found, with $r=0.0588$.

5 Discussion

Registered Users of OACs

The results showed a higher proportion of the population in the smaller, Level 3 districts to be registered users than was the case in the larger Level 2 communities. People may have had readier access to the internet outside the OACs in the larger centres. Residents of the Level 3 centres were more likely to be aware of the OACs, as it is assumed that communication is more effective in a smaller population. Another factor that may have influenced the lower proportion of users registered in the Level 2 centres was the likely larger number of activities already in place for residents. That is, many locals may have had a long-standing affiliation with a range of sporting and/or social clubs that can operate in communities that are sizeable enough to support their existence. Consequently, the uptake of ICTs within OACs may be subjected to greater competition in larger population centres.

Internet Use

There was considerable internet use in both the Level 2 and Level 3 centres. It is conjectured that there was more limited access to the internet outside the access centres in the Level 3 centres than was the case in the Level 2 centres. As stated in the previous section, people in the smaller communities would have been more aware of the existence of the OAC, with less competition from other activities usually associated with larger centres. As a result, they may have been more able and willing to use the internet access provided in the OACs.

One anomaly found in the results was the considerable growth in the number of registered users in the Level 3 centres, yet fairly constant use of the internet. With increasing numbers of user registrations, it was expected that internet use would have grown as well. One explanation for this finding may be that some registered users purchased their own computers after using an OAC. Although there was some anecdotal support for this proposition reported from the centres, it was unlikely to have occurred to such a degree to have accounted for the trend seen. Another explanation may be that some of the users lost interest after registering, and so did not continue to use the internet. Yet the increased figures for micro e-business activity over the two year period suggest that this explanation may not be convincing. It occurred to the authors that use of the internet could not increase if the centres had been operating to near full capacity, so that usage had been capped by limited resources. An administrative employee of the Tasmanian Community Online Project validated that this last explanation was likely.

In the Level 2 OACs, the results showed a slower increase in the number of registered users over the two year period than for the Level 3 centres, combined with increased access to the internet. Again, growth in the number of registered users may have been dissipated by the purchase of privately owned computers by some of the users. It is also likely that there was increasing awareness of the OACs after the Level 2 centres had been operating for some time, which may have accounted for some of the growth in internet access.

Micro E-Business Activity

Growth in micro e-business activity was seen in Level 3 OACs but not in the Level 2 centres. There are several possible explanations for the surge in indicators of micro e-business activity over the two year period in the Level 3 centres. In communities of less than 2 000 residents, the good communication processes that made residents aware of OAC facilities were likely to have operated just as effectively to inform micro businesses of the potential of using the centres for micro e-business activities. However, in the larger Level 2 centres, communication would have been less

effective. Moreover, there would have been more opportunities outside the OACs to pursue micro e-business activity, that is, competition for the services offered by OACs.

Similarly, the dramatic growth in the proportion of registered users in the Level 3 OACs would have contributed to micro businesses in those communities quickly learning of the potential of the facilities for business activity. In fact, it is likely that many of those who undertook micro e-business activity in the OACs were the same people who first came to use the internet, perhaps for social or general reasons, before realising its potential for their business. This would not have occurred until they had acquired some confidence and training in computer use.

In the Level 2 centres, slower growth in the number of registered users over the period would have acted against growth in micro e-business activity. Furthermore, near maximum use of facilities in the Level 3 centres appeared not to have occurred in the Level 2 centres, at least not in the first year of operation. Internet usage would not have been able to increase if the centres had been operating at, or near, maximum capacity. This last characteristic of Level 2 centres would also have acted against business organisations in these regions engaging in micro e-business activity in the OACs, and may have contributed to the restricted growth of these activities in the larger centres.

Correlation between Internet Use and Micro E-Business Activity

The lack of correlation between use of the internet and micro e-business activity noted in the Level 3 centres was not unexpected, given that growth in internet use may have been restricted by the number of computers available. If unlimited facilities had been available, it is possible that a correlation between use of the internet and micro e-business activity may have been observed. For the Level 2 OACs, no correlation between internet use and micro e-business activity may be explained by the factors that were offered in previous paragraphs for limited growth in micro e-business activity and increased internet use in these centres. Where micro e-business activity displayed little trend towards growth while internet use did, a meaningful correlation between the two cannot be expected.

6 Study Limitations

A limitation of the study is that it examined micro e-business activity indicators rather than analysed data for all micro e-business activity generated within OACs. Furthermore, as stated earlier, micro e-business activity that originated outside the centres was excluded. Given the numbers of Tasmanian OACs now in operation, over time sufficient data will be generated to allow generalisations to other telecentre projects.

7 Future Research

Although the research question did not conjecture that growth in micro e-business activity was related to a specific kind of internet use, such as economic objectives, it would be interesting to investigate whether there was an association between growth in micro e-business activity and a specific form of internet use. As the 59 OACs continue operation, more will have been in operation for two years and provide comparison data with the Round 1 centres. Furthermore, it would be interesting to investigate different OACs, and determine whether there are trends in their operation that relate to characteristics of the centres.

8 Conclusions

This research has shown that Tasmanian Online Access Centres were valued by communities in small and remote regions, especially those with a population of less than 2000. Although participation was lower in population districts with between 2 000 and 15 000 residents, it seems likely that many users of OACs in these larger centres otherwise would have been less likely to share opportunities that ICTs offer.

As a result of the introduction of OACs, many residents of the small, isolated communities investigated have been empowered to participate in the information society. It seems likely that many of these people previously have been prevented from participation by the digital divide.

The results of this study suggest that the establishment of community online access centres in remote districts of Tasmania with a population of less than 2 000 has been effective in promoting micro e-business activity. Although considerable evidence of micro e-business activity was found in OACs that served populations of between 2 000 and 15 000, no consistent pattern of growth was found over the two year investigation period.

This study did not attempt to investigate whether the indicators of micro e-business activity observed led to economic well-being for the districts. However, it seems reasonable to assume that economic well-being will be fostered by increased business activity. Furthermore, e-business in particular would appear to be well suited to overcoming the difficulties of conducting business from small and isolated districts.

Consequently, the findings of this study suggest that the provision of opportunities for people to access, and become familiar with ICTs, may prove beneficial in promoting the economic well-being of small and isolated communities. The study also suggests that OACs can bring advantages that would otherwise be denied to small pockets of population in remote areas.

It is acknowledged that small, isolated regions in many developing nations may be disadvantaged when compared with the setting of this study, due to a lack of many basic services. However, the implementation of community ICT facilities could prove a useful tool for opening up opportunities that may lead to improved economic well-being.

Acknowledgements

The authors would like to thank officers from the Tasmanian Communities Online Project for authorising access to data used in this investigation.

References

Australian Bureau of Statistics, (1998a) *Characteristics of Small Business, 1997*, 8127.0, Canberra, Australian Govt. Pub. Service.

Australian Bureau of Statistics, (1998b) *Household Use of Information Technology, Australia, 1997-98*, 8128.0, Canberra, Australian Govt. Pub. Service.

Bell, D., (1979), Thinking Ahead. *Harvard Business Review*, May–June, pp 20–42.

Department of Employment, Workplace Relations and Small Business, (2000), *Australian Regional Labour Markets June Quarter 2000*, Brochure No 91.

Department of State Development, (1999a), Industry Audits, Information Technology, Communications and Advanced Technology,
URL <http://www.dsd.tas.gov.au/indaud2.htm>, Accessed 20/07/2000.

Department of State Development, (1999b), *Tasmanian Industry Audits, a shared vision*, Overview URL <http://www.dsd.tas.gov.au/indaud2.htm>, Accessed 18/08/2000.

Harris, R. W., (1999), in Pan Global Networking International Development Research Centre, Telecentre Evaluation a Global Perspective Gomez. R & Hunt, P. (Eds.) *Evaluating Telecentres within National Policies for ICTs in Developing Countries*,
Dated 25/01/2000. URL <http://www.idrc.ca/telecentre/evaluation/nn/00>, Accessed 25/07/2000.

Hudson. H. E., (1999), in Pan Global Networking International Development Research Centre, Telecentre Evaluation a Global Perspective Gomez. R & Hunt, P. (Eds.) *Designing Research for Telecentre Evaluation*, Dated 25/01/2000. URL http://www.idrc.ca/telecentre/evaluation/nn/20_Des.html, Accessed 25/07/2000.

International Telecommunications Union, (1998), *Regional Seminar for Central European Countries: the role of Community Telecentres in Fostering Universal Access and Rural Development*, Budapest, 7–9th December.

Mehlman, J., (2000), The Digital Divide, *Australian Computer Magazine*, August, pp 68–75.

Ministerial Council for the Information Economy, (1998), *Towards a Strategy for the Information Economy*, Canberra.

Organisation for Economic Co-operation and Development, (1999), *Working Party on the Information Economy, OECD Workshops on the Economics of the Information Society: A Synthesis of Policy Implications*, OECD, Paris.

Orlikowski. W.J., Baroudi. J.J., (1991), Studying Information Technology and the Structuring of Organisations, *Information Systems Research*, Vol 2, No 1, pp 1–28.

Share, P., (1996), *Telecentres, IT and Rural Development: possibilities in the Information Age*, URL: <http://www.csu.edu.au/research/crsr/sai/saipaper.htm>, Accessed 02/08/2000.

Timbs. J., (1999), *Tasmanian Communities Online Project - Empowering and Training Rural Communities in Information Technology*, Community Networking 1999, Ballarat 29/09/99 – 1/10/99.

Whyte. A., (2000), *Assessing Community Telecentres Guidelines for Researchers*, International Development Research Centre, Ottawa.

ZDNet, (2000), World Wide Web - *ZDNet Webopedia*, URL:http://www.zdwebopedia.com/TERM/W/World_Wide_Web.htm, Accessed 21/08/00.

Appendix A

Category	Explanations
No of uses of the internet:	
<ul style="list-style-type: none"> for self development 	Furthering formal and informal education activities, developing technology skills, seeking information to assist personal and social objectives
<ul style="list-style-type: none"> for economic objectives 	Using electronic information resources for business, increasing job skills, job searching, developing WWW pages, commercial research
<ul style="list-style-type: none"> for communication 	e-mail, chat, newsgroups, writing letters
<ul style="list-style-type: none"> for online transactions 	Accessing government and commercial services, online commerce, ordering, bill-paying, downloading software