Researching the Portal

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ABSTRACT

The Web portal is now ubiquitous, and a considerable amount of research has now been done into portal technology and applications. In this paper we will argue that research in portal applications should adopt a socio-technical stance, and should see the portal as an innovation which must be adopted before it can be used. We distinguish between inventions and innovations and argue that there is nothing automatic about adoption of an innovation, and that this can best be investigated through the lens of innovation theory. The paper also points out that from a socio-technical perspective some portal adoptions have had positive consequences while others have been negative. To fully appreciate all the human and non-human influences involved, research into the applications of portal technology should adopt a socio-technical approach that considers positive and negative consequences of this technology. We argue that a good way to do this is by considering the portal as an innovation and considering its adoption using the theory of innovation translation, informed by actor-network theory.

WHAT IS A WEB PORTAL?

Most people have a idea of how to answer this question, but not all the answers would be the same – there are many views on what constitutes a web portal. The term 'Web portal' is rather overused and takes on a somewhat different meaning depending on the viewpoint of the people involved in the discussion. Some people define a portal quite tightly suggesting, for example, that it must be customisable by the user or that it must have certain specific features (Tatnall 2005c). Although there are many different definitions, some simple and some quite technical, we will use a simple definition that suggests that as in general terms a portal is just a gateway, a web portal can thus be seen as a gateway to the information and services on the Web. More than this, a Web portal should be seen as providing a gateway not just to useful sites on the Web, but to *all network-accessible resources* whether they involve intranets, extranets, or the Internet (Tatnall 2005a). In other words a portal offers easy centralised access to all relevant network content and applications.

The first Web portals were designed by companies like Yahoo, Excite and Lycos to act as general jumping-off points to the contents of large parts of the Web. An early classification of portals had them being either horizontal or vertical (Lynch 1998). The original portal sites mentioned above would have been considered as horizontal portals because they were used by a broad base of users, whereas vertical portals were focused toward a particular audience. Davison, Burgess and Tatnall (2004) offer the following list of portal types: General Portals, Community Portals, Vertical Industry Portals, Horizontal Industry Portals, Enterprise Information Portals, e-Marketplace Portals, Personal/Mobile Portals, Information Portals and Niche Portals. A major problem, however, is that new types and categories of portal are appearing all the time, portal types are re-classified, and most classification schemes include overlapping categories. Even given the difficulty in classifying portals or attempting to count the numbers of each type, it has become clear that specific, rather than general portals are very much the topic of interest around the world (Tatnall 2005c).

THE GROWING IMPORTANCE OF WEB PORTALS

A crude measure of the growing importance of the portal comes from a Google search of the World Wide Web. In September 2006 this search produced ***1.5 billion*** entries relating to Portals. A similar search performed in October 2005 produced 425 million entries, and in December 2003 only 35.6 million. This measure is rather crude as definitions change and some entities that were not previously called portals now are. It is also the case that some of these entries refer to other types of portals, such as those providing entrance to medieval cathedrals. It is nevertheless clear that web portals have become an important topic for discussion, and one that is becoming more important as time goes on.

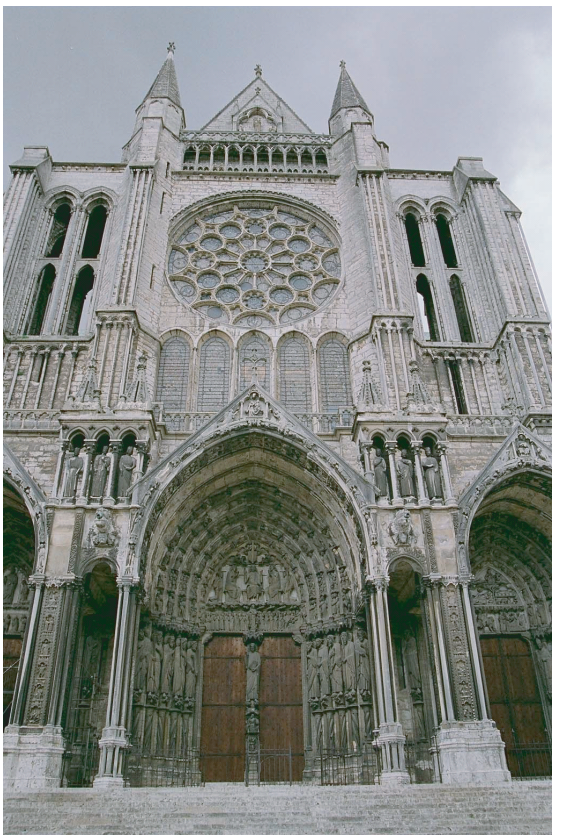
Portal research can be conveniently broken down into research on portal technology, and research on portal applications (Tatnall 2007 forthcoming). In this paper we will concentrate on portal applications.

RANGE OF PORTAL APPLICATIONS

Articles in the Encyclopaedia of Portal Technology and Applications (Tatnall 2007 forthcoming) cover a wide range of topic, ranging from the complex to the very simple. One area of research discusses the nature, characteristics, advantages, limitations, design and evolution of portals, while at the other end of the spectrum several investigations centre around semantic portals and some philosophical portal issues.

A major user of portal technology around the world is governments and the public sector. A large research effort describes and discusses public sector, education and government portals, while social and community-based portals are not forgotten. At the personal portal level, research is conducted in topics including Weblogs, widgets and MP3 players. Medical, health and bio-informatics portals form another significant group of applications.

Figure 1. The Great Portal, Chartres Cathedral, France



Another important research area is in the business and industrial sectors. This research investigates organisational and management issues regarding portal use, enterprise information portals, human resources portals, portals for small to medium enterprises and more specific topics including shopping, the automotive industry and wine industry portals. The economics of setting up and using these portals is also discussed, as are issues of strategic planning, user acceptance, security and the law.

Portal technology itself has been researched by many scholars, especially those involved in the design and implementation of portals. One important consideration is whether certain implementation factors are more likely to lead to successful adoption of portal technology than others. The design and development of portals is an issue, and applications and technologies such as business intelligence, artificial intelligence, semantic portals, intelligent agents and mobile technology are discussed.

TWO SIDES TO THE STORY

Research into adoption of portals has shown that there is a potential for both detriment and benefit to society from this wide range of portals applications. Sentences that start "all freedom loving people …" have been used over the years to justify everything from gun ownership to invasions of foreign countries. An argument for free exchange of information should not need to be made, but the complete licence of the Wild West should also be seen as potentially harmful. In this paper we will examine both sides of the freedom/licence question that have been researched in medicine, democracy and government, and intellectual property piracy. In each case we examine the research to show the dichotomy of the benefits of opening global communications through portals and the potential problems that can arise in an uncontrolled space.

Portals and Medicine

Medical portals abound on the internet. Almost every major disease is represented by at least a support group portal. These portals offer everything from emotional support, through possible treatment advice to contacts within the medical community.

(Lewis 2006) suggests that while the medical literature has a rather pessimistic take on issues like online health consumption, debates over cyberchondria and cyberquackery are underpinned by a recognition that doctors are no longer necessarily the sole holders of health knowledge and that many consumers are now increasingly taking control over their own health care management. Thus the 'quality' debate within the medical literature on online health consumption is underpinned by anxieties over what gets counted as legitimate health knowledge today. The penetration of the Internet into provision of medical information is startling. An independent US study conducted in 1999 found that 31 percent of respondents under the age of 60 had sought health information on the web (Brodie, Flournoy, Altman, Blendon, Benson and Rosenbaum 2000). In 2002 Harris Interactive, conducted a study in (Taylor 2002) whose key findings included the information than 80% of all adults who are online (i.e. 53% of all adults) sometimes use the Internet to look for health care information. A December 2005 survey found that 20% of online Americans said the Internet has greatly improved the way they get information about health care (Madden and Fox 2006), while in Europe a survey by market research company Datamonitor of over 4500 adults in France, Germany, Italy, Spain, the UK and the US, found that 57% of respondents had consulted Internet sources when looking for health information (BBC 2002).

Two reported problems with all this health information available through the various portals are: social alienation, and problems with the quality of health information available. Shields (Shields 1996) finds that one of the dominant popular discourses around web use is that it produces or worsens processes of social alienation, the argument being that it is possible for interaction through computer to replace person to person contact. Theodosiou and Green (Theodosiou and Green 2003) identify five important problems with patients using medical portals to satisfy their needs:

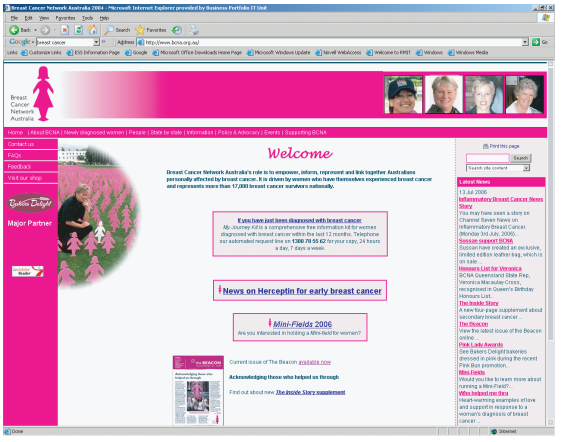
- Potentially dangerous drugs and other substances may be bought by individuals for themselves or their children
- Individuals can spend a lot of money on products or diagnostic procedures that have no scientific backing or benefit
- The information may be more negative than the reality of the situation
- Individuals may abandon treatment programmes of proven efficacy to pursue less-mainstream approaches
- Users' sites (e.g. for families affected by autism) may contain advice or opinions of questionable ethics (e.g. non-mainstream treatments that are intrusive or punitive)

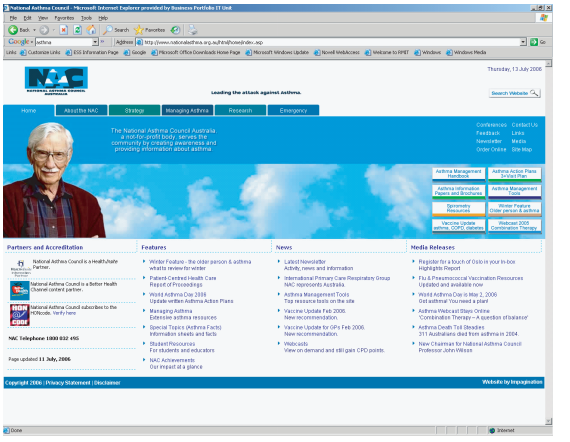
Portals and Democracy

Commentators are split on the issue of the Internet and democracy. For instance George (George 2005) asks "Does the internet democratize communication?" This is one of the big questions that has guided a decade of inquiry within media studies, political science, sociology and other disciplines. George suggests that the relationship between new media and political factors is far too dynamic and interdependent to be reduced to simple causal statements. The less democratic the society, the more attractive the Internet looks as an emancipatory medium – but the more likely radical Internet use will be blocked or punished. Furthermore, the Internet cannot be treated as an independent variable as the technology has been, and will continue to be, shaped by political and economic forces.

Studies of Internet use in Asia find the interaction between economic and geographical forces to be complex. A detailed study of Korea undertaken by Woo-Young (Woo-Young 2005) found Citizen e-participation in Korea is characterized by: (1) convenient access to detailed information, (2) free expression and exchange of opinions, (3) online activism led by politicized agenda, and (4) active formation of cyber groups. The Korean case shows that the electronic participation of citizens may even develop into off-line social mobilization.

Figure 2. Medical portals





Portals and Intellectual Property

Some researchers have evidence that the issue of piracy shows that lobby groups have criminalised the practice and are intent on confusing discussion of the issues in order to try to control activities on the Internet. (Yar 2005) finds two useful ways of looking at exchange of electronic information: "The first mode, proceeding in a largely 'realist' manner, sees the 'rise of piracy' as the outcome of a range of social, economic, political and technological changes that are radically reconfiguring the global political and cultural coordinates within which the consumption of media goods takes place. From this point of view, globalization, socio-economic 'development' and innovation in information technology help to establish the conditions for expanded production and consumption of 'pirate' audio-visual goods. However, the second mode, juxtaposed to the first, proceeds in a 'social constructionist' mode to view the emergence of the 'piracy epidemic' as the product of shifting legal regimes, lobbying activities, rhetorical manoeuvres, criminal justice agendas, and 'interested' or 'partial' processes of statistical inference." Yar sees the expansion of proprietary copyrights, and the criminalization of their violation, is part of a larger 'game' in which struggles to dominate the uses of information are being played out within the new 'knowledge economy'. Rather than taking industry or government claims about film 'piracy' (its scope, scale, location, perpetrators, costs or impact) at face value, we would do well to subject them to a critical scrutiny that asks in whose interests such claims ultimately work.

SOCIO-TECHNICAL RESEARCH ON PORTAL APPLICATIONS

The mixed outcomes illustrated by research into portal applications points to a need to develop a research approach that will bring more understanding of the mechanisms that lead to either great benefit or considerable risk to those exposed to the ubiquity of portals. Recent success in socio-technical approaches to this type of research point a way forward.

Just because a portal exists it cannot be assumed that organisations or individual people will want to adopt or use it. A portal will only be adopted if potential users make a decision to do so, and adoption of technological innovations, such as a portal, occurs for a variety of reasons. The first step to researching the use of a portal by an organisation (or individual) though is to investigate why it was adopted. The remainder of this paper will consider the portal as a technological innovation and consider portal adoption through the lens of innovation theory.

It is important to distinguish between *invention* and *innovation*. Invention refers to the construction of new artefacts or the discovery of new ideas, while innovation involves making use of these artefacts or ideas in commercial or organisational practice (Maguire, Kazlauskas and Weir 1994). Invention does not necessarily invoke innovation and it does not follow that invention is necessary and sufficient for innovation to occur (Tatnall 2005b). Clearly the portal can be seen as an invention, but the point here is that it will not be used unless it is adopted, and that means looking at it also as a technological innovation. Of course, the application of innovation theory to the adoption of a technological innovation assumes that the potential adopter has some choice in deciding whether or not to make the adoption. In the case of an organisation or individual considering the adoption and use of a portal, however, it is difficult to see any reason why they would not have a large measure of choice in this adoption decision. This makes the application of adoption theory quite appropriate when considering the use of Web portals.

INNOVATION TRANSLATION

Compared to the better known innovation approaches of Diffusion of Innovations (Rogers 1995) and the Technology Acceptance Model (TAM) (Davis 1986), an alternative view is that of Innovation Translation proposed in actor-network theory (ANT). This approach considers the world to be full of hybrid entities (Latour 1993) containing both human and non-human elements. It offers the notion of heterogeneity to describe projects such as the adoption of portal technology which involves computer technology, the Internet, the Web portal, broadband connections, Internet service providers (ISP) and the individual or organisation considering the adoption. More specifically though, ANT makes use of a model of technological innovation which considers these ideas along with the concept that innovations are often not adopted in their entirety but only after 'translation' into a form that is more appropriate for the potential adopter.

The core of the actor-network approach is translation (Law 1992), which can be defined as: "... the means by which one entity gives a role to others." (Singleton and Michael 1993 :229). Rather than recognising in advance supposed essential characteristics of humans and of social organisations and distinguishing their actions from the inanimate behaviour of technological and natural objects (Latour, Mauguin and Teil 1992), ANT adopts an anti-essentialist position in which it rejects there being some difference in essence between humans and non-humans. ANT makes use of the concept of an actor (or actant), that can be either human or non-human, and can make its presence individually felt by other actors (Law 1987).

It is often the case that when an organisation (or individual) is considering a technological innovation they are interested in *only some aspects* of this innovation and not others (Tatnall 2002; Tatnall and Burgess 2002). In actor-network terms it needs to *translate* (Callon 1986) this piece of technology into a form where it can be adopted, which may mean choosing some elements of the technology and leaving out others. What results is that the innovation finally adopted is not the innovation in its original form, but a translation of it into a form that is suitable for use by the recipient (Tatnall 2002).

RESEARCHING THE ADOPTION OF WEB PORTALS

Adoption of a portal is not a straightforward process and researching this adoption is particularly complex when the topic is determining detriment or benefit to society. By its very nature such an investigation must involve both humans and technology and be treated as a socio-technical study. We suggest that innovation translation (and actor-network theory) has many advantages as an explanatory framework over both Innovation Diffusion and TAM in socio-technical studies like this.

Both Innovation Diffusion (Rogers 1995) and TAM (Davis 1986) suggest that adoption decisions are made primarily on the basis of perceptions of the characteristics of the technology concerned. Using an Innovation Diffusion approach a researcher would probably begin by looking for characteristics of the specific portal technology to be adopted, and the advantages and problems associated with its use. They would think in terms of the advantages offered by portals in offering a user the possibility of finding information, but would do so in a fairly mechanistic way that does not allow for an individual to adopt the portal in a way other than that intended by its proponent – it does not really allow for any form of translation. If using TAM this researcher would similarly have looked at characteristics of the technology to see whether the potential user might perceive it to be useful and easy to use.

A researcher using an Innovation Translation approach to studying innovation, on the other hand, would concentrate on issues of network formation, investigating the human and non-human actors and the alliances and networks they build up. They would attempt to identify the actors and then to follow them (Latour 1996) in identifying their involvement with the innovation and how they affect the involvement of others. The researcher would then investigate how the strength of these alliances may have enticed the individual or organisation to adopt the portal or, on the other hand, to have deterred them from doing so (Tatnall and Gilding 1999; Tatnall 2002) (Tatnall and Burgess 2006). Especially in investigations involving interaction of humans and non-humans (technical artefacts) such an approach has much value.

CONCLUSION

Web portals are now quite ubiquitous and researching their use in organisations and by individuals is an important aspect of Information Systems research. It is useful to consider the portal as a technological innovation and to research it using an approach based on innovation theory.

While there is a significant amount of research into impacts of the use of web portals, the outcomes of much research are inconclusive when attempting to explain the uptake of the technology. It seems clear that a socio-technical perspective is need in the research effort. ANT provides a perspective that can produce resolution of the conflicting research results and provide an explanatory system.

REFERENCES

BBC. (2002). "Health Websites Gaining Popularity'." Retrieved July, 2006, from http://news.bbc.co.uk/2/hi/health/2249606.stm.

Brodie, M., Flournoy, R. E., Altman, D. E., Blendon, R. J., Benson, J. M. and Rosenbaum, M. D. (2000). "Health Information, the Internet, and the Digital Divide." *Health Affairs* **19**: 255-266.

Callon, M. (1986). Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St Brieuc Bay. *Power, Action & Belief. A New Sociology of Knowledge?* Law, J. London, Routledge & Kegan Paul**:** 196-229.

Davis, F. (1986). A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory and Results. Boston, MIT.

Davison, A., Burgess, S. and Tatnall, A. (2004). *Internet Technologies and Business*. Melbourne, Data Publishing.

George, C. (2005). "The internet's political impact and the penetration/participation paradox in Malaysia and Singapore." *Media, Culture & Society* **27**(6): 903–920.

Latour, B. (1993). *We Have Never Been Modern*. Hemel Hempstead, Harvester Wheatsheaf.

Latour, B. (1996). *Aramis or the Love of Technology*. Cambridge, Ma, Harvard University Press.

Latour, B., Mauguin, P. and Teil, G. (1992). "A Note on Socio-Technical Graphs." *Social Studies of Science* **22**(1): 33-57.

Law, J. (1987). Technology and Heterogeneous Engineering: The Case of Portuguese Expansion. *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*. Bijker, W. E., Hughes, T. P. and Pinch, T. J. Cambridge, Ma, MIT Press**:** 111-134.

Law, J. (1992). "Notes on the Theory of the Actor-Network: Ordering, Strategy and Heterogeneity." *Systems Practice* **5**(4): 379-393.

Lewis, T. (2006). "Seeking health information on the internet: lifestyle choice or bad attack of cyberchondria?" *Media, Culture & Society* **28**(4): 521-539.

Lynch, J. (1998). Web Portals. *PC Magazine*.

Madden, M. and Fox, S. (2006). "Finding Answers Online in Sickness and in Health." Retrieved July, 2006, from http://207.21.232.103/pdfs/PIP_Health_Decisions_2006.pdf.

Maguire, C., Kazlauskas, E. J. and Weir, A. D. (1994). *Information Services for Innovative Organizations*. Sandiego, CA., Academic Press.

Rogers, E. M. (1995). *Diffusion of Innovations*. New York, The Free Press.

Shields, R. e. (1996). *Cultures of Internet: Virtual Spaces, Real Histories, Living Bodies.* London, Sage.

Singleton, V. and Michael, M. (1993). "Actor-Networks and Ambivalence: General Practitioners in the UK Cervical Screening Programme." *Social Studies of Science* **23**(2): 227-264.

Tatnall, A. (2002). Modelling Technological Change in Small Business: Two Approaches to Theorising Innovation. *Managing Information Technology in Small Business: Challenges and Solutions*. Burgess, S. Hershey, PA, Idea Group Publishing**:** 83-97.

Tatnall, A. (2005a). Portals, Portals Everywhere ... *Web Portals: the New Gateways to Internet Information and Services*. Tatnall, A. Hershey, PA, Idea Group Publishing**:** 1-14.

Tatnall, A. (2005b). To Adopt or Not to Adopt Computer-Based School Management Systems? An ITEM Research Agenda. *Information Technology and Educational Management in the Knowledge Society*. Tatnall, A., Visscher, A. J. and Osorio, J. New York, Springer**:** 199-207.

Tatnall, A. (2005c). *Web Portals: from the General to the Specific*. 6th International Working for E-Business (We-B) Conference, Melbourne, Victoria University.

Tatnall, A., Ed. (2007 forthcoming). *Encyclopaedia of Portal Technology and Applications*. Hershey, PA, Idea Group Reference.

Tatnall, A. and Burgess, S. (2002). *Using Actor-Network Theory to Research the Implementation of a B-B Portal for Regional SMEs in Melbourne, Australia*. 15th Bled Electronic Commerce Conference - 'eReality: Constructing the eEconomy', Bled, Slovenia, University of Maribor.

Tatnall, A. and Burgess, S. (2006). Innovation Translation and E-Commerce in SMEs. *Encyclopedia of E-Commerce, E-Government and Mobile Commerce*. Khosrow-Pour, M. Hershey, PA, Idea Group Reference**:** 631-635.

Tatnall, A. and Gilding, A. (1999). *Actor-Network Theory and Information Systems Research*. 10th Australasian Conference on Information Systems (ACIS), Wellington, Victoria University of Wellington.

Taylor, H. (2002). "The Harris Poll #21: Cyberchondriacs Update." Retrieved July, 2006, from http://www.gsbc.com/harris_poll/index.asp?PID=299.

Theodosiou, L. and Green, J. (2003). "Emerging challenges in using health information from the internet." *Advances in Psychiatric Treatment* **9**: 387-396.

Woo-Young, C. (2005). "Online civic participation, and political empowerment: online media and public opinion formation in Korea." *Media, Culture & Society* **27**(6): 925-935.

Yar, M. (2005). "The global 'epidemic' of movie 'piracy': crimewave or social construction?" *Media, Culture & Society* **27**(5): 677-696.