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How to cite:

Ellis-Chadwick, Fiona; Doherty, Neil and Hart, Cathy (2002). Signs of change? A longitudinal study of Internet adoption in the UK retail sector. *Journal of Retailing and Consumer Services*, 9(2) pp. 71–80.

For guidance on citations see [FAQs](#).

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Version: Accepted Manuscript

Link(s) to article on publisher's website:
[http://dx.doi.org/doi:10.1016/S0969-6989\(01\)00030-3](http://dx.doi.org/doi:10.1016/S0969-6989(01)00030-3)

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Signs of Change? A longitudinal Study of Internet Adoption in the UK Retail Sector

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Signs of Change? A longitudinal Study of Internet Adoption in the UK Retail Sector

Key Words: Internet Adoption; Web Retailing; Web-sites; On-line Sales; Retail Sector; United Kingdom.

Abstract: The Internet and the World Wide Web have changed quite significantly in a relatively short period of time. Some of the differences are readily quantifiable or at least easily visible; e.g. exponential growth rates in the number of users, rapid expansion in the number of personal and business web sites, an increase in transmission speeds and the advent of new mark up scripts, such as DHTML. Whilst these quantifiable changes and technological improvements are a valuable benchmark when considering the practical ramifications of developing an on-line business, from a strategic perspective it is perhaps more important to consider the extent to which Internet technologies are likely to effect long-term changes to organisational behaviour and economic activity. For instance, in the book retailing business, Internet vendors, benefiting from comparatively low on-line set-up costs, have been able to use price as a major marketing tool. This action has resulted in reduced profit margins across the sector (Intel, 2000). Therefore, from a retailer's perspective perhaps the most important issue to resolve is not whether there are sufficient customers on-line but how e-commerce is likely to reshape their markets and business processes. However, little academic research exists which has recorded Internet adoption trends, over time, making assessment of such issues difficult. This paper seeks to redress the balance by presenting a comprehensive and rigorous longitudinal review of the adoption of e-commerce within the UK retail sector. More specifically, the paper provides an up to date assessment of the state of e-commerce within the UK retail sector, before reviewing trends in its adoption over a four-year period from 1997 to 2000. The key finding is that whilst clear evidence of growth has been found across all types of retailers, it is fastest amongst larger retailers, and those operating in sectors such as books, alcoholic beverages and mail order, The paper concludes by offering implications for retail practitioners and for research.

Introduction

During the last four years the World Wide Web has changed. The number of Internet hosts has increased significantly from 19,540,000 in 1997 to 93,047,785 in 2000 (Internet Software Consortium, 2001). The global Internet user community has grown to approximately 179 million (Nua, 2000) and for the first time ever, more women than men will gain access to the Internet (Angus Reid, 2000). The size of the Internet economy has grown; in 1996 according to Forrester Research (1996), the total Internet economy was estimated at 15 billion US dollars and by 1999, revenues from on-line consumer spending alone were estimated at 36 billion US dollars (Boston Consulting Group, 1999). Recently, dot com, companies predicted to lead the on-line economy have begun to collapse, suffering from lack of investment capital and elusive profits. Established companies however are moving to the forefront of e-commerce (Datamonitor 2001). But how far reaching is this trend and what are the long-term implications for the UK retail sector? This paper initially considers recent literature in order to provide a framework for considering the adoption and diffusion of the Internet and the Web. The trends in adoption in the UK retail sector are addressed by examining data collected from a review of the on-line activities of 1099 over a four-year period from December 1997 to December 2000. A discussion of the findings follows, which highlights key implications for retail practitioners. Finally, conclusions and implications for research are presented.

Literature Review: The Diffusion of E-commerce amongst UK-based Retailers

This section seeks to review the work of previous authors who have conducted studies of the Internet adoption, and in so doing, define the research objectives that guided the execution of this research study. During the mid-1990's it was suggested that bricks and mortar retailing could become a thing of the past (Van Tassel & Weitz, 1997). Companies operating solely on-line were predicted to cannibalise the market share of their off-line counterparts, by offering fast, flexible and lower cost on-line solutions. Moreover, threatened by disintermediation¹, the continued dominance in retail market by established off-line retailers was also brought into question. The rapid rise and apparent success of the dot com business viewed (companies operating solely on-

¹ **Disintermediation:** the removal of intermediaries in the supply chain in favour of the producer marketing

line) in conjunction with the low levels of Internet adoption amongst brick and mortar retailers in the UK (Hart et al, 2000) suggested that established retailers could be falling behind in the growing on-line economy.

However, unlike their on-line counterparts established companies have well-developed brand equity, extensive industry knowledge, access to financial resources and well-developed supplier relationships to support business development. Indeed, a recent rise in the number of dot com company failures, especially in the business to consumer sector (Webmergers, 2001) has been accompanied with indications that established retailers are succeeding on-line, complimenting their existing market offers with web based alternatives. According to a recent survey (Data monitor, 2001), the UK has the most developed grocery e-tailing sector in Europe. Traditional retailers like Tesco, reportedly the world's largest on-line grocery retailer, have integrated the Internet and the Web into their businesses and benefited from the equity in their established brands and the convenience via the Internet. Consumers, wary of the security risk posed by shopping on the Internet have embraced the on-line offerings of well-known retail brands. Furthermore, established retailers have the opportunity to benefit from their experience and knowledge gained from many years of trading enabling them to provide high levels of customer service. The success of UK grocery retailers on the Web could have been predicted given that the retail structure within the UK tends to be dominated by the food sector, and within that sector, the large food multiples. High concentration and competition combined with static food sales and possible saturation of the market, suggest that the major UK food multiples may perceive the Internet to provide additional growth via a new marketing channel. However, it is unclear how widespread Internet adoption is within the retail sector or whether the example set by Tesco Plc is an industry norm or an isolated incident.

An obvious starting point for research into the adoption of a complex technology, such as the Internet, is the '*diffusion of innovation*' theory (Rogers, 1983). However, previous studies that have applied this theory in a technological context (for example: Premkumar et al, 1997; O'Neill et al, 1998) have tended to focus upon the adoption of a particular technology designed to fulfil a

directly to the consumer (Ettorre,1996; Libresco, 1997; Picot et al, 1997).

specific purpose. The Internet does not conform readily to the format of a particular technology performing a specific purpose. For example, in the case of the Internet, there is not a single innovation to be adopted but a plethora of applications for a range of conventional and newer technologies. As previous research has shown, the Internet can be used to pursue many different business and marketing functions; retail channel, electronic sales channel, communicating information (Doherty et al, 1999; Van Tassel & Weitz, 1997; Morganosky, 1997). Consequently, when it comes to research into the commercial exploitation of the Internet, it appears that the '*diffusion of innovation*' model doesn't readily fit.

The lack of an obvious theory upon which to base the study of Internet adoption has certainly not deterred academics from researching this increasingly important domain. For example, there have already been a wide variety of studies focussing upon the commercial adoption of the Internet and its functions within a business (O'Keefe et al, 1998; Cappel & Myerscough, 1996; Cockburn & Wilson, 1996; Auger & Gallagher, 1997; Spiller & Lohse, 1997). However, previous research has tended to focus only on active web sites or those sites having a high global / brand presence. Indeed, the majority of research has concentrated on the highest areas of activity in the US, for example the top 100 US retailers, (Morganosky, 1997) yet little evidence exists to suggest whether European (KPMG & OXIRM, 1996) or UK retailers as a sector will adopt the Internet to the same extent. The studies have identified that there are variations in how companies use the Internet for retailing purposes, but it is not possible to suggest implications of the Internet for retailing as a whole by examining only on-line companies. Established companies may not automatically adopt the Internet into their retail practices and thus their approach to the new technology will impact on its future penetration into the UK retail market. There is a great deal more to be learned about the structure of the Internet consumer market and subsequently its future potential as a retail environment by comparing companies, which are absent against those currently involved. It was realised that as the adoption process is continuous over-time and the function for which the Web had been adopted may change over time. To gain insight into adoption trends longitudinal study was instigated to pursue the following aims.

Research Aims

The primary aims of the research were to examine how retailers are using the Internet to interact with consumer and to explore whether these levels of use have changed overtime. The secondary aims were to quantify levels of retailer/consumer activity as a point of reference for current and future research. More specifically, the survey had the following distinct research objectives:

1. To examine current levels of Internet adoption by UK retailers, in terms of the range of facilities, functions and services being offered.
2. To investigate whether the current levels of Internet adoption are influenced by either the retail sector in which the organisation primarily operates, or its size, in terms of the number of retail outlets that it operates.
3. To explore the rate of change in activity levels, over a four year period, and how these rates vary within different retail activity groups, or different size bands.

The following section of this paper explains the methods used to achieve these objectives.

Research Method

This study of Internet adoption involved a direct review of retail web sites. Web site activity was reviewed on an annual basis over a four-year period from 1997 to 2000. The main aims were to identify the range of functions and services being offered and whether any changes had occurred over time. The rest of this section discusses the design and implementation of the series of on-line surveys.

Timing of data collection

To date four on-line surveys have been conducted: Survey 1 - 1997, Survey 2 - 1998 Survey 3 - 1999, and Survey 4 - 2000. For each survey the data collection took place in the months preceding the Christmas trading period. As retailers generally plan well in advance of the selling season (Dunne & Lusch, 1999) and given the importance of the Christmas trading period to UK retailers it was considered that web site activity would be most developed at this time. The data collection period for each survey covered the period from October to early December. The first

survey was exceptional as time was also given to the development and validation of the pro forma document (June to September).

Design of the pro forma data collection document

To facilitate the accurate and consistent capture of information pertaining to the range of functions and services being offered through retailers' web sites, a *pro forma* web site assessment document was created. The content of this document, in terms of web site functionality, was established by thoroughly reviewing the web sites of ten retailers with a high profile Internet presence in June 1997 e.g., Tesco, Blackwells.

The categories of data ultimately deemed important to collect were:

- 1. Registration details:** The presence of a registered '*uniform resource locator*' (URL) was interpreted as an indication of on-line activity. However, registration of a URL does not necessitate instant development of a web site, thus 'registration' implied intent towards web site development.
- 2. Information provision:** Many web sites appear to use the Web as an information channel providing existing and potential customers with various types of information e.g., product related, financial statements, and other company specific information e.g., store location. It should be noted that the key objective was to explore the type of information being presented rather than the depth or quality of information.
- 3. Interactivity:** The pre-testing exercise had confirmed that the Internet is also used interactively for two-way communication and transactions, with the main method of on-line communication being E-mail. Some of the sites reviewed also provided on-line ordering and payment systems, although these varied greatly with respect to geographical limitations, merchandise ranges and levels of security.

In addition to classifying a wide range of generic Internet functions and services, the *pro forma* document was also used to collate information about each retailer's area of activity (grocery, electrical, clothing etc), format i.e. (primarily store-based/primarily mail order) and size, in terms

of number of retail outlets operated. Collection of this data provided an opportunity to explore whether levels of Internet activity varied according to the primary retail activity, the retail format used by the organisation, or its size. The resultant document was then pre-tested on another twenty retail web sites to test for content validity. No changes were deemed necessary for full implementation of Survey 1.

As an overarching aim of the on-line survey was the capture of consistent data it was deemed important to retain the design of the pro forma document for the subsequent Surveys (2-4). However, continuation sheets were available to gather data, which could not easily be classified under the above headings for Surveys 2 - 4. The continuation sheets proved to be adequate to record additional data, which in general involved increases in range and depth of information rather than totally new activity classes. Notwithstanding this factor, the issue is revisited in the discussion section of this paper.

Targeting of Research Instrument

Given the scale of the project it was important to set manageable parameters in terms of potential numbers of sites to be visited whilst not diminishing the capacity of the study to identify trends likely to affect the sector as a whole in respect of their levels of Internet adoption. The aim was to include only the UK's largest retailers, in the sampling frame, as these were perceived as being more readily identifiable through reference documents such as: the Corporate Intelligence Survey, the Business Monitor and the Healy and Baker Directory. Moreover, it was believed that the largest retailers were likely to be most influential in terms of the uptake and application of the Internet. Consequently, a sampling frame composed of all multiples² and those retailers with a turnover greater than 5 million pounds was defined to ensure that all the UK's leading retailers were targeted by this research. Ultimately, the Healy and Baker Retail Directory (1996, 1997), which, claims to provide '*an alphabetical list of all companies operating two or more retail outlets*' was used to identify retailers that conformed to the sampling criteria. This resulted in a comprehensive list of 1099 retailers, which formed the basis for data collection.

² Multiples: Organisations operating ten or more retail outlets.

The levels of Internet adoption for all the retailers in this sampling frame were monitored for each of the four years. However, it should be noted that in each of the years following 1997 the number of retailers dropped, as some of the original 1099 retailers went out of business or merged. To this end, the Healy and Baker Retail Directories (1998, 1999, 2000) were consulted to establish whether companies were still trading. It was considered important to address this issue as continuing to include bankrupt or insolvent companies could cause bias in the results.

Data Collection

It was possible to conduct a rigorous review of Internet activity for all the UK's leading retailers because of the Domain Name System (DNS), which has evolved as a way of ensuring no two Internet sites have the same name (Albitz and Lui, 1997). For the United Kingdom the top-level domain name is '.uk', a node one level down, a first-level domain is '.co' (meaning - commercial and equivalent to the top-level US domain '.com') and a sub domain is likely to be a company name. The data was collected using the following three-stage procedure:

- 1. Presence of a registered URL:** The on-line survey commenced by determining whether each of the 1099 target companies had a registered URL, using the on-line search tool '*Whois*³', which has been specifically designed to find domain names.
- 2. Web site activity validation:** Each registered URL was checked for site activity. If there was an error message indicating an incorrect address then the spelling was rigorously examined and if failure to connect to a web site prevailed, the URL was assumed to be inactive.
- 3. Web site review procedure:** Each active Web site was reviewed and the content recorded using the *pro forma* document as a review guide.

The above method was used to ensure that the collection of data was conducted in a rigorous and consistent manner. More detail with respect to the results of the first survey and the methods by which retailers were targeted and the data collected can be found in a previous publication⁴

³ The Whois function is supplied and supported by InterNIC and can be found at:- www.nic.uk/whois.html.

⁴ To preserve the authors anonymity, details of this publication will be withheld until after the refereeing process

Research Results

The following presentation of the research results is explicitly related to the three research objectives proposed at the end of the literature review.

The functions and facilities currently being offered by UK retailers

The data presented in Table 1 provides an overview of the range of functions, facilities and services currently being offered via the Internet, by the leading UK-based retailers. Whilst it can be seen that the majority of retailers [72%] have taken the preliminary, but fairly modest, step of registering a URL, only about half of these have, as yet, taken the opportunity to use their web site as a mechanism for communicating with their markets. Indeed the provision of information is clearly the most common function of the Internet at present, but increasing numbers of organisations are also now using it for email communications with customers [35%] and for directly supporting marketing campaigns [26%]. However, only 18% of this sample have fully engaged in e-commerce, by developing an on-line sales ordering capability.

Insert **Table 1: 'The Provision of Informational and Interactive Services** about here.

In addition, the data presented in Table 1 suggests that there is a high degree of variability of the rate of adoption within each of the seventeen retail activity groups. Intuitively, it appears that the speed of adoption has been far quicker within sectors such as mail order, books and clothes, as compared with others such as new, convenience stores and health and beauty. The statistical significance of these differences is fully reviewed in the following section.

Factors affecting the rate of adoption amongst UK-based retailers

This section aims to explore whether the rate of adoption of the Internet amongst retailers is influenced by either the retail activity group within which the retailer operates or by the organisation's size, in terms of the number of retail outlets it operates.

Retail activity sectors: It was noted earlier, that there is evidence to suggest Internet adoption varies greatly across the seventeen different areas of primary retail activity. To test this

is complete.

hypothesis, a chi-squared test for goodness of fit was conducted, and the results are presented in Table 2 (the numbers in upright type in the table are actual values, and those shown in italics are the expected values for each cell). It can be seen from the results of this test, that there is a strongly significant association (at the 0.001 level) between an organisation's primary area of retail activity and the extent to which it has embraced e-commerce.

Insert **Table 2:** *The relationship between retail activity category & Internet adoption* about here.

An inspection of the data suggests that those organisations operating in the first eight areas of retail activity, as listed in Table 2, have an increased likelihood of having an active web site, whilst those operating in the bottom six have a decreased likelihood of having an active web site. For example, whilst the expected number of mail order companies operating an active web site is only 47, there are already 59 such companies with an active web-site. By comparison, only 17 specialist food retailers are currently operating an active web site, whilst the expected number is 44. It is likely that the motivation for certain sectors to be embracing e-commerce more rapidly than others will vary from sector to sector. For example, the high levels of adoption within the books and music, alcohol retailers and toys sectors, are probably the result of products such as books CDs, wine and toys being well suited to the e-commerce format. Alternatively, the high levels of adoption amongst mail order companies can probably best be explained by their long-term operation of a logistics infrastructure which readily facilitates e-commerce. In yet other sectors, such as groceries and clothing, the adoption of the Internet might be a defensive strategy to protect market share.

Number of Outlets: The results of a chi-squared test, presented in Table 3, suggest that there is a statistically significant association between the size of retailers, in terms of the number of outlets each operates, and the rate of adoption. More specifically, an inspection of the data in Table 3 suggests that there is an increased likelihood of adoption amongst larger retailers and a decreased rate of adoption amongst smaller retailers. Furthermore, it can be seen that it is the largest organisations, with over three hundred outlets that are most likely to have developed a fully transactional web site. This may be because those retailers with the largest network of outlets might have most to lose should they be left as observers, rather than active participants, in a vibrant Internet marketplace. Alternatively, it could be that those retailers with the largest

numbers of outlets are most likely to have the investment resources, skilled personnel, scale and sophistication of logistical and technical infrastructure necessary to successfully support e-commerce.

Insert **Table 3: *The relationship between numbers of outlets & Internet adoption*** about here.

The results presented in table 3 are important, because they tend to counter previous research. For example, (1998) has suggested that it is the larger organisations that will be the least likely to adopt because of their established distribution relationships, whilst Auger & Gallagher (1997) predicted that smaller retail organisations would be the most likely to adopt the Internet due to their greater flexibility.

4.3 The adoption of the Internet by UK-based retailers, over the period 1997-2000

This section aims to explore whether the rate of change of the adoption of the Internet, over the past four years, has been influenced by either the retail activity group within which the retailer operates or by the organisation's size, in terms of the number of retail outlets it operates.

Retail activity sectors: The levels of Internet adoption have been rigorously monitored over a four-year period [1997-2000]. The results, presented in Table 4, demonstrate the percentage of retailers who have registered a URL, and who have developed an on-line sales capability, for each of these four years. It is interesting to note that every year the number of retailers registering a URL, within each retail activity category, appears to be significant higher. This same trend can also be observed for the introduction of on-line sales ordering facilities. Indeed, a 'paired samples' test shows that there are significant differences [at the .001 level] between the adoption levels, year on year, for both URLs and sales.

Insert **Table 4: *Growth in Internet Adoption by Retail Activity Category*** about here.

When it comes to levels of adoption within individual retail activity categories, it can be seen that some have grown far more rapidly than others, over the past four years. For example, the number of alcohol retailers offering an on-line sales facility has increased by 38 percentage points, moving from 6% in 1997 to 44% in the year 2000. Similar rapid rates of growth have also been

experienced within toys [36 percentage points] and books [32 percentage points]. The rapid rates of expansion in these sectors might in part be due to the suitability of their products for an Internet format, but also due to the competition many have experienced from Internet 'start ups'. For example, the phenomenal growth of *Amazon.com* and *Cdnow.com* have put book and other retailers selling books under great pressure, and the launch of sites such as *Virginwines.com* has put the alcohol retailer under pressure.

Number of retail outlets: The results, presented in Table 5, highlight the percentage of retailers who have registered a URL, and who have developed an on-line sales capability, for each of the five classes of retailer size. It is interesting to note that every year the number of retailers registering a URL, within each retailer size category, appears to be significantly higher. This same trend can also be observed for the introduction of on-line sales ordering facilities. Indeed, a 'paired samples' test shows that there are significant differences [at the .001 level] between the adoption levels, year on year, for both URLs and sales.

Insert **Table 5: *Growth in Internet Adoption by Number of Retail Outlets*** about here.

When it comes to the growth in individual size categories, there are interesting differences to be observed between the growth in the registration of URLs and the introduction of on-line selling. With respect to the registration of URLs, the growth witnessed over the past four years has been fairly uniform, with growth in all five, size categories ranging from 37 to 46 percentage points. However, there are very distinct differences between the adoption of sales in each of the five categories over the past five years. Whilst the introduction of on-line selling has only grown by 9 percentage points amongst the smallest retailers [0-20 outlets], it has grown by 32 percentage points amongst the largest retailers [> 300 outlets]. This finding provides more evidence that it is the largest retailers who are presently at the forefront of the e-commerce revolution, in the UK.

Discussion - Trends in Internet adoption in the retail sector

This paper began by proposing that the Web has changed across a range of quantifiable variables, e.g. number of users, transmission speeds. Additionally the findings of this research have shown a

six-fold increase in the number of retailers offering on-line shopping to their customers between the years 1997 to the year 2000. But are such increases the only signs of change or is the Web having a more far-reaching impact on the retail industry? This section discusses emerging trends in patterns of adoption among Web active retailers in the UK and in doing so considers whether the Web itself is an agent of change. Retailers generally begin on-line activities by providing information and interactive communication. Their site may then develop into an electronic shop almost mirroring their off-line activities. Finally a more complex platform may be developed linking together other on-line retailers to form an on-line community. More specifically the three emerging platforms are:

- ◆ **Communication platform** - This involves the retailer in providing generally available information e.g., financial information, location of stores, mission statement and terms of customer service, (sensitive information is generally excluded). Additionally interactive features are offered which prompt the customer to take some form of action, e.g., order a catalogue or sign up for a store card e.g., emmasommerset.co.uk. It should be noted that the use of the Web as a communication platform is generally excluded from discussions of e-business models. Perhaps the reason for this is that communication is not perceived as an income generation model. However, such discussions do include e-procurement where the revenue comes from cost savings rather than external income. (Timmers, 1999). Moreover, Pant and Ravichandran, (2001) do acknowledge the use of the Web as an advertising channel, but their description of this model includes the web site owner giving away something free to site visitors. Retailers using the Web as a communication platform rarely offer free gifts unless it is consistent with their off-line retail offer. In addition, established retailers using the Web in this way have the opportunity to benefit from 'source credibility' (Kellerman, 1961) which plays an important part in the success or failure of a communication channel. A point for consideration however, is that from a communication perspective retailer web sites of this kind are trying to both inform and stimulate action - two objectives not normally targeted by one communication medium (Fill, 1999).

- ◆ **Electronic-shop** - this involves retailers presenting their off-line shop on-line e.g., currys.co.uk. They may be targeting a range of different audiences with product assortments

of varying breadth and depth. More specifically, the combination of audiences and product range may be one of the following: selected product range to a regional audience, comprehensive product range to a regional audience, selected product range to a national audience, comprehensive product range to national audience, selected product range to a global audience, comprehensive product range to global audience. The web site will not generally include links to companies or offers outside company boundaries of the web site retailer. This platform is generally consistent with the work of Timmers, (1999) and Pant & Ravichandran.(2001), however neither explicitly points to variation in audience type and product range.

- ◆ **Trading Community** - Some retailers are moving beyond the e-shop model and developing portals which are either inward looking i.e. linking together other companies under the umbrella of a single Holding Group e.g. enjoyment.co.uk or outward looking, i.e. linking together companies outside the Holding Group e.g. Birthdays.co.uk. This type of portal provides the on-line customer with a range of services which are offered as a two way link passing traffic from one brand to another brand (either within a company group or extending beyond a company group). This platform embraces the concept of community as discussed by Pant & Ravichandran, (2001).

Whilst the first two platforms do not suggest a radical change from existing retail practices the Trading Community platform does potentially signify change. If adoption of this model were to become widespread within the retail industry, especially outward looking portals then the nature of retailing may change; the success of new on-line business models may transcend into the off-line world. Furthermore, widespread adoption of this platform on-line (currently a model used by only the most proactive web adopters i.e. companies, which have been using the Web for transactions and for at least the last three years) could raise the expectations of the off-line consumer in terms of product range offered. Single category retailers may be expected to broaden their product offer to include a broader range of services. For example Birthdays.co.uk include links to Thorntons Plc and Wax Lyrical the specialist candle retailers. As the number of Internet

consumers' increase and the total on-line retail offer improves, individually successful on-line retailers may be expected to mirror the most successful offer whether that be on or off-line one.

The above discussion provides a framework for further investigation of existing data and further research into the impact of adopted on-line retail business models on off-line business models. Whilst the signs of change generated by the web are perhaps at the moment fairly limited, it is important to probe such issues in order to develop frameworks to provide guidance for retail strategists.

Conclusions

This paper identifies growth rates in retailer adoption of the Web. It shows rates of adoption over a four-year period and the different ways that multiple UK retailers might integrate the Web into their existing businesses. In the quantifiable sense adoption of the Web has certainly changed in this sector. In answer to the question 'Is the Web becoming an agent of change in the retail sector?' there is some evidence to suggest that it is not, namely retailers are using the Web as a communication and e-shop platform, which is to be expected. However, as the more innovative retailers are going beyond these models and exploring new ways to differentiate themselves from the competition on-line. Furthermore, it is likely that such retailers are learning from their on-line experiences and in doing so eliminating errors and streamlining the Web site and supporting operations. Those companies which have chosen to use the Web as a communication platform or e-shop may find themselves left behind through lack of experience of managing more complex on-line retail business models. This could become critically important if successful on-line models are applied off-line. However, further research is required into this area in order to determine the extent to which the Web is likely to promote long-term changes in the retail sector.

The primary value of this research lies in the identification of trends in Internet adoption over a four-year period and furthermore it has discussed a range of models used by UK retailers on-line. The important implications for retailers are that whilst some retailers appear to be using the Internet as an additional channel to pursue either marketing communication or sales objectives.

Others show evidence of exploring a broad range of objectives; the potential value of on-line links with other companies.

It should also be noted that this study focussed on mainstream retailers in the United Kingdom. A future comparison with other European Countries might reveal some interesting results. The study may also have been limited in the depth of content achieved in the on-line survey, however, it has made a valuable contribution by providing a robust picture of UK Internet based retailing by traditional retailers over a four-year period. This will provide a solid foundation for further extensions of the research. The lack of European research in this area also prompts investigation into the rationale behind retailers' Internet strategy and further research is currently underway.

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Table 1: The Provision of Informational and Interactive Services

Retail Activity Category	Registered Site (URL)	Informational Services			Interactive Services			
		Product	Financial	Other	Marketing	Recruitm't	Email	Sales
Grocery	20	9	10	10	7	7	9	6
Electrical	28	15	10	16	13	12	16	11
Toys	28	16	3	14	13	4	18	13
DIY	15	10	3	11	7	5	11	4
Home Shopping	85	52	14	56	45	15	54	36
Sports	29	13	1	14	9	3	16	9
Alcohol Retailers	15	8	2	11	7	4	9	7
Books & Music	48	29	8	28	25	12	29	22
Clothing	95	43	26	63	37	21	52	19
Furnishings	17	30	4	35	24	6	28	9
Jewellery	19	10	3	11	8	5	10	4
Mixed Stores	64	27	18	36	25	24	31	17
Convenience Stores	35	12	8	11	5	8	10	1
Footwear	35	7	0	9	3	3	8	2
News	13	2	0	2	1	0	1	0
Health & Beauty	42	13	5	20	12	11	18	7
Speciality Foods	41	9	5	14	4	4	10	5
Totals	668	305	120	361	245	144	330	172
	(72%)	(33%)	(13%)	(39%)	(26%)	(15%)	(35%)	(18%)

Note: The figures in brackets represent the percentage of the total retailers surveyed, which offer a specific category of Internet service.

Table 2: The Relationship between Retail Activity Category and Internet Adoption

Retail Activity Category	No URL	URL, but no Web Site	Active* Web-site	Total Retailers
Grocery	0 (6)	9 (6)	11 (8)	20
Electrical	2 (8)	12 (9)	16 (12)	30
Toys	3 (9)	10 (10)	18 (13)	31
DIY	2 (5)	3 (5)	12 (7)	17
Mail Order	26 (31)	26 (34)	59 (47)	111
Alcohol Retailers	1 (5)	4 (5)	11 (7)	16
Books & Music	6 (15)	19 (17)	29 (22)	54
Clothing	23 (34)	35 (38)	64 (50)	122
Furnishings	17(24)	20(23)	36 (30)	73
Sports	6 (10)	13 (11)	16 (14)	35
Jewellery	5 (7)	7 (7)	12 (10)	24
Mixed	38 (29)	28 (32)	36 (42)	102
Convenience Stores	9 (12)	21 (14)	14 (18)	44
Footwear	11 (13)	25 (14)	10 (19)	46
News	2 (4)	11 (5)	2 (6)	15
Health & Beauty	44 (24)	21 (27)	21 (35)	86
Speciality Foods	66 (30)	24 (33)	17 (44)	107
Totals	261	288	384	933

Significant at the 0.001 % level; $\chi^2 = 181 > 59.7 = \chi^2 (0.001), 32 \text{ d.f.}$

* **Note:** The active web-site category includes both informational and interactive service providers.

Table 3: The Relationship between Number of Outlets and URL Registration

No of Outlets	No URL	URL, but not Interactive Site	Interactive Site	Total Retailers
0 – 20 Outlets	136 (102)	111 (114)	111 (147)	358
21 – 50 Outlets	61 (55)	54 (61)	77 (76)	192
51 – 100 Outlets	21 (28)	40 (32)	38 (39)	99
101 – 300 Outlets	13 (31)	34 (34)	61 (43)	108
> 300 Outlets	3 (18)	23 (20)	38 (25)	64
Totals	660	179	93	932

Significant at the 0.001 % level; $\chi^2 = 61.2 > 26.13 = \chi^2 (0.001), 8df.$

* **Note (1):** The active web-site category includes both informational and interactive service providers.

Note (2): This analysis excludes all 'home shopping' companies, as they don't have retail outlets, and also a small number of other retailers for which the information was not available.

Table 4: Growth in Internet Adoption by Retail Activity Category

Retail Activity Category	% of retailers with a URL				% of retailers with on-line sales			
	1997	1998	1999	2000	1997	1998	1999	2000
Clothing	33	59	72	78	3	9	14	16
Footwear	26	31	62	76	0	0	2	4
Jewellery	36	54	71	79	0	4	17	17
Alcohol Retailers	37	73	88	94	5	13	44	44
Convenience stores	28	40	64	80	0	0	2	2
Grocers	79	88	100	100	13	13	24	30
Health & Beauty	19	30	37	49	1	2	3	8
DIY	48	79	89	88	0	11	17	24
Electricals	50	69	78	93	8	28	25	37
Furnishings	33	56	71	77	1	3	10	12
Books	32	53	80	89	8	19	31	41
News	24	38	67	87	0	13	0	0
Sports	41	50	86	83	0	8	25	26
Toys	49	74	81	90	6	18	35	42
Mail order	43	58	74	77	10	20	30	32
Mixed	28	40	55	63	2	3	12	17
Speciality foods	5	16	29	38	0	1	3	5

Table 5: Growth in Internet Adoption by Number of Retail Outlets

Number of outlets	% of retailers with a URL				% of retailers with on-line sales			
Retail Outlet	1997	1998	1999	2000	1997	1998	1999	2000
0 – 20 Outlets	17	32	52	62	1	4	8	10
21 – 50 Outlets	28	44	62	68	2	7	14	19
51 – 100 Outlets	35	52	66	77	2	6	15	18
101 – 300 Outlets	51	73	78	88	0	8	17	23
> 300 Outlets	49	78	91	95	2	22	28	34