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# Evaluating the Economic and Social Impact of the National Broadband Network

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### Abstract

*Governments the world over are developing policy and implementing broadband infrastructure for the purpose of improving access to and availability of broadband for businesses and citizenry based on assumptions that broadband infrastructure will return economic and social benefits. However, little research has been done that evaluates the impact of implementations of broadband infrastructure and/or the community benefit in access to broadband or indeed the potential disadvantage to communities that do not have adequate access to broadband. The Australian government has recently announced that Tasmania will be the first State to deploy the national broadband network (NBN) initiative. Consequently now is an ideal time to establish a baseline against which the economic and social impacts of the implementation in the state might be usefully measured and interpreted. This paper reviews academic and practitioner literature examining the social and economic impact of broadband and presents a proposed research framework for evaluating this important area within the Tasmanian and Australian context.*

### Keywords

Broadband, IT infrastructure, regional development

### INTRODUCTION

Since the late 1990s and early 2000s broadband demand and penetration has continued to grow and broadband has become a necessary infrastructure for most businesses and a growing number of households. There has been action by many governments including UK (Galloway 2007), Korea (Kelly et al 2003) and Spain (Gerrand 2006) to increase the access and affordability of broadband for citizens supported by numerous publications extolling the potential economic and social benefits of broadband for businesses and households over the past 10 to 15 years (Galloway 2007). In addition a number of reports have been prepared that attempt to estimate or project the actual economic value of broadband implementations in a number of different locations including for example, Molloy et al (2008). The reports are frequently prepared to help persuade the relevant authorities to commit funding in anticipation of a broadband implementation in order to provide justification and support for the required funding. By contrast there are relatively few papers or reports that measure, evaluate and interpret the actual economic and social impact of broadband technologies post-implementation, in order to determine the real benefits of broadband to regions, businesses and/or households. The majority of the available literature examining the impact of broadband is practitioner and/or consultancy based. There is a dearth of academic literature that considers this important area.

This paper sets out to review the existing literature that examines the impact of broadband technologies, both practitioner and academic. In so doing it examines the publications that estimate or project the value of broadband to a community or region and the few empirical papers that attempt to evaluate, measure and/or interpret the actual post-implementation impact of broadband. Finally the paper presents a proposed research framework for evaluating this important area within the Tasmanian context thus providing useful baseline information for application in an Australian context.

## BACKGROUND

Networking the Nation was established in 1997 with a goal of assisting the economic and social development of rural Australia by funding projects which improve telecommunications infrastructure, promote services available through telecommunications networks and improving equity of access to digital services ([http://www.archive.dcita.gov.au/2006/06/networking\\_the\\_nation](http://www.archive.dcita.gov.au/2006/06/networking_the_nation)).

Always on broadband connection is a relatively recent arrival to the Australian telecommunications context. Whilst Australian consumers have enjoyed the opportunity to browse the internet via dial-up modems since the late 1990s always on broadband connectivity has only been readily available in Australia since 1999 and the early 2000s (Estens et al 2002) albeit at relatively low speeds compared with those available globally and those proposed by the National Broadband Network (NBN).

On April 7<sup>th</sup> 2009 the Australian Government announced its \$43 billion NBN plan and at the same time announced its decision to fast-track negotiations with the Tasmanian Government to begin the rollout of a fibre to the premises (FTTP) network and next generation wireless services in Tasmania as early as July 2009 ([http://www.dbcde.gov.au/communications/national\\_broadband\\_network](http://www.dbcde.gov.au/communications/national_broadband_network)). The NBN proposal commits the Australian Government to a plan to connect Australian homes, businesses and education facilities with optical fibre directly to the premises with speeds of 100 megabits per second. The NBN will extend to include towns with a population of around 1,000 or more people. For those living in remote areas of rural Australia the fibre network will be supplemented by “next generation wireless and satellite technologies that will be able to deliver 12 megabits per second or more” ([http://www.minister.dbcde.gov.au/media/media\\_releases/2009/022](http://www.minister.dbcde.gov.au/media/media_releases/2009/022)). The NBN will be operated as a publicly owned and open access infrastructure with access available on a commercial basis to carriers and other users wishing to leverage off the network. A key driver of the Government’s plan to rollout the NBN is a belief that high speed broadband such as will be delivered by the NBN will increase productivity and innovation for Australia over the long term.

### What is Broadband?

Broadband has been defined in many ways and the definition continues to evolve. The definition of broadband also varies between countries, in Australia for example early definitions included any connection greater than 64kbps but some authors suggest that initially broadband was considered to be anything greater than 144 kbps (Jerman-Blazic 2008). In Australia broadband has also historically included asynchronous services in addition to synchronous services although with the move to a true high speed broadband network such as the NBN synchronous services will become the norm. Some recent definitions of broadband tend to focus less on specifying the actual bandwidth of the link and more on defining the service in business related terms. A selection of recent definitions appears below:

OECD (2008a:7) “The term “broadband” is typically used to denote an Internet connection with download speeds faster than traditional dial-up connections (at 64 kbit/s).”

COM (2004:5) “a wide range of technologies that have been developed to support the delivery of innovative interactive services, equipped with an always on functionality, providing broad bandwidth capacity that evolves over time, and allowing the simultaneous use of both voice and data services”

### The Case for Broadband

Reports and papers written in support of broadband frequently espouse its potential benefits, for example:

“Broadband service potentially creates new markets, increases workers’ productivity, and adds value to business performance, public efficiency and the quality of life. Harnessing the broadband benefits is crucial to consolidate progress towards a knowledge-based economy and ensure growth through improved competitiveness. The successful deployment, take-up and use of broadband is therefore of central importance to the future prosperity of the European economy and to its social inclusion.” (COM, 2004:23).

However, there is little empirical evidence available that indicates the espoused benefits are actually realised or indeed that many attempts have been made to evaluate, measure, quantify or interpret the actual impact of broadband.

The following quote from Price Waterhouse Coopers (2004:74) summarises the difficulties in calculating the benefits of broadband:

“A broadband connection *per se* has no value to customers. Rather, the value to customers of broadband access arises from the applications for which it is used. . . . .Subscribers receive benefit from the package of applications that they consume over their broadband connection. The net economic benefit is the difference between the total benefit that subscribers receive from these applications and the amount they pay for them.”

High speed broadband, such as is being proposed under the Rudd government’s NBN rollout, is anticipated to produce considerable economic flow on for the economy. Australia will be at the cutting edge when the NBN rollout commences. Australia will be among the few countries, including Korea, Japan and some European countries, that provide 100mb always on connectivity to the majority of citizens. It is anticipated that such high speed connections will revolutionise the manner and medium for service delivery in many areas of the economy. In industries that can benefit from rapid and real time movement of large high quality images, such as health, the potential for gain is possibly predictable. However, as is the case with many innovative endeavours, it is probably true that the areas that will gain the most from NBN have not yet been identified and the roles that will emerge in the future have not yet been contemplated. When the Australian government first announced Networking the Nation in 1997 very few would have predicted how profoundly the music and newspaper industries would be effected by Internet connectivity. It is likely that the same will result as the NBN rolls out. The areas of most profound impact will only be identified in hindsight. This uncertainty adds to the degree of difficulty inherent in appropriately designing research to first foresee and then measure the economic and social impacts of the NBN and underlines the need to take a broad view of the research domain.

There is a growing realisation among commentators and industry participants that development of excellent content is key to encouragement of greater take up of broadband by businesses and households (OECD 2008). The dilemma is that while broadband penetration rates remain low and grow slowly, the business case for developing and deploying innovative applications for delivery via broadband is much harder to justify. Alternatively, if there is no incentive for businesses and households, by way of attractive applications and/or services, to commit limited finances to purchasing a broadband connection then many will decide not to connect (Crandall 2003). In order for the true impact of the NBN to be assessed it will be necessary, as a first step at least, to track the penetration and take up of broadband services. Businesses and citizens will only move to broadband and high speed broadband where they see a benefit for themselves. Thus, the pattern of demand that follows the NBN rollout is one potential indicator of consumer interest and NBN impact.

Beyond connectivity one needs to assess the actual social and economic impacts that result from households and businesses having access to broadband. In this matter, Jerman-Blazic (2008) offers some limited insights into the techno-economic evaluation for selecting the preferred method of upgrading the Slovenian national network. However, the content of this paper is limited to a consideration of the benefits, economic and technical, of particular technologies and does not address the broader economic and social impacts of the availability of broadband to businesses and/or the community. The economic impact of a broadband network cannot be adequately reflected by a return on investment (ROI) calculation (SNG 2003). In fact, the investment of the large sums required to fund broadband networks cannot be justified purely on the basis of revenue generated directly from the network. The impetus for governments in making the large capital expenditures necessary to build broadband networks come from the *potential* for broadband to contribute to economic development, productivity and public good (BSEG 1994).

### **Anticipated Impacts**

Reports by consulting firms consisting of predictions that rely on assumptions and projections to anticipate the potential economic benefits of broadband are relatively common. In 2003 The Allen Consulting Group produced a report for Ericsson that predicted positive impacts for the Brisbane and Moreton areas of Qld and for Qld as a whole from what they described as a ‘true broadband’ deployment. Specifically:

- Increases in gross regional output and gross state product (GSP)
- Increases in employment, creation of jobs
- Increases in aggregate consumption

ACIL Tasman prepared a report for Multimedia Victoria in June 2004 predicting that broadband would contribute to GSP growth at a rate of between 0.47 per cent and 0.82 per cent annually, depending on the underlying assumptions that were used in the calculation.

Systems Knowledge Concepts Pty Ltd prepared a report for The Information Directorate Department of Further Education, Employment, Science and Technology Government of South Australia in 2008 estimating the economic benefits of increased broadband use on the Yorke Peninsula and predicting a positive economic return for that area (Molloy et al 2008).

### Existing Empirical Studies of the Impact of Broadband

There are very few empirical studies of actual broadband implementations that analyse the impacts of broadband post-implementation (Kelley 2003, Ford and Koutsky 2005, Strategic Networks Group 2003). Of the few empirical studies of the actual impact of broadband that are available, the majority provide insights into the economic and/or social impacts of broadband for a discrete area or location and commonly provide some quantitative data with a qualitative interpretation of that data, for example Kelley (2003). Table 1 includes a brief summary of the results of existing empirical studies of the actual impact of broadband:

Table 5 - Summary of Empirical Studies of the Actual Impact of Broadband

<i>Author(s)</i>	<i>Details of Study</i>	<i>Actual Impacts</i>
<b>Strategic Networks Group (2003)</b>	South Dundas, Canada (pop. Approx. 10,000):	62.5 new jobs \$2.8 million in commercial/industrial expansion \$140,000 in increased revenues and decreased costs
<b>Kelley (2003)</b>	Cedar Falls (pop. Approx. 36,000) has a publicly owned network. Waterloo (pop. Approx. 69,000) has communications that are provided through the private sector.	Demonstrating clear economic benefits to Cedar Falls including increased construction, and higher land values. The study reports that “the direct link is evident between advanced communications and productivity and economic development”
<b>Ford and Koutsky (2005)</b>	Used an econometric model to analyse before and after data to quantify the effect of the publicly owned broadband network in Lake County, Florida, US.	“Our findings are consistent with other analyses postulating that broadband infrastructure can be a significant contributor to economic growth.”
<b>Massachusetts Institute of Technology (2006)</b>	“...applying controlled econometric techniques to data on broadband availability and economic performance for the entire U.S.”	“The results support the view that broadband access does enhance economic growth and performance, and that the assumed economic impacts of broadband are real and measurable.” “between 1998 and 2002, communities in which mass-market broadband was available by December 1999 experienced more rapid growth in employment, the number of businesses overall, and businesses in IT-intensive sectors, relative to comparable communities without broadband at that time.”
<b>Fornefeld, Delaunay and Elixmann (2008)</b>	MICUS conducted a study on behalf of the European Commission that included within it two regional case studies Cornwall (UK), and Piedmont (Italy).	Cornwall (UK), the case study showed improvement in productivity and employment growth. Also significant was the role of the “act now” strategy that identified demand stimulation and education as key success factors for broadband take-up. Piedmont (Italy), project began later and only early data is available but indicating a positive economic effect.

Whilst it would be ideal, and possibly preferred, to be able to present clear quantitative information that would indicate the impact of broadband for an area or region. In reality it is extremely complex to establish beyond doubt that broadband alone has created an observed change in an economic or social indicator, for example an increase in jobs within a region, since clearly there are many other factors at work within regions over any given period of time that are also impacting on economic and social indicators, for example, government funding models, the effects of the global economy, changing weather conditions in rural areas to name but a few. However, the research outlined in this paper is designed to monitor and document the baseline situation with

regards to the economic and social snapshot of Tasmania and its regions. Establishing this baseline now will position Tasmania well to identify, monitor, measure, track and document major trends and changes that occur following the rollout of the NBN.

### **Taking a Balanced View**

Not all of the potential impacts of increased and high speed access to ICTs are necessarily positive. It has been suggested that young people and in particular adolescents who are constantly engaged playing games over the Internet exhibit signs of addiction to the technology (OECD 2008b, Woyke 2009). There is also much controversy over the impacts of playing violent games and exposure to violent materials and whether or not this results in bullying or other aggressive behaviours. The current research reveals a few studies that link exposure to violent material with increased aggression (Lynch 2001). Alternatively, there are studies that indicate that no causal link exists (Freedman 2002). In addition, there is also research that indicates the anonymity of the internet creates an environment that encourages cyber-bullying via electronic means (Ortega, Mora-Merchán and Jäger 2007). Increased levels of stress associated with ICT have been recorded (OECD 2008) and ICT has become an area of conflict between parents and children as access rights and usage patterns are constantly negotiated and renegotiated (Shepherd, et al 2006). The potentially negative consequences of ICT are not only an issue for children and/or teenagers and their parents and teachers there are also bodies of work that explore the potential for ICT to create negative social impacts in other areas of society. In order for any research into the economic and/or social impacts of the NBN to be realistic and balanced, the potential for both positive and negative impacts must be acknowledged.

## **RESEARCH CONTEXT**

Available figures indicate that Tasmania has the lowest percentage of broadband take-up of any state in Australia with only around 39% of total households connected to broadband (ABS 2008). The low levels of penetration and take up of broadband by businesses and households is a barrier to changing government service delivery models and business models away from traditional service methods to digital delivery (Crandall 2003).

In addition many Tasmanian's experience relative disadvantage compared to the rest of Australia including "higher levels of welfare dependency, a higher proportion of households with low economic resources, lower literacy levels and lower school retention rates than a number of other Australian states and territories" (Social Inclusion Unit, DPAC, Tas 2008:13). Dwivedi and Lal (2007:654) found that "socio-economic variables including age, education, occupation and income, significantly helped to explain differences between the adopters and non-adopters of broadband."

Following a study commissioned by the Tasmanian Government in 2003, and completed by the Tasmanian Electronic Commerce Centre (TECC), the Tasmanian Government part-funded and sponsored the Tasmanian Collaborative Optical Leading Testbed (TasCOLT). TasCOLT is a pilot of a low cost high speed fibre to the premises (FTTP) network. The project ran for three years from 2003 to 2006 in three locations throughout Tasmania, Devonport, South Hobart and New Town, the network remains in operation. The intention of the project was to explore provision of a high speed broadband network and to create an environment to trial innovative applications and undertake research (Spring and Wiatr 2006). Tasmania's experience with the TasCOLT project provides valuable learning (McCann 2008) and positions the state for its role at the forefront of the NBN rollout.

The analysis for this research will be conducted primarily at the regional level and subsequently compared and contrasted with data at a whole of Tasmania level where such aggregations and comparisons can reasonably be made. Taking a regional focus offers a number of advantages including helping to highlight instances where an economic and/or social impact may be the result of something not related to the rollout of the NBN. It may also provide insights into differences between regions that may be attributable to difference in ICT awareness, industry profile, geography or demography.

A number of regions will be selected for inclusion in the research on the basis of:

- a) Existing levels of connectivity; some areas of Tasmania have extremely low levels of broadband penetration and additionally low levels of mobile phone coverage. In regions where these two characteristics are present it could be reasonably anticipated that both the economic and social impacts of the NBN will be more significant.
- b) An urban area; it is anticipated that in areas where broadband connectivity is already available and high levels of infrastructure and other support are accessible the effects of the NBN, at least initially, may be negligible.

- c) Existing levels of ICT adoption and awareness by local government; it reasonable to assume that where a local council has recognised and adopted ICT as a valuable tool for its own use and in providing services to its rate payers that there may be a greater likelihood, within that region, of programmes and service delivery for businesses and individuals that will be improved by broadband connectivity. Alternatively, where the local council has not yet itself embraced ICT as a tool for improving their business operations or the delivery of their services it may be less likely that the businesses or residences within that region will readily identify and position to exploit any potential benefits that may be associated with the NBN.

## THEORETICAL LENSES

The mixed method research described in this paper includes a qualitative perspective that will take an inductive approach with themes and constructs emergent and identified from the data. Techniques derived from grounded theory will be used for qualitative data analysis. However, some existing theories will be referenced as frames or lenses and in particular will inform the quantitative perspective of the research. Broadband research, and this research in particular, spans a range of research areas and directions and could reasonably incorporate, for example, theories such as the theory of reasoned action (TRA) (Fishbein and Ajzen 1975), the technology acceptance model (TAM) (Davis 1989, Davis et al 1989) the theory of planned behaviour (Po-An Hsieh et al 2008), innovation diffusion theory and adaption structuration theory (Dwivedi and Lal 2007). It is expected that an outcome of this research will be the development, adaptation or extension of a suitable theory or model for application in this and similar research.

## PROPOSED RESEARCH DESIGN AND METHODOLOGY

To support the development of the model proposed in this paper data collection will be based on a mixed methodology (Teddlie and Tashakkori 2003). Three forms of data collection will be completed within this the qualitative perspective will involve semi-structured interviews. The results of the qualitative analysis will be used to guide the development, construction and administration of a survey. The survey and the aggregation and analysis of quantitative data from existing data sets will provide the quantitative perspective.

Table 6 - Preliminary Regional Indicators for Evaluating the Impact of the NBN

Broadband Indicators	Economic Indicators	Social Indicators	Environmental Indicators
Geographical Penetration of Broadband	Retail Sales Figures	Education levels and retention rates	Government Funding Models
Broadband Connections by Business	Employment Figures (Participation Rate/Unemployment Rate)	Demographics of families with broadband	Meteorological Factors
Broadband Connections by Household	Average Earnings	Usage patterns of households	Level of ICT usage and awareness of local authorities
	Job creation figures	e-health initiatives	Types and number of broadband/ICT promotional programmes
	Property Values	e-education initiatives	Changes in GSP
	Numbers and Types of Registered Businesses	ICT literacy programmes	
	Gross regional output		
	Government Grants		
Selection of Related Research			
ABS (2008)	Ford and Koutsky (2005), Kelley (2003), SNG (2003), The Allen Consulting Group (2003)	Dwivedi and Lal (2007), Po-An Hsieh, Rai, Keil (2008)	Fornfeld, Delaunay, and Elixmann (2008), The Allen Consulting Group (2003)

As discussed earlier the research outlined in this paper will focus primarily on data collection at the regional level. Concentrating on sampling a small number of regional areas creates some issues in terms of access to existing data sets. The Australian Bureau of Statistics does not provide data that easily translates to the level of granularity necessary for a regional view. Additionally there are no data sets that correlate neatly with any

commonly held geographical or regional division of Tasmania, including local government boundaries or the Tasmanian Government's regional divisions. However it is possible, operating within the framework of qualitative research, to analyse such data sets as can be accessed whilst also providing clear descriptions of the assumptions and limitations they embody and with a comprehensive and detailed interpretation of the process of analysis, the findings and the research context. Table 2 provides a summary of the types of indicators that may be appropriate for inclusion in the data collection and analysis, work is continuing to finalise and refine these indicators.

In addition a regional focus will be beneficial in terms of supporting a richer and deeper exploration by the researcher than would be possible if the research frame was the whole of Tasmania. Semi-structured interviews will be conducted with key representatives within each region and relationships established with local councils, business organisations, peak industry bodies, businesses and individuals within each regional area. The interview participants will be selected using selective and snowball sampling techniques. It is through these interviews that the researcher anticipates capturing data that would otherwise be unrecorded, such as, the numbers of businesses or individuals who approach councils with a desire to establish in a regional area and ultimately decide not to do so because of the lack of required levels of broadband access and speed. Anecdotally, at least, this lost opportunity cost is a significant barrier for regional areas and the collection and analysis of qualitative data would provide a mechanism for exploring the true impact of such occurrences on regional areas. In fact it is likely that we have progressed from the situation where broadband connectivity provides an advantage to a point where lack of broadband connectivity constitutes a disadvantage and broadband is considered, for business at least, as an essential requirement for locating into an area. This amount of immersion in the research location would be difficult to sustain at the whole of Tasmania level.

The final form of data collection, the survey, will be designed and developed for distribution throughout the region based on the results of the qualitative analysis. The survey will be piloted within one region and any necessary modifications made prior to its being distributed throughout the other regions included in study and, if resources permit, throughout regions that were not included in the qualitative aspects of the study.

The specific target group for the survey will be informed by the qualitative analysis and identified after the qualitative analysis is complete. Although it is likely to include businesses operating within the regions, key decision makers, representatives of local government and community organisations and other key individuals within each region.

Given that the roll out of the NBN in Tasmania will occur in three towns (Scottsdale, Smithton and Midway Point) within the next 12 months it is also proposed to include a control group for the survey analysis. This will be achieved by identifying a target group within a town that is included in the initial roll out of the NBN and identifying target groups in towns with similar profiles and characteristics that are not to be included in the initial roll out. In this way some early comparisons might be possible, although care will need to be taken to provide full and detailed qualitative interpretations of the different environments and factors affecting each town during the period of the comparison.

At this point it is anticipated that the qualitative data will be analysed using techniques derived from grounded theory (Charmaz 2003, Dey 1999) and the quantitative data from existing data sets will be analysed using descriptive statistical analysis. The survey will include use of descriptive statistical analysis and the Likert Scale in order that the resulting data can be analysed in a variety of different ways including using parametric and non-parametric testing. Data from the three data sets will be compared and contrasted and contextualised within the research setting. A detailed qualitative interpretation of the three data sets, the relationships between them, their individual limitations and any external factors impacting upon them, will be documented to ensure richness and clarity in the final representation of the social and/or economic impacts that follow the NBN rollout in Tasmania.

## **DISCUSSION**

The research outlined in this paper is significant in terms of setting a baseline of the rollout of high speed broadband throughout Australia, using Tasmania as a test case. The choice of a mixed methodology is a significant strength of the research design and provides an opportunity to broaden and extend knowledge of the social and economic impacts of high speed broadband that might result from the NBN rollout.

Several key themes emerge from the existing literature including:

- The definition of broadband has continued to evolve since the late 1990s and early 2000s in Australia. It is clear that broadband of the speed that has been indicated for the NBN is cutting edge not only in Australian terms but also in world terms. There will be few other countries in the world offering 100mbps connectivity to the majority of businesses and households at the time the NBN is expected to have been completed.

- Lack of access to broadband is exacerbated by a perceived lack of direct benefit in connecting to broadband.
- It is difficult to encourage creative content and applications for high speed broadband where there are low levels of take up of broadband connectivity.
- Social and economic impacts are difficult to measure as a result of the multidimensional and secondary nature of the benefits of broadband and the constantly changing environment within which broadband is rolled out.

It is unlikely that when the first electric light was turned on in Australia in 1863 ([http://www.energex.com.au/switched\\_on/electric\\_energy/electric\\_history\\_australia.html](http://www.energex.com.au/switched_on/electric_energy/electric_history_australia.html)) those present were looking eagerly ahead to enjoying large screen plasma television or the convenience of a home espresso machine. Similarly with high speed broadband the real benefits and applications have not yet been conceived but could include broadcast quality video images used to support better health care provision, eg radiology or access to other specialist services or to underpin education through effective resource sharing eg shared specialist teachers such as language or music. The biggest impediments to these types of advantages will be rethinking the policy frameworks and business models that underpin our current approaches for example, to health, education and government service delivery in order that we can reap the benefits of high speed broadband and *driving demand* for access to the NBN through clever content delivery whilst *enabling* access to the NBN through targeted programs to assist low income households and households with low digital literacy levels to become effective participants in the digital future.

The NBN rollout provides a real opportunity for regional and remote Australians to overcome the location disadvantages inherent in living in geographically isolated areas. Since location disadvantage is a characteristic of many areas of Australia where there is a wide dispersion of the population without ready access to quality education and health services for their families the learning from this research has the potential to be applied as the NBN rollout progresses throughout Australia. There are likely to be commonalities with other regions identified through this research that might assist governments in maximising the acceptance and uptake of the technology.

In order to effectively evaluate the impact of NBN on Tasmania's economy and communities it is imperative that a baseline is established now, prior to the NBN rollout that includes key economic and social indicators and a complete environmental scan broken down by regions within the state and also aggregated to a state level where possible. It is proposed that data will be collected at several stages including, prior to the NBN rollout, and six to twelve months post the NBN rollout in a number of different locations throughout the state. This will enable a more complete analysis and interpretation of both the economic and social impact of NBN in Tasmania. It is anticipated that the results of this research will provide useful information both for Tasmania and for other regions as the NBN rollout continues.

## CONCLUSION

The literature presented in this paper illustrates the lack of empirical support for broadband implementations as a means for stimulating economic and social benefit and underlines the difficulties inherent in evaluating the impact of broadband rollout in a manner that is meaningful and has a high degree of accuracy. Despite this difficulty it is important for decision makers in government and business to understand the impact that broadband or, the converse - a lack of access to broadband, is having on regions, businesses and communities in Australia in order that good policy can be developed to support regions, businesses and communities and underpin growth, productivity and social sustainability. An exciting opportunity exists for empirical research to be conducted in parallel with the proposed \$43 billion rollout of the NBN to examine the actual, measurable impacts of the NBN rollout and to provide both quantitative information and qualitative interpretations of the identified impacts in a manner that will be useful for academics, business professionals and those within our communities developing business development and social policies. The research design for the research programme outlined in this paper is well advanced and data collection began in June 2009.

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