Diffusion Patterns of the Internet Technology Cluster in Irish SMEs

James Griffin
Tipperary Institute, Ireland

INTRODUCTION

Electronic commerce has been recognised as a source of fundamental, pan-sectoral change to the conduct of business; Chan and Swatman (2000) use the term: "A new paradigm for doing business." Other authors have gone further, viewing modern IT developments as the latter part of a period starting in the mid-1970s that represents a transition to nothing less than a new phase of capitalist development (Amin, 1994). Benjamin, Rockhart, Scott Morton, and Wyman (1983) also suggest that the world economy has been fundamentally altered by the globalisation of competition which has largely been caused by the declining cost and consequent increasing spread of IT developments.

The resulting shift in business practices as businesses attempt to exploit these new opportunities will necessitate wide-scale adoption of new processes and technologies. Elliot and Loebbecke (2000) suggest that this requires new thinking on how organisations adopt innovations and the revision of theoretical models of adoption. Bamfield (1994) identifies innovation theory as an appropriate framework for understanding IT adoption processes. La Rovere (1998) concurs, stating that the diffusion of innovations in information technology (IT) is becoming an increasingly important area of study.

Furthermore, any overview of recent Internet-related literature will identify that the issue of mapping diffusion patterns is being increasingly affected by the range and variety of technologies that are drawn into the e-business platform. In terms of understanding the nature of Internet usage and diffusion within SMEs, it is necessary to individually measure the extent to which different elements of what essentially comprise an Internet Technology Cluster are used amongst adopting firms.

This necessitates a definition of the different elements of the Internet Technology Cluster. This can be accomplished through the analysis of past surveys and technical articles written in the field of Internet research. Three basic elements are identifiable. Firstly, several studies have identified e-mail as the most common Internet application used in business (Howe, 2001; Everett, 1998; Feher & Towell, 1997).

Secondly, many of the most common Internet technologies and applications centre around the Internet browser. Graphics, audio, HTML, and HTTP technologies are all involved in the presentation of Web sites to the viewer via the browser, whilst research and communications applications such as search engines, newsgroups and discussion groups, and online journals are viewed via the browser. These elements can be combined together under the banner of Internet browser applications.

Finally, more complex technologies based around back-end activities and remote access to Internet services (through FTP, WAP, and Telnet) can be grouped together to give an indication of the extent of usage of more advanced Internet applications.

BACKGROUND

During the summer of 2001, the author conducted a detailed survey of SMEs in six distinct geographical regions of the Republic of Ireland (three urban and three rural). The survey examined current Internet usage levels, the factors influencing the adoption decision process, and the actual benefits achieved by SMEs that have adopted the Internet.

A stratified sample frame of 700 companies was chosen from the population of 3,500 SMEs. A total usable response rate of 153 responses was achieved. Following readjustments to the sample frame size, the overall response rate for the survey stands at 23.4%.

As highlighted in Table 1 below, the current level of Internet connectivity within Irish SMEs is very high (over 90% of firms). This is no doubt a function of the high level of awareness that has been created over recent years. However, problems arise when the nature of this connectivity is examined in more detail, through the application of the cluster-based definition of the Internet.

The 90.8% of respondents with Internet access were asked to rate the extent to which they used the three separate elements of the Internet Technology Cluster. Rating of each element was on a five-point Likert scale.

In accordance with previous literature, *e-mail* was the most used Internet application, with an average usage

Table 1. Key findings related to the extent of Internet usage in Irish SMEs

	Yes		No	
Does your firm currently have Internet access? (n=153)	90.8% (n=139)		9.2% (n=14)	
Does your firm currently have a Web site? (n=139)	52.5% (n=73)		47.5% (n=66)	
	ISDN	**LAN**	**Dial-up**	**Unsure**
Type of connection (n=139)	23% (n=32)	8% (n=11)	62% (n=86)	7% (n=10)

rating of 3.43. *Internet browsers* received an average rating of 2.82, whilst the *Advanced Applications* category received an average usage rating of 1.43.

Only 52.5% of firms with Internet connections have a Web site of their own; this is lower than would have been expected for a 90% rate of connectivity. The type of physical Internet connection is generally a simple dial-up (62%), with few firms engaging in higher speed connections. A worrying 8% of owner managers could not even describe their connection type, suggesting a lack of understanding of, or degree of separation from, Internet applications in their organisation.

Of those respondents without a Web site, 67% did express an intention to set one up within the next 12 months. This fact, coupled with the steadily increasing Web site adoption rate depicted in Figure 1, indicates a pattern that is strongly reminiscent of the types of mimetic and bandwagon diffusion patterns described by Abrahamson and Rosenkopf (1993), DiMaggio and Powell (1983), and O'Neill, Pouder, and Buchholtz (1998). Mimetic and bandwagon diffusion patterns can best be defined as self-reinforcing diffusion patterns that effectively dismiss the technical attributes or properties of an innovation, with its level of adoption instead being a factor of the number of adoptions that have already taken place. Given the coverage and attention that the Internet has received in media, commercial, and academic circles over the past five years in Ireland, it is unsurprising that a mimetic form of diffusion pattern is evident amongst SMEs in Ireland.

CRITICAL FINDINGS

To explore the supposition that Internet technology diffusion in SMEs in Ireland may be following a mimetic pattern, it is helpful to review the main characteristics of mimetic adoption patterns. A review of relevant diffusion theory highlights two key characteristics.

Firstly, many authors, through the examination of the EDI adoption experience in SMEs, have identified a key characteristic of mimetic adoptions to be a reduction in benefit amongst organisations partaking in reactionary and later adoptions vis-à-vis firms engaging in earlier, more strategic adoptions (see Cash, 1985; Friedman, 1998; Raymond, Julien, Carrier & Lachance 1996; Swatman & Swatman, 1992).

Figure 1. Diffusion pattern of Web site development