

Socio-structural correlates of online news and information adoption/use



Implications for the digital divide

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Abstract

Using data from a national survey of 4270 Australians conducted in late 2003, this article merges the structural approach to media audience formation with innovation diffusion theory to explore major socio-structural factors influencing the adoption of online news and information. It finds that more internet accessibility, traditional news and information usage, and privileged socio-economic profiles are strong predictors of online news and information adoption.

Keywords: digital divide, innovation diffusion, internet use, news consumption, online news

While there has been much speculation about the enormous potential of internet news and information to alter people's relationships with traditional media since the web started to penetrate daily life in the early 1990s, there has not been much academic attention to why and how people are adopting the new medium for news and information. Most empirical research so far has treated online news and information adoption as one dimension of overall internet usage patterns rather than a form of use that is of interest in its own right (see, for example, Atkin et al., 1998; Ferguson and Perse, 2000; Lin, 2001; Liu et al., 2002; Mikaki et al., 2002; Papacharissi and Rubin, 2000; Rhee and Kim, 2004; Zhou and He, 2002). Of the studies with an exclusive focus on online news and information consumption, most are from the US and mostly address the result, rather than the cause, of online news and information adoption (Chyi and Larosa, 1999; Johnson and Kaye, 1998; Kaye and Johnson, 2002; Schierhorn et al., 1999; Tewksbury and Althaus, 2000; Tewksbury et al., 2001; Vargo et al.,

2000; Wearden, 1998; Wearden and Fidler, 2001; Wearden et al., 1999; Weir, 1999; Wu and Bechtel, 2002). This article is a preliminary attempt to address this situation, exploring the influences of socio-structural factors on the adoption/use of online news and information among internet users.

From a sociological perspective, more attention needs to be paid to the effect of socio-structural factors on the use of online news and information because understanding their effect provides some deep insights into the social impact of new media technologies on the already existing social inequality between different segments of society, especially the much-debated digital divide between those who have access to digital technologies and those who do not (Katz and Rice, 2002; Kwak et al., 2004; Lin, 2001; Lister et al., 2003; Neuendorf et al., 1998; Norris, 2001; Powell, 2001; Rhee and Kim, 2004; Rice and Katz, 2003; Rogers, 1986; Servon, 2002; Tanaka, 2000; Wareham et al., 2004; William, 2004; Xavier, 2001). In the past decade, as new technologies have accelerated their diffusion and become cheaper, more available and more familiar, some scholars have argued that socio-economic variables such as income and education have become less important in their take-up, narrowing or even eliminating the digital divide. In merging the structural approach to media audience formation with innovation diffusion theory to explore the dynamics of online news and information adoption/use among Australian internet users, however, this article will show that the digital divide does not vanish after one gains access to the medium. Using data from a national survey of 4270 Australians conducted in late 2003, the study finds that more internet accessibility, more traditional news and information usage and privileged socio-economic profiles (in terms of general demographics, socio-economic status, perceived economic well-being, and the nature of daily working/living environment) are strong predictors of online news and information adoption/use.

Previous approaches to online news and information adoption/use

Three major strands of empirical research have investigated the first decade of web-based news and information adoption/use. The first follows many pre-web studies of computer-mediated communication to explore the usability (efficiency and effectiveness) of information presentation on computer screens. A group of researchers at Kent University have investigated the potential adoption of digital news formats by using experimental and/or convenience (non-probability) survey methodologies to determine whether users prefer portrait-oriented (vertical) or landscape (horizontal) display of screen documents (Schierhorn et al., 1999; Wearden, 1998; Wearden and Fidler, 2001; Wearden et al., 1999). Other researchers have addressed the issue of layers and links, such as the effect of the length of initial summaries and links to sidebars (i.e. the amount of summary information) on readers'

decisions to continue to read stories (Vargo et al., 2000), as well as time efficiency and cognitive effect of scrolling down the online newspaper interface and hypertextual links (Oostendorp and Nimwegen, 1998). The lack of editorial cues in the online environment on news knowledge acquisition has also been explored (Tewksbury and Althaus, 2000). D'Haenens et al. (2004) explore differences in news consumption and recall between reading print and online news. Sundar (1998, 2000) investigates the effect of source attribution and the presentation of audio/video materials on users' perception of online news quality and credibility.

The second research strand is directed at general online news and information usage and its trends – an issue attracting both academic and market research. The Pew Research Centre for the People & the Press has included online news in its influential biannual media consumption surveys since 1996.¹ In addition, the Pew Internet & American Life Project has produced several studies examining how Americans used the internet after the 9/11 terror attacks, how the event changed their internet usage in the subsequent year, and how the medium was used for news and non-news information during the second Iraq war.² News and information consumption, as an instrumental online activity, has also been studied within the World Internet Project, a series of longitudinal studies conducted periodically to explore internet adoption in more than 20 countries. Unfortunately, most published reports from these studies often provide only summary statistics of usage patterns rather than examining theoretically derived propositions about likely adoption and potential development.³

The third thread includes some studies that undertake analyses of the dynamics of online news and information adoption/use from a user-centric perspective. Chyi and Larosa (1999) compare general preferences for the print and online format of a newspaper among its early online adopters. Wu and Bechtel (2002) and Kaye and Johnson (2002) address deeper layers of media usage, employing uses and gratifications theory to investigate early users' motives of, actual exposure to, and satisfaction with, online news. Other research directly compares the internet as a news medium with other news media in terms of credibility (Abdulla et al., 2002; Johnson and Kaye, 1998; Nozato, 2002; Schweiger, 2000). Little, however, has been done to address the potential adoption of online news and information in socio-structural terms – although numerous studies about the social structure of internet adoption can be found in the literature. The only substantial study in relation to this so far is a recently published book, which is based on a series of American surveys of different aspects of online news adoption/use (Salwen et al., 2005). In the current paper, innovation diffusion theory is merged with the structural approach to audience formation to investigate internet users' online news and information adoption/use as a result of socio-structural attributes, including internet accessibility, traditional news and information use habits, and socio-economic background.

Approaching online news and information adoption/use: a socio-structural framework

In studying internet news and information adoption, the first important point to bear in mind is that it is indeed a 'contingent innovation', i.e. one cannot adopt online news and information without having access to the 'trigger technology' of the internet. In other words, attempts to model the diffusion pattern of online news and information should be made primarily in the context of internet diffusion, employing the online population as the major population for potential diffusion. Within this context, the promising attributes of online news and information as an innovation can be highlighted. According to Everett Rogers (2003), the leading researcher in innovation diffusion theory, five empirically interrelated but conceptually distinct characteristics determine the adoption rate of an innovation, briefly described in relation to online news and information below.

(1) *Relative advantage* is the extent to which an innovation is perceived as better than its precursor(s), including economic profitability, low initial cost, decreased discomfort, social prestige, time and effort savings, and the immediacy of rewards). As an innovation, online news and information is well qualified in terms of relative advantage. The medium possesses a tremendous capacity for immediacy, in-depth coverage, enjoyable multimedia presentation, customization and searchability to meet and better serve existing news and information-related needs. Moreover, it is home to a vast storage of not only news but also specialized (non-news) information, from searchable hobby information to job advertising/classifieds and work- and study-related knowledge. Also, much, if not most, news and information is offered for free on the web.

(2) *Compatibility* is the degree to which an innovation conforms to existing values, past experiences and needs of the receivers. Although online news and information is very different from existing forms of print or broadcast news formats, retrieving and reading news and information on a web browser is at least not strange in relation to potential adopters' past experiences because handling information on the computer screen is one primary use of the existing computer.

(3) *Complexity* refers to the extent to which an innovation is perceived to understand and use. Because the technical expertise needed for different online activities is basically the same (opening a web browser, entering URLs, clicking on links, etc.), an internet user does not need to learn any new skill to retrieve news and information online.

(4) *Trialability* is the degree to which an innovation can be tried on a limited basis. Given that news and information is a ubiquitous feature of the internet and most is offered for free, it is highly trialable to the internet user. In addition, the interactivity of the web enables many opportunities for online users to be 'accidentally informed' (via an email notice, a chat room or an unintentionally searched document, for example).

(5) *Observability* refers to how visible the results of an innovation are to potential adopters. As the web is an interactive environment, where people can easily share and discuss news and information with their peers through a variety of platforms (such as email, chat rooms, online forums, etc.), the benefit of online news and information adoption is quite observable to potential adopters.

All this, along with the role of news and information as an essential part of daily life, suggests that this new medium is an ideal place for human beings to meet their seemingly insatiable need for news and information. Indeed, early research (Atkin et al., 1998; Lin, 2001; Nguyen, 2003; Nguyen et al., 2005; Papacharissi and Rubin, 2000; Salwen et al., 2005; and the aforementioned World Internet Project studies) has confirmed that, once connected, it is very likely that people will adopt online news and information before most other services.

That is not to say that internet users adopt online news and information as a matter of course. Adoption of any innovation, whether it is a media service or any other new idea or technology, is a progressive five-step process from knowledge, persuasion and decision to implementation, and finally, confirmation (Rogers, 1986, 2003). During the implementation stage, for example, some users might find themselves lacking the time for news consumption when going online. Others might dislike reading on computer screens or simply do not perceive online news and information to be as 'powerful' as is generally assumed. Also, there is a possibility of a negative attitude towards online information, as many advantages of the web as a news and information medium might turn into disadvantages that discourage immature online news and information users. For example, as updates are now available in a matter of seconds and, in principle, everyone can be a publisher, web-based news and information might appear untrustworthy, leading to dropouts.

In order to understand the dynamics of online news and information adoption, a good starting point is that an over-time diffusion of an innovation in a social system normally follows an S-shaped curve, which rises slowly at first, then accelerates until half of the potential population has adopted it, and finally slows down until there are no or only a few more adopters (Rogers, 2003). Throughout this diffusion process, there are five groups of adopters: (1) innovators (earliest adopters, who make up 2.5% of the total number of individuals adopting an innovation); (2) early adopters (the next 13.5%); (3) early majority (34%); (4) late majority (34%); and (5) laggards (the last 16%). The distinction between these groups is innovativeness, i.e. 'the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of the system', which is strongly associated with three groups of variables: socio-economic status, personality values, and (interpersonal and mass) communication behaviours (Rogers, 2003: 280). While some studies

have established a link between personality traits and media exposure (see Finn, 1997 for an example), within its limited scope this article only addresses the other two groups of predictors. These two sets of innovativeness determinants are highly relevant to the study of audience formation in the light of the structural approach to media use.

The basic premise of the structural approach is that the media audience is formed on the basis of two largely constant elements of the social structure: (1) an individual's social situation (age, gender, education, income, place of residence, etc.) and his/her relevant media-related needs; and (2) the media structure, i.e. the available and accessible media options for an individual, given his/her socio-economic situation. Accordingly, media orientation, which is accompanied by a particular pattern of media use, 'is a joint outcome of social background and past media experience and takes the form of an affinity for certain media, specific preferences and interests, habits of use, expectations of what the media are good for' (McQuail, 2000: 386). Social background gives rise to media-related needs and use resources (attention, time, access, cognitive ability, etc.), which then generate media orientation, leading to media exposure (Katz et al., 1974; Tichenor et al., 1970). Given this, online news and information adoption can be expected to result at least partly from adopters' socio-economic status and previous news and information habits – a point that is well in line with the adoption/diffusion literature.

That is to say, many generalizations made by diffusion scholars about socio-economic status and communication behaviours as predictors of innovation adoption can well be applied to the current online news and information population. These socio-structural factors seem to have an effect on both innovativeness and on online information behaviours. In reality, as Rogers (2003) pointed out, part of the reason why some people are more innovative than others is that they have more access to information and better information-processing skills. It must be noted that we cannot make the assumption that the current online news and information population is that of early adopters for we do not know where the diffusion process has reached in the famous S-shaped curve. It is, however, safe to consider these users as *earlier* adopters of online news and information, whether they are considered within the general population or within the internet population. Thus, as diffusion researchers have consistently found that earlier adopters of innovations are likely to have more education, enjoy higher socio-economic status (better income, higher occupational prestige, privileged social class, etc.), work in larger-sized units and have a number of other privileged status characteristics (Rogers, 2003), it is sensible to expect that online news and information as an innovation is likely to have been adopted by socio-economically advantaged internet users, even though the socio-economic gap among these users might have attenuated. The first hypothesis derives from this:

H1: Online news and information adoption *among internet users* is associated with a more socio-economically advantaged background.

In terms of communication behaviours, Rogers and others have generalized that, among other things, earlier adopters of an innovation tend to have more exposure to mass media content. This is well in line with a considerable number of past media use studies, which have defined a trend to the 'all-or-nothing' model, stating that a heavy user of one medium tends to use other media heavily (Wright, 1986). In the internet age, for example, Stempel et al.(2000) found that American internet users from 1995 to 1999 were more likely than non-users in all age groups to read newspapers and listen to radio news. Dutta-Bergman (2004) found those who used certain news content categories in traditional sources sought these more online. Using the same dataset for this study, we recently published an article that found a strong complementary relationship between the internet and traditional mass media within the specific domain of news and information: online news and information users at different use levels tended to report more uses of traditional sources, especially information-intensive sources like newspapers and news magazines (Nguyen and Western, 2006). This study, however, explored this relationship within the general population rather than the online population. In this article, based on the above literature, we expect the same phenomenon within the online population:

H2: Online news and information adoption *among internet users* is associated with more traditional news and information uses.

However, innovation diffusion theory is far from being adequate to approach audience formation as it does not specifically address the other determining element in the structural model: the media structure. In particular, news and information audience formation depends not only on potential adopters' innovativeness but also on the extent to which this content is accessible to them, given their socio-economic situation (McQuail, 2000; Weibull, 1985). The media structure includes media institutions (newspaper titles, radio channels, TV companies) and their output (the volume of produced media content and the types of produced content) – and, as media choice is a process of selecting among available media institutions and the content within their output, the relationship between the media structure and individual users is 'a matter of availability or accessibility' (Weibull, 1985: 130).

This role of media accessibility, however, might be lessened to a substantial extent for at least three important reasons: (1) the web is a multi-media environment where any type of traditional news and information formats is available; (2) the internet is space-independent in the sense that news and information from any corner in the world can be approached after only one or a few clicks; and (3) most of this content is offered free of charge. While this free diversity of content/media options will force internet users to make choices suitable to their social/psychological situations, one

could even argue that the media structure no longer plays an important role in determining an internet user's entry into the world of online news and information. In other words, having internet access now equals having the power to access the whole global media structure to reach as much information as desired. It follows from this that online news and information adoption and usage in part results directly from internet accessibility.

This is strongly confirmed in an intensive review of online news take-up in the developed segments of the world by Nguyen (2003), who models potential online news development through, among others (e.g. socio-economic attributes and internet experience), bandwidth (broadband versus dial-up connection) and locations of use (workplace/home). Accordingly, broadband, with its always-on connection, increases the amount of online news usage. Also, the presence of the internet in the workplace, where other news sources are generally not available (especially when something of interest happens during the day), makes it the place where the prime-time audience of online news resides. Both broadband connection and the location of use indeed can be argued to be indicators of only one element: internet accessibility. Given this, it is plausible to suggest that more access to the internet increases both the likelihood of adoption and the level of using online news and information. This might happen both intentionally (someone with more internet access is more likely to think of it right away when they want some news and information) or unintentionally (someone with more internet access is likely to use it more and thus is more likely to be 'accidentally informed' by some news and information items during their internet usage – e.g. via a link to a news story in a friend's email message, or via an unintentionally searched item).

This is consistent with the first hypothesis because internet accessibility might be directly and indirectly affected by socio-economic factors. For example, professionals might have more access to the internet (both at work and at home) than non-professionals because their job requires them to use information technologies, they have higher incomes that permit access to these technologies, they have higher education levels that make learning to use new technologies somewhat easier, and they generally place a stronger value on information. Thus we propose the third hypothesis:

H3: More accessibility to the internet increases the adoption likelihood and usage level of online news and information.

Methods

This article is based on our secondary data analysis of the 2003 Australian Survey of Social Attitudes (Gibson et al., 2004). This is the first of an ongoing series of national surveys of the social attitudes and behaviours of adult Australians. Data collection was conducted by an inter-university research

team and directed out of the Australian National University from August to December 2003, employing a stratified systematic random sample from the 2002 Australian Electoral Roll (Gibson et al., 2004). The dataset is publicly available on the Australian Social Science Archive's website (<http://ssda.anu.edu.au/>). The overall response rate was 44 percent with a final sample size of 4270. Of these, nearly 70 percent (2804 people) used the internet. About 59 percent of the sample had internet access through home (and possibly other places). About 37 percent had access through work (and other places).

The survey asked respondents numerous questions relating to beliefs about Australian society and national identity, and attitudes and behaviours with respect to major institutions, such as the family, the criminal justice system, the mass media, work and education (see Wilson et al., 2005). Over 20 questions relating to internet access, news and information use and socio-demographic factors were employed in this study. Data were analysed using Stata 8. Most original socio-economic variables were recoded to enable tests of differences in proportions. Cross-tabulations with chi-squared tests and hypothesis testing for the mean were also used when necessary. Socio-economic background was measured with four groups of variables: (1) general demographic background, including age, gender and education (number of years of formal education and highest qualification); (2) socio-economic status, including household income and how it is compared to the average rate, perceived social class, occupation and workplace positions; (3) perceived economic well-being, including current management of household income, the likelihood of losing one's job, the ease of finding a job similar to the current one, and the chance of improving one's living standards; and (4) the nature of users' daily environments, including how urban respondents' living areas are and the size of one's workplace (in terms of employee numbers).

The question related to news and information uses was worded as 'How often do you use the following for news and information?', with seven media listed: 'Commercial television', 'ABC and SBS television', 'Radio', 'Newspapers', 'Internet sites', 'Talkback radio' and 'News magazines'. The response categories included 'never', 'once a week or less', 'several times a week' and 'daily'. These were numerically coded to indicate the number of times a medium was used in an average week ('never' was treated as zero; 'once a week or less' equalled one time a week; 'several times a week' equalled three times/week; and 'daily' equalled seven times/week). An index indicating overall traditional news and information usage was constructed by taking the mean use of all the six traditional sources. Another index, measuring accessibility to the internet, was constructed as the sum of variables measuring internet connection presence at work, at home and at other places (universities, internet café, etc.). This variable runs from zero for respondents with no internet access to three, for respondents with internet access at work, home and other places.

Results

Of the 2804 internet users in the study, fully three-quarters received online news and information and more than a third did this several times a week or every day. Before testing the three proposed hypotheses about online news and information adoption among internet users, we explored the general pattern of online news and information uses *within the general population*. Table 1 compares the current status of the internet as a news and information medium to other media. The new source has passed well beyond the minority point: more than half (53%) of the sample used it for news and information – with more than a quarter (27%) doing this frequently (at least several times a week) and more than one-tenth on a daily basis. Not surprisingly, the internet was still used less than most of the long-established sources, including commercial television (used for news and information at least several times a week by 86% of the respondents), public television (69%), radio (84%) and newspapers (66%). Internet sites, however, were more frequently used for news and information than talkback radio (25%) and magazines (12%). All this suggests that, a decade after taking off, the internet has become a comparatively major news and information medium in Australia.

Table 2 compares the socio-economic characteristics of users and non-users of online news and information for the entire sample (including both internet users and non-users). In socio-economic terms, Table 2 shows a clear difference between adopters and non-adopters of online news and information across the four groups of variables in ways that are consistent with predictions by diffusion scholars. The pattern of online news users having higher social statuses and higher subjective perceptions of status is consistent across almost all the variables. Particularly, users of online news and information were more likely than non-users to be under 40 years of age;

Table 1: Frequency of using different sources of news and information (row percentages)

	<i>Daily</i>	<i>Several times a week</i>	<i>Once a week or less</i>	<i>Never</i>	<i>n</i>
Internet sites	11	16	26	47	3860
Commercial TV	65	20	10	5	4064
Public TV	41	28	21	10	4028
Newspapers	40	26	29	5	4099
Radio	63	21	11	5	4061
Talkback radio	14	11	18	57	3944
News magazines	5	8	40	48	3924

Source: Australian Survey of Social Attitudes 2003.

Table 2: Socio-economic differences between users and non-users of online news and information within the general population (*z*-tests for proportion differences)

	<i>Users</i>	<i>Non-users</i>	<i>Difference</i>
Demographics			
Under 40 years of age	.37	.18	<i>p</i> < .001
Having 12 years of education or more	.78	.50	<i>p</i> < .001
Having a university or higher degree	.34	.12	<i>p</i> < .001
Being a male	.48	.47	<i>p</i> > .49
Socio-economic status			
In labour force	.76	.49	<i>p</i> < .001
Household income more than \$78,000/year	.40	.16	<i>p</i> < .001
Household income above average	.38	.18	<i>p</i> < .001
Belonging to middle class	.66	.44	<i>p</i> < .001
Having professional job prestige	.55	.36	<i>p</i> < .001
Having supervisory/managerial job	.51	.46	<i>p</i> < .001
Perceived economic well-being			
Manageable household income	.82	.76	<i>p</i> < .001
Not likely to lose job in next 12 months	.88	.86	<i>p</i> > .09
Easy to find a similar job	.54	.46	<i>p</i> < .001
Good chance to improve living standards	.72	.61	<i>p</i> < .001
Daily environments			
Living in an urban area	.80	.73	<i>p</i> < .001
Working place with 50 or more employees	.55	.50	<i>p</i> < .004

Source: Australian Survey of Social Attitudes 2003.

have at least 12 years of education; possess a university degree; identify themselves as belonging to the middle or upper class (versus working class); have a professional or managerial occupation; hold supervisory or managerial positions in their workplace; be in the labour force; be able to cope or live comfortably with current household incomes; find it easier to ‘find a new job with another employer that has approximately the same income and conditions’ (exact wording in questionnaire); agree that ‘the way things are in Australia, people like me and my family have a good chance of improving our standard of living’; live in an urban area (a large town or a metropolitan area); and work in an organization with at least 50 employees. There was no statistical difference between users and non-users in terms of sex and the likelihood of losing their job ‘in the next 12 months’.

In relation to the first hypothesis, Table 3 restricts socio-economic comparisons to users and non-users of online news and information among those who use the internet. Much of the pattern observed in Table 2 is evident again, although the percentage-point differences between the two groups tend to be smaller. Again, users are younger, are more highly educated, report

Table 3: Socio-economic differences between online news and information users and non-users within the online population (*z*-tests for proportion differences)

	<i>Users</i>	<i>Non-users</i>	<i>Difference</i>
Demographics			
Under 40 years of age	.37	.26	$p < .001$
Having 12 years of education or more	.78	.64	$p < .001$
Having a university or higher degree	.34	.20	$p < .001$
Being a male	.48	.45	$p > .73$
Socio-economic status			
In labour force	.76	.67	$p < .001$
Household income more than \$78,000/year	.20	.18	$p > .36$
Household income above average	.38	.28	$p < .001$
Belonging to middle class	.66	.56	$p < .001$
Professional prestige	.55	.48	$p < .001$
Supervisory/managerial position	.52	.49	$p > .25$
Perceived economic well-being			
Household income manageability	.83	.80	$p > .11$
Not likely to lose job in next 12 months	.88	.89	$p > .78$
Easy to find a similar job	.54	.46	$p < .003$
Good chance to improve living standards	.72	.63	$p < .001$
Daily environments			
Living in an urban area	.80	.78	$p > .12$
Working place with 50 or more employees	.55	.50	$p < .02$

Source: Australian Survey of Social Attitudes 2003.

higher subjective household incomes, identify more with the middle class and are more likely to be in professional occupations. They are also more likely to be in the labour force, more optimistic about future re-employment and future living standards, and to work for larger organizations. There are, however, some important changes from Table 2 results: adopters and non-adopters do not significantly differ in terms of household incomes (20% versus 18%). This is similar to household income manageability – the great majority of both groups (83% versus 80%) did not find it difficult to live on their current household income. There are also no differences with respect to supervisory/managerial position, location of residence, or gender. With all this in mind, H1 can be said to be mostly confirmed.

Table 4: Differences in mean use of traditional news and information among Internet users who do and those who do not adopt online news and information (times per week)^a

	<i>Users</i>	<i>Non-users</i>	<i>Difference</i>
Commercial television	5.08	4.75	$p = .004$
Public television	3.91	3.34	$p < .001$
Radio	5.25	4.77	$p < .001$
Newspapers	3.99	3.34	$p < .001$
Talkback radio	1.32	1.37	$p = .65$
Magazines	1.02	0.57	$p < .001$
Total	3.43	3.02	$p < .001$

(a) 0 = *Never*; 1 = *Once a week or less*; 3 = *Several times a week*; 7 = *Daily*
 Source: Australian Survey of Social Attitudes 2003

In relation to H2, Table 4 presents the mean weekly uses of various traditional news and information sources among users and non-users of online news and information within the online population. As can be seen, there is a strong pattern of more uses of traditional media for news and information among internet users who adopted online news and information than those who did not: 5.08 versus 4.75 times per week in the case of commercial television ($p < .01$); 3.91 versus 3.34 for public television ($p < .001$); 5.25 versus 4.77 for regular radio ($p < .001$); 3.99 versus 3.34 for newspapers ($p < .001$); and 1.02 versus .57 for news magazines ($p < .001$). There was no statistically significant difference in the case of talkback radio. In total, online news and information adopters scored higher in their overall use of traditional sources than non-adopters (3.43 versus 3.02 times per week). The second hypothesis is strongly supported.

In terms of the relationship between internet accessibility and online news and information adoption, there was a statistically significant association ($p < .001$): 55 percent of online news and information users have internet access at more than one place (work and home; work and other places like universities or public libraries; home and other places; or all), compared with only 32 percent of non-users doing so (data not shown). Internet accessibility is therefore a determinant of online news and information adoption. Table 5 further confirms this as there is a clear effect of accessibility on the level of online news and information usage: more than half (51%) of those with internet access at more than one place received news and information from internet sites frequently (at least several times a week), while only 27 percent of the other group did so. Also, note that those with internet access at only one place are twice as likely to be non-users of online news and information than the other group (34% versus 17%). The third hypothesis is therefore strongly supported.

Table 5: Relationship between Internet accessibility and frequency of online news and information usage (column percentage)

	<i>Internet access at more than one place</i>	<i>Internet access at one place</i>
Daily	22	9
Several times a week	29	18
Once a week or less	32	39
Never	17	34

Pearson Chi-squared test 205.22, with 3 *d.f.*, $p < .001$

Source: Australian Survey of Social Attitudes 2003.

Further analysis and conclusion

This article has shown that by 2003 the internet had become a source of news and information for the majority of Australian adults. This is in line with previous research that implies that news and information has been ‘the *raison d’être* of internet adoption’, joining the top group of frequently used online services (Atkin et al., 1998; Lin, 2001; Nguyen, 2003; Nguyen et al., 2005; Papacharissi and Rubin, 2000; Salwen et al., 2005). The proposed hypothesis about socio-economic influences on online news and information adoption is strongly supported: online news and information adopters are more socio-economically advantaged people – whether in terms of personal background, social status, perceptions of socio-economic well-being, or their daily working/living environment. One noteworthy finding is that age, which does not have a consistent effect on innovation adoption (Rogers, 2003), does exercise a substantial influence in the case of internet news and information. Interestingly, although internet users as a whole are a more homogeneous group than the one including both general users and non-users, i.e. although socio-economic differences between users and non-users of online news and information within the internet population are lessened, the former continue to show a significantly more upscale socio-economic profile.

Do these socio-economic factors affect the level of news and information usage? To explore this issue, we focused on adopters of online news and information in a further statistical comparison between frequent (several times a week or every day) and infrequent (once a week or less) users of online news and information. This analysis reveals that these two groups are not significantly different in most of the above socio-demographic variables, except for sex (51% of frequent users being a male – compared to 44% of infrequent users), occupation (60% versus 50% being a professional), and age (65% versus 44% having an age of less than 40). This suggests that most socio-economic factors, although exercising great influence on online/news information adoption, do not considerably affect its usage

level. In the years ahead, if the internet as a news and information medium continues to expand, the group most likely to adopt it as a *major* news and information source is young male online professionals.

In addition to socio-economic factors as strong indicators of entry into the online news and information population, the study confirms that online news and information adopters tend to be heavier users of traditional sources than non-adopters. The only source being used to the same extent by adopters is talkback radio, which is much less information-oriented and more entertainment-intensive than any other source. Finally, internet accessibility is not only a strong predictor of entry into the online news and information population but also substantially increases adopters' level of online news and information usage. Although the above findings do not allow us to have a glimpse of where on the S-shaped diffusion curve online news and information has reached, a positive projection can be inferred from this final point: as the internet is becoming increasingly ubiquitous and thus more accessible, we can hope that online news and information will continue to become more important in Australia in the years ahead.

These findings will contribute much to the debate surrounding whether new information technologies in general, and the internet in particular, are widening or narrowing the digital divide, especially the information gap between the resource-rich and the resource-poor. According to Powell (2001: 309), a combination of 'dirt-cheap' internet access and the costs of computers 'approaching the costs of television sets' has led to the end of the 1990s digital divide in the 21st century. Neuendorf et al. (1998) contended that 'a convergence of users' should be expected to correspond to a world of no discontinuous innovations, where the 'hardware' of an innovation is linked to established delivery systems. These arguments have received empirical support from quite a number of recent works, which have identified a less influential role for demographic factors such as income and education on the adoption of the internet (Rhee and Kim, 2004), web-streaming (Kwak et al., 2004; Lin, 2004; Tanaka, 2000), as well as other types of online services (Lin, 2001). Thus, some scholars have contended that those worrying about the digital divide are not facing a social problem but creating a myth (Compaine, 2001). Some argue that the digital divide is more a 'digital delay' (Xavier, 2001: 6).

This study, however, does not seem to support this. While access to technologies is important, it is only a necessary condition. The findings clearly show that there is still a considerable discrepancy between those internet users who do and those who do not adopt online news and information. The sufficient condition does not seem to be about having access to the internet but about how much access one has, and about the many background factors facilitating, motivating and stimulating news and information adoption/use, including social locations and resulting information needs and resources. With the trend toward neoliberal economic policies in Australia (such as the

proposed sale of Telstra and the recent media ownership reform under the Howard government), as well as the corporate media's general trend of adopting the 'get more out of less' strategy (focusing on small markets of highly educated and affluent audiences rather than the general public), this situation is likely to be worsened. Given the many cultural and social similarities between Australia and other developed countries, the association between socio-structural predictors and this information gap can be more or less expected elsewhere too.

Notes

- 1 Published reports and datasets of these surveys are available at <http://peoplepress.org/reports/>
- 2 Published reports and datasets of these surveys are available at <http://www.pewinternet.org/reports.asp>
- 3 Published reports from these surveys are available at <http://www.worldinternet-project.net/>. Datasets can be requested in some cases.

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