A Market of Pilots: Exploring the role of consumers and design in the development of a mass market for ambient assisted living technologies.

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Abstract: There is growing evidence that the market for ambient assisted living technologies is not developing at the speed, and to the scale, that has been forecast.This paper explores the relationship between design and the dynamics of this emergent market sector. The intention is to consider the processes that shape the development and production of such technologies and to explore how they are shaped by, and themselves shape, an early stage market.

Keywords: AAL; Pilots; market development; design; technology

1. Introduction

This paper asks what it is that makes a market. It is not intended to provide a formal piece of economic analysis – not least because its author is not an economist. Rather, the intention is to cast a critical eye on the practice of the ambient assisted living technologies sector. In particular, the desire is to diagnose some of the reasons why the market for these technologies has not developed as expected, and to make some recommendations that might change the course of the developing market.

Organised into three sections, this paper first explores the basic nature of the existing AAL market and some of the factors believed to be stifling market development. I characterise the AAL market as being 'supply side' led and I argue that this imbalance has implications for what products the AAL sector produces and how they are adopted. Secondly, the paper explores how a market operates in relation to products and their users. I suggest that this relationship is critical to understanding how products are designed, how they evolve over time and the speed and scale of their adoption. The notion of a market as a 'conversational device' is introduced as a way of understanding the functioning of these relationships in different markets or product categories. Finally, the paper explores how the AAL market might re-orient its focus, its technology development and its broader narrative to drive adoption.

2. A Supply Side Market

There is a saying in the healthcare technology world which runs as follows – "Our country has more pilots than x" (where for x the speaker inserts the name of the national airline). For the companies, academics and policy makers that have devoted considerable time, energy and resources to establish a market this 'joke' provokes a world-weary acknowledgement that the market is indeed not taking off. At present, the market for many health and care or AAL technologies is in many respects a market of pilots. There is growing evidence that the market for ambient assisted living technologies is not developing at the speed, and to the scale, that had been previously forecast (1,2).

This slow development has mystified many commentators, not least because the demographic and economic drivers are mature, and health care needs are obvious. The key issues are well known: significant and rapid ageing of the population, the growing prevalence of chronic disease and consequent increase in demand for care and support from health and social care systems. At the same time, as the population grows older the dependency ratio, the proportion of those in working compared to non-working age, declines. Increased life expectancy is accompanied by increases in the incidence of mental and physical impairment and a rise in the number of people living alone and in need of care. The result is welfare, health and social care systems which are confronted by unprecedented challenges in terms of the quality and quantity of the care they need to provide.

In the context of the convergence of these powerful demographic, health and economic forces, new ways of imagining and providing care are being encouraged. These are described as being about transforming a model of reactive, illness management in locations such as hospitals, towards a more decentralised, self managed and proactive or preventative mode of 'personal' care in the home. AAL technologies are regarded as essential in the development of new models of care and, it is argued, such technologies represent a huge market opportunity.

Pronouncements about the self evident benefits or logic of a market for technologies that enable people to manage more of their care within a home environment, are common in policy and other documents outlining AAL technologies. However, a market has not yet flourished. Analyses of market immaturity often focus on extrinsic factors such as policy differences across countries, or lack of reimbursement systems and these are held to be the principal barriers to market development (2).

Less often do commentators pay attention to the intrinsic nature of the AAL market which has developed to date and the ways that its current form might be part of the slow growth problem. One way of characterising the AAL market, as it has developed to date, is as being 'supply side' led: a market dominated by clusters of actors focused on the design and development of technologies and in which demand, or the lack thereof, is lamented but not creatively addressed. These clusters can take a variety of forms such as industry-academic collaborations, networked collaborations of multiple stakeholders and small business innovation initiatives (3). Funding for such initiatives can be from a variety of sources, most typically from national and EU sources such as the UK government funded Assisted Living Innovation Platform (ALIP) or EU Framework Projects.

In other words, an attempt is on-going to create an AAL market through an industrial-era style science and technology-led innovation model. In this paradigm the objective is on technical innovation and invention and tends to be led, in disciplinary terms, by scientists and engineers. What is excluded

is a concerted attempt to include customers from the point of ideation onwards, and to think creatively about the new business models that will be required to see sustained adoption and integration of technologies into the lives of individuals and organisations. In large part, the customer of such technologies in this innovation paradigm is assumed to be care commissioners, public servants, not consumers.

It is worth reflecting on the fact that these characteristics of the supply-side market - centrally funded from the public purse, dependent on subsidy and research grants – are broadly out of step with current trends in social and healthcare policy. Such policy is shifting towards ideas of consumer empowerment in which the individual receiving care is re-imagined as a much more powerful and central figure in the organisation and provision of this care (e.g., Putting People First, 4). At yet in some ways the model that has emerged to develop technologies for this nascent market is profoundly distanced from, and even antithetical to, the market models presumed in this emergent policy landscape.

However, this not to argue that the 'user' is ignored in the process of understanding what to design and develop in the AAL space. The shift towards user-centred design is to be applauded but it does not, in itself, equate with receptivity to the needs and dynamics of the market as is implied by, for example Curry (3), who states that 'knowledge of user needs creates market pull not technology push'. Listening to users (be they 'end' users, organization or other stakeholders) creates technologies and services that meet 'needs' and have a degree of fit with the everyday realities of those consulted – but it does not follow that because 'users' have been consulted there is market pull for such technologies. There is market pull for technologies when a market of dynamic buyers and sellers is operational. Listening to users does not itself create markets, though arguably it is one important precursor to creating the right products for a market.

Markets develop from, and are at core about, a relationship between supply and demand. In a typical market, information flows between producers and consumers results in changes in product price, features, design and other features . Consumer behaviours in a market provide information to producers, designers, integrators through the value chain. In a supply-side 'proto' market no such communication between producers and consumers occurs. Interaction between the users and the producers of AAL technologies is largely confined to a process of 'needs' evaluation and 'user-centred design' processes. This has had important implications for what is being produced, how it is being adopted and, consequently, on the overall nature of the AAL market.

2. Markets as Conversational Devices

"The only thing worse than being talked about is not being talked about" - Oscar Wilde.

In the seminal 1999 business book *The Cluetrain Manifesto*, the relationship between customers and businesses that comes about in markets was explored. The authors' thesis was that markets have changed, in large part because of 'electronic media', and resultantly 'markets are getting smarter—and getting smarter faster than most companies' (5). At the heart of the Manifesto were the ideas that

'markets are conversations' (Thesis 1) and that 'markets *want* to talk to companies' (Thesis 60): the essential proposition being that the interaction between customers and companies constitutes the market; that the market is a flow of communication in two directions - a conversation. The Manifesto authors sought to encourage companies to listen to their customers, warning them that, in 'networked markets', customers have a new found power to critique and comment upon an organisation's products and services and this has implications for the management of their market franchise and reputation.

The broader point of the Manifesto was about the creative potential of the interplay between business and their customers. The authors argued that this potential could be used to the advantage of businesses in understanding consumer preferences, experiences and needs. The internet, the authors contended, created a new channel for *and* amplified the signals between the demand and supply side of markets, creating new opportunities for businesses to hear the voice of their customers (and detractors). In this sense, markets are a device for communication between those that produce and those that buy and use goods. Such communication can be implicit and explicit. Buying or not buying a good is sending a signal to the producer about the veracity of their design, pricing and other decisions. Equally, listening to explicit customer feedback, comments and the opinions of others in the value chain allows companies to learn about their product and service offerings. This point was made succinctly by William Davies who noted that 'markets…are computational devices for translating opinions into facts. It's not so much that they don't lie, as that they *can't*. In the words of George Stigler they "lay the cards face up on the table"' (Davies, 6). Markets are communication devices.

Markets tell technologists, designers, academics or policy makers what it is that people are buying, using, adopting and saying about products. They are the most intimate of feedback mechanisms. We might refer to them as a *conversational device.* However, the challenge confronting the AAL community is the fact that a market, in the form of a fully functioning conversational device, does not currently exist. And in the absence of a market it is difficult to assess the actual usage, attitudes, practices and preferences of AAL consumers. My contention therefore is that while pilots might be useful they have a number of deficiencies when compared to a market – they are short term, often support abstracted or 'unreal' use cases, benefit from un-natural levels of support and intervention from technicians and researchers, and, crucially, unlike a market, are not repeatable. Repetition is a key feature of a market: pilots typically are one-off projects. This is not, of course, to argue that pilots have no value: the adoption of new technologies in this sector requires evidence of their utility, and efficacy, and support for the claims that they provide business value and increase the quality of care. Equally, technology needs testing in the challenging conditions provided for by pilots.

What results from conversation about products, technologies and services that exist between producers and consumers of such goods? Design historian Harvey Molotch argues that talking about things enables them to evolve or mutate since it implicates them within everyday discourse. In conversations about goods and service we are explicitly, or implicitly, comparing them with competitive or similar items and we are bringing to bear symbolic, metaphorical and descriptive powers which shape our own, and others perceptions and uses of the item.

He makes this point with reference to different types of goods:

"Some products are more mentionable; people may enjoy giving consumer tips to one another on computer equipment or sports gear…Washing machines are kept relatively apart – physically in the utility room and topically out of dinner parties – because they are just not interesting in social life" (Molotch, 7: 104)

Other classes of good, Molotch suggests, sit outside the bounds of normal conversation:

"Goods associated with infirmity and disease are often off-limits for casual banter, making it hard for remedial products to easily respond to change tastes systems or even functional needs….the stigma shape the goods and inhibits them from changing" (ibid.: 106)

So we have the idea that talking about things, whether through formal or informal feedback mechanisms and in everyday life contexts, pushes these things to the heart of everyday discourse where its form, design or aesthetics becomes implicated into systems of taste, practice and preference. In short, when we talk about something, even in negative terms, it is becoming a reference point in a cultural landscape and that it useful for producers of goods and services.

If a market allows things to be talked about – the non-existence of a market prevents this all important talk occurring. This is the challenge currently faced by the AAL community: the immaturity of the market results in the inability for demand-side messages about peoples' uses, experiences and desires to be heard in the way they are in a mature market. However, that market is failing to emerge in part because of the absence of consumer voices that can shape the production of technology designs. The AAL market faces a double bind.

The objection might be raised that significant time and effort is spent in AAL programmes, and in the world of R&D, listening to users and understanding their every day lives, their needs and the contexts of product or service use. Indeed, such an approach, once unusual, is now an orthodoxy. It is clearly vital to listen to all stakeholders when conceiving and designing technologies. Indeed, many design processes now focus on the practice of co-creation – working with 'end users' to design *with* them, not just *for* them based on a detailed understanding of their needs.

My intention is not to critique this approach – indeed it is one that I wholeheartedly endorse – but I want to stress that listening to users in the design process, and through formal evaluation, is not the same as studying the dynamics and behaviours of a market. Additionally, in contemporary consumer capitalism notions of desire, experience and identity are at the core of our ownership and use of products and often it is the intangible value, more than the tangible benefits, that shape our desire to own and use technologies. There is a danger that design processes based on 'user needs' will focus more on meeting those 'needs' than igniting the imagination of users through attention to the cultural and symbolic aspects of the technology.

My argument is therefore that if AAL technologies are not in a market setting, they will not become part of our cultural landscape and we won't talk about them. Not talking about things inhibits their ability to adapt or contort to suit the lives of their 'end users' or the organisation into which their integration is vital. This then, is the diagnosis of the problem – the lack of a market – and its

repercussion – the production of technologies or objects that are not talked about, not part of our socio-cultural landscape and do not therefore initial reflect, or evolve to reflect, systems of taste and practice.

What though of possible solutions to this problem? How can the AAL community create a market or work towards creating a space, beyond pilots, which allows producers and consumers of AAL technologies to interact in mutually beneficial ways?

3: Creating Conversational Devices and Products

Because the purpose of business is to create a customer, the business enterprise has two – and only two – basic functions: marketing and innovation – Peter Drucker

The AAL sector currently sits in a liminal space between the market and the pilot and, as I have argued, because there is only a 'proto-market' at present there is no clear mechanism for understanding what product and service are desired and would be used in repeatable, non pilot contexts. My argument is that the market is an extremely useful construct, because it suggests a conversation (a relationship) between a provider and consumer. However, problems arise when that conversation is not facilitated. And yet, in some senses the market is a poor construct, because it ignores the "organized complexity" in the environment. To that end we need to (a) appreciate the density of connections and practices that are in the world; and (b) create denser feedback loops between producers and users of new technologies such as AAL. I now want to turn to some other recommendation for closing the gap between our ambitions of a significant market for AAL technologies and the current reality.

A Private or Public Market. At present there is an implication in the design and go-to-market strategies of AAL players that national governments, and their health and care agencies are the ultimate customer of their technologies. The 'Commissioner', not the consumer is central to the conceptualisation of the market. This has important implications for the way that products are conceived and designed – as assistive technologies that support 'needs' - rather than products that enable the sort of everyday experiences of a highly heterogeneous older population. The result is a stigmatization, and a lack of acceptance of products or services because they are considered suitable for 'the other': the old, frail and infirm. As a recent set of policy recommendations notes: "it would be best to avoid 'niche products' and look for products/services that are adaptable to the need and demands of a wide range of potential customers"(2, 12)**.** A recommendation, therefore, is to consider more fully the scope of a private pay or hybrid pay market for AAL technologies.

A Focus on Design. As I have argued elsewhere, "for technology to be usable, useful and desirable it has to have 'soul'. We need to strive to make technology that connects people to their own aspirations, their own projects of self development, self esteem, experience and identity. People, of whatever age, are multi-dimensional and technology needs to support multi-dimensional lives and experiences" (8, 10). A focus on design, comparable with that evident in most consumer products and

technology devices, would reduce stigmatisation and lead to the creation of products that attend to contemporary aesthetics, and culturally relevant motifs.

'Talkable' Products. If the proposition that markets are conversation devices is accepted then our aim as a community should be to create products that can be talked about. In part, more focus on design, usability and desire at a product level is vital. However, that is an argument about form and aesthetics. At a functional level, the AAL community needs to consider integrating the ethos and practice of Web 2.0 into its creations – this means actively supporting interactions with other platforms, data sources and building an inherent sociality into devices. This will require a recognition that in a Web 2.0 world, sources of meaning and value (e.g., friends, digital artefacts such as photos, music, location aware services) are likely to be external to a technology platform and the AAL design challenge is to enable users to access these sources of value.

Toolkits for Innovation: One existing feature of the AAL sector is the creation of multiple, competing technologies, infrastructures or knowledge ontologies by different collaborators and teams. Consideration should be given to the development of resources or toolkits which allow a broader community of developers to interact with, and innovate for, these technology infrastructures. A focus on, for example, the creation of software development kits (SDKs), would create the opportunity for a broad community of developers to create value for users at the front end, without having to focus on the complexity of the back end infrastructure.

A System view of Innovation. To date, it could be argued, much of the energy in the AAL sector has been expended on technologies and products, and less on innovations in service design and innovation, including business models. In order to stimulate market development a more system level view of innovation needs to be adopted, with a focus on long term integration into complex organisations and networks. One element of this approach is to ensure that the need for market research analysis, in addition to the focus on 'user needs' in the design stage.

4. Conclusion

Much of what has been suggested above mirrors the arguments made in a different context by Amar Bhidé in his book *The Venturesome Economy* (9). In arguing against what he refers to the 'techno-nationalist' advocates of greater investment in cutting-edge science and technology research, Bhidé argues that innovation which take place closer to end-consumers can have a greater impact than scientific or technology advances and innovations. For Bhidé it is the integration and application of existing or new technologies that is the source of value creation; the iPod® is an obvious example. In that sense he highlights the role of marketing and sales processes in innovation, over and above the technology know-how or product attributes. I believe that this argument resonates with the challenges facing the AAL sector and community. As I have argued in this paper, we need to create a market in

which the voice of consumers (not just users) can be heard and acted upon, in order to let them have a equal voice in the shape of a market and its products.

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