Examining ICT application adoption in Australian home-based businesses: An innovation-decision process approach

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Abstract

This article reports on a study that examines an under-researched area, the use of information and communications technologies (ICT) in Australian home based businesses (HBB). HBB constitute a large part of the economy, yet little is known of how they use ICT to improve their business operations. The study involved interviews with 30 business operators in the Western region of Melbourne, a major Australian city. The findings were analysed using an innovative approach to Rogers' (2003) Diffusion of Innovations, employing the Innovation-Decision process as a lens for the analysis. Additionally, the article introduces a new means to assess the adoption of ICT applications by examining their level of penetration, level of maturity and usefulness to HBB. The study findings suggest that ICT application adoption in HBB is not uniform and needs to be considered according to individual ICT applications and explained in the context of particular home-based businesses. The study contributes to studies of innovation adoption, particularly in relation to the use of ICT applications in HBB. Further, the findings could identify specific areas for policy initiatives and training priorities to effectively support ICT adoption in the economically-significant HBB sector.

Keywords

Home based businesses; ICT applications; diffusion of innovations; innovation-decision process; interviews

Introduction

In Australia, as in most economies around the developed world, small businesses contribute to a significant proportion of overall business activity. Defined as those employing less than 20 people, small businesses count for as much as 96% of the total number of businesses in the country (DIISRTE, 2012).

In recent years, academic research has been drawn to a large subgroup within small businesses, those that are conducted from the operator's home. There are known as HBB (for Home-based Businesses) and they comprise a large and growing majority of small businesses. For instance, in Australia in 1997, HBB comprised 58.3% of all small businesses; in 2004, that proportion had grown to 68% (Australian Bureau of Statistics, 2005).

Due to their large numbers, HBB represent an economically significant sector in terms of employment generation. According to Wang, Walker, Redmond and Breen (2009), HBB represent the fastest growing business segment in most western countries. In 2011 the majority of HBB (61%) ran as one-person operations providing livelihood opportunities to their operators, while 24% employed one to four additional employees (DIISRTE, 2012). However, there is concern that HBB are not as productive as non-HBB. In particular, HBB compare poorly in terms of value-added and labour productivity (Australian Bureau of Statistics, 2010).

To enhance HBB performance to generate even more economic contribution from the sector, governments had first focused on addressing the bureaucratic and information issues that impede the establishment and operation of HBBs (Ali, Paguio and Breen, 2011). Training course offerings from various Government bodies have recently included topics related to the adoption of Information and Communication Technologies (ICT) applications. This development has been motivated by the increasing awareness that the use of computers and the Internet could deliver efficiency and market reach benefits that get around the resource

constraints of HBB. However, this initiative has not been matched by a corresponding increase regarding research into the adoption and usage of ICT in HBBs.

This study investigates the management of ICT applications among HBB to assist in addressing the current literature gap in this area. Through semi-structured interviews, the study explores the adoption and use of particular ICT applications by HBB through the lens of Rogers' (2003) innovation-decision proves. In particular, the research questions examined are: To what extent are ICT applications being used in HBBs? How are they being used? Is there an intention to keep using them? What are the reasons for non-adoption of ICT applications? Where awareness exists of an ICT application, but a decision to adopt or not to adopt has not been made, what are the reasons for this? Is awareness of the ICT application still lacking? Are there any factors specific to HBBs that affect the use of ICTs across the stages of Rogers' innovation-decision process?

Literature Review

Home-based businesses

Pratt (2000:106) defined HBB owners as "self-employed individuals who operate a business or profession primarily in or from a home office". The Australian Bureau of Statistics (2005) described two classifications of HBB:

1 *Businesses operated at home*: where most of the work of the business was carried out at the home(s) of the operator(s)
2 *Businesses operated from home*: where there are no other premises owned or rented other than the home(s) of the operator(s)

Many 'micro' (very small) businesses are HBB. These types of businesses often require little startup capital and are defined by their small number of employees (often less than 10, with other definitions suggesting that they have less than five). Often the employees are family or household members employed on a casual basis. Typical sectors for micro businesses are

commerce, manufacturing and services (Meadows, Riley, Mao and Harris, 2003; *Author1 et al*, 2009).

HBB comprise over half of all businesses in Australia, and early in the 21st Century had a growth rate of 16% (Walker, Bode,Burn and Webster, 2003). The number of HBB is growing and they are becoming an alternative to regular, salaried employment. This is especially the case in developed countries where full--time salaried positions are not as available as they once were (Jain and Courvisanos, 2013). As such, service businesses, which can easily move from 'commercial' sites to 'non-commercial' sites, are more likely to be home-based. A significant growth driver of rural HBB has been city-based residents desiring to move outside of the CBD and start a HBB in their new place of residence (Mackloet, Schutjens and Korteweg, 2006; Rowe, Haynes and Stafford, 1999), with governments supporting this move (Jain and Courvisanos, 2013).

The role of ICT

Studies that examine HBB in general are not widespread (Jain and Courvisanos, 2013). Studies specifically examining the adoption and use of ICT in micro or home based businesses are available, but are not as common as small businesses studies – this is despite the fact that many of these small business studies actually include micro businesses (*Author1 et al*, 2007).

Micro businesses generally lag behind other businesses in their use of ICT. An example of this is illustrated in Figure 1, which examined the use of ICT in over 1800 small and medium sized businesses in Australia (Telstra Corporation, 2012). Figure 1 shows the level of usage of different ICT (owning a computer, using the Internet and having a website) was lowest for businesses with only one or two employees (common for HBBs) and tended to increase for larger businesses.

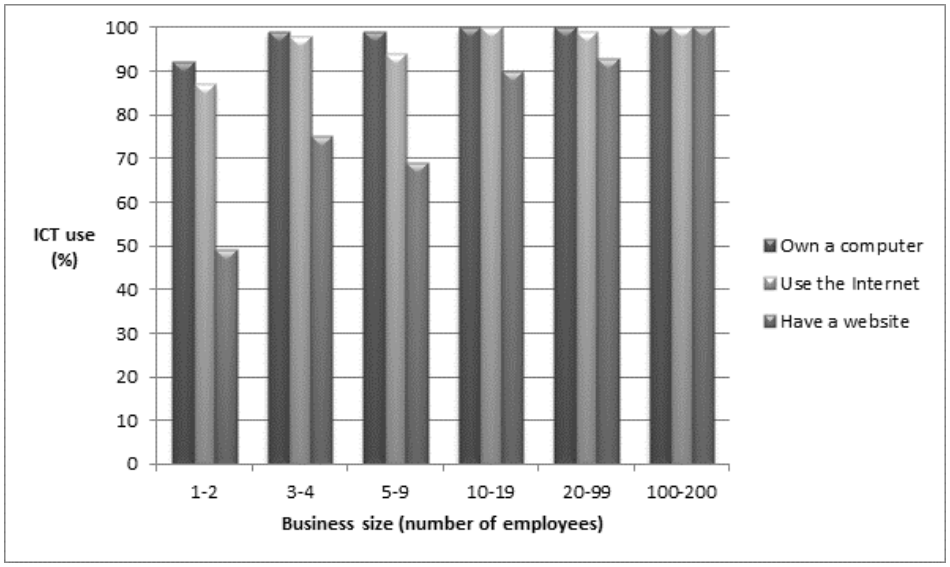

Figure 1: Technology use in Australian SMEs (compiled from Telstra Corporation, 2012)

Most small businesses use ICT to improve efficiencies. Thus many studies have shown that small businesses typically use accounting and 'office' software (such as word processors and spreadsheets) in their businesses (*Author1 et al*, 2009). A study of 522 home-based businesses in New Zealand (Clark and Douglas, 2011) found that HBB used a range of ICT. Their analysis examined HBBs according to their geographic sales reach, ranging from businesses with a local or regional sales focus though to those with a national or international focus. Use of the Internet occurred in the vast majority of businesses (from 96% of HBBs with a local sales focus to 99% in those that had an international sales focus). Email (97-99%) was also popular. Mobile phone use was higher for areas focussed on local (85%) and regional (90%) sales than those focussed on national (81%) and international (76%) sales. The proportion of HBBs with their own websites varied greatly. Local (39%) and regional (54%) focussed HBBs had lower levels of adoption of websites when compared with those that had a national (69%) or international (87%) focus.

ICT use in HBBs: Diffusion of innovations

One of the most popular approaches employed to study the adoption and use of technology is Rogers' (2003) *diffusion of innovations.* The use of this approach, and its associated

Innovation-Decision Process, can provide insights into how technologies are adopted into everyday lives. The Innovation-Decision Process comprises a series of stages describing the adoption process. Note that according to Rogers (2003) an innovation does not actually have to be 'new' for it to be considered to be an innovation for a business. All it has to represent is that it is new to the business, in this case the HBB.

The steps or stages of the Innovation-Decision Process are, in order of occurrence (Rogers, 2003):

1. **Knowledge** – when a decision maker is made aware of an innovation and begins to understand how the innovation functions. Rogers discusses three types of innovation knowledge: awareness that the innovation exists; information of how to use the innovation effectively and how an innovation works. This stage can be influenced by the way in which knowledge of an innovation is distributed via communications channels, such as through mass media or from person-to-person.
2. **Persuasion** – when a decision maker forms favourable or unfavourable attitudes towards an innovation. One of the aspects that can affect attitude is the perceived attributes of the innovation, but opinions can also be influenced by other factors. The perceived attributes are Relative Advantage: or how an innovation is perceived to be better than the replaced innovation; Compatibility: the degree in which an innovation is perceived to be consistent with the present socio-cultural values and beliefs; Complexity: the perceived difficulty of implementation, ability to understand, or use the innovation; Trialability: the level an individual can experiment (or trial) the innovation; and Observability: how perceptible the results of the innovation are to others. Adoption is also influenced by other factors, such as who has the authority to make the adoption decision and the potential existence of technology champions (or change agents) to promote the adoption of the innovation.

3. **Decision** – when a decision maker engages in activities that lead to either choosing the innovation or rejecting it.
4. **Implementation** – when a decision maker puts in place the new innovation. A this stage there is still likely to be some uncertainty in relation to the adoption of the innovation, so further information in regards to how to obtain and use the innovation may be sought. Rogers (2003) also discusses the notion of *re-invention*, where an innovation is either modified used in a different manner than originally intended.
5. **Confirmation** – when a decision maker wants reinforcement about the decision made to use the innovation. The decision to continue or discontinue use of the innovation is made.

Rogers (2003) classifies adopters of innovations into different groups according to when the innovation is adopted, relative to when an innovation is adopted. Initial adopters are known as *innovators* and *early adopters.* Then the innovation is adopted by the *early majority* and *late majority.* Finally, the last category to adopt the innovation is known as *laggards.* There is another category that Rogers (2003) devotes little time to – those that do not adopt the innovation at all (*non-adopters*). This is described by Ramdani and Kawalek (2007) as 'pro-adoption bias'. Factors such as industry sector, management support, management skills, cost of the technology and business size have been shown to influence ICT adoption by SMEs (Bayo-Moriones and Lera-López 2007; Kannabiran and Dharmalingam 2012). The Telstra Corporation (2012) study mentioned earlier suggested that smaller businesses (such as HBBs) do not adopt ICT at the same rate as their larger counterparts.

There have been a small number of studies that have examined technology adoption in micro and/or home businesses. As mentioned earlier, Clark and Douglas (2011) examined the adoption and diffusion of ICT in HBBs in New Zealand. In regards to adoption, they were interested in the "factors which act as motivators or barriers to adoption, as well as their potential influence on adoption decisions" (:352). The authors also discussed other adoption

studies, such as those which examine different business functions and those that group the factors into broad categories, such as organisational factors, environmental factors and technological factors. In regards to diffusion, they referred to "the spread of ICTs or the extent to which specific technologies are used within business activities" (:353).

Niehm, Tyner, Shelley and Fitzgerald (2010) examined technology adoption and diffusion via a survey of small family businesses the authors linked Roger's innovation-decision process with the well-known Technology Acceptance Model (TAM) (refer Davis, Bagozzi and Warshaw, 1989). TAM studies are prevalent in the literature, but to summarise they are based on the premise that user acceptance of ICT is based upon their understanding of the perceived ease of use and the usefulness of ICT (Niehm et al, 2010) and how this predicts the intention to adopt and actual usage of ICT. Whilst the study included business that were 'home based' and those that were not, the findings suggested that ICT did *not* diffuse as widely though HBB.

The links between TAM and the innovation-decision process (as identified by Niehm et al, 2010) and the manner in which Clark and Douglas (2011) examined the adoption and diffusion of ICT in HBBs in New Zealand are shown in Figure 2.

Niehm et al's (2010) combined model	**Antecedents of ICT adoption**		**Decision to adopt ICT**	**Consequences of ICT adoption**	
	ICT knowledge	*Business and community influencing factors*	*Perceived ICT ease of use*	*Implementation and ICT usefulness*	*Confirmation and impact of ICT*
Clark and Douglas (2011)		**Adoption**		**Diffusion**	
		Motivators for, or barriers to, adoption	*Influence of factors on the adoption decision*	*Extent of use of ICT*	
Roger's (2003) innovation decision process stage	Knowledge	Persuasion	Decision	Implementation	Confirmation

Figure 2: Summary of theoretical models for adoption of ICT in HBBs (adapted from Niehm et al (2011); Clark and Douglas (2011) and Rogers (2003))

Clark and Douglas (2011) suggest that there are not only limited studies in the use of ICT by micro businesses, but also in relation to the use of ICT by HBBs. Research into ICT use in general is often limited by treating small businesses as one homogeneous group (*Author1 et al* 2009). What is currently not known is detailed information about the adoption, usage and evaluation and specific ICT applications in HBBs. Thus, this study looks to extend earlier work by extending the range of ICT applications that are examined, and also to examine the implications in regards to antecedents of ICT adoption (incorporating the motivators for, or barriers to, adoption), the decision to adopt ICT and the consequences of ICT adoption.

From the main research issues mentioned earlier, a number of specific research questions have been adopted for this study. These are framed with reference to Rogers (2003) innovation-decision process, but are also informed by Niehm et al's (2010) and Clark and Douglas' (2011) studies.

- To what extent are ICT applications being used in HBBs? [Diffusion stage]
- For those that have been adopted, how are they being used? [Extent of use stage]
- For those that have been adopted, what are the benefits/ problems associated with adoption and use? [Confirmation stage: Confirmation and impact of ICT]
- For those ICT applications that have been adopted, is there an intention to keep using them? [Confirmation stage]
- What are the reasons for non-adoption of ICT applications? [Decision stage: influence of factors on the adoption decision; perceived ICT ease of use]
- Where awareness exists of an ICT application, but a decision to adopt or not to adopt has not been made, what are the reasons for this? [Persuasion stage: Motivators for, or barriers to, adoption; Business and community influencing factors]
- Is awareness of the ICT application still lacking? [Knowledge stage]

- Are there any factors specific to HBBs that affect the use of ICTs across the stages of Rogers' innovation-decision process?

Methodology

It was decided to adopt a case study approach to address the research questions, as ICT adoption, usage and evaluation generally involves socio-technical decision making and case studies allow for this type of investigation to occur (Yin, 2003; Darke and Shanks, 2002). In this instance, the case study approach involved multiple cases, in this instance, individual HBBs, as this allowed for "cross-case analysis and comparison, and the investigation of a particular phenomenon in diverse settings" (Darke and Shanks, 2002:115).

In order to investigate the research questions, it was felt that the use of semi-structured interviews of HBBs was the best approach. This is because semi-structured interviews provide the opportunity to beliefs, motivations and reasons for actions (Leedy and Ormrod, 2013), in this instance in regards to the adoption and use of ICT applications. This approach also allowed for a few, central questions about each ICT application to be asked and the flexibility of the approach allowed for further probing of responses where required.

Individual, face-to-face interviews were undertaken with a purposive sample of 30 HBBs. As the authors were located in a university in Melbourne, Australia, local government bodies in the Melbourne West region were co-opted to contact potential participants from their list of HBB constituents. The sample was constituted to have representations from 'at home' and 'from home' HBB. The objective was to cut through the various segments in the HBB sector and collect information from possibly differing perspectives to address articulated research questions. Prior to each interview, the websites and/or social networking presences of the businesses (where available) were accessed and their content not only informed the conduct of the interviews, but also contributed as an extra source of data for the cases to add depth and context to the results. Typically, the owner/ manager of each HBB was targeted for each

interview. As HBB typically comprise a single employee (or a 'handful' of employees at most) where the owner/ manager is responsible for the vast majority of major decisions. Ethics approval for the conduct of the study was gained from the human research ethics committee of the authors' university.

The purposive sample methodology described above finds support in Greenhalgh's (2001) prescription for recruiting qualitative research participants by firstly identifying particular segments of interest to the research and seeking representatives out. The number of interviews is in line with Mariampolski (2001) guideline of no less than ten and preferably between 15-30 interviews to effectively address research objectives for studies using the interview data collection technique. Refer to Table 1for a profile of the HBB interviewees.

Table 1: Profile of Interviewees

ANZSIC Business categories	Number of businesses	Owners		Average number of employees	Operations	
		Female	Male		At home (%)	From home (%)
Property and Business Services	12	5	7	2.4	22*	78
Retail trade	4	3	1	1.0	50	50
Personal and other services	3	2	2	3.0	25	75
Accommodation, Café and Restaurants	3	2	1	3.0	100	
Cultural and Recreational Services	2	1	1	2.5	25*	75
Transport and Storage	2	-	2	2.5	25*	75
Health and Community Services	1	1	-	1.0		100
Manufacturing	1	-	1	6.0		100
Construction	1	1	-	4.0		100
Overall	**30**	**15**	**15**	**2.6**	**32**	**68**

**Some businesses in these categories indicated a split between working 'at home' and working 'from home'*

The content of the interviews was recorded in NVivo which classified the various data items according to various constructs identified in the literature as described in the previous section. In addition, certain results were stored in the spreadsheet package Microsoft Excel to calculate averages and percentage adoption rates. Clark and Douglas' (2011) study of home-based businesses examined business use of the Internet, business features of websites, business uses of email, and business use of mobile phones. The authors felt that this type of

approach would be useful for this study, and were keen to examine ICT adoption of applications for well-established and newer ICT applications. Table 2 provides a list of the ICT applications for the study, their expected adoption rate and the rationale for selecting them..

The content of the interviews was recorded in NVivo which classified the various data items according to various constructs identified in the literature as described in the previous section. In addition, certain results were stored in the spreadsheet package Microsoft Excel to calculate averages and percentage adoption rates.

Table 2: ICT applications adopted for study

ICT application	Expected adoption rate	Rationale
Email	High	Telstra Corporation (2012): 97%; Clark and Douglas (2011): 98% adoption rate
Online banking	High	Telstra Corporation (2012): 91% adoption rate
Business presence on third party website or portal	High	*Author1* (2011): 82% adoption rate
Use of mobile phone for business (not voice calls)	Medium	Clark and Douglas (2011): 82% of HBB used mobile phones for calls and other purposes; Telstra Corporation (2012): 61% of small businesses possessed a smartphone
Website	Medium	Telstra Corporation (2012): 60% adoption rate; Clark and Douglas (2011): 63% adoption rate
Accounting software	Medium	Halabi, Barrett and Dyt (2010): 60% adoption rate
Online transactions (buying or selling via a website)	Medium	Telstra Corporation (2012): 61% received payments over the Internet; 73% paid for goods over the Internet
Social networking	Low	Telstra Corporation (2012): 26% of small businesses had a social media presence (86% of these being Facebook)
Twitter	Low	Telstra Corporation (2012): 26% of small businesses had a social media presence (32% of these used Twitter)

Results

Individual ICT applications

This section discusses the experience of HBBs in regards to each of the nine ICT applications that were identified. The results are presented according to the stages of Rogers' (2003) innovation decision process for each application.

1. Email

All of the businesses used email, so the discussion was therefore mainly based around how it was used and any perceived benefits or problems that had occurred.

Implementation

For the most part, email was used to send business information (such as newsletters and details about products or services). This is interesting as email allows for two-way communication – but this usage relates to one-way communication from business to recipient. For instance, a HBB operating in the entertainment field used Microsoft Word to create music lists in different languages which could then be emailed out to clients. This provided significant savings as the costs to print and send these out was described as "astronomical". Email was also commonly used to send formal documents (such as orders, quotes and invoices). An interviewee from a construction business noted that when customers requested quotes they expected a quick response: "There is a risk that business will be lost if [quotes are] not sent promptly, as potential clients are canvassing other providers". A lesser number of businesses used it for marketing, especially to follow up leads. An interesting use identified by some of the ICT-based HBBs is that they set up client computer systems to send them an *automated* email when a problem occurred with their system. Another use was that email was intentionally used by a small number of businesses to maintain a trail record of communications.

Confirmation

All businesses certainly indicated that they were intending to keep on using email. There were a number of positive outcomes of email use that were identified. A number of participants described its use as being "indispensable", comment especially on the fact that it saved time. From a mobility viewpoint, two strong findings to emerge were that email was

ideal to use when "out on the road" and also for keeping in contact with clients who were some distance away.

Email has become the preferred method of communicating with clients for many participants. For instance, comments such as "It's a default platform for communication with our customers" and "It's the lifeblood for keeping in contact with clients" were commonplace. The flipside to this was a small number of businesses used email, but still preferred to talk to customers, either face-to-face or by telephone.

A number of negative aspects of email use were also identified. For instance, a major theme that emerged was that it could be difficult to manage, mainly through problems with spam. It was also not always reliable, with problems such as emails not being delivered, limited mailbox size and or when the "system goes down".

Figure 3 summarises the major themes that emerged from the discussion with HBBs about their use of email. Note that major themes of the discussion are identified in **bold text,** whilst minor themes are in regular text. The summary confirms that email is a well-established ICT application in HBBs, with most of the discussion relating to how it was used and the positive and negative outcomes associated with its use. There is no doubt that the overall conclusion to be made in regards to email is that benefits outweigh any problems in regards to its use.

Knowledge	Persuasion	Decision	Implementation	Confirmation
			Uses: **- Send business information** **- Send orders/ quotes/ invoices** - Marketing - Automated emails - Paper trail	***Positive outcomes*** **- Prefer to email** **- Indispensable** **- Fast; Saves time** **- Great for dealing with clients at a distance** **- Great when on the road** ***Negative outcomes*** **- Can be difficult to manage** **- Not reliable** - Prefer to talk

Figure 3 : Major themes related to Email use

2. Web portals/ directories

Participants were asked if they intentionally had a business presence on any other websites, such as the Yellow Pages or regional or industry directories. Over eight out of ten of participants had such a presence, although their assessment of usefulness was lower when compared with the other ICT applications at the high end of usage. In a study of third-party website usage, *Author1* (2011) also found a high adoption rate amongst Australian small businesses.

Decision

A small number of businesses that had not yet implemented a third party website had made the decision to, but had not yet acted on that decision. Of those that had decided not to proceed with a web portal or directory, the main reason was that there was no need. For instance, a signwriting business indicated that they get enough custom from word-of-mouth and from repeat business.

Implementation

The vast majority of third-party website implementations were for the purpose of promoting the business. This is either for the purpose of receiving direct business from new customers or by referring them to the business website. The general consensus seemed to be that many directories offered a free or inexpensive means of "getting your name out there". Some businesses adopted a strategy of listing on as many free directories as they could, whilst others adopted a more strategic approach, listing on specific regional or sector based directories.

Confirmation

As was mentioned earlier, most businesses that had implemented third-party websites were not overwhelmed by their success. The implementation had led to some extra work for some businesses, in the form of more work or extra enquiries. In particular, the Yellow Pages did

manage to provide extra business in some instances, with others complaining about the cost of listing on this service. Low cost was a reason for some businesses to maintain their third-party listings and many regional and general business directories provided free listings. Other observations by businesses were that third-party websites were mainly ineffective or that they had no way of measuring their effectiveness. Some interviewees felt that most people searched for businesses via a Google search rather than through a third party directory.

The general usefulness of Web portals/ Directories seemed out of line with its penetration rate as shown in Figure 4. Perhaps the explanation could be related to the fact that this application was available early on when there were fewer alternatives in advertising businesses to potential customers online, thus the high penetration. Another reason suggested by interviewees was the low barriers to entry (often free to subscribe to them).

Figure 4 shows the main themes that emerged from the web portal/ directory discussion.

Knowledge	Persuasion	Decision	Implementation	Confirmation
		- Have not implemented yet	Use: - **Promotion**	***Positive Outcomes*** **- Has led to some work** - Cheap ***Negative Outcomes*** - Ineffective - Most people search with Google - Have not tried to measure their effectiveness - Costly

Figure 4: Major themes related to Web portal/ Directory use

3. Online banking

Participants were asked if they used online banking in their business. Around eight of out of ten respondents indicated that they did use online banking and generally found it to be very useful. These results are consistent with the Telstra study which reported 81% of small businesses describe Internet banking as 'essential' (Telstra Corporation, 2012).

Decision

Those businesses that had chosen not to use online banking were aware of its existence and had made a clear decision not to use it. There were generally two reasons for this. A small number of businesses actually prefer to do their banking in person, with one business actually still dealing in cheques. A window tinting business interviewee preferred to "stroll to the bank branch and talk to people there". A similar comment was made by an interior decorator. The other reason inhibiting online banking usage was security concerns, specifically a fear of hacking.

Implementation

There were three common uses of online banking. Most commonly, this was to pay suppliers and to receive payments from customers. Another strong theme emerging was that businesses liked the ability to check their current bank balances at any time – for the purposes of monitoring cash flow or just seeing if payments had been made from clients or to suppliers.

Confirmation

It was quite obvious that participants that used online banking would continue to use it into the future. The two major benefits identified were that they were able to do their banking at a time that suited them and that they saved time through not having to go to the bank. In addition, many businesses found online banking easy to use and saved on fees, especially when compared with credit card transactions or writing cheques. An interviewee whose business offered computer services commented that: "It's great when people pay me by direct debit. It makes it so much easier. Most suppliers also prefer direct debit as they make such a small margin they charge you to use credit cards".

However, some businesses did complain that there was not enough space in the description area of transactions for full details of payments to be made, or sometimes "the payee does not

put a reference for the payment". In these instances, time is often wasted trying to track down who made the payment or what invoice was being paid.

Figure 5 shows the main themes that emerged from the Online banking discussion.

Knowledge	Persuasion	Decision	Implementation	Confirmation
		- No need to adopt: can do things locally/ in person - Security concerns	**Uses:** **- Make payments** **- Receive payments** **- Check balances**	***Positive Outcomes*** **- Time saving** **- Convenient hours** - Easy to use - Saves on fees ***Negative Outcome*** - Fiddly details at times

Figure 5: Major themes related to Online Banking use

4. Mobile business

Mobile devices can include regular mobile phones (that basically just make telephone calls), smartphones, laptop computers, personal digital assistants (or PDAs) and tablets. These devices can be used anytime, anywhere, enable immediate and interactive transactions, communications and services, and provide services that can be tailored to individual users (Turban, King, Viehland and Lee, 2006). However, the use of mobile devices for work purposes can result in blurred boundaries between work life and personal life, especially for HBB. *Author2 et al* (2009) suggested that the use of mobile technologies can cause conflicts between work and family use. For instance, there can be disdain for workers using mobile devices for work in 'private' situations, as well as pressures on some workers to be available outside of normal business hours (Middleton, 2008). Participants were asked if they used mobile devices for business (other than voice calls) whilst outside the home/ office.

Decision

Around two-thirds of participants used smart mobile devices for purposes other than making telephone calls. Those businesses that did not use smart phones had different reasons, such as a landscaping business that did not use such devices as they were too easily broken in their work environment. However, that interviewee also suggested that it would be "handy" to be

able to access up-to-date weather information as that “impacts on jobs”. Another business indicated that there was always someone “at home” to check emails and to pass on a message via a telephone call if it was needed.

Implementation

The main business uses of smart mobile devices away from the home/office were to check and send emails and as a ‘mobile office’. Typical comments were “my mobile is my office”, “when I step away from the desk I have key bits of info” and “I can check on work when I am on the road”. Other uses included sending quotes and orders via the mobile device and using GPS to confirm job locations. Some users suggested that mobile devices played a key role in the conduct of their business. For instance, a software developer indicated that he used his smart phone for social networking, email, Twitter and a calendar (which was ‘synched’ back to his office calendar). This offered continuous access to important applications away from the office: “when I step away from the desk I have key bits of info…”.

Confirmation

Mobile devices were described by some businesses as being indispensable, with comments such as “could not live without it”, “have to have it”, “could not run the business without being mobile” being commonplace, with the key benefit being the ability to work anywhere. However, a small number of businesses raised work/life balance as an issue, with a small number of businesses referring to the need to discipline themselves in regards to how they work, with one business proprietor in particular mentioning that with the mobile phone around, she finds herself “still working on my holiday”.

Figure 6 shows the main themes that emerged from the mobile business discussion.

Knowledge	Persuasion	Decision	Implementation	Confirmation
		- No need to adopt	**Uses:** **- Mobile office and accounts** **- Email** - Send quotes/ orders - GPS	***Positive Outcomes*** **- Indispensable** **- Work anywhere** ***Negative Outcomes*** - Work/life balance

Figure 6: Major themes related to Mobile Business use

5. Website

Participants were asked if they had your own website. Around two-thirds of the businesses had a website, consistent with other studies mentioned (Telstra, 2012, Clark and Douglas, 2011).

Persuasion

This was the first ICT application where a few participants indicated that they were in the persuasion stage of adoption. These businesses suggested that they did not need one at the moment, but were thinking that it might be a possibility in the future.

Decision

Some businesses had decided to set up a website, but had not yet done so. There was also a group of businesses that had decided that they had no need for a website. This was generally because they had enough work or had a small number of clients. Other reasons for not having a website included a concern about not having the required skills to implement a website or the cost involved in setting one up. Some of the HBBs participating in the study were franchisees, and they indicated that part of their franchising fee was devoted to promotion by the franchisor and that franchisees were not encouraged to have individual websites.

Implementation

The two main uses of the business website were to provide information about the business and its offerings ("It tells people who we are and what we do…") and for marketing and promotion, with some businesses indicating that the majority of their customers found them via their websites. A small number of businesses that operated in different market niches

even had a separate website for each niche. For example, a software developer had two websites, one for the general software development aspect of the business and the other devoted to the area of the business that developed 'apps' for smart phones.

Confirmation

One of the main benefits identified from having a website was that it helped to establish business reputation and credentials, as it can make the business "look legitimate", can provide "a great first impression" and can make it look like the business had been in operation for a while. An interviewee from a printing business commented that a website provides a company with some 'validation', as people see home-based businesses as "businesses that do not pay rent and are not professional". A counselling service commented that "when people look at your website they say: "yeah, this person has been in business for a while". Another benefit identified was that customers requiring further information about offerings could be referred to the business website. The main problem identified was that websites could be time consuming to update. Other problems, which were also identified earlier in the decision phase by other businesses, was that the website could be costly to update or the business lacked the skills to be update the website. A few businesses mentioned that they were considering an update or redesign of the website or had even undergone one recently. For instance a Bed and Breakfast operator commented that she was intending to make the website more appealing and easier to navigate, whilst a printing business had just relaunched its business website which now "tells people who we are and what we do". Figure 7 shows the main themes that emerged from the website discussion.

Knowledge	Persuasion	Decision	Implementation	Confirmation
	- Might adopt in the future, but not yet	**- Decided to adopt, but have not implemented yet** **- No need to adopt** - Lack relevant skills to create website - Costly to set up	**- Provides information about the business and offerings** **- For marketing, promotion – to attract customers** - Have two websites	***Positive Outcomes*** **- Establishes credentials/ reputation** - Refer customers to the website ***Negative Outcomes*** **- Time consuming** - Lack skills to update website - Costly to update

Figure 7: Major themes related to Website use

6. Computerised accounts

Small businesses have been using accounting software for many decades. Halabi, Barrett and Dyt's (2010) study of Australian small businesses found that 60% had adopted a specific 'off the shelf" accounting package. Participants were asked if they used computerised accounting software (such as MYOB). The levels of usage were similar to the earlier study, with just over half of the businesses using such a package. However, the analysis revealed that spreadsheet software was also used in varying degrees by many businesses, mainly as a supplement to their accounting package. It was possible to classify the businesses according to three categories:

- Those businesses who have everything done by an accountant (and do not use software).
- Those businesses that use accounting software or a spreadsheet package such as MS Excel to a basic level and then pass the files from these onto accountants for further processing.
- Those businesses who do everything themselves, using accounting or spreadsheet software, including generating reports and submitting statements to the Government Tax Office.

Decision

The main reason for businesses **not** to use accounting software was that their accountant handled everything. Another reason suggested was that the software itself was too costly.

Implementation

The implementation of accounting software was mainly according to the three categories mentioned earlier. Either the software was used to generate tax reports, or this information was passed onto the accountant to do this.

Confirmation

There were no 'standout' benefits or problems in relation to the use of accounting software, although there seemed to be some contradictions (refer to Figure 8) in responses. For instance, some businesses described the software as being 'irreplaceable' whilst others described it as just suiting basic needs. Also, accounting software was described as being 'simple to use' by some participants, but 'complex to learn' by others.

Figure 8 shows the main themes that emerged from the computerised accounts discussion.

Knowledge	Persuasion	Decision	Implementation	Confirmation
		- Accountant does it all - No need to adopt - Costly	**Uses:** **- Accounting software/spreadsheet to enter transactions.** **- may or may not info pass to accountant to prepare periodic tax report**	***Positive Outcomes*** - Irreplaceable+ - Suits basic needs+ - Saves time - Simple to use* ***Negative Outcome*** - Complex to learn*

Figure 8 : Major themes related to Accounting Software use

7. Online buying/ selling

Participants were asked if they did any online purchasing or selling of goods over the Internet. This differed from purchasing goods or services in a conventional manner and then paying for them via *online banking*. The Telstra Corporation (2012) study of Australian small and medium sized businesses found that 61% of businesses received payments over the

Internet and 73% paid for goods over the Internet. Just over half of the businesses used online buying or selling.

Decision

The main reason for non-adoption of online purchasing or selling was that there were already other options in place, such as payment via traditional means of cash, cheque or credit card. Other alternatives were online banking and electronic payment systems. Interestingly, some businesses actually recognised that they were a service business and commented that receipt of online payment was not relevant. An example of this was a consulting services business that "sells a service that is delivered straight to companies, so it is not really applicable". A fruit and vegetable collective dealt mostly with cash or cheque and had an "old fashioned click-clack machine" for dealing with credit card transactions.

Implementation

In the case of online purchases, a number of items such as materials from suppliers, books and software were purchased, but also venues were booked and job advertisements were paid for. Receipt of revenue was less prevalent and was mainly received via the business website, although in one case receipts were received via eBay (probably PayPal).

Confirmation

The main benefit of online buying and selling was that it was quick and convenient. However, for the first time in relation to ICT applications, some participants indicated that whilst they had once had online sales on their website they had discontinued it. This was mainly because the returns did not justify the cost and effort needed to maintain the function. Figure 9 shows the main themes that emerged from the online buying and selling discussion.

Knowledge	Persuasion	Decision	Implementation	Confirmation
		- No need to adopt **- Not needed as they are a service business**	**Uses:** **- General purchases** - Purchase from suppliers - Receiving payments	***Positive Outcomes*** - Quick/ convenient ***Negative Outcomes*** - Used to have online sales, *discontinued use*

Figure 9: Major themes related to Online Buying and Selling use

8. Social media

Participants were asked about the use of two social media applications in their businesses: **full social networking websites** (such as Facebook) and **Twitter** (a 'microblogging' service for sending and forwarding brief messages). Adoption rates were low, with less than two in five businesses using a social networking package and only one in five businesses using Twitter. This was again consistent with the low adoptions of small and medium sized businesses in the Telstra Corporation (2012) study.

Knowledge

Social media applications were the first ICT applications where participants provided comments that implied they were in the Knowledge phase of Rogers' innovation-decision process. For both applications, and especially for Twitter, some participants indicated that they had little idea of what the application was or what it was capable of.

Persuasion

The situation was somewhat reversed in relation to businesses still being persuaded in regards to the use of social media tools, with more businesses being in this stage for social networking sites than for Twitter. Either some participants already had a private social networking page and were investigating whether or not they should have a business presence as well, or had seen other examples of business social networking pages (Rogers' notion of 'observability') and were considering something similar.

Decision

Some businesses had clearly evaluated social media applications and had decided that there was no need for them in their business as they wasted time, or alternatively that the tools were not suited to their businesses. A computer services business commented that they had "heard lots of stories about people who do use it [social media] for business" and wondered how businesses with "a website, Facebook, Twitter, Myspace, etc" kept them up to date. A Bed and Breakfast operator commented that "Facebook is a time waster. If I got on it, I would lose hours at a time and I won't get anything done".

Implementation

Those businesses that used social media applications saw a clear difference in how they were applied. Social networking websites were typically adopted for promotion purposes – either to advertise events or special offers. Twitter was mainly used for two purposes, to enhance business links and as a network from which information can be sourced.

Confirmation

When discussing the benefits of social media, most businesses considered that they increased their exposure and help them to raise their profile. In both instances the main problem with their use was that they were seen as time consuming in that they required constant monitoring and may distract from the business activities. In fact, some business that had previously had a business social media presence had discontinued it. This was once again because the link between private and business use was being blurred and businesses did not feel that the benefits gained offset the disadvantages of this.

Figure 10 and Figure 11 show the main themes that emerged from the social networking and Twitter discussion.

Knowledge	Persuasion	Decision	Implementation	Confirmation
- Need to find out more	**- Considering adoption**	**- No need to adopt** - Not suited to business use	**Use:** **Promotion** **- Events announcements**	***Positive Outcome*** - Some exposure ***Negative Outcome*** - Time consuming - **Discontinued use**

Figure 10: Major themes related to Social Networking use

Knowledge	Persuasion	Decision	Implementation	Confirmation
- Don't know enough about it	- Considering adoption	- No need to adopt	Uses: - Build links - Another source of information	***Positive Outcome*** - Raise profile ***Negative Outcome*** - Time consuming

Figure 11: Major themes related to use of Twitter

Penetration and usefulness

This section introduces a new lens by to investigate the use of ICT by HBBs. For each application, it compares the rate of adoption (penetration), the level of usefulness and the level of maturity in regards to adoption of each ICT application. Each participant was asked to rate the level of usefulness of each ICT application that they had adopted on a scale of one (not at all useful) to five (extremely useful). Figure 12 shows the rate of adoption (penetration) of each ICT application across the 30 HBBs, plotted against the average response to the usefulness question. In regards to penetration, it can be seen that the rates of adoption for each ICT application were reasonably in line with expectations for the study with email, online banking and presence of web portal or directory leading the list of adoption and the social media applications showing the lowest rate of adoption.

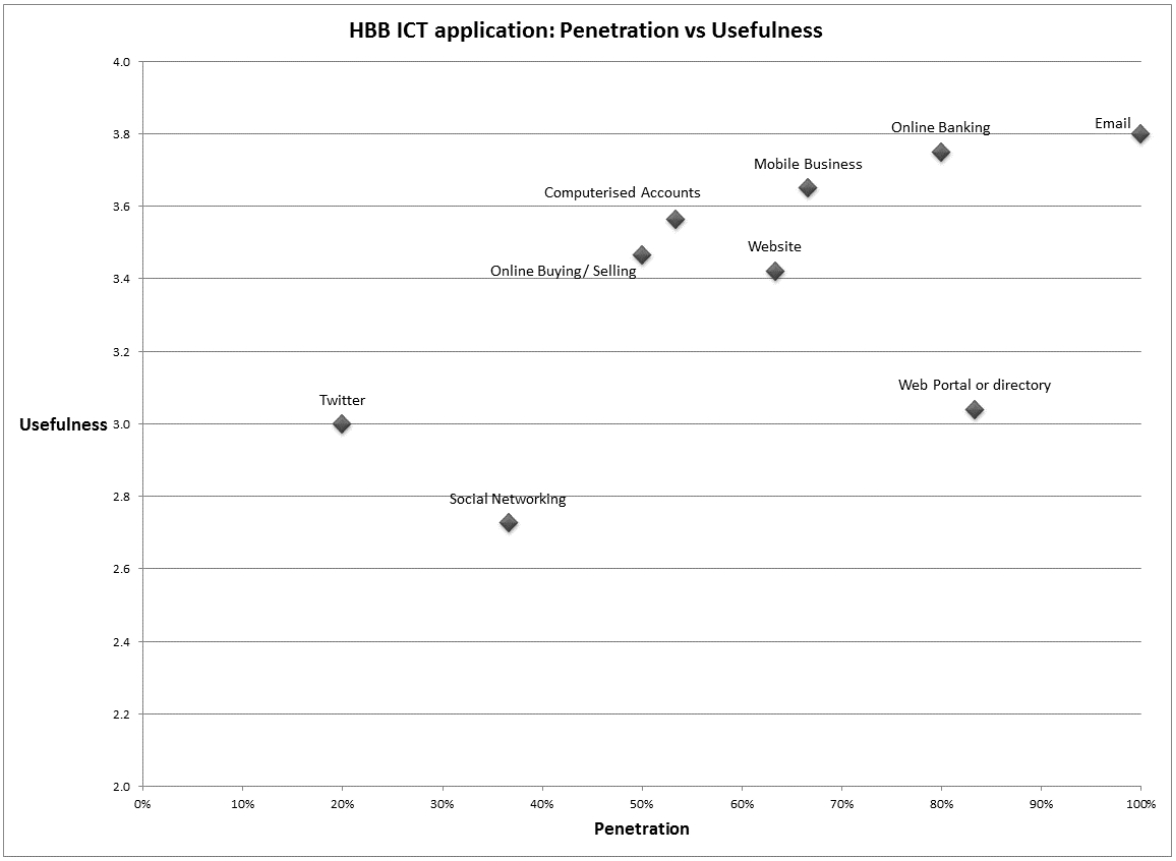

Figure 12: Penetration versus Usefulness of ICT Applications

When there are a small number of observations (such as 30 in this instance) it is often useful to look at other measures, such as median and mode, when making a determination as to the perceived usefulness of ICT applications. In Table 3, an overall assessment of the effectiveness of the various ICT applications is determined by taking into account a variety of measures, scaled back to the initial Likert-type value associated with the value. This is because the assessment of ICT usefulness involves an ordinal scale and there is an argument that mean and standard deviation are not suitable for the analysis of ordinal values, such as Likert-type scales. In these instances, it can be more suitable to employ mode or median values (Jamieson, 2004). The analysis in Table 3 confirms that (for the most part) the most frequently used applications are also regarded as being the most useful. The exception to this rule is web portals or directories, which will be discussed in the next section.

Table 3: Assessment of ICT application usefulness

ICT application	Mean	Median	Mode	Overall
Email	3.80 (very useful)	4 (very useful)	4 (very useful)	Very useful
Online Banking	3.75 (very useful)	4 (very useful)	4 (very useful)	Very useful
Mobile business	3.65 (very useful)	4 (very useful)	4 (very useful)	Very useful
Computerised accounts	3.56 (very useful)	4 (very useful)	4 (very useful)	Very useful
Online buying/ selling	3.47 (moderately useful)	4 (very useful)	4 (very useful)	Very useful
Website	3.42 (moderately useful)	3 (moderately useful)	4 (very useful)	Moderately useful
Web portal or directory	3.04 (moderately useful)	3 (moderately useful)	3 (moderately useful)	Moderately useful
Twitter	3.00 (moderately useful)	3 (moderately useful)	3 (moderately useful)	Moderately useful
Social networking	2.73 (moderately useful)	3 (moderately useful)	3 (moderately useful)	Moderately useful

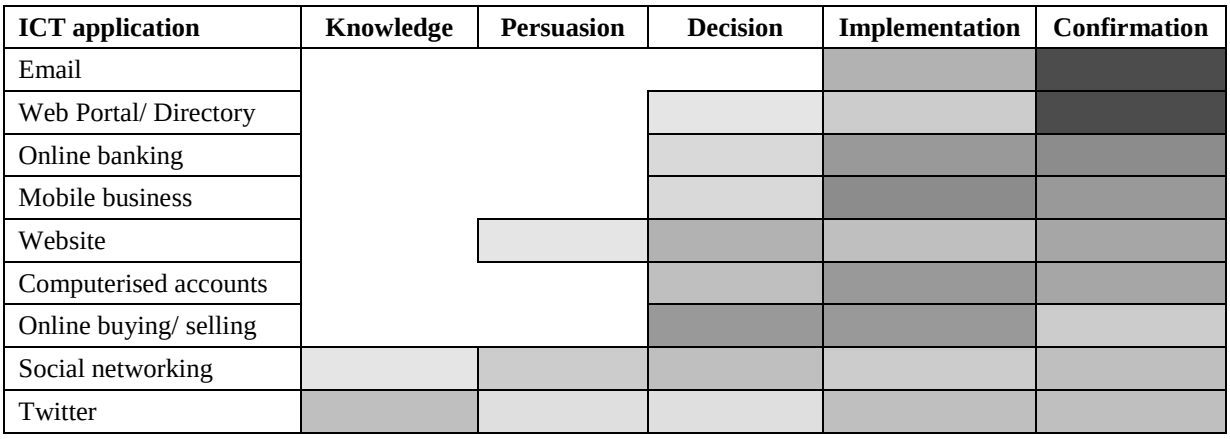

Figure 13: I-D map representing the number of comments related to the adoption and use of ICT applications by participant HBBs

Figure 13 represents the main themes identified by participant businesses in the form of an Innovation-Diffusion (I-D) map (*Author1 et al*, 2011). In this instance the I-D map shows where the greatest concentration of comments occurred, with a higher proportion of comments being represented by darker shaded cells. In the case of email the majority of comments occurred in the implementation and confirmation stages as all HBBs had adopted email. Also, the uncertainty still surrounding website use was reflected by some businesses not yet having decided whether or not to adopt a website. Given the market reach and legitimacy signalling benefits for HBB, intervention efforts could be initiated to address

impediments to website adoption. Finally, the lack of knowledge of social media applications is reflected by the spread of comments across all of the innovation-decision stages. Some businesses knew very little at all about these applications, whereas others were at the stage where they had tried the applications and even discontinued their use. At the minimum, this could imply the need to provide HBB with knowledge on social networking applications, particularly on the awareness and how-to levels (Rogers, 2003). The use of I-D maps for this purpose (examining the volume of relative comments across innovation-decision to identify separate emphases placed on the adoption of different ICT applications) is a new approach to considering the adoption of ICT applications in small businesses.

The level of maturity of adoption of each application can be assessed by where the discussion centres upon in the innovation-decision stages. For instance, ICT applications where the majority of comments related to the Decision, Implementation and Confirmation stages were considered to be **mature.** Although websites had been adopted for some time by HBBs, there were still a number of businesses that were in the Persuasion stage, so this ICT application was assessed as being **developing.** Social networking sites and Twitter had comments ranging from the Knowledge stage all of the way through to the Confirmation stage and thus was assessed as being **immature** in regards to its implementation. The results are summarised in Table 4.

Table 4: Overall assessment of ICT application adoption stages

ICT application	Penetration	Maturity	Usefulness
Email	High	Mature	Very useful
Online Banking	High	Mature	Very useful
Mobile business	Medium	Mature	Very useful
Computerised accounts	Medium	Mature	Very useful
Online buying/ selling	Medium	Mature	Very useful
Website	Medium	Developing	Moderately useful
Web portal or directory	High	Mature	Moderately useful
Twitter	Low	Immature	Moderately useful
Social networking	Low	Immature	Moderately useful

Research Synthesis

This study is unique in that it is the first to examine the adoption of ICT applications in HBB using Rogers innovation-decision stages as a theoretical lens.

The analysis of interviews of HBBs and results presented in Table 4 confirms that the experience of adoption of ICT applications across all stages of adoption was not consistent. It is not enough to point out the length of time that these applications have been in existence to explain these findings. For instance, not all ICT applications with high penetration were considered to be 'very useful' by participants. Web portals/ directories experience a high level of penetration, but were only considered to be moderately useful. Although websites had been available to HBBs for some time, there still some obvious confusion associated with their adoption and doubt as to their level of usefulness.

There was obvious acceptance of the benefits experienced by HBB with their use of most ICT applications. Some of the reported benefits include increased efficiency, convenience, wider market reach and generally, the electronic facilitation of routine transactions and communications. The level of approval for each specific application however was moderated by the length of time since the application's introduction in the market, information levels, availability of alternative means of achieving the same benefits, and considerations related to work-life issues. From a theoretical perspective, the use of Rogers' innovation framework in the analysis outlined the specific stage of businesses in the adoption process, and the results reflect observable differences with regards to the different ICT applications.

An important aspect of this study was the investigation of businesses that had reached the decision stage of adoption, but had had elected to **not** adopt the innovation. All ICT applications except for email had business in this category. By far the most common reason given for non-adoption of the technology was that there was no perceived need to adopt the application. This relates back to Rogers' (2003) notion of *relative advantage* – the proposed

innovation was not seen to provide relative advantage over existing practices. Other factors that were mentioned in the literature, such as cost (website; accounting software), lack of skills (website) and business sector (online buying and selling not suited to businesses providing a service) were also evident to a lesser extent.

It should be remembered that this study involved interviews with a broad selection of 30 HBBs in the western region of Melbourne, Australia. The authors feel that this study would be representative of the practices of ICT adoption in many such groupings of HBBs in cities of major Western countries, but hesitate to claim that similar, specific uses of ICT applications would be matched. It is also important to remember that the study represents a *moment in time* – new technologies are emerging and being adopted on a continual basis. However, the authors feel confident in claiming that the study has identified differing patterns of ICT adoption, usage and evaluation with different ICT applications – and expect that differences would also be found in similar studies in other locations.

Conclusion

This study adds to the minimal literature available of the use of ICT in HBB. A unique contribution of this article has been the use of Rogers' (2003) Innovation-Decision process to demonstrate that it is necessary to go beyond the simple measure adoption rates for different ICT applications in HBBs. In regards to the theoretical contribution:

- The use of the *stages of adoption* allowed the researchers to develop an understanding of the issues affect decisions related to the adoption, usage and evaluation of different ICT applications in HBBs.
- Additionally, the new approach introduced to assessing of ICT applications by examining a combination of penetration levels, maturity levels and usefulness provided a new way to assess the adoption (or non-adoption) of these applications.

In regards to practical applications of the study:

- The applications used by these businesses should not be classified into a single 'ICT use' group as typically happens in small business research.
- The level of adoption of ICT varied profoundly across different applications, as did HBBs' level of understanding of each application, the benefits they received from them and their intentions to continue to use them. On this premise, it became possible in this study to identify specific areas in applications adoption where training initiatives for knowledge provision or adoption support could best be targeted.

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