

The Ubiquitous Portal

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INTRODUCTION

The word *portal* can be used to represent many different things, ranging from the elaborate entranceway to a medieval cathedral to a gateway to information on the Internet. What all the usages have in common, though, is the idea of facilitating access to some place or some thing. In addition to its use in relation to Web portals, the term can also be used more metaphorically to allude to an entranceway to far away places or new ideas, new knowledge, or new ways of doing things. Some new, or different, ideas, knowledge, or ways of doing things have had a beneficial effect on society, while others have had a detrimental affect. A portal can thus lead to various different places, things, or ideas, both good and bad. Before a portal can be used, however, it must be adopted by the individual or organisation concerned, and adoption of technological innovations such as portals is the subject of this article.

BACKGROUND

Gateways come in all shapes and sizes, and likewise so do portals. Portals are seen everywhere (Tatnall, 2005a) and it would be difficult to make any use of the Web without encountering one. On the Web there are government portals, science portals, environmental portals, community portals, IT industry portals, professional society portals, education portals, library portals, genealogy portals, horizontal industry portals, vertical industry portals, enterprise information portals, medical and health portals, e-marketplace portals, personal/mobile portals, information portals, niche portals, and many more. Portals have become truly ubiquitous.

In literature and film also, many mentions are made of portals, although not all of the Web variety. These range from a description of the sun by William Shakespeare in *Richard II* (Act 3, Scene 3): "See, see, King Richard doth himself appear, as doth the blushing discontented sun from out the fiery portal of the east." (Shakespeare, 1595), to the means of moving around the universe in the TV series *Star-gate SG-1*. The transportation device used by Ford Prefect and Arthur Dent in the *Hitch Hiker's Guide to the Galaxy* (Adams, 1979) could also be considered a portal, as could the teleport mechanism employed by the crew leaving or returning to the *Enterprise* in *Star Trek*. In much science fiction and fantasy literature, a portal-like device is used

to move from one place to another without the need for inconvenient (or perhaps impossible) explanations of the means of doing so. The portal (whether or not it is called this) is thus used as a *black box* (Latour, 1996) capable of almost magical transformations.

In many ways, a Web portal can also be considered as a black box that achieves its purpose of taking a user to some interesting or useful place on the Web without them needing to know how this is done. For most people, other than those involved in their design or construction, the technology of the Web portals is irrelevant. All they want to know is that it provides a convenient means of taking them to some Web location where they want to go.

Just because a portal exists, however, there is nothing automatic about organisations or individual people wanting to adopt or use it. A portal will only be adopted if potential users make a decision to do so, and such decisions are not as simple as one might naively think. Adoption of a technological innovation, such as a portal, occurs for a variety of reasons, and this is a significant study in itself. 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 article will consider the portal as a technological innovation and consider portal adoption through the lens of innovation theory.

THE PORTAL AS A TECHNOLOGICAL INNOVATION

Many people use the words *invention* and *innovation* almost synonymously, but for any academic discussion of technological innovation an important distinction needs to be made between these terms. 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, & 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.

ADOPTION OF TECHNOLOGICAL INNOVATIONS

There are a number of theories of technological innovation, diffusion of innovations (Rogers, 1995) probably being the best known. Other innovation theories include the technology acceptance model (Davis, 1989; Davis, Bagozzi & Warshaw, 1989) and innovation translation (Callon, 1986b; Latour, 1996; Law, 1991), informed by actor-network theory (ANT).

Innovation Diffusion

Innovation diffusion is based on the notion that adoption of an innovation involves the spontaneous or planned spread of new *ideas*, and Rogers defines an innovation as: "... an idea, practice, or object that is perceived as new" (Rogers, 1995, p. 11). In diffusion theory the existence of an innovation is seen to cause uncertainty in the minds of potential adopters (Berlyne, 1962), and uncertainty implies a lack of predictability and of information. Diffusion is considered to be an information exchange process among members of a communicating social network driven by the need to reduce uncertainty (Rogers, 1995). Rogers elaborates four main elements in innovation diffusion: characteristic of the innovation itself, the nature of the communication channels, the passage of time, and the social system through which the innovation diffuses (Rogers, 1995). Innovation diffusion has had considerable success in explaining large scale movements and adoptions, but has been found less successful when considering adoption by individual organisations and people.

Technology Acceptance Model

The technology acceptance model (TAM) is a theoretical model that evaluates "... the effect of system characteristics on user acceptance of computer-based information systems" (Davis, 1986, p. 7). It was developed from the theory of reasoned action (Fishbein & Ajzen, 1975). TAM assumes that a technology user is generally quite rational and uses information in a systematic manner to decide whether to adopt a given technology. Davis's (1986) conceptual framework proposed that a user's motivational factors are related to actual technology usage, and hence act as a bridge between

technology design (including system features and capabilities) and actual technology usage. Davis (1986) posits that perceived usefulness and perceived ease of use are major determinants of technology acceptance. Like innovation diffusion, TAM places considerable importance on the "innate" characteristics of the technology and so is based on an essentialist position (Grint & Woolgar, 1997).

Innovation Translation

An alternative view of innovation is that of innovation translation proposed in actor-network theory (ANT), that considers that the world is full of hybrid entities (Latour, 1993) containing both human and nonhuman elements. ANT developed around problems associated with attempts to handle socio-technical "imbroglios" (Latour, 1993) like electric cars (Callon, 1986a), scallop fishing (Callon, 1986b), Portuguese navigation (Law, 1987), and supersonic aircraft (Law & Callon, 1988) by regarding the world as heterogeneous (Chagani, 1998). ANT 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 & Michael, 1993, p. 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, & Teil, 1992, p. 56), ANT adopts an antiessentialist position in which it rejects there being some difference in essence between humans and nonhumans. ANT makes use of the concept of an actor (or actant) that can be either human or nonhuman, 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 & Burgess, 2002). In actor-network terms it needs to *translate* (Callon, 1986b) 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).

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