

Telecommunications Access, Social Capital and Sustainable Development

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Abstract—This paper examines the role of telecommunications in sustainable development of urban, rural and remote communities in the Northern Territory of Australia through the theoretical lens of Social Capital. Social Capital is a relatively new construct and is rapidly gaining interest among policy makers, politicians and researchers as a means to both describe and understand social and economic development. Increasingly, the concept of Social Capital, as opposed to the traditional economic indicators, is seen as a more accurate measure of well-being. Whilst the essence of Social Capital is quality social relations, the concept intersects with telecommunications and Information Communications Technology (ICT) in a number of ways. The potential of ICT to disseminate information quickly, to reach vast numbers of people simultaneously and to include the previously excluded, is immense. However, the exact nature of the relationship is not clearly defined.

This paper examines the nexus between social relations of mutual benefit, telecommunications access and sustainable development. A mixed methodological approach was used to test the hypothesis that *No relationship exists between Social Capital and access to telecommunications services and facilities*. Four communities, which included two urban, a rural and a remote Indigenous community in the Northern Territory of Australia are the focus of this research paper.

Keywords—Indigenous disadvantage, Social Capital, sustainable development, telecommunications.

I. INTRODUCTION AND BACKGROUND

TELEGRAPHIC communication is one of those improvements which, when introduced, cannot be parted with again, or arrested in its progress. From being a novelty and a scientific curiosity it becomes a social [and economic] necessity... [Sydney Morning Herald 1859: Cited in 1:55]. Historically, telecommunications access in Australia has been integral to the social, political and economic development of the nation. From the laying of the Overland Telegraph Line (OTL) in the late 1800s through to the present day, telecommunications access has played a major role in shaping Australia's social and economic viability. Geographic and social isolation, economic development and disparities in telecommunications access have been recurring themes in the history of Australia's telecommunications. Following European settlement in 1788, the continent's remoteness from the rest of the English speaking world, combined with the country's vast and underpopulated terrain, provided the initial impetus for the development and deployment of telecommunications throughout the colony. However, as telegraphy rapidly became the preferred tool of business and commerce, disparities in telecommunications access also rapidly became apparent [2:70].

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The disparities were particularly evident in the remote, underpopulated regions of the Northern Territory (NT). The Territory, isolated from mainstream Australia by distance and by lack of telecommunications access struggled to establish its social and economic viability. Whilst innovations such as morse code, the pedal radio and wireless communication attempted to appease the communications needs of the inhabitants of the outback, telecommunications access in the Territory stagnated and remained beyond the reach of most rural and remote communities. In 1995 the deregulation of the telecommunications industry, combined with the partial privatisation of the national communications carrier Telstra, acted as a catalyst for rapid expansion in the areas of network technology and data transmission. However, the deregulation of the industry also served to heighten the issues of equity and access. Whilst the growth in telecommunications access following the privatisation of Telstra had been exponential, the growth had occurred predominately in the major urban areas. Particularly at risk of falling behind telecommunications developments in mainstream Australia were the Indigenous communities in the rural and remote regions of the continent [3-5]. Consequently, an examination of telecommunications access in rural and remote communities of the NT is clearly warranted. This paper examines the nexus between social relations of mutual benefit, telecommunications access and the sustainable development of urban, rural and remote communities in the NT. A mixed methodological approach is used to test the hypothesis that *No relationship exists between Social Capital and access to telecommunications services and facilities*. Four communities which includes two urban, a rural and a remote Indigenous community in the Northern Territory of Australia are the focus of this research paper.

II. THE NORTHERN TERRITORY CONTEXT

The Northern Territory (NT) is situated in the central and northern regions of Australia. In comparison to other states and Territories, the NT is geographically isolated from all the major population centres in Australia. Darwin, the capital city of the NT, is closer to Kupang in West Timor, than it is to any major Australian city. The NT covers 1 346 200 square kilometres and, in relation to Australia's seven States and Territories, occupies 17.5 per cent of the total land mass. According to the Australian Bureau of Statistics (ABS), the Territory is "...the third largest of the states and territories after Western Australia and Queensland yet has the smallest population and population density." [6:1].

Despite the geographic size of the Territory, the population represents less than one per cent of the total Australian population. The total Territory population as at June 2005 was 202 793 [6:4]. According to the ABS, the population density

of the Territory is approximately 0.1 person per square kilometre, making it the most uninhabited region of the continent [7:61]. The population density is also significantly lower than the national average of 2.6 persons per square kilometre.

The majority of the Territory population resides in the major urban areas of Darwin, Palmerston, Tennant Creek, Nhulunbuy, Katherine and Alice Springs. More than 50 per cent of the population reside in Darwin, the capital city of the NT. The remainder of the population resides in remote communities throughout the Territory. As at June 2003, approximately 25 per cent of the total Territory population resided in remote areas of the NT [7].

The population in the remote regions of the NT is distributed over a large number of small communities. According to the NT government there are over 700 small communities located in the remote regions of the Territory [8:11]. As the following figure indicates, remote communities in the NT range in size from less than 50 inhabitants to a population of more than 250 people.

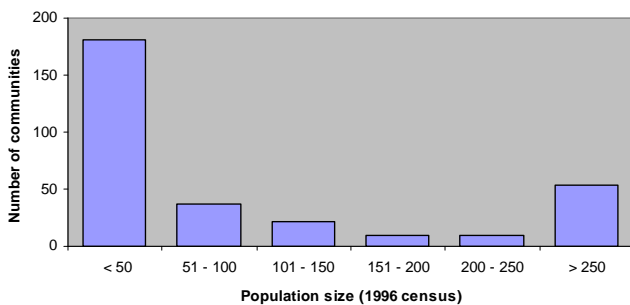


Fig. 1. Distribution of Indigenous Communities in the NT
Source [8:11].

The estimated resident Indigenous population in the NT at June 2001 was 56 875 which comprised around 29 per cent of the total NT population [9:68]. This is significantly higher than the national average where the Indigenous population represents approximately 2 per cent of the total Australian population. As at June 2003, the majority of the population who resided in the remote regions of the Territory were of Indigenous descent [7].

III. INDIGENOUS DISADVANTAGE

In contrast to Australia's broader economic success, Indigenous disadvantage is widespread and disproportionately high. According to a range of sources, Indigenous people Australia-wide, experience severe disadvantage on every social indicator including health, education, employment, income, housing and law and justice [10, 11, 12:9, 13].

A report prepared by the Productivity Commission in 2003 detailed the extent of Indigenous disadvantage and, as the Chairman of the Commission stated in a speech delivered in Melbourne:

It is distressingly apparent that many years of policy effort have not delivered desired outcomes; indeed in some important respects the circumstances of Indigenous people appear to have deteriorated or regressed [12, 13:9].

The areas of particular concern that were highlighted in the report included Indigenous health, participation in the labour force, housing and education outcomes. The 2003 Social Justice report also commented that:

There is an overwhelming sense that the crisis situation that Indigenous peoples face is highly likely to worsen substantially over the next decade due to the faster growth rate of the Indigenous population ... government programs will not be able to keep up with the growth of the Indigenous population with the result that it will become increasingly difficult to maintain the status quo or prevent a further deterioration in key areas of well-being [12:4].

According to the Productivity Commission, there is already a 20 year gap in life expectancy for Indigenous men and women relative to the rest of the population, a suicide rate three times higher than the rest of the population and a homicide rate 10 times higher than that of other Australians [12:4]. The Indigenous incarceration rate is also significantly higher than that for the rest of the population. In 2003, five years after the release of the findings of a Royal Commission into Aboriginal Deaths in Custody, Banks reported that, "...Indigenous juveniles are still 19 times more likely than other young Australians to land in criminal detention." [12:5-6].

The remoteness and isolated conditions of many communities in the Territory compounds this disadvantage. As the Principal Social Analyst of the ABS explained:

...those living in remote areas, while relatively small in number, are the most disadvantaged groups in Australia from both a locational perspective, in terms of accessing goods and services, and in terms of their socio-economic characteristics (such as levels of income, participation in education). These are highly associated with the fact that many of these people are Indigenous people whose general level of disadvantage is well established [14:10].

It is widely acknowledged however, that improved service delivery alone will not redress the severe disadvantage experienced by Indigenous people living in rural and remote locations [12, 13, 15-17]. Good governance [17], a connectedness with culture and traditional lands [18, 19:39], and a sense of "community" [17] have also been reported to have the potential to facilitate Indigenous well-being.

Increasingly, the concept of Social Capital is also seen as a means of understanding the complex issues surrounding disadvantage, community engagement and sustainable development. As the ABS has explained:

This interest is ... fuelled by some promising research indicating that Social Capital may further explain the disparities in health, housing, education, and other facets of social life [20].

IV. SOCIAL CAPITAL DEFINED

The theoretical construct of Social Capital is relatively new and still evolving. It has its origins in the notion of well-being and in disciplines as diverse as economics, medicine,

sociology, psychology, philosophy, anthropology, and politics. Traditionally, the concept of well-being has been perceived as having strong links to the discipline of economics. However, according to the ABS, there is currently a great deal of interest in developing a set of economic statistics that give value to things previously left outside the economic system:

Around the world a consensus is growing that countries and governments need to develop a more comprehensive view of progress, rather than focussing mainly on economic indicators such as Gross Domestic Product (GDP)[21].

The World Bank, in the report *Social Capital: the Missing Link* also acknowledged that the traditional economic perspective which encompassed natural capital, physical or produced capital, and human capital "...overlook[ed] the way in which the economic actors interact and organize themselves to generate growth and development." [22:1]. The report claimed that the missing link has been Social Capital.

Increasingly, the concept of Social Capital, as opposed to the traditional economic indicators, is seen as a more accurate measure of well-being. According to the ABS:

Social Capital is fast gaining wide interest and use among policy makers, politicians and researchers alike. There is also a strong push from the general community to use Social Capital as a way to not only describe but also to understand community well-being. Using purely economic terms for such a task is seen as inadequate[23].

Social Capital is not a precise concept and there is considerable debate as to what is actually meant by the term. Winter, an Australian researcher in Social Capital and public policy, suggests there is reasonable agreement on the conceptual definition which encompasses "...social relations of mutual benefit characterised by norms of trust and reciprocity" [24:1]. The essence of Social Capital is, as Stone and Hughes suggest, "...quality social relations." [25:40].

The ABS has adopted the Organisation for Economic Development and Cooperation (OECD) definition of Social Capital: "...networks, together with shared norms, values and understandings which facilitate cooperation within or among groups." [26:2, 27:5]. According to the ABS, the "... OECD definition [of Social Capital] is emerging as a common basis for international comparability" [27:5]. Consequently, this paper has also adopted the OECD and the ABS definition of Social Capital.

The positive benefits of the "quality social relations" that constitute Social Capital are reported to include confidence in political institutions, satisfaction with government and political engagement [28:319]. Social Capital, it has been claimed, may also help mitigate the effects of social and economic disadvantage [20, 28:319] and assist in "...support[ing] the development of sustainable local communities, including rural and remote areas and within major cities." [27:1]. According to the ABS, the potential for Social Capital to make a positive contribution to outcomes in diverse areas of social concern such as health, community safety and education is considerable and has captured the

attention of policy makers, social analysts and researchers alike [20:2].

In recent years, the ubiquitous reach of the Internet has generated considerable interest in the capacity of Information Communication Technology (ICT) to disseminate information quickly, to reach vast numbers of people simultaneously and to include the previously excluded. Consequently, the areas of telecommunications and ICT intersect with the concept of Social Capital in a number of ways. Whilst the link between ICT and productivity has been well documented, the exact relationship between telecommunications access and Social Capital is not clearly defined [29:154, 30:5, 31:3].

Although research in the area of ICT and Social Capital is still in its infancy, there is a growing body of literature on this issue. Numerous Social Capital authors have been investigating the role of government in facilitating telecommunications infrastructure [19:39]; the potential of ICT to build social networks across cultural and social divides [32]; the potential of Group Forming Networks to enhance sociability [33]; and the role of ICT in facilitating social and economic development [34, 35]. Whilst Department of Communications Information Technology and the Arts (DCITA) in Australia, has produced a discussion paper on *The Role of ICT in Building Communities and Social Capital*, [36], to date there has been no empirical evidence linking telecommunications access and the development of Social Capital. As DCITA commented "...research in this area remains largely undeveloped." (DCITA, 2005c:33). Consequently, this paper uses a research based methodology to test the hypothesis that *No relationship exists between Social Capital and access to telecommunications services and facilities*.

V. ISSUES IN THE MEASUREMENT OF SOCIAL CAPITAL

Social Capital is an elusive concept. It has its origins in a number of disciplines and, as a consequence, it is a mix of disparate concepts such as trust, reciprocity, norms and cooperation. In recent years the popularity of the concept has prompted considerable research in the area. However, the very intangible nature of the concept makes it difficult to measure. As the World Bank has acknowledged, Social Capital is, as a concept, "...difficult to quantify." [37]. The popularity of the concept compounds the issue and, as Stone has argued, in recent years conceptualisation has outpaced the development of effective measurement tools [38:1].

Due to the inherent nature of the construct, the measurement of Social Capital is also complex. As Wood acknowledged, "The contextual variability of Social Capital ... renders its core features difficult to distil and operationalise." [39:43]. In the NT the difficulties in examining and measuring the construct is exacerbated by the cross cultural milieu of the Territory. Whilst the social, cultural and linguistic diversity of the Territory proves a challenge in terms of the application of research methodology, the very complexity of Social Capital within a cross cultural dynamic needs to be understood.

Consequently, the data collection phase of this research project, which was consistent with economic and social research methods, involved both quantitative and qualitative data collection and analysis [40-43]. The use of a range of

data collection methods, including a case study, observations, interviews and a survey, enabled a mix of perspectives to be brought to the study [44, 45]. A mixed methodological approach also added a depth and dimension to the research that would not have otherwise been possible. According to Sydenstricker-Neto, "Adding qualitative flesh to the quantitative bones is a good [research] strategy." [46].

VI. METHODOLOGY

Four NT communities participated in the data collection phase of the research project. This phase of the project occurred during the latter half of 2005. The communities were selected as representative of those that existed in the Territory at the time the study occurred. The participating communities included two major urban communities -Alice Springs and Darwin; Katherine/Litchfield, a rural region; and Milikapiti a remote Indigenous community located on the Tiwi Islands approximately 120 kilometres north of Darwin.

The communities of Darwin, Alice Springs and Katherine/Litchfield participated in a mail out survey. The survey was used to test the research hypothesis that *No relationship exists between Social Capital and access to telecommunications services and facilities*. The Indigenous community of Milikapiti was not surveyed. In this instance a case study approach was deemed to be a more appropriate data collection method.

VII. INDIGENOUS PARTICIPATION

A sensitivity to the needs and experiences of Indigenous participants was an overriding concern throughout this study. Low levels of literacy and numeracy amongst Indigenous participants were also significant issues that were taken into consideration with regard to the data collection instruments and methods employed with this cohort of participants. Consequently, it was deemed inappropriate to survey the participating remote Indigenous community. The data collection methods employed in this instance had a qualitative rather than a quantitative emphasis. Accordingly, a participant observer approach was the main methodology employed in the case study of the Milikapiti community. The data collected via observation was triangulated through information gathered in interviews and through a verbally administered questionnaire.

In the course of the data collection phase of the case study, approximately 10 Indigenous Milikapiti community members were interviewed and consulted. Three interviewees (approximately 1 per cent of the Milikapiti population) were identified by the community as suitable spokes-people. These three interviewees subsequently consented to participate in a detailed semi-structured interview. These interviews explored in depth the social processes, the Social Capital indicators present in the community as well as community access to telecommunications services.

The interviews were structured around a questionnaire which incorporated the core concepts from Narayan and Cassidy's survey which employed statistically validated questions for measuring Social Capital in developing countries [47]. This questionnaire was administered verbally. The three participants all held a significant role in the community: they were full time employed and were recognised by the

community as representative of the views of the community. All three participants were traditional owners, and all three were women.

VIII. DEFINING THE AREAS TO BE MEASURED

The dimensions of Social Capital that were examined in the data gathering phase of the research were closely linked to the theoretical constructs that underpin the concept. A theoretically informed approach to the measurement of Social Capital is, according to Stone, an essential prerequisite of an investigation:

By linking Social Capital measurement directly to the theoretical understandings of the concept we are able to: first recognise that Social Capital is a multidimensional concept comprising social networks, norms of trust and norms of reciprocity; second, understand Social Capital as a resource to action; and third empirically distinguish between Social Capital and its outcomes [38:6].

Trust, networks, reciprocity and cross-cutting ties - or networks that encompass diverse groups - are common themes in the Social Capital literature. These themes correlate with Social Capital dimensions that were recommended by the OECD in the report, *Social Capital: The Challenge of International Measurement* [48]; the 2004 ABS *Information Paper Measuring Social Capital* [27]; and The Australian Institute of Family studies research paper, *Measuring Social Capital* [38:6]. Consequently, the survey which was employed in the data gathering phase of the research incorporated a range of Social Capital indicators including trust, norms, reciprocity and networks. The survey contained 70 "selected-response format" questions of which 13 questions pertained to telecommunication use and access. The remainder of the questions pertained to the indicators of Social Capital. Survey participants were chosen at random from the 2005 electoral roll. A computer generated list containing a random sample of 1 per cent of the voting population from Darwin, Katherine, Alice Springs and Litchfield was used to obtain the names and addresses of potential participants. The random sample methodology was used in order to eliminate any potential bias in the selection of participants [41,43]. In total, 525 participants were invited to participate in the study. Initially there were 320 participants identified from Darwin, 72 from Katherine and Litchfield and 133 from Alice Spring. The responses from Katherine and Litchfield areas were combined to represent a rural region. In total, 176 surveys were completed and returned. The completion rate was 33.52 per cent. Approximately 7.9 per cent of surveys were returned unopened by the post office. The unopened returned surveys reflected the transient nature of the NT population - approximately 8.0 to 10 per cent of the NT population relocate interstate each year. Follow-up phone contact also indicated a significant number of respondents were no longer living at the address on the electoral roll.

IX. SURVEY RESULTS

A demographic analysis of the survey responses indicated that all respondents were broadly representative of the

community from which they were drawn. The average age, the gender ratio, the linguistic and cultural diversity and the mobility of the survey respondents was broadly consistent with that of each region.

A Principal Component analysis of the survey results revealed that the survey contained four main dimensions. The variables in each dimension were analysed in order to determine their commonality. For the purpose of this study each dimension was ascribed the following definitions:

A. Network Participation

This dimension is concerned with the civic and social participation. It examines the extent to which people are actively engaged in and with their community. It is also concerned with the nature of their involvement with the community. It includes participation in professional, social and community activities. This participation may take the form of voluntary work, donating time/money, organising community services and events or just simply attending a community event. Communities with a high instance of collaboration, mutual assistance and obligation and active citizenry can promote an atmosphere of mutual trust, vital social networks, equal political relations and a tradition of participation.

B. Network Transactions

According to the ABS, networks are not static objects, but dynamic relationships for a purpose, maintained by supportive and productive interactions [27:84]. A significant dimension of Social Capital is the transaction that occurs between people within networks and between organisations. The behaviours in this dimension include, but are not restricted to, the sharing of knowledge and information, the capacity and willingness to negotiate, the provision of support to family and friends, an involvement in civil life and a sense of community identity. These elements are actions or behaviours that contribute to the formation and maintenance of Social Capital, and they represent the advantages and obligations that network members or groups draw from engaging in network mediated transactions.

C. Network Density

This dimension refers not only to the size of the networks people are engaged in, but also to the social connectedness of these networks. It includes the breadth, depth and extent of the networks. Whilst network size, in terms of the number of family and friends, is integral to this dimension, the frequency and mode of communication in and between network members is also significant. Included in this dimension are the norms of inclusiveness, acceptance of diversity, social and civic participation, friendship, trust and the concept of power relations. Bonding, bridging and linking relationships are aspects of this dimension and are manifest in the number of relationships and the norms these relationships exhibit.

D. Network Qualities

This dimension encompasses the intangible qualities such as trust, reciprocity and a sense of efficacy. Qualities that are

difficult to quantify, but are essential to quality of life and social health issues. Trust is the propensity of people to be dependable, to keep promises and to speak honestly. Consequently, trust in networks such as local trade, the community, friends, family and government services is a vital component of this dimension. Openness, inclusiveness, confidence and the encouragement of active social and civic participation are also included in this dimension.

The definition for the elements Network Transactions and Network Qualities draws heavily from the work of the ABS in this area. The definitions for Network Participation and Network Density are the researcher's own.

E. The Variable Telecommunications

Thirteen questions in the survey were related to the variable *Telecommunications*. As telecommunications was the independent variable in the hypothesis, *No relationship exists between Social Capital and access to telecommunications services and facilities*, the questions that related to telecommunications were not included in the Principal Component Analysis and were accordingly, analysed separately.

X. PEARSON 1-TAILED BIVARIATE CORRELATION

In order to determine if a relationship exists between the independent variable Telecommunications and the Social Capital dimensions of Network Transactions, Network Qualities, Network Density, and Network Participation, a Pearson 1-tailed bivariate correlation was performed. As indicated in Table I (Refer Appendix I), the analysis revealed that there was a relationship between the variable Telecommunications and the dimension of Network Transactions, Network Participation and Network Density. The analysis also revealed that no significant correlation existed between Telecommunications and Network Qualities. As the strength of a relationship within the Pearson correlation range of .50 to 1.0 is generally regarded as "large" [49, 50:120], the analysis suggests that there is a strong relationship between Telecommunications and Network Transactions, a medium relationship between Telecommunications and Network Participation and a less significant relationship between Telecommunications and Network Density.

As indicated in Table II (Refer Appendix I), a subsequent bivariate correlation was also conducted on the survey returns from each community.

The analysis revealed that in the two urban communities there was a significant correlation between Telecommunications access the Social Capital dimensions of Network Participation, Network Transactions and Network Density. The strongest correlation was between Telecommunications access and Network Transactions. There was no correlation between Telecommunications and Network Qualities.

In the rural region there was a significant correlation between the variable Telecommunications and the dimensions of Network Transactions and Network Participation. There was however, no significant correlation between Telecommunications and Network Qualities and, unlike the

two urban communities, there was no correlation between the variable Telecommunications and Network Density.

The responses to the variables in the dimension Network Density was generally consistent across regions. However, survey respondents from the Katherine/Litchfield area had fewer close relatives and close friends than respondents from other regions. Katherine/Litchfield residents also indicated that they had slightly less trust in banks, fewer people they could call upon in a crisis; they experienced more negative attitudes due to cultural differences and felt more isolated than the respondents in either Alice Springs or Darwin.

XI. MILIKAPITI CASE STUDY

As discussed previously, observation, a series of interviews, and a verbally administered questionnaire formed the basis of the data collection instruments employed in the Indigenous community of Milikapiti. Ten people were interviewed and three people consented to participate in an in-depth interview and a verbally administered questionnaire. The three participants in the in-depth interviews¹ were traditional owners, all were female and all were acknowledged and recognised by the community as leaders and spokes-people. The interviewees were all engaged in full time employment. They were employed at the school, at the health clinic and one was a police aide. Two of the respondents had no children of their own and one interviewee had one child only. All interviewees were, however, members of a large extended family.

In order to preserve a consistency in the data presented, the information collected via interviews, the verbal questionnaire and observation was organised and interpreted around the questions that constituted the variable Telecommunications and the four principal components of Network Density, Network Transactions and Network Participation and Network Qualities.

A. Network Density.

Indigenous kinship and family structures are powerful and cohesive forces which bind Aboriginal people together and provide psychological and emotional support [51-53]. According to the interviewees, the kinship system is, to the Tiwi people, the most significant group to which they belong.² All interviewees identified their "family", their "tribe" and their "skin group" as the group that was the most important to their household. The interviewees also identified their "family" as the group that is the most homogeneous in terms of language, culture and religion and as the group with whom they interact the most frequently.

Whilst all interviewees acknowledge membership of a number of groups, such as the church group and the community women's group, these groups were predominantly found within the community and were constituted mainly by "family" members. One interviewee, who worked as a

teacher's aide at the local school, acknowledged that six of her co-workers were members of her immediate family.

All three expert witnesses were employed in roles that necessitated contact with individuals, groups and organisations beyond the confines of the community. Consequently, all interviewees were able to identify eight or more close friends, other than family members, whom they could call on for help or to talk about private matters. All interviewees were also "definitely" able to identify people other than family members, they could call on for financial assistance if the need arose. However, close family members were acknowledged by all interviewees as people they would most likely call upon if they had to borrow money.

The three interviewees expressed a general sense of satisfaction and control over their lives. Whilst the interviewees were either "very happy" or "moderately happy" with their life, they also felt they had the power to make important decisions that could change the course of their life. However, when questioned about Local, Territory and Federal Government their responses indicated an ambivalence about placing their trust in these authorities.

B. Network Transactions

All three interviewees claimed that they frequently socialised with others over food or drink, either in private or in a public place. The socialisation, according to interviewees, was with people from different tribes, different cultures and different linguistic backgrounds. A licensed club operates at Milikapiti. The club is the focal venue for the majority of the social interaction that takes place in the community. This club is open on weekdays for four hours a day and half a day on Saturday. Both Indigenous and non-Indigenous people frequent the club. During the football season almost all community members can be found at the club on Saturday afternoons supporting their local team in the Tiwi Island Football League.

Whilst it was acknowledged that tensions existed in the community, the interviewees regarded the community as friendly. Interviewees cited the cause of the tensions in the community as disputes over landholdings, disputes between tribes, disputes between men and women and between the older and younger generation. According to all three interviewees, these disputes had occasionally led to violence. Despite the tensions in the community, interviewees felt moderately safe to very safe when home alone.

The main sources of information that were identified by all three interview participants included relatives, friends and neighbours. Two interviewees also identified newspapers, television and the Internet. One interviewee identified "community leaders" as one of the main sources of information.

C. Network Participation

The number of community groups that interviewees were involved in ranged from two to "many". The interviewee who worked as a teacher's aide at the local school claimed membership of eight "significant" groups. The groups included tribe, skin group, two school groups, the Aboriginal School Parents Association (ASPA), Church, Council for

¹ The three interview participants are referred to as "interviewees"

² Through out the course of the data collection phase of the study the Tiwi frequently referred to the kinship subsections of "family", "tribe" and "skin group". These terms, when referred to in this study, imply the complex interrelated network of relationships that constitute the Tiwi kinship system.

Aboriginal Alcohol Program Services (CAAPS) and the community Women's Group. This interviewee, in particular, was very involved in community events and frequently volunteered her time and skills to local community groups. As she was highly literate in both English and Tiwi she was also frequently called upon to assist visitors to the community. Consequently, her networks were extensive and extended beyond the community. During the case study she was observed with an address book which contained contact detail and phone numbers of her friends, associates and the Tiwi organisation located on the islands.

All three interviewee participants had a strong sense of commitment to their community. They all worked in an area that provided a service to community members such as the school, the health clinic and law enforcement. All participants acknowledged that they would willingly donate time to a project that would benefit the community. Two interviewees stated that they would also donate money to such a project.

All interviewees identified recent community activities that they, or their family, had been involved in. These activities were undertaken for the benefit of the community. The activities cited included a "clean-up" after Cyclone Ingrid, a category three cyclone which swept through the community in March 2005. A re-enactment of 300 years of white contact was also given as an example of a recent event where the community came together for the benefit of others.

Whilst cooperation by community members to solve a problem that would affect the whole community was considered to be "very likely", interviewees did not consider the community to be very proactive in organising or petitioning officials/politicians for new services. A petition for a community swimming pool was cited as an example of one of the "few times" the community had actively sought a new service.

D. Network Qualities

The interviewees were fairly ambivalent about the questions concerning "trust". As the interviewees were employed in Education, the Health Service and Police, Fire and Emergency Services and were highly regarded by the Community, there was, at the very least, a degree of trust in these services at the local level. But, in general, interviewees thought that "...you could not be too careful when dealing with people". However, they unanimously agreed that most people in the community would willingly help you if you needed it.

All interviewees had voted in the last election and all had participated in community activities. Only two of the three interviewees reported that they had been actively involved in community issues, but all three acknowledged that they would willingly support local issues if they were perceived to be of benefit to the whole community.

E. Telecommunications

At the time of the case study, telecommunications access was a point of contention in the community and the cause of considerable tension. Interviews conducted with community members revealed that whilst most non-Indigenous residents had a telephone and Internet access in their home, very few Indigenous community members had access to these services.

Approximately 10 Indigenous households were identified as having a landline and home phone. However, it was also acknowledged that many of these phones were, for a variety of reasons, not always operational. Home Internet access was not a priority and, as of 2005, no Tiwi people at Milikapiti were identified as having a home computer. There was one public phone in the community and no public Internet access.

The lack of access to phones and the Internet caused both social and organizational problems for the community as a whole. Community members with access to phones, faxes and the Internet were often expected to share the facility or are asked to undertake administration tasks on behalf of others. One interviewee admitted that until recently she had a phone installed in her home. The continual pressure from family members wanting to use the phone eventually led to her having the service disconnected. Council Administration workers reported that they had frequently undertaken Internet banking on behalf of community members. However, the council staff discontinued this service when it began to interfere with the work they were employed to carry out. A sign prominently displayed in the Health centre which stated: *Telephones in the clinic are not for private use by the community or staff* provided an indication of social and administrative tension that surrounded the provision of telephone and Internet access in the community.

All three interviewees had access to a telephone and the Internet through their work location. The Police Aide did not have a dedicated phone and Internet connection but could obtain access through the Council office if necessary. All interviewees used the telephone daily for work related transactions. The Internet was used less frequently but was accessible.

In September 2005, mobile phone coverage was not available at Milikapiti. However, it was anticipated that a mobile phone tower would be erected before the end of 2005. The installation of a phone tower was part of a project by Telstra to provide the whole of the Tiwi Islands with Code Division Multiple Access (CDMA) phone coverage. According to DCITA, Milikapiti would receive CDMA access through the Towns Under 500 Program [54].

A mobile phone tower had been installed in the community of Nguiu on Bathurst Island just prior to the commencement of the case study. Phone coverage extended to the mainland and, when towers were erected at Milikapiti and the community of Pirlingimpi, coverage would include the three communities on the Tiwi islands.

In anticipation of the impending availability of mobile phone coverage, a number of Milikapiti community members had purchased a handset. The youth of the community were also very keen to have access to mobile telephony. On a recent school excursion into Darwin, mobile phones were, according to a local school teacher, purchased by most students. Secondary school students who had returned from boarding school on the mainland to attend a mourning ceremony were also observed with mobile phones. Whilst the phones were unable to transmit voice or text data they were used to take digital images of the ceremony.

XII. SUMMARY OF RESEARCH RESULTS

An analysis of the survey results revealed four Social Capital dimensions. The dimensions included Network Participation, Network Transactions and Network Qualities and Network Density. A Pearson 1-tailed Bivariate Correlation indicated that there was a relationship between telecommunications and Social Capital in the three communities surveyed. However, a synthesis of the data obtained from the participating Indigenous community, and the results of the survey conducted in two urban and one rural community revealed that the relationship was not consistent across all locations and all communities. The data indicated that the relationship between Social Capital and Telecommunications was stronger in the two urban communities than it was in the rural and remote Indigenous community.

In each of the three surveyed communities there was a positive relationship between the variable Telecommunications and the Social Capital dimensions Network Transactions and Network Participation. In the urban communities of Darwin and Alice Springs there was also a relationship between variable Telecommunications and the Social Capital dimension Network Density. In the three communities surveyed, no relationship was found to exist between Network Qualities and Telecommunications.

As Telecommunications access in the participating Indigenous community was so limited, no relationship between the Social Capital dimensions of Network Transactions, Network Participation, Network Qualities and Network Density was found to exist. There was, however, evidence of considerable pent-up-demand for telephone and ICT access. There was also evidence to indicate that, when available, ICT was used for both personal and work related transactions.

XIII. CONCLUSION

This paper examined the role of telecommunications in sustainable development of urban, rural and remote communities in the NT through the theoretical lens of Social Capital. Social Capital is a relatively new theoretical construct and it is rapidly gaining interest among policy makers, politicians and researchers as a means to both describe and understand social and economic development. Increasingly, the concept of Social Capital, as opposed to the traditional economic indicators, is seen as a more accurate measure of well-being. Whilst the essence of Social Capital is quality social relations, the concept intersects with telecommunications and ICT in a number of ways. However, the exact nature of the relationship between ICT, social relations of mutual benefit and sustainable development needs to be understood.

The Territory presents a complex economic, demographic and social environment. The NT is geographically isolated from all the major population centres in Australia. The physical isolation of the Territory is also compounded by a relatively young, widely dispersed, very multi cultural and often highly mobile population. Of the 202 793 people who inhabit the Territory, the majority of the population resides in Darwin and Alice Springs, the major urban areas of the NT

[6:53]. However, approximately 25 per cent of the population resides in the remote regions of the Territory [7]. The population in the remote regions of the NT is distributed over a large number of small communities. These remote communities range in size from less than 50 inhabitants to a population of over 250 people. As at June 2003, the majority of the population who resided in the remote regions of the Territory were of Indigenous descent [55]. According to the *ABS National Aboriginal and Torres Strait Islander Social Survey* [11]; and the Human Rights and Equal Opportunity Commission 2002 [and the] 2003 *Social Justice Report[s]* [10, 13], Indigenous disadvantage is wide spread, disproportionately high and is in contrast to Australia's broader economic success. Indigenous disadvantage is, as the NT Government has acknowledged, multi dimensional and is manifest in poor outcomes in areas that include health, education, employment, income, housing and law and justice [56:4].

Consequently, this paper examined the nexus between social relations of mutual benefit, telecommunications access and sustainable development. The study tested the research hypothesis that *No relationship exists between Social Capital and access to telecommunications services and facilities*. Four NT communities were involved in this study. The communities included two urban, a rural community and a remote Indigenous community. The communities were chosen as representative of the diverse population, communities and circumstances that constitute the Territory.

The main finding of the data analysis indicates that the null hypothesis was incorrect. A relationship between Telecommunications and Social Capital does exist. However, the relationship is not consistent across all locations. The data indicates that geographic isolation, the density of established relationships and the capacity to access telecommunications services can have an extenuating effect on the telecommunications-Social Capital relationship. There is no evidence to indicate a relationship exists between access to telecommunications and Network Qualities - the intangible elements of Social Capital that encompass trust, openness, reciprocity and a sense of efficacy.

The lack of statistical data precluded an analysis of the relationship between access to telecommunications and Social Capital in the Indigenous community that participated in this study. However, anecdotal evidence suggests that access to telecommunications services may facilitate generalised and individual trust [36:16]; help create and sustain bridging and linking relationships [36:41,53]; build and sustain Indigenous networks [36:48]; as well as assist in promoting Indigenous values such as "...the importance of country, family traditional law, culture, community and relationships..." in an online world [36:48]. The role of ICT in facilitating the Social Capital of Indigenous communities is, however, an area that needs further research.

As discussed, high levels of Social Capital are reported to include positive implications in the areas of health, education, economic development and social and civic stability. Social Capital, the ABS claims, may also help to mitigate the effects of social economic disadvantage [20, 28:319]. Given the evidence that indicates that there is a positive relationship between Telecommunications and Social Capital, access to

telecommunications services has the potential to facilitate the sustainable social and economic development of urban, rural and remote communities in the Northern Territory.

As the discussion paper prepared by DCITA acknowledged:

...through access and effective use of ICT individuals and communities have a greater opportunity for engagement with others, broadening their understanding and building bonding, bridging and linking capital. Greater participation in communities is assumed to contribute to stronger Social Capital with the community at the local, state, national and global levels and hence contribute to improved economic and social outcomes [36:45].

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APPENDIX

TABLE I
TELECOMMUNICATIONS AND SOCIAL CAPITAL DIMENSIONS
ALL SURVEY RESPONDENTS

| Social Capital Dimension | | Telecom m. | Network Participation | Network Transactions | Network Density | Network Qualities |
|------------------------------|---------------------|------------|-----------------------|----------------------|-----------------|-------------------|
| Telecomm. | Pearson Correlation | 1 | .424(**) | .517(**) | .214(**) | .079 |
| | Sig. (1-tailed) | | .000 | .000 | .002 | .148 |
| | N | 176 | 176 | 176 | 176 | 176 |
| Network Participation | Pearson Correlation | .424(**) | 1 | .358(**) | .323(**) | .311(**) |
| | Sig. (1-tailed) | .000 | | .000 | .000 | .000 |
| | N | 176 | 176 | 176 | 176 | 176 |
| Network Transactions | Pearson Correlation | .517(**) | .358(**) | 1 | .282(**) | .238(**) |
| | Sig. (1-tailed) | .000 | .000 | | .000 | .001 |
| | N | 176 | 176 | 176 | 176 | 176 |
| Network Density | Pearson Correlation | .214(**) | .323(**) | .282(**) | 1 | .285(**) |
| | Sig. (1-tailed) | .002 | .000 | .000 | | .000 |
| | N | 176 | 176 | 176 | 176 | 176 |
| Network Quality | Pearson Correlation | .079 | .311(**) | .238(**) | .285(**) | 1 |
| | Sig. (1-tailed) | .148 | .000 | .001 | .000 | |
| | N | 176 | 176 | 176 | 176 | 176 |

TABLE II
TELECOMMUNICATIONS AND SOCIAL CAPITAL DIMENSIONS BY COMMUNITY

| Location | Telecom. and Network Participation | Telecom. and Network Transaction | Telecom. and Network Density | Telecom. and Network Quality |
|------------------|------------------------------------|----------------------------------|------------------------------|------------------------------|
| Darwin | .409(**) | .583(**) | .172(*) | -.014 |
| Alice Springs | .426(**) | .375(**) | .398(**) | .178 |
| Katherine/Litch. | .479(**) | .474(**) | .247 | .291 |