INTRODUCTION (BACKGROUND AND AIMS):

The Australian National Broadband Network (NBN) aims to roll-out optic fibre-to-the-premises (FTTP), upgrading existing copper wire infrastructure to connect up to 93 per cent of homes, schools and workplaces across Australia with broadband speeds of 100 megabits per second\(^1\). The introduction, adoption and use of this high speed broadband (HSB) will have implications for economic productivity, for government and private services, and for social and family life. Whilst the NBN is often discussed on the national scale in terms of economic growth, productivity, and innovation the possibilities and implications of HSB at the micro scale of daily domestic life are important for these larger aggregations; yet they remain uncertain, and thus require investigation and interpretation.

The home is a site of deep significance in people’s lives (Lawrence 1987; Hareven 1991), and important changes in the home both reflect and reinforce this significance (Bammer 1992; Tabor 1998). The Australian home has in recent time become a place characterised by a range of information and communication technologies, cabled and wireless communication systems, interactive computer games, online social networking, personal entertainment systems, and so on, many of which rely upon broadband technology for their operation. The next five years will almost certainly see a wider appropriation of HSB and all that this capacity implies.\(^2\) The domestic home, then, forms a key site for mapping the present and possible future uses of broadband technology, and present and possible futures of daily life. The purpose of the present pilot study (and planned larger study) is to develop a detailed and improved understanding of the social, technological and economic dynamics that presently shape domestic broadband use; the relationship of broadband to other forms and patterns of media...
use and wider technology consumption; and the shifting patterns and imagined expectations of future use for HSB at an individual and family level.

Understanding in detail the early stages and evolving dynamics of broadband introduction, appropriation and experience in the home is critical to:

- mapping shifting arrangements or practices of education and employment from home, and what this will mean for domestic life, for the economy and for the relationship of the home to schools and workplaces;
- informing effective, evidence-based policy and policy implementation – including regulatory responses – in the Australian communications and media landscape;
- understanding domestic leisure and the implications of HSB for media consumption and production, patterns of media usage, and modes of communication.
- and most importantly, understanding the implications of all of the above for the performance of family life.

This research builds on our previous work on “connected homes”, which considers the interplay of multiple technologies and practices in the home, rather than focusing on particular technologies in isolation (Arnold 2004; Arnold et al. 2006a; Arnold et al. 2006b; Davis et al. 2008; Nansen et al. 2009; Nansen et al. 2010, Nansen et al. 2011; Shepherd et al. 2006; Shepherd et al. 2007). We aim, therefore, to consider the complementary and disruptive relation of FTTP to other in-premises connections, such as wireless; the relation of newer services and devices in relation to legacy systems (eg shifts from dial-up to HSB, broadcast to IPTV, VCR to PVR); the challenges of and solutions to questions of interoperability; and questions of technology accumulation, placement and routines of use, and of course, what this implies for the experience of family life.

In addition to our own previous work, the current study is informed by approaches in media studies that trace how the uses and experiences of new technologies within the home emerge over time as they are introduced and “domesticated” (eg, Haddon 2003; Lally 2002; Morley 1986; Morley 2003; Silverstone and Haddon 1996; Silverstone and Hirsch 1992; Spigel 1992; Spigel 2001; Williams 1975). These studies of media consumption, use and enculturation have shown that as successive waves of technologies are appropriated and enter the home, spreading throughout the spaces of the house and around the times of the clock, habits and patterns of family life undergo change.

This pilot study aims, therefore, to develop an in-depth understanding of the complexities and shifting patterns of domestic life associated with the appropriation of HSB infrastructure.

**METHOD:**

Our empirical work thus far is informed by a participant cohort of ten households (of mixed composition), who had FTTP provided in 2009 in advance of the NBN rollout, through the TasCOLT project (TECC 2008; Spring and Wiatr 2006; Given 2010), and the Hybrid SmartStreet project (“HybridSmartStreet” 2009; TECC 2009). These households are located in North Hobart, Tasmania – a relatively privileged demographic area. As one participant noted, “the trial is only in selected areas, and they are quite middle-class and not really representative of the whole state. It will be interesting to see whether there is going to be a skewing of the results or data … I’m sure that our use of technology is very different: what we can afford to buy; what we are interested in; what we do after hours.” Such a cohort can, however, be characterised as “early adopters” of technology (Rogers 1983), who are an important group for identifying emerging dynamics of any technology appropriation.
Our empirical work involves us in a suite of qualitative methods spread over a one-year period. This suite of methods involves established interview techniques as well as more novel methods, including ‘technology tours’ and the use of a ‘domestic probe’ pack (see Arnold 2004; Arnold et al. 2006a; Arnold et al. 2006b; Gaver et al. 1999; Gaver et al. 2004; Shepherd et al. 2006; Shepherd et al. 2007). The first ‘technology tour’ occurred in early 2010 when participants were asked to escort us around the home, provide an inventory of the technologies in the home, and explain something of their origins, purposes, usefulness (or lack thereof), their ‘character’, their principal users, and their rationale for their location in the home. Families were subsequently introduced to a ‘Domestic Probe’ pack containing a Polaroid camera and a ‘Broadband Scrapbook’, to collectively record, assess, and reflect on their experiences with the HSB technologies, and to build a history or collage of their technology use in the home, including the pasting and annotating of Polaroid images of technology in use. Using the pack, participants were invited to gather research data and tell their own story of their home-based relationships with broadband technologies. For a period of a year following this initial visit, a series of three follow-up face-to-face interviews is being undertaken. Guided by the traces in the domestic pack, these open-ended, semi-structured conversations are designed to elicit reflective insights into daily uses and expectations of HSB technologies and services in the home. We talk about which technologies are used in the home, what sort of tasks are accomplished, where these technologies are located and why, when these technologies are used, what human relations are affected, what values are relevant, and what behaviour results, using the domestic probe traces to stimulate the conversation.

FINDINGS:

As the reader will expect, we found that different households and families appropriate and domesticate HSB in different ways, despite the small sample and narrowness of the demographic. Some maintain limited and quite prosaic uses, such as paying bills or checking emails; whilst some others are voracious media consumers and users. There are, however, a number of observable patterns in the appropriation of broadband, not all of which are consistent. We found that with HSB, our informants

1. continued on with business as usual,
2. took a liking to information snacks,
3. remapped domestic territory … or didn’t, and
4. sought to domesticate their new technologies through the application of discipline.

These findings will be described in turn.

1. HSB MEANS BUSINESS AS USUAL

In these initial stages of broadband use, our informants’ Internet activities often appear at face value to be business as usual. That is, practices employing the Internet may simply migrate from one platform to another, and any new practices employing the Internet are incremental aggregations of closely related existing activities. For example, many participants had long experience paying bills and banking online, or searching Google for information, and used dial-up when this was the only technological platform available. The provision of HSB has not simply displaced these activities with new ones, though it has displaced the technology that mediates that activity, whilst many new activities are often simply more of the same focal activity:

“We are not hugely technologically minded people, so we tend to use it for the things we need to do rather than playing around with it for fun.”
“I still only use it for emails or finding bits of information, like recipes and that sort of stuff on the net, that’s my main usage of it.”

“In dial-up times I was using the Internet for basic transactions ... it is certainly faster and more effective with higher [faster] broadband.”

Participants did not have the same level of problems with speed or disconnections any more, and the Internet is thus used in the home more often, albeit in limited and instrumental ways rather than in new ways, based on their history of home Internet use, familiarity with its functionality, or habits of use. And so online banking and bill paying moves from the exception to the rule, online purchasing becomes routine and moves across a wider range of products and dealers, limited online information gathering becomes broader as news sources, maps, encyclopaedias, recipe collections and the like are bookmarked, and are used often rather than rarely.

And just as sources and functions incrementally aggregate, so too does hardware. In many cases we see homes littered with screens and ICT devices, and these are of different ages, functionality, working order, and operating platforms. Often these new technologies appear to be un-reflectively adopted, the accumulation of new devices and services is normalised, and a proliferation of technology is accepted as part and parcel of contemporary living. The rhetoric of the NBN, in company with product manufacturers and service providers, suggest that this trend will only continue.

Meanwhile, the most venerable domestic technology remains the television (see also ACMA 2007), and despite HSB, many still turn to live broadcast first as a matter of course, and only turn to recorded or downloaded offerings if nothing free-to-air is appealing. For some, television is conceptualised as a live or immediate medium – especially if they prefer news content, which is time-relevant. Consistent with this finding, television ratings agency OzTAM report that about 25 per cent of metropolitan Australian homes are now equipped with Personal Video Recorders (PVRs), yet their 2010 data shows that time-shift viewing practices are currently a fringe activity, with approximately 96 per cent of content still viewed live and less than 4 per cent of content time-shifted (ThinkTV 2010). Despite this finding, others in our study are beginning to turn away from a viewing live broadcast television and the limited content on offer, choosing instead to control viewing by selecting from pre-recorded content:

“Sometimes we’ve had the telly on when we’re tired, as a form of relaxation I guess, and you think what on earth am I watching. But because we have the shows recorded on TiVo, you think: ‘hang on, what’s this?’”

“My idea of TV is something that is on now.”

“I almost-never watch live free-to-air TV anymore, I mainly choose from stuff I’ve already recorded.”

As each of the participants in this study had been supplied with a TiVo media device and access to Hybrid TV’s video-on demand (VoD) entertainment service, CASPA, our research is able to track any changes – whether additional or displacement – in media viewing habits and consumption behaviours in light of the early adoption of these products and services, consider how they connect with more established patterns, and consider what future HSB-supported devices, in particular Internet Protocol Television (IPTV), may mean. The force of familiarity is also reflected in Internet use, despite increased speed or capacity. Many continue to use familiar applications or undertake established activities such as information searches, basic email communication and financial transactions, yet these common focal practices incrementally aggregated to embrace a somewhat expanded range of what remain prosaic and instrumental applications. Thus we see our informants making online purchases from eBay as well as Myer, transferring money across online accounts as well as
paying bills online, or communicating through Skype as well as email. This phenomenon of simultaneous aggregation and displacement of communications and media use would appear to increase participation in the digital economy (ACMA 2007, ACMA 2009), and accounts for the increase in both social exchanges and financial transactions emerging from the take-up and usage of information and communication technologies.

Similarly, while HSB is commonly used at home to undertake forms of paid work, this remains business as usual – routine labour such as attending to emails, that is additional to, rather than substituting for, the office. Described as supplemental work (Fenner and Renn 2004), this is not the fundamental shift in work practices that HSB may enable. We did note, however, two examples among our informants of home-based work – one trading shares and another running a design and distribution business – which were dependent upon broadband Internet access for transactions and communication. HSB does provide infrastructure for home-based information production, which may prefigure some of the more flexible labour possibilities that HSB enables, and raises questions for future changes to home-spaces or the meaning and practice of home life, especially as it stands in relation to the workplace (Nansen et al. 2010).

From a research perspective two interesting and contrary things emerge from this observation of “Business as Usual” aggregation and displacement. The first is the sense of disappointment researchers looking for dramatic change may feel when confronted by the absence of profoundly new and innovative experiences driven by the new and innovative technology, and the second is the nagging feeling that we are missing something – that the subtlety of “Business as Usual” has elided the aspects in which the experience of aggregation and displacement of technologies and technology uses is new and profound.

2. INFORMATION SNACKING

When considering the difference between dial-up and broadband connectivity, the focus is often on the implications of the huge difference in data transfer rates. However, for many households, speed is not the difference that makes a difference; rather it is the fact that broadband is ever-present and ever-available, whereas dial-up must be switched on and off. The implications of this shift from dialling-up a connection to having the Internet connected, “basically all day, everyday” as one of our participants noted, is to radically increase the propensity to use the Internet – not necessarily in duration, but certainly in frequency. When always connected, as is often-noted the Internet interpolates “information snacking” – frequent, but bite-sized uses of the Internet to look at a YouTube clip, look up sports scores, correct the spelling of a word, catch up with the headlines, check the weather, listen to a song, note social networking status updates, or read and send email, all with a frequency that sometimes borders on the obsessive-compulsive.

A variation on information snacking interpolated by HSB involves accessing bite-sized chunks of information or media all at once, in parallel, rather than in serial fashion. One achieves this through opening multiple browser windows or tabs simultaneously, and flicking between them:

“The faster the speed the better, ’cause then you could have multiple screens, with windows all at once.”

“I’ve made my simultaneous web access more complex ... doing half a dozen things at once.”

“I’m quite capable of having say, two screens, a couple of browsers.”
Further, people are becoming increasingly accustomed to the speed and affordances of broadband-enabled Internet, and feel that even if their snacks are limited, that this is enabling, and integral to their lifestyle:

“I enjoy having it (broadband), and maybe I don’t use it as much as the others do, but I know I like the thought of just grabbing something if I need to. So yeah, it is essential. We have to have it.”

3. DOMESTIC CARTOGRAPHY

A cartographer’s job is to construct a map that differentiates one territory from another through the inscription of lines on a map. A household also constructs domestic territories of one kind or another, through the placement of bricks and mortar, furnishings, the location of technologies, and of course through the reflexive performance of daily life in the space of the home (Nansen et al. 2011). We have seen that broadband information snacking represents a different relation to time, and so the location of broadband within the home interpolates a relation to space, and asks that the household remap that space.

Many participants who were familiar with using dial-up and wired desktop computers did so in specific locations of the house, such as the study, and continue to use technologies in this way. Domestic cartographers have clearly differentiated and mapped their territory. They do not see any advantage in blurring or erasing the home’s defined territories through using a mobile device, such as a laptop, or having wireless connectivity, supported by broadband, to enable distributed forms of Internet use. This deliberate appropriation of Internet connectivity purposefully contained to specific spaces is consistent with a desire for spatial order, and the congruency with familiar routines is consistent with an historical desire for order.

In a similar sense, the screen may be mapped and territorialised just as the house as a whole may be mapped and territories distinguished. On one inscription, convergence is undesirable, and lines are clearly drawn. A screen for the Internet is viewed as a particular kind of screen, a medium for information seeking or communicating rather than for entertainment; a TV screen is a screen for entertainment, or at least a particular kind of entertainment; and the computer screen is different territory again, work territory, distinguished from TV, distinguished from non-work Internet use, and certainly distinguished from a book or a phone:

“I never much watch video on a computer anyway. To my mind they are two distinct things, TV for TV stuff you know.”

“If I was going to read a book I would go and get it, I don’t particularly like reading 10, 20, 30 pages on the net.”

“The whole idea that I could merge everything with the net hasn’t reached me at all. Hence a TV is a TV and nothing more than that.”

In contrast, some in our study are erasing the lines distinguishing screens, as well as the lines distinguishing spaces within the house, and are experimenting with the possibilities of space-shift and format-shift anywhere, any-screen, media convergence. So, for example, a smart phone is carried around from room to room and its screen is deployed for multiple purposes in multiple contexts. Laptops and wireless connections are used for work or for entertainment in bed or in the living room. Multiple devices and sources of content are connected to the same screen:

“We connected the laptop up to the TV, we sat and watched Youtube because there is a really fast download now you don’t have to sit around and wait too long for things to pop up ... occasionally we plug the notebook into the television, and you can watch iView or Yahoo7.”
This media desegregation of time, space, and screen, is welcomed by many of our participants as part of a natural progression or future-orientation that seeks to overcome current technology limits and to work towards a desire for seamlessness and convenience in all areas of domestic life, including work, education, consumption and social interaction. Typically, this is materialised in the more prosaic idea of shopping through an Internet-enabled TV from the comfort of a couch:

“I can see it going in the direction that they can go onto the TiVo and do maths homework or download educational stuff, or you can do your Woolworths shopping and things like that through the TV through the Internet, and being able to watch all these streamed shows with no issues about drop-outs and freezing and speed problems.”

“There’s hardly a TV coming out in the next 12 months that doesn’t have a hard drive in it. So I can see a time when all TVs will be connected and you touch it.”

In terms of media consumption HSB will support the blurring of screen functionality and raise a whole range of questions for emergent viewing patterns. The more immediate implications relate to increased possibilities for digital content delivery and the current availability of media convergence technologies: PVRs, VoD services, IPTV or Internet-enabled TV, and catch-up or time-shift TV programming. These modes of consuming content are clearly in their infancy in Australia, yet the expected increase in take-up of these products and services on the back of broadband infrastructures and speeds is expected to lead to deeper penetration, increased use and a number of changes to media viewing habits and consumption behaviours.

In the US, where these kinds of services have been available for longer, the flexible and customised patterns they enable are typically associated with scheduling content to fit lifestyles rather than adhering to a fixed broadcast schedule. As these technologies are increasingly adopted in Australia there is much that local research can contribute to an understanding of local domestic media consumption patterns. As HSB is normalised, and convergent Internet enabled products move into new market opportunities here, Australian homes and screens may be remapped as convergent rather than territorialised, but at this early point in HSB history, it is a tentative arrangement rather than an established pattern of use. While some in our study eagerly embraced media convergence, for most of our participants the computer and Internet remain information and communication technologies, rather than entertainment or leisure technologies. When they go online at home it is to seek out information, to undertake a specific activity such as banking, or to communicate, rather than to sit in front of in order to relax or view entertainment, as with the TV.

From a research perspective, the interesting phenomenon to watch here is the relationship between convergent technology and convergent activities. At the moment our informants distinguish between activities such as information seeking, paid work, communicating, or engaging in entertainment and leisure. These activities have different motivations, a different personal affect, and often occur at different times and at different places. Consistent with this, our informants differentiate between the technologies that carry these activities – different devices are used for different types of purpose, reinforcing clear boundaries and definitions. The question is whether multifunctional devices that erase distinctions between categories of technology will also blur distinctions between categories of activity.
4. DOMESTICATION REQUIRES DISCIPLINE

“Put it this way: television is now slightly more interesting because of control, but only slightly.”

Those participants in our study who have domesticated HSB-supported digital television through devices or services such as TiVo, PVRs, VoD services, or Internet-enabled TV note that in these early stages of adoption they watch slightly more TV, but that it is mainly used to re-organise existing viewing habits or preferences. So, they do things like record a show and then skip advertisements, or record a season of a show to ensure that an episode will not be missed and they have a back-up copy:

“My overall couch potato hours have increased since I got this thing but not by a lot.”

“Some things we have on a season pass, but we watch it in real-time anyway. So, we have it on season pass in case we weren’t gonna be here.”

“I like season pass because my show on a Sunday night, sometimes it’s just not convenient or if we’ve been away.”

In this sense, HSB-supported digital television and its associated devices – PVRs, VoDs, IPTV – and associated practices – recording, storing, time-shifting, catch-up TV – are seen as something that will afford a better control and management of existing viewing routines. Fixed television broadcasting schedules are re-arranged or customised for convenience or to fit lifestyles. These more flexible patterns of viewing content mean that content is watched at a later and more convenient time than scheduled in order to work around routines of work, sleep, vacation, and so on.

Such shifts in viewing patterns are not unexpected, nor necessarily new (e.g. VCR), and are in accordance with the affordances of the device. Nevertheless, by operating in a digital and HSB environment they afford a more extensive range of possibilities for mediating the ways content is viewed in terms of volume, speed, location and time. Principally, by working as time-shifting and time-management tools such affordances have the potential to disentangle a whole range of significant affects, practices and habits that broadcast regimes have implied:

“The kids like the easy recording, where you’ve basically got the guide and highlight and press record, you don’t have to worry about timing.”

“With this box I can sort of say it’s on now but put it aside, so my range of vision, if you like, has extended.”

“With this thing you can sort of forget about routine and just record what you want to watch.”

Here, digital and HSB-supported television challenges a broadcast regime that requires synchronising domestic routines with the flow of a television schedule, and concomitantly, the affective concerns that accompany the prospect of missing a show or episode, are ameliorated.

We have found that in contrast to this older regime of a fixed schedule of television viewing, families with PVR devices are developing a familiarity with this technology, are accommodating this into their media consumption routines, and are appropriating it in both ordinary and significant ways. We have found different strategies for recording content, with some systematically recording, others recording more haphazardly, and many utilising the TiVo recommender system; and similarly, we are finding that viewing recorded content has
implications for other forms of content delivery, and for revenue models, especially live free- 
to-air broadcast television funded by advertising, as well as the model of DVD hire from 
physical store-fronts:

“When you put the television on, I pull up the TV guide and see if there is anything 
worth recording”.

“I used to flick from channel to channel if there was nothing good on, now you have 
the control to fast forward through the ads.”

“I was interested in the idea of recording live TV, because that is the one restriction 
of live to air broadcast: you have to be there to watch it.”

“We hardly ever watch DVDs anymore either, despite living across the road from a 
video shop.”

Furthermore, the TiVo and its recommender system are impacting upon the kinds of content 
our participants are viewing. In some cases it is revealing new and unknown shows, and 
diversifying the content people watch. Yet, we are also noticing that many have formed 
ambivalent relationships with the recommender system. It may suggest programs that people 
are unaware of, but this is not always appreciated, after all, who is in control? Who is 
domesticating whom? Similarly the accumulation and abundance of content made available 
by the device is sometimes appreciated, with some claiming this means they are expanding 
their tastes or are able to be more discerning in their choice of viewing, whilst others claim it 
becomes a burden that must be managed:

“We like cooking shows and it records all these cooking shows automatically.”

“It taped some really good SBS movies which we would never have seen otherwise.”

“We’ve been more discerning, to be honest. We’ve been much more selective in what 
we watch, because you can go through that list of things that are sitting there.”

“Sometimes it’s a bit spooky when the little red light’s on, and it’s during the 
weekend and you think: ‘what’s it doing? What's possibly on TV at this time of the 
day that we would want to watch?’”

“There is only so much you can watch ... and there is too much junk.”

“When the TiVo was first installed it automatically recorded everything you vaguely 
showed an interest in. So we had to switch that off because there was a whole screen 
full of stuff we were expected to watch.”

“You can’t put everything on the [TiVo] wish list, because then you spend hours 
going through and deleting it.”

New technologies can’t be domesticated if they can’t be controlled, and an issue that 
repeatedly arose and mediated HSB expectations, involved difficulties making technologies 
work. Amidst the promise of technology affordances, in practice it is often difficult to get 
everything smoothly integrated and working as one would like:

“The wireless router is down there [downstairs office], and if I sit on this end of the 
lounge it’s okay, but if I sit on that end it drops out ... it’s really frustrating ... it drops 
out and you lose everything.”
“I am a bit of a technophobe: I like toys but I don’t know how they work; it’s a magic box with people in it.”

“Today is the first time the external hard drive has been connected to the laptop, I wanted to see if it could find it [music], so that I could then play the music that is on there through the Playstation through the stereo, but nothing works.”

“You buy a new thing and then it turns out it doesn’t actually work with the other things you have and you have to buy another thing to get the two things to work together. Why Sony – who now are doing the television and you can use the Playstation to record the TV as a PVR – doesn’t build that into the back of the television so it is a Playstation, PVR, TV, all in one I don’t know.”

An important aspect of controlling HSB was seen to be asserting limits on convergence, and on advertising and ‘junk’ content to be pushed onto consumers:

“We use Skype ... but the problem with Skype is there is no end to it, so it is very hard to get up and say look I have to do something. With the telephone it is so much easier to get out of it. People will just talk indefinitely it seems. Initially I couldn’t get Skype to switch off with this new laptop, so I stuck a post-it note over the camera in case for some reason it came on. At least then that way I could say ‘well there is something wrong with my camera. Sorry we can’t Skype now, the camera is not working.’”

“I’ve noticed over the last couple of years, there’s so much stuff on the Internet these days, just with normal usage you are downloading all these junk files you don’t want, basically advertisements, you do a bank transaction and you get all this Flash graphics stuff, pop pop pop, so just normal usage the bandwidth requirements are jumping up, not because you want it, simply because the way it works it chucks more stuff at you.”

In research terms then, the ground seems to be laid for a divergence between a desire to overcome technological limits and achieve seamless integration, versus those who had concerns about a range of undesirable consequences of increased bandwidth and convergence – such as cost, the ubiquity of screens, the demands of technologies or quantities of ‘junk’ content. This divergence represents in many ways a difference between users who want to integrate technology throughout the non-territorialised house and non-segmented daily life – despite, or maybe on account of, the common experience these same people encountered with problems of interoperability of devices and smooth functioning of service in the present – versus those who desire to domesticate and control media and communications technologies through territorial mapping and functional separation.

CONCLUSION

Overall, this study suggests that changes to the performance of family life in the early stages of broadband adoption are limited, and despite varying degrees of use observed in our participants, the meanings and uses of new technologies often adhere to familiar, routine, or past modes of use. The data also suggests, however, that more significant changes in behaviour are slowly or tentatively following from emergent affordances available. Tentative findings from this pilot study have confirmed that increased bandwidth is accompanied by increased participation in the digital economy, in online activities, and in the use of entertainment and communication services and technologies; and that increased digital literacy emerges through experience and use of HSB. The more immediate shifts are pronounced in the areas of entertainment or inter-personal communication applications, and
have yet to be, or remain to be, assessed in terms of the longer term possibilities or implications of HSB for labour, learning or service access arrangements from home.

While it is too early to draw extended comparisons between the expectations of providers (policy makers, engineers, entrepreneurs) with the experiences of end-users, at least two preliminary observations can be made at this point. Firstly, the above tentative finding, that there is some correlation between increased bandwidth and delivery speed and increased participation in the digital economy and related activities, lends initial support to the view that HSB has the potential to become an “economic and social transformations tool” (Bartlett 2009).

Secondly, participant interest in ancillary broadband services, such as TiVo’s VoD service, would seem to lend support to investor Ralph Wanger’s widely cited observation that there is much to be gained from investing in “downstream” businesses that will benefit from new technologies rather than the technology companies themselves (Watson 2005, 94). Yet, commercial interest in this space, and the perspective that “the NBN will transform the way content is delivered” (‘Hybrid TV and IBES partner’ 2009), both need to be tempered by the importance of paying due attention to the complexities associated with the domestication of new technologies. The experience of our participant households suggests that while the NBN is perceived to offer a range of benefits, these are mediated in relation to past routines of use, concerns about the future costs of HSB for households, as well as present frustrations in making their technologies work for them. A further challenge facing entrepreneurs is that it is unclear whether HSB infrastructure and the development of applications supported by it will be faithfully adopted by Australian households as supplied; our data suggest it won’t be adopted as-is, but will be domesticated in various ways.

In addition to the above remarks, the limits of the present pilot study also need to be acknowledged. Our research participants were only provided with moderate broadband capacity, the research is being conducted over a relatively short duration, and it is only being conducted in a single place. These limitations mean that the observations and conclusions of this initial investigation are restricted, and also that many issues require further exploration, especially as HSB capacities and services are made available, evolve, and become more habituated and widespread. The impending NBN roll-out also offers potential to extend the demographics of analysis and undertake comparative analysis across a range of contexts, including comparing differences between urban, regional and rural populations, and between different household compositions.

The authors’ intention is to convert the present pilot project into a longer study in order to track and compare changing modes of production, consumption and service access in the home over time and in different places as HSB technologies evolve. In this longer study, the aim is to utilise comparative, longitudinal methods to gather data that can track shifting expectations and experiences of communications and media technologies in the wake of the HSB roll-out across rural, regional and urban Australia. By mapping the uses of HSB introduction over time, and comparing these uses in different geographic and population contexts, such a study can provide a significant contribution to literature on media in the home in a time of rapid technological change by providing a contextual, comparative and longitudinal approach to analysing the dynamics of socio-technical change and increased bandwidth affordances in domestic settings – but also to yield specific, empirical knowledge relating to the social, technological, economic and geographic dynamics that shape Australia’s domestic broadband reception and usage. This information is vital to effective, evidence-based policy implementation and to successful private sector initiatives in Australian communications and media industries. It will also provide a clearer picture of whether the infrastructure supporting HSB and the NBN, and the services and opportunities permitted by them, will indeed emerge as “nation changing” (Bartlett 2009).
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ENDNOTES

1. Wireless and satellite technologies that will be able to deliver up to 12 megabits per second will be used to provide access to the remaining population living in more remote parts of rural Australia.

2. Appropriation’ is a term used within the field of Science and Technology Studies (STS) to refer to the differentiated social processes involved in the consumption, use and meanings of technologies.

3. ACMA (2007) report that most Australian homes have three or more televisions, three or more mobile phones, whilst almost every household has a computer, 91 per cent with Internet access, and 76 per cent with broadband access. Consequently, ACMA describe household media environments as technology rich or ubiquitous, whilst the Kaiser Family Foundation characterise the typical US home as media saturated.

4. The composition was as follows: four households were made up of families with a mother, father and either two or three children aged between 8 and 16; two households had two parents and a single teenage child; two households were couples without children; one house was a single father and teenage son; and, one house was a couple with a young child.

5. Each of the participants in the Hybrid SmartStreet project were given a TiVo media device that would permit access to high definition TV, as well as existing broadband services via Hybrid TV’s Video-on-Demand (VoD) entertainment service, CASPA (TECC 2009), as well as free Internet service for 12 months. While this trial was meant to simulate the NBN in terms of Internet speed and capacity over the period of the trial, our participants have reported broadband speeds up to 4 Mbps rather then the projected 100 Mbps. The broadband speed provided is, nonetheless, a faster service than our participants previously had – often dial-up – and so can speak to trends in domestic broadband use following increased bandwidth provision and domestication.

6. Personal video recorders (PVRs) are digital recording devices that save content onto a hard-drive rather than magnetic tape cartridges, as with VCRs.

7. This figure accounts for any content that is recorded and viewed at a later time. Oztam, however, differentiate time-shift viewing that is ‘As Live’ – viewing of recorded television content within the same day as broadcast – and ‘Time Shift’ – viewing of recorded television broadcast content up to seven days after the live broadcast time, see http://www.oztam.com.au/time-shift-faqs.aspx.
8. The TiVo is a PVR device, which allows for pause and rewind of live television; to auto record every episode in a season; to auto record shows via keywords such as favourite actors; to apply parental controls; to view a 7 day on screen guide, and record programs directly from the guide.

9. As our participants were not supplied with connection speeds resembling the NBN proposal (100 Mbps), the content available on the CASPA VoD service was unable to be viewed immediately, and the wait-time to download meant that most had not used this service.

10. The term affordance was originally coined by psychologist James Gibson to refer to the properties embedded within an object that enabled particular actions to proceed. It has since been modified within the fields of human-computer interaction and technology studies to include properties that users identify or appropriate, and so suggests a relational understanding where what a technology affords exists neither in the thing itself nor the person alone but instead emerges through their relationship.

11. Although there are already Internet-capable televisions, which offer web-access, many products currently only allow users limited access to online content or specific websites such as YouTube. Future products and platforms, such as GoogleTV will offer far broader and more integrated Internet content and access from a television screen.

12. This is the replaying of a broadcast program, or having broadcast content available online to allow people to watch it at a later, more convenient time.

13. The recommender system allows users to rate programs by pressing either a “thumbs up” or “thumbs down” button on the remote control. TiVo user ratings are combined to record recommended programs based on what TiVo users with similar viewing habits watch.

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