

Stone Chips to Silicon Chips:
A Grounded Theory of Information and Communication
Technology adoption in Australian Indigenous households—
rural, urban and remote.

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The Australian National University

Declaration

I, Peter John Radoll, hereby certify that this thesis entitled ‘Stone chips to Silicone Chips: A Grounded Theory of Information and Communication Technology adoption in Australian Indigenous households—rural, urban and remote’, submitted for examination in the degree of Doctor of Philosophy, is the result of my own original work and that where reference is made to the work of others, acknowledgment is duly given.

.....

(Peter John Radoll)

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Abstract

Information and Communication Technologies (ICTs) have become an everyday part of life. Communication networks within Australia link financial, educational, government and non-government services to Australian households. Both the 2001 and 2006 Australian Census data demonstrate that Indigenous Australians are 69% less likely to access the Internet at home than the rest of the Australian population. This study examines the factors affecting the adoption of Information and Communication Technologies in Australian Indigenous households and provides a plausible explanation as to why this gap exists.

This study uses a multiple case study approach and draws on the Glaserian Grounded Theory Methodology to examine Indigenous household ICT adoption in a rural Indigenous community, an urban Indigenous community and a remote Indigenous community, to identify differences and commonalities of ICT adoption and non-adoption in diverse cultural and geographical locations across Australia.

The theoretical lens draws on Pierre Bourdieu's theory of habitus to develop a practice perspective of household ICT adoption established through the habitus concepts of structures and agency or society and individual. The research establishes the existence of the Indigenous substantive field and postulates that new practices are formed with the intersection of the Indigenous field and external fields. Through the development of substantive fields this thesis develops a theoretical framework of Indigenous household ICT adoption. The findings suggest that a single model of ICT adoption can be applied to all Indigenous communities across Australia. The results could have considerable practical and policy significance.

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Abbreviations and Acronyms

- CDEP – Community Development Employment Projects
- ICT – Information and Communication Technologies
- IS – Information Systems
- TRA – Theory of Reasoned Action
- GTM – Grounded Theory Methodology
- DOI – Diffusion of Innovations
- TPB – Theory of Planned Behaviour
- MATH – Model of Adoption of Technology in Households
- TAM – Technology Acceptance Model
- UTAUT – Unified Theory of Acceptance and Usage of Technology

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Chapter 1 Introduction

1.1 Background to the research

The overarching purpose of this thesis is the building of a substantive theory of Indigenous household information and communication technology (ICT) adoption. The term ICT is used to refer to both computers and the internet in this thesis. The substantive theory will serve as a guide to addressing low household adoption of ICTs by Indigenous Australians. This will be achieved by producing a theoretical foundation of the issues associated with low adoption of ICTs by Australian Indigenous peoples by:

1. exploring the factors that lead to adoption of ICTs in Indigenous households;
2. exploring the factors that lead to non-adoption of ICTs in Indigenous households;
and
3. establishing the understanding of these factors, their interactions and their determinants.

There is a growing body of evidence that demonstrates the benefits of ICT adoption to communities, households and individuals. These benefits include access to online services such as government services, educational institutions, electronic health, and electronic banking, as well as increased income (Adesina and Baidu-Forson 1995; Allyn and Yun 2005; Alston 2003; Alston et al. 2003a; Arocena and Senker 2003; Baker 2001; Benton Foundation 1998; Clark 2004; Curtin 2001; Daly 2005; Daly 2006; Green et al. 2007; Pietro 2007).

Quality, coverage and usage of ICTs together is now regarded as a critical issue for Australian society. This is likely to increase in scale and importance as ICTs form the

basis of much economic activity, and not having access to ICTs has a clear detrimental economic and social impact. It is clear that some individuals, because of geographic location, education, economic position or culture, may be excluded from ICT access (Australian Bureau of Statistics 2001c; Australian Bureau of Statistics 2006a). This exclusion is framed around the concept of the digital divide which separates society between the haves and the have-nots (Attewell 2001; Davis et al. 2002; Gurstein 2004; Trachtenberg 2000).

The use of ICT is quite low for Indigenous Australians compared with non-Indigenous Australians. The 2006 Australian Bureau of Statistics (ABS) Census demonstrated that 43% of Indigenous households had access to the internet, compared with 64% of those from other households (Australian Bureau of Statistics 2006b). The 2006 Census also demonstrated that the household ICT adoption rate for Indigenous households reduces with remoteness, while non-Indigenous household ICT adoption rates remain relatively consistent across all localities (see Figure 1.1).

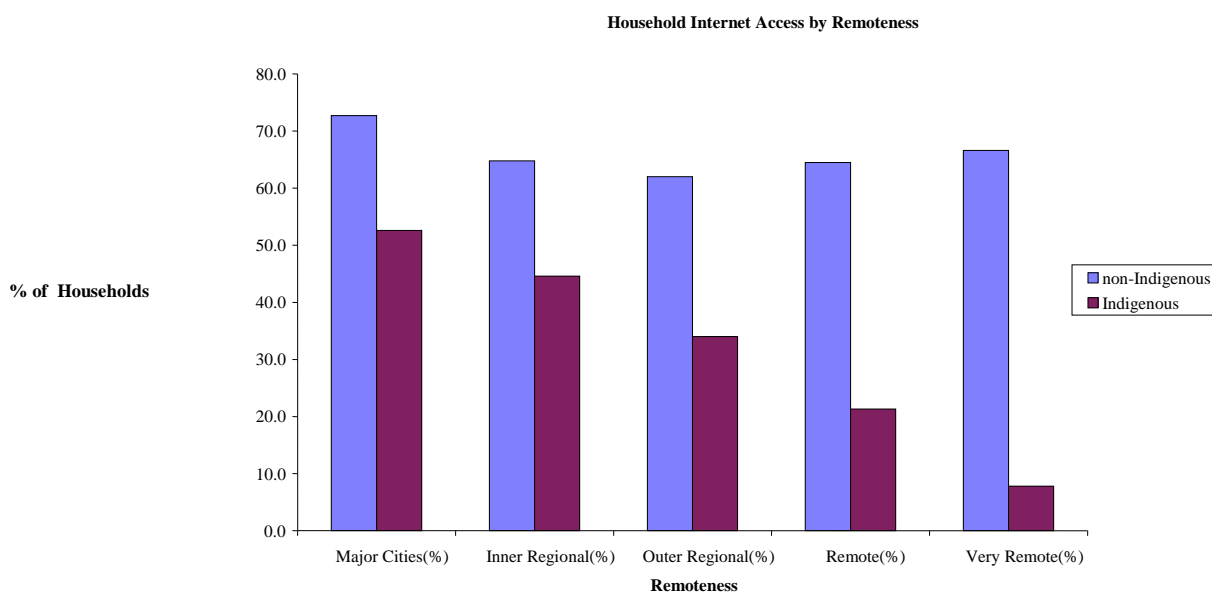


Figure 1.1: COMPARISON OF NATIONAL NON-INDIGENOUS AND INDIGENOUS INTERNET ACCESS (Source: ABS 2006)

While many factors in what affects the household adoption of ICTs in society more broadly have been identified in previous research (Brown and Venkatesh 2005; Brown et al. 2006; Lloyd and Hellwig 2000; Venkatesh and Brown 2001; Venkatesh et al. 2000), little research has been conducted that explains the low ICT adoption by Australian Indigenous households.

This chapter proceeds as follows: Section 1.2 discusses the research framework, the research question and the aims and objectives of the research. Section 1.3 discusses the motivation for the research to be undertaken. Section 1.4 discusses the research methodology. Section 1.5 provides an outline of the thesis. Section 1.6 discusses the definition of Indigenous Australian, Section 1.7 concludes this chapter.

1.2 Research framework, aims and objectives

This thesis examines how Indigenous households adopt ICTs in a rural community, an urban community and a remote community to identify differences and commonalities of ICT adoption or non-adoption in diverse cultural and geographical locations across Australia. The three areas that are examined in this thesis are classified by the Australian Bureau of Statistics (ABS) as an inner-regional (foundation case study in Chapter 4), major city (second case study in Chapter 5) and very remote (final case study in Chapter 6) areas of Australia (Australian Bureau of Statistics 2004b). These ABS classifications of the three areas are discussed further in Chapters 4, 5 and 6. In accordance with research ethical protocols, the communities in this study will remain anonymous and will only be referred to as the rural Indigenous community, the urban Indigenous community and the remote Indigenous community respectively. Indigenous communities are located across three State and Territory jurisdictions of Australia.

The research problem for this thesis is to discover why Indigenous households have low ICT adoption rates. Investigating ICT adoption problems is usually framed around examining the factors associated with the phenomenon (see Anandarajan et al. 2002; Cornell and Swedberg 1995; Jepsen 2007; Levin and Wadmany 2008; Taylor 2002; Tsakloglou and Papadopoulos 2002). This research will be guided by previous research in that it will investigate the factors affecting the adoption of ICTs in Australian Indigenous households.

The research question to be addressed in this thesis is:

What factors affect the adoption of Information and Communication Technologies in Australian Indigenous households?

There are three principles that drive this research. Firstly, there is little research on the factors affecting the adoption of ICTs in Indigenous households. This has left the research area void and this needs to be addressed. Secondly, as I am Aboriginal, it is hoped that I can assist the broader Indigenous community through the utilisation of my research capacity; finally, the building of a theory of Indigenous household ICT adoption is vital to the Indigenous community as ICTs can increase income, provide better civic engagement, higher education achievement and better health outcomes (Marker et al. 2002). Household use of ICTs can also assist in addressing the continuing disadvantage faced by the Indigenous community by improving access to education, government, financial and health services.

There are two primary objectives of the research:

1. to investigate the factors that affect the adoption of ICTs in Australian Indigenous households;
2. to develop a theoretical framework that can be used to explain the adoption of Information Communication Technology in Australian Indigenous households.

This research aims to contribute to the information systems field in both theoretical and practical terms. Theoretically it aims contribute to the understanding of ICT adoption in Australian Indigenous households. It aims to contribute to the knowledge of how Indigenous Australians make decisions regarding the adoption and use of ICTs in the home context and examines reasons why Indigenous people do not adopt ICTs into the home. This so-called non-adoption is just as important to this thesis as finding the answers to non-adoption could assist in explaining low ICT adoption rates in Australian Indigenous households. The research could also assist Indigenous communities with ICT adoption strategies and assist in providing a basis for sound policy for State and Federal Government ICT or ICT-based Indigenous programs. From the practical point of view, the research will address the issues that have significant financial, social and educational implications for Indigenous Australians.

This thesis does not undertake a comparative study between the Indigenous and non-Indigenous communities; rather it examines how Indigenous households adopt ICTs. This research is explanatory in nature with the main aim of explaining the household ICT adoption process for Indigenous households. It is envisaged that the model developed will also be used to predict Indigenous household ICT adoption.

1.3 Motivation

It is generally recognised that the Australian Indigenous population is the most impoverished community in Australia and continues to experience chronic disadvantage relative to the non-Indigenous community. Average life expectancy of Indigenous males is 57 years while for non-Indigenous males it is 76 years¹ (Altman and Hunter 2003). Similarly, the average life expectancy for Indigenous females is 65 years and for non-Indigenous females it is 82 years (Altman and Hunter 2003; Australian Bureau of Statistics 2001a; Australian Bureau of Statistics 2006a). The extent to which social indicators play a role in the household adoption of ICTs has not previously been researched specifically in Indigenous communities. However, non-Indigenous research in the area demonstrates that these do play a role (Lloyd and Bill 2004; Lloyd and Hellwig 2000).

Since 2001 there have been a number of ICT projects that have been undertaken throughout Australia's Indigenous communities by the Federal Government (Australian Government 2000; Australian Government 2002a; Australian Government 2002b; Australian Government 2005b). These projects, while implementing the provision of ICTs in remote, rural and urban communities, were developed with the aim of increasing Indigenous use of ICTs (Alston 2003; Australian Government 2002b; Australian Government 2005b). However, the 2001 and 2006 Censuses demonstrated that ICT adoption rates for Indigenous households have remained stagnant over time at approximately 69% lower than the non-Indigenous community (Australian Bureau of Statistics 2001a; Australian Bureau of Statistics 2004c; Australian Bureau of Statistics 2006a; Australian Bureau of Statistics 2008)

¹ In recent years there has been an active public debate about the best method of calculating Indigenous life

There are two primary motivations for this research. The first motivation is that Indigenous Australians adopt ICTs into their households at a lower rate than other Australians. It is important that this lower adoption be addressed because there is a risk that as other Australians move toward higher rates of household adoption and more household use of ICTs, the Indigenous community could miss out on the advantages that ICTs bring by having them in the home. The second motivation is that ICTs have the potential to assist Indigenous communities in the areas of health, education and employment. It was discussed previously that having access to ICTs has a positive impact on income, access to educational institutions and the services government provides.

ICT adoption relies heavily on the community that it is being diffused in. Cooper and Zmud (1990) argue that ICT implementation is defined as an effort directed toward diffusing appropriate information technology within a user community. Moreover, Martinko et al. (1996) propose that the introduction of a new technology, along with other external environmental and internal intrapersonal influences—combined with prior success or failure involving information technology, evokes causal attributions which serve as cues for further attributions regarding information technologies.

1.4 Methodology

Given that there is little research on Australian Indigenous household ICT adoption, a theory building qualitative research methodology is required. While case study research is usually undertaken to test hypotheses or some aspect of a recognised theory, case

study research can also be used for theory building (Eisenhardt and Graebner 2007; Eisenhardt 1989).

Case study research can be combined with the Grounded Theory Methodology (GTM) to build a theory (Eisenhardt 1989). Grounded Theory is derived from sociological research and was introduced by Glaser and Strauss (1967). GTM is described as ‘the discovery of theory from data systematically obtained from social research’ (Glaser and Strauss 1967, p.2). There are a number of strengths with using the GTM. Firstly, the GTM is able to be applied to emerging research areas where there is little theoretical understanding. Secondly, the GTM forces the researcher to keep an open mind as they undertake the research processes of coding, forming categories and memoing. Most importantly, the findings that form the final substantive theory of the phenomenon being studied are grounded in the empirical data. GTM is appropriate for information systems research (Lehmann 2001; Lehmann and Fernandez 2007; Levina 2005; Orlikowski and Iacono 2001). The GTM with case studies is used in this research to develop a grounded theory of Indigenous household ICT adoption.

It is important to note that Indigenous communities are the most studied communities in Australia. For more than two centuries non-Indigenous researchers have examined every facet of Australian Indigenous life, utilising many different research methods and methodologies, some of which have been ethically unsound and detrimental to the Indigenous community being studied (Dodson and Smith 2003). This research differs in that the research is being undertaken by an Aboriginal researcher utilising culturally sensitive research methods and methodology.

1.5 Thesis Outline

This thesis is structured as follows:

- This chapter has outlined the background and research objectives of the thesis and has discussed the research problem and question. It outlines the issues to be investigated as they relate to the Indigenous community.
- Chapter 2 provides a preliminary literature review of key ICT adoption theories.
- Chapter 3 outlines the research methodology undertaken for this research and discusses the rationale behind the choice of research methodology. The research methods used for data collection are also discussed.
- Chapter 4 provides the detailed results and analysis of the foundation case study. It develops the first theoretical framework of propositions to be tested in the subsequent case studies.
- Chapter 5 provides the detailed results and analysis of the second case study. It develops the second theoretical framework after the examination of the first group of propositions has been undertaken.
- Chapter 6 provides the detailed results and analysis of the third case study. It develops the third theoretical framework after an examination of the second group of propositions has been undertaken.

- Chapter 7 details the combined results and delimits the propositions from the final theoretical framework to form for first theoretical construct. It compares the final theoretical construct with previous adoption theories.
- Chapter 8 develops the emergent theory of Indigenous household information and communication technology adoption.
- Chapter 9 synthesises the results of the study and discusses the conclusions drawn from the outcomes of the research. It discusses the strengths of the findings in relation to previous research. It also discusses the strengths and weaknesses of the methodology used for the study.

1.6 Definition of Indigenous Australian

Defining an Indigenous individual is a difficult task as Indigenous identity is not officially in Australian legislation. However, there is a shared definition of Indigenous identity across Australia. That is, for an Aboriginal person to officially be considered Aboriginal they must fulfil what is known as the ‘test of Aboriginality’. There are three criteria to be fulfilled before an Aboriginal person can be officially considered Aboriginal. The three criteria are (Gardiner-Garden 2000; High Court of Australia 1983):

1. *must be a member of the Aboriginal race*
2. *identifies as an Aboriginal*
3. *is accepted by the Aboriginal community in which they live²*

² The Aboriginal community is made up of the other Aboriginal people in the local area. The usual way to prove identity is to have an Aboriginal organisation produce a Certificate of Aboriginality endorsed by the board of the Aboriginal organisation, which is made up of members of the local Aboriginal community.

The word Indigenous is used almost universally across Australia to refer to Aboriginal and Torres Strait Islander peoples. However, many Aboriginal people tend to identify themselves with their clan or family group at the local level such as Eora, Pitjantjatjara and Yuin. Some Indigenous people will identify themselves with the general region from where their family originates, and use a collective noun such as Koori to refer to Aboriginal people in some parts of New South Wales, or Murri to refer to Aboriginal people in northern New South Wales and Queensland, or Nyoongar to refer to Aboriginal people in parts of South Australia and Western Australia.

1.7 Conclusion

The household ICT adoption gap between Indigenous and non-Indigenous households, highlighted by the ABS Census data, shows that there has been a consistent gap of approximately 69% in both the 2001 and 2006 Censuses. There is little previous research that examines the low rates of Indigenous household ICT adoption. ICTs have the potential to increase income, provide access to health, education and government services. This research builds on previous adoption research and utilises a grounded theory approach to examine the factors that affect the adoption of ICTs in Australian Indigenous households and builds a substantive theory of Indigenous household ICT adoption.