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Focusing on non-adopters of broadband: A critical realist perspective

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Abstract

Australia is conducting a substantial nationwide implementation of broadband. It is primarily a fixed line network but includes wireless and satellite networks in more remote areas. The rollout is under the control of the NBN Co, whose goal is ensuring access to fast broadband for all Australians. Their key performance indicators are the number of serviceable and activated premises. Recent reports indicate activation rates for fixed line broadband are exceeding expectations, despite increased competition from mobile connections. Whilst this is good news, international experience suggests adoption will plateau. We contend that there needs to be more focus on those disenchanted or disinterested "non-users" who are never likely to adopt. We argue for a critical realist perspective to better represent the adoption context and to provide a grounding for explanations of the causes behind such decisions. We also propose possible common-sense strategies to reverse non-adoption.

Keywords Broadband adoption, social realism, modes of reflexivity

1   Introduction

The Australian government is currently implementing a National Broadband Network (NBN) that will be available in various forms to all Australians. Whilst being an instrument of industrial policy which will facilitate production and consumption, the original motivation also embodied a substantial equity motive, connecting those in sparsely populated remote and less affluent regions which would otherwise not be economically viable to connect (Cave & Martin, 2010). In order to reach remote regions which would not be serviced by private companies, the former Australian Labor government established the NBN Co, a government owned corporation which is responsible for the rollout and ownership of the NBN throughout Australia. This organisation is the major vendor of wholesale broadband Layer 2 services to retail Internet Service Providers (ISPs) who on-sell services to business and consumers.

In this paper we consider the question of rural adoption (more specifically "non-adoption"). International experience suggests that in spite of strong promotion, reasonable pricing and social and economic benefits, rural adoption of broadband has been disappointing and lags behind that of urban regions. It is also evident that broadband adoption in more advanced broadband rollouts does plateau despite strong promotion; this plateau seems to be around 75% adoption. We suggest that this plateauing is a consequence of a core of "non-adopters" rather than so called "laggards". We argue that in order to address non-adoption we need to focus on the characteristics of non-adopters and the causes behind non-adoption. Park and Jae Kim (2014) argue that the Korean government has appreciated the importance of addressing the digital divide since initial rollout of their broadband network. They have collected relevant statistics on those disadvantaged and provided programs to encourage adoption. Yet the divide is perhaps more pronounced as the separation between users and non-users becomes more entrenched :

> the analysis in this study shows that the gap persists between those who are socially included and those who are excluded, suggesting that existing social exclusion parameters are transferred to digital exclusion. The second-level digital divide is compounded by existing social exclusion indicators, such as income, disabilities, age and occupation (p. 81).

We first present the dominant research models used to predict and evaluate adoption patterns, and suggest that these models focus on factors encouraging adoption, rather than factors affecting non-adoption. We argue that a different approach is required to properly examine non-adoption. We argue that the rollout of large-scale technologies, such as the NBN, need to be considered as both social and technical programs. This different focus requires a careful contextual examination of the social reality, or ontology, of agents both in terms of the context within which the adoption decision is made and in the way that agents consider this context in relation to their personal "projects" and their own particular ways of behaving. As Archer (2003) suggests, people always have the possibility to do otherwise than expected or predicted – this unexpected behaviour depends largely on their own reflexive deliberations – their "internal conversation". It is this reflexive engagement of purposive agents with their existing social contexts that needs to be understood in order to explain the reasons behind non-adoption.

We suggest that particular modes of reflexivity are associated with particular types of non-use and propose particular strategies for these different categories of non-use. We suggest that only by understanding the social reality of agents and their reflexivity (impacted by their natal, experiential and social history) can we hope to be able to explain and possibly address this rejection of broadband. We suggest that reflexivity is an important mechanism for explaining non-adoption and suggest that two modes of reflexivity in particular will explain much of the non-adoption (as described later in the paper these are the "communicative" and the "fractured"). We then suggest ways for promoting broadband for these two modalities in particular. We consider the context of rural adoption to better highlight our arguments.

1.1   Rural adoption benefits

LaRose et al (2007, p. 360) suggests the rural benefits of broadband are substantial including the fostering of social interactions to increase attachment to rural communities and reduce out-migration, enhancing economic opportunities by stimulating the development of home businesses, and improving rural access to health care and education. Using rural America as an example they suggest an important paradox in that the region most to benefit is lagging behind in adoption.

As Tsai & LaRose (2015) suggest, coverage does not necessarily imply adoption. This has clearly been appreciated by the NBN Co in their adoption of two key performance indicators - service provision

(homes and businesses serviceable) **and** premises activated. Recent reports (e.g the NBN Co FY2015 annual report) suggest targets for activation are being exceeded over the initial rollout: as of June 2016, 2,893,474 premises had been made ready for service and 1,098,63 activated (NBN Co, 2016). Yet despite the early NBN Co experience of unexpected high activation rates, recent studies (Horrigan & Duggan 2015) indicate that there is evidence of a plateauing of home broadband connection and a corresponding significant increase in mobile broadband. It is suggested that this is a consequence of large increase in smart phones and mobile tablets. Importantly though, as Zickuhr & Smith (2103) suggest, a significant proportion of users (20% of American users in their study) have neither home broadband nor a smartphone. It would be expected that such figures would be higher for rural regions where mobile access coverage is lower. Non-adoption is a significant barrier to achieving many of the benefits of ubiquity (such as medical services or education). It is important that this sector be better understood. In the following sections we review traditional research models, consider the implications of a focus on "non-users" and the usefulness of traditional models in examining "non-adoption".

1.2 Broadband adoption research models

Tsai et al (2015) compare 5 models used by researchers to examine broadband adoption – the Technology Acceptance Model (TAM, Davis, 1986; Davis, Bagozzi, & Warshaw, 1989), the Unified Theory of the Acceptance and Use of Technology (UTAUT, Venkatesh, Morris, Davis, & Davis, 2003), Diffusion of Innovations (DoI, Rogers, 2003), the Model of Adoption of Technology in Households (MATH, Brown & Venkatesh, 2005; Venkatesh & Brown, 2001), and Social Cognitive Theory (SCT, LaRose et al., 2007, 2012). They suggest that the first of these (DOI, TAM, UTAUT and MATH) work on similar foundations, each progressively extending previous models by adding particular variables. Such development is useful and important, however, as Bagozzi (2007) suggests (from Tsai et al (2015)), the parsimony or simplicity of the TAM model is its major strength – the powerful core assumption being that intentions to use a technology influence adoption behaviour, and perceived usefulness (PU) and perceived ease of use (PEU) determine intentions to use. Nevertheless: "Parsimony has also been an Achilles' heel for TAM. It is unreasonable to expect that one model, and one so simple, would explain decisions and behavior fully across a wide range of technologies, adoption situations, and differences in decision making and decision makers. ...in favoring a simple model, researchers have overlooked essential determinants of decisions and action, and turned a blind eye to inherent limitations in TAM...Almost no research has deepened TAM in the sense of explaining PU and PEU, reconceptualizing existing variables in the model, or introducing new variables explaining how the existing variables produce the effects they do" (p. 244).

In line with this suggestion we contend that existing models tend to inadequately represent the social reality of the agent and also have an unclear grounding in terms of representing the social and material context within which adoption occurs. We suggest that critical realism can provide a useful grounding for examining broadband adoption and non-adoption. In particular, we suggest that an individual's reflexivity (as described by prominent critical realist Margaret Archer in her sequence of books on the subject – Archer (2003, 2007, 2012)) is important in understanding how the existing identified factors will be less or more important for certain types of people and the personal projects they might be pursuing.

UTAUT builds on original DOI and TAM models to propose four key constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions that influence behavioural intention to use a technology and/or technology" (Venkatesh et al (2012, p. 159). The MATH model perhaps represents the most advanced of the models in that it builds on previous representations by suggesting that intention to adopt can be predicted by considering normative, attitudinal, and control beliefs: "Normative beliefs refer to other people's influence (including influence from friends and family, secondary (media) sources, and workplace referents) on an individual's behavior (Venkatesh & Brown, 2001). Attitudinal beliefs include applications for personal use, children, work, fun, and status gains. Control beliefs entail fear of technological advances, fear of declining cost, cost of the product, perceived ease of use, and possession of the requisite knowledge to use the innovation".

Yet we suggest that such additional constructs seem arbitrary in their inclusion and are not reflected in a clear theoretical grounding. As Bagozzi (2007) suggests none of the models adequately reflect the group, cultural or social aspects of technology acceptance. Our paper argues that a useful model for representing the social role of people is critical realism – an approach fundamentally focused on the actions of agents within a pre-existing social environment. Such an approach seems more suitable in considering the adoption of a technology like broadband that has such wide social and personal implications.

The TAM is largely conceived as a model for the adoption of technology by individuals; where social influences are acknowledged they are represented as external constraints or enablers to the individual adoption decisions, as Bagozzi (2007 p. 247) suggests: "When so-called "social influence processes" have been introduced into TAM, the practice has been to treat social influence in the limited senses of either a constraint or force on the decision maker and perceived as originating from "other people whose opinions are important to me" (e.g., Venkatesh and Davis, 2000) or as an attempt to "enhance one's ... status in one's social system," such as a reference group (e.g., Moore and Benbasat, 1991, p. 195)". A model based around critical realism fundamentally reshapes the adoption argument in its acknowledgement that in such matters the individual cannot be separated from their social role, as Archer (1995, p. 1-2) suggests "...for what we are and what we do as social beings are also affected by the society in which we live and by our very efforts to transform it... We are simultaneously free and constrained and we also have some awareness of it. The former derives from the nature of social reality; the latter from human nature's reflexivity". We suggest that **reflexivity** is an important mechanism for explaining adoption behaviour.

LaRose et al (2007) propose the use of social cognitive theory (SCT) to examine adoption behaviours seeking to understand the inner reasoning leading one to accept or reject an innovation. The SCT approach proposes a consideration of observational learning and enactive learning to better recognize the fact that perceived outcomes are formed through direct experience with one's own behaviour or through observation of the behaviour of others. The SCT grounding is used to propose additional causal factors termed enactive learning and observational learning. This approach is used to address the criticism that the diffusion paradigm often neglects the individual's capabilities and psychological factors and their role in technology acceptance or rejection. TAM and earlier models are said to instead focus more on the characteristics and qualities of the innovation rather than the important user perceptions: "That distinction is a crucial one in the present context, since the attributes of broadband Internet are more or less fixed while the perceptions of those attributes by consumers may still be malleable through promotional efforts" (p. 362).

SCT shares some elements with a critical realist approach in that both recognize the important role that cognition play in causal analysis. For both "reasons are causes", but critical realism provides a more developed foundation in that it also suggests an emphasis on pre-existing, perhaps non-recognized, non-ideational structures and mechanisms as well. As Johnson & Duberley (2000, p. 165) suggest:

> While our knowledge of these structures is always interpretative, human agency draws upon extant structures as a condition of action. Moreover it is through human agency that social structures come about, are reproduced and transformed — regardless of our intentions or awareness that this is so. So while human behaviour in, for instance, organizations may often lie in and be caused by the inner interpretative reasoning of actors: for the critical realist there may be causes that are not recognized by, nor accessible to, those actors.

In particular, the work of Archer (2000) highlights the role of emotions and embodied "active practice" in guiding "inner conversations", reasoning and decisions. The richer model provided by critical realism can provide a better understanding of the adoption decision. For this paper we particularly look at reflexivity as described within critical realist argument as an important mechanism to understand and ultimately explain adoption and non-adoption.

This distinction between adoption and non-adoption is important. As will be described below, adoption is a positive action whereas non-adoption may be a consequence of deliberate action or even disinterest. Forms of "non-use" will follow different causal chains and we argue will depend very much on the mode of reflexivity engaged by a person at the time.

1.3 Focusing on the non-user

Satchell and Dourish (2009) describe a range of varieties of non-use including lagging adoption, active resistance, disenchantment, disenfranchisement, displacement and disinterest.

The concept of lagging adopters can be seen to be prevalent in much of the Internet adoption literature and in the statistics used to examine adoption. Much of the literature discusses the benefits of universal adoption and the desirability of improving the factors supporting adoption and implicitly assumes that 100% adoption is possible. Yet broadband is ultimately a voluntary choice for many, home use being perhaps more voluntarist than business in that businesses, through competitive threats, might generally be expected to adopt the Internet promptly for commercial reasons. Non-use is not all about laggards, active resistance is an option for some users in that they may actively reject

the Internet for various reasons such as concern for privacy. Similarly disenchantment may be reflected by a limited or partial use of Internet applications as a reflection of nostalgic regret for things changing.

Disenfranchisement or exclusion can take many forms as Satchell and Dourish (2009, p. 12) suggest: "Interest in universal accessibility has largely focused on physical and cognitive impairments as sources of technological disenfranchisement, but it may also have its origins in economic, social, infrastructural, geographical, and other sources". The investigation of disenfranchisement depends heavily on an understanding of contextual social and personal situations and the particular material and ideational structures in place. Similarly displacement is an important concept in that manner "users" will depend on different material and social intermediaries to achieve their Internet connection. Such degrees of non-use are difficult to get a grip on when the dominant model for understanding adoption is considering a person with their own computer and not some public provision or private arrangement. The concept of "user" is challenged by such use or "non-use".

The final category of disinterest is perhaps the most difficult challenge for researchers and those promoting broadband in that the non-user may have no interest in the things that you assume they are interested in. As will be described below this is the domain of the "fractured" reflexive – those who are not participants in society but rather victims. Converting such a group is important since for many these persons have the most to gain, both economically and socially.

The crucial constraint in current adoption models is that they cannot properly represent these non-adopters nor make clear the causes behind the non-adoption. Such consideration often requires a careful deep analysis of the social and contextual: simple factors models cannot provide this depth. Much more sophisticated models are needed to reflect the complexity of adoption and non-adoption.

In particular current research models have no recognition of the different types of user and how their different life worlds affect the adoption decision. We suggest the consideration of **reflexivity** to better explain non-adoption.

2 The role of reflexivity

We propose a focus on non-adopters and suggest the importance of reflexivity as a mechanism to explain the non-adoption decision made by particular agents in particular contexts. Potential users differ in their cultural and economic environments, personal characteristic, their capabilities and their life-concerns. As Kontos and Poland (2009) suggest when examining social health care improvements, there is a need to reflect human choice along with context in examining government programs:

> In seeking to understand how mechanisms play out in a particular setting, with particular agents at a specific time, we must also take account of how reflexive agents perceive, negotiate, unwittingly reinforce or selectively resist the effects of these broader trends and influences in the context of their own life biographies, socialization, and the micro-social context of peer relations in the workplace (p6).

Recent research in the social sciences suggests that individual reflexivity (termed the "internal conversation" by Archer (2007)), driven by personal biography, context and personal concerns, provides useful information about how individuals engage with information and decision-making. Reflexivity is defined as the "regular exercise of the mental ability, shared by all normal people, to consider themselves in relation to their (social) contexts and vice versa (Archer, 2007, p4).

As Garcia-Ruiz & Rodriguez-Lluesma describe:

> Human reflexivity becomes important as the linkage between concerns, projects and practices. We act in order to promote our concerns, and form projects to advance or to protect what we care about most. It is through our internal conversations that we reflexively define the courses of action conducive to the realization of our ultimate concerns in an appropriate modus vivendi [mode of living]. What people seek to do is reflexively defined by reference to the concerns they wish to realize. This means establishing practices, both satisfying to and sustainable by the subject, in an appropriate social environment (Archer 2007, p. 88). Hence, to understand the meaning of those practices it is necessary to grasp the life-projects in which they are embedded, as well as the ultimate concerns that underlie such projects (p. 223).

Archer (2010) asserts that most western social theorising has "regarded reflexivity as a more or less homogenous phenomenon" (2010, p5) which when applied in similar circumstances would lead to the

same outcomes. This, of course, has induced analysts to search for the "silver bullet", the "critical success factors" which explain what most people will do most of the time – thus for broadband we are tempted to propose important identifiable supportive adoption factors such as price, speed, availability, ease of use and so on. These are identifiable external factors and are important considerations in the adoption decision. But such determinants need to be considered alongside the individual's internal reflexivity seen as an inner dialogue. Individuals always have the possibility to do otherwise than deterministic logic dictates.

Archer (2007, 2009, 2010) describes the importance of this mechanism, largely seen to be a consequence of the natal context, in explaining agents life decisions. In a series of books she examines the role of reflexivity in today's society and proposes a number of dominant reflexive modes that can help to explain people's ultimate concerns and how these concerns impact their life choices. In particular, Archer (2000) explores the dynamics of reflexivity and places the "ultimate concerns" of the individual within "three orders of reality" which shape the outcomes of their "internal conversations": these are the natural, the practical and the social (p. 197). The natural world encompasses that which must be navigated to ensure physical well-being: avoiding hunger and stubbing your toe. The practical world demands that we take steps to get things done: to catch a bus or catch a deer, to use a monthly ticket or a bow and arrow. The social world provides normative directives and notions of self-worth and aspiration. The self (providing the "necessary anchorage" for the application of reflexivity) moves between these strata in making decisions or rationalising them away. It is this conception of individual agency that allows us to locate decisions to adopt broadband within a historical and dialectical context. Unlike a computer or decision tree that will identify, weight and process criteria immediately prior to the event, the application of reflexivity is a mode of deciding which unfolds from a preceding timeline in which physicality, emotion, active practice and reason have been engaged.

2.1 Modes of Reflexivity

The notion of reflexivity in explaining the behaviours of agents and actors as developed by Archer is both simple and powerful (Mutch, 2007). It characterises individuals as variously adopting communicative, autonomous, meta and fractured modes depending on their personal concerns, projects and practices:

- The *communicative reflexive* inhabits a coherent, stable social world that is constantly reinforced by reiteration and external conversations with others, re-establishing and reinforcing the status quo.
- The *autonomous reflexive* is less reliant on others, more dependent on internal conversation and shuns predictability through this self-reliance and limited dependence on the "similars and familiars" that support and shape the conservatism of the communicative reflexive. They are primarily self-motivated, upwardly mobile, innovative, and not risk averse. They tolerate and flourish in contextual discontinuity and change.
- *Meta reflexives* are inward looking, contemplative and ask questions about the questions themselves: *why do I think like this, what caused me to be this way*? They are idealistic, support worthy causes or the disadvantaged, and can become socially seditious as they observe contradictions and historical conspiracies.
- Finally, *fractured reflexives* are passive agents who are unable to reflexively examine life's alternatives – they become frozen, unable to participate fully in reinforcing, changing or challenging the way of things – they are seen by Archer (2003) as societies "victims". Archer suggests a relatively even division between each sector within today's society.

Emirbayer and Mische (1998) consider a more action-focused perspective and define three distinct capacities through which individuals engage with change: iterative, practical evaluative and projective. The *iterative* capacity is constrained to the continual reconstruction of the status quo, a highly conservative and static form of dealing with the world directed at reproduction of the past. The agent with *practical evaluative* capacity, whilst often conversational and therefore conservative, will adopt a technology if it fits existing purposes and structures in the present – a better kind of hammer, but still a hammer, so to speak. The *projective* capacity, focused on the future, and usually residing in autonomous reflexives, envisions new purposes and new structures for the realisation of aspirations. These three components of agency therefore play an important role in understanding the adoption decision by individuals.

Archer's *communicative reflexive* re-enacts external conversation with "similar and familiars" to develop their internal conversation, thus reinforcing conventionalism and "the familiar over the novel". As detailed in Table 1 below, we propose that the brand of non-use particular to the

communicative would be disenfranchisement, displacement and perhaps disinterest. For the iterative old ways of doing would do just as well and little motivation is possible unless their similar and familiars adopt. Communicatives may tend to depend on other parties to fulfil their needs and may never completely adopt. The communicative reflexive would tend to adopt broadband if it was deemed to support iterative behaviours or if it were mandated in some way (for example for health services). Subsequent enactment would only ensue if trusted advisors from their relational group confirmed and supported their initial interest. This reflects Katz, Matsaganis and Ball-Rokeach (2012) proposal to embed influence within local media and minority anchor groups as a means of helping the USA's National Broadband Program gain traction amongst ethnic groups in that country. Local media and anchor groups understand the context and life world of those groups and can frame the applications of Broadband in a way which makes sense to those participants.

The *autonomous reflexive*, with their dependence on their own reason and future orientation, would be practical or projective; they would be open to novel ideas or practical conceptions, providing they were in line with their instrumental purposes. In general they would be enthusiastic adopters of broadband and non-adopters would be considered as laggards – the attraction of the Internet for personal and social gain would ultimately be expected to lead to adoption. Selling broadband to the autonomous reflexive SME owner-managers, society's entrepreneurs, should not be difficult if they are familiar with Internet possibilities, but external factors such as speed, cost, and availability would be important in discouraging laggard behaviour. Perhaps in some cases they would need encouragement in self-efficacy and coaching to show how the broadband would directly improve utilitarian outcomes and their own life chances and business prospects.

In fact Archer (2007) suggests that the autonomous reflexive increasingly dominates today's globalized society: "Today, decreasing numbers of us live in the situation termed 'contextual continuity', which seems to be the necessary though not sufficient condition for the development of communicative reflexivity" (p. 320). Archer goes on to propose that the proportional reductions in communicative reflexives within today's society will lead to corresponding increases in autonomous reflexivity. As the situational logic of opportunity engendered by increasing globalization and contextual social discontinuity the autonomous reflexive will have increasing opportunities for personal advancement. Such argument is good news for broadband adoption, however as Dobson, Jackson and Gengatharen (2013) suggest, rural communities are perhaps more ensconced in a situational logic of protection, rather than opportunity. For rural communities the drift towards metropolitan cities, lower job opportunities and a desire to maintain the family encourages a focus on protection of opportunities and life chances in order to better fulfil their rural projects. For rural communities the predominant reflexivity mode would be the communicative reflexive who depends heavily on similars and familiars to help guide their life choices. This suggests a different approach is needed in rural communities – one focused on avoiding displacement and emphasizing the benefits for social groups.

It can be similarly argued that the meta-reflexive would increasingly be observed in rural regions as people move to the rural regions in order to avoid or address the incongruities of modern society. The meta-reflexive would be most open to the projective ideas and novel choices provided by broadband providing they were in line with their moral aims; their actions would be expected to be targeted at the greater good and could be ambitious and impractical in their social aims, perhaps even to their own detriment. Meta-reflexives may actively resist broadband for moral and altruistic reasons and may reflect a disenfranchisement in non-use. The ability of the Internet as a change agent would need to be emphasized and the social benefits achievable highlighted.

The hardest "nut to crack" would appear to be the fractured – their brand of non-use would largely be dis-interest and would perhaps be the most difficult to address. How can those disengaged from society as a whole be encouraged to adopt the social applications provided by broadband? The external factors suggested by traditional models would have little attraction for the fractured – broadband access would generally be used in public services such as libraries or government offices. Adoption of broadband would be a consequence of mandated requirements and would be limited and short term. Yet this sector of society is the most vulnerable to experiencing the disadvantages of non-use; the digital divide has serious implications in terms of accessing government services and information. Direct focused intervention would need to be introduced to individually introduce broadband and its benefits. Table 1 summarises the differentiated approaches that might be taken to encourage broadband adoption.

2.2 Modes of Reflexivity and Adoption Programs

Our characterisation of individual agency has consequences for the provision of information upon which to base decisions to adopt broadband. Training programs to the general public, often

communicative reflexives, must allow for patient and inclusive conversation which encourages re-evaluation of norms and collective assumptions. Social norms influence attitudes to computer-mediated interaction but informed conversation can change them. Furthermore, information might be better delivered to cohesive social groups and in social environments to encourage ongoing conversation about broadband to take a positive and practical direction that gains momentum within a social group, rather than allowing the reinforcement of the status quo (which might be based upon a general ignorance of both their own life worlds and technology). Another strategy would be to embed technologically savvy agents of changes into community groups to conduct conversations about broadband in the language and context of the group. Whilst there is a palpable rural ideology, it is not clear how universal it is or indeed that everyone has bought into it. And yet as an "undiscussable" component of the rural social world, its presence can be felt in group defensiveness or rejection *vis à vis* Broadband and the Internet in general. The role of computer-mediated communication in enhancing existing practices and its possible practical applications may encourage adoption. Education or advertising about the benefits and scope of the Internet and broadband should be integrated into this fabric. It can be both discussed and demonstrated to strengthen and not diminish the country way of life.

Similarly, social ontologies of groups such as small manufacturing, farmers, medical services, country town historical societies or sporting clubs could be developed to identify the most important aspects of those business and life worlds. These would lead to a picture of what is important in those groups and points of leverage for the NBN could be highlighted in education. Information provision, whether in advertising, training or brochures, should be as specific as possible to life worlds, providing specific and common scenarios and use-cases. Whilst it may be important for other reasons, non-specific advertising will probably not influence people in the decision to adopt. Again, embedding of domain experts or change agents who also understand the opportunities of broadband within such groups could help adjust attitudes to broadband to become more positive.

Table 1 summarises the differentiated approaches that might be taken to encourage broadband adoption.

Agents' Reflexive Mode	Type of non-use	Agents' Reflexive Capacity	Possible target groups	Promotion Strategies
Communicative	Disenfranchisement, Disinterest	Iterative	Older rural people, isolated communities, some community groups (historical society, museum, sport)	Embedding empathetic specialists within social groups, conducting dialogue and sensitive conversation in group contexts
				Focus on Normative Beliefs (MATH model)
				Appreciating personal capacities and self-determination.
				Focus on group ontology (community activity), specific use cases and applications
Communicative	Disenfranchisement Displacement	Practical Evaluative	Farmers, small businesses, artisans	Focus on group ontology (business activity), specific use cases and applications
				Focus on Normative and Attitudinal beliefs (MATH)
				Encourage enactive and observational learning (SCT)
Autonomous	Laggard	Projective and practical evaluative	Managers, community leaders, innovators	Enactive and observational learning (SCT)
				Improve external factors like pricing, cost, availability etc,
				Focus on Enactive learning
				Address Attitudinal beliefs
Meta	Active	Projective	NGOs, consultants,	Focus on Control Beliefs (MATH)

	Resistance		volunteers	Emphasise social benefits and opportunities
	Disenchantment			
Fractured	Disinterest	Not consistent	Marginalised groups	Training in reflexivity to understand personal capacities and self-determination.
				Emphasise non-exclusional aspects of broadband (e.g. voice-voice, applications requiring low literacy)
				Embedding empathetic specialists within social groups, conducting dialogue and sensitive conversation in group contexts

Table 1: Summary of adoption strategies for modal groups

3 Conclusion

The paper argues that broadband promotion will need to focus more on non-adopters as broadband provision matures. As discussed the adoption of the NBN in particular will plateau as mobile users increase. However there will always be an element that will never adopt fixed or mobile broadband – it is this sector that needs to be well understood and targeted. Understanding the physical, practical, social and cultural characteristics of this group is an essential prerequisite to addressing inequities. We believe using Archer's model of self and reflexivity allows a rich analysis of adoption trajectories and has profound implications for future research. Critical realism, as a method of framing and analysis, can provide an important "underlabouring" role. In rural regions in particular, we suggest that promotion of broadband needs to be cognisant of the dominant communicative reflexive element evident in the region – the dependence on "similars and familiars" to confirm or deny decisions, the family focus and lifestyle orientation of many inhabitants.

Generally, our analysis suggests that there is the opportunity for a more nuanced and sophisticated provision of knowledge and information to businesses and communities in rural and remote areas that will accelerate the uptake, application and innovative redesign of business and life worlds to exploit this landmark communications infrastructure. Accepting the more dominant role for the autonomous reflexive within metropolitan regions would allow a similar conclusion but the dominant message from our study is that no mode can be ignored – each mode needs to be recognized in advertising and promotions since all targets have their own particular issues and contextual concerns. In particular strategies need to be developed to target the fractured reflexive and to break through the evident disinterest and lack of connection.

Traditional Internet adoption models developed around the diffusion paradigm will be useful to develop strategies to convert non-adopters to adopters but the strategies need to focus on particular groups to be most effective. This paper suggests a social realist approach such as critical realism can provide useful grounding for examining the social, cultural and personal issues underlying non-adoption. As Fleetwood (2005, p. 197) suggests, **ontology matters**: "The way we think the world is (ontology) influences: what we think can be known about it (epistemology); how we think it can be investigated (methodology and research techniques); the kinds of theories we think can be constructed about it; and the political and policy stances we are prepared to take".

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