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EXPLORING THE EFFECTS OF E-COMMERCE
Report 1

Draft report for
Retail and Consumer Services Foresight Panel

1/10/99

From the CRIC E-commerce Team

Executive Summary

This report is a first output of a project being undertaken by CRIC (the ESRC Centre for Research on Innovation and Competition, at the University of Manchester) on behalf of the Retail and Consumer Services Panel of the Foresight Programme. It examines data sources and forecasts dealing with the extent and pattern of consumer e-commerce use, and the levels of use of various platforms (PCs, interactive TV, and also others such as smart cards, mobile PDAs, etc.)

After some definitional issues are considered, and the research strategy is explicated, the bulk of the report reviews data and forecasts. Among the main conclusions to emerge are that:

- Despite variations, and in some cases “worst case” and “best case” scenarios, there is consensus that **the market for consumer e-commerce will grow very substantially.**
- Many forecasts derive from unclear methodologies and partial data; this together with different definitions of e-commerce, is one factor in the variation in forecasts.
- Many of the available reports draw upon one or other of a relatively small number of authoritative studies and sources.
- Though there is some variation in estimates of market size and trends, it is notable that the ballpark figures tend to be very similar, once definitional variations are taken into account.
- It is likely that there will be significant differences in the trajectories of e-commerce growth between the UK and USA.
- Despite variations in analysis of social differentiation, there is broad agreement on the social groups that are likely to display more or less rapid uptake. Expectations are that poorer groups, the elderly, and some minorities (including some people with disabilities) will be substantially less likely to use the new systems.
- There is also some agreement on the sectors and products that are liable to see most rapid expansion of use namely computer hardware, travel, music and books. These breakdowns ignore the potential importance of non-retail e-commerce such as electronic auctions, gambling and share trading.
- Practically all studies are focused on e-commerce via PC and Internet platforms. There has been very little exploration of other platforms, though digital TV and mobile telephony are both systems that some commentators have identified as potentially major media for e-commerce. Some commentary has suggested that rapid uptake of digital television could bring about rapid access to e-commerce for a large proportion of the population that is currently excluded.

This report has been commissioned by the Retail and Consumer Services ForeSight panel.

It has been prepared by the ESRC Centre for Research on Innovation and Competition (CRIC).

The full text of the report is available at

<http://les.man.ac.uk/cric/e-commerce>

A major objective of CRIC's research is to cast new light on the problem of competitiveness, and the role that innovation plays in this. CRIC is particularly concerned to explore this theme in the context of service activities and new forms of organisation for innovation. The University of Manchester and UMIST jointly support the Centre.

Key persons involved in producing this report are: Andrew McMeekin, Professor Ian Miles, Alexander Roy and Dr Jason Rutter.

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1 INTRODUCTION FROM TASKFORCE CHAIR

Welcome to the first Electronic Commerce Taskforce Report. We commissioned CRIC to produce an authoritative review of all the existing forecasts and likely outcomes of e-commerce in the UK over the next 5-10 years. This report summarises their findings. It is intended to be used by management of companies and organisations involved with the retail and consumer services market sectors, in order that they can maximise the e-commerce opportunity that the digital revolution presents.

The report also analyses the parameters that will drive or inhibit the uptake of e-commerce in the UK. In a second report the group summarises three future scenarios, which reflect the consequences of the positive and negative aspects of these parameters.

We hope that this report will be updated on a regular basis and that the reader will be able to access the sources of information sign-posted in this report for further details.

Chris Townsend
Chair of the Electronic Commerce Taskforce

2 INTRODUCTION

2.1 Defining E-commerce

It is important to be clear about exactly what is being discussed when we talk of “e-commerce”. This and related terms are used in diverse, potentially misleading, and frequently confusing ways by different people. Dramatically different estimates of market size, for example, may be more a product of different objects of analysis than of underlying differences in assumptions about growth rates, etc. For the purposes of this report, we have adopted the following definition:

E-commerce: the purchases of goods, services or other financial transactions in which the interactive process is mediated by information or digital technology at both, locationally separate, ends of the interchange.

The rationale for this is set out below.

Key points:

- Here “transactions” includes both specification of a good or service required, and commitment to buy. The service may involve an activity such as moving money between bank accounts, where the fee for this task is subsumed into the general handling charges of the account or other mechanisms.
- The process of e-commerce can be differentiated into a sequence of stages. These stages can include (not necessarily in this order) the expression of interest to purchase, exposure to information on the product or service, choosing of product or service, commitment to purchase, taking delivery, payment. Some accounts of e-commerce are more restrictive than others in demanding the presence of one or other step.
- We understand that e-commerce often involves payment through a digital technology, or the transmission of sufficient details to allow such payments to be made. However, this is not in itself a defining feature of electronic commerce. Payment can be made offline, for example by cash-on-delivery, or on collection and still fall within the boundaries of our definition.
- We understand e-commerce to involve electronic specification of the required good or service. (Thus conventional mail order or telephone shopping are ruled out.) However, there may be transactions (e.g. payment via smart card through a mobile phone) where rather than goods or services being ordered and paid for individually an agreement to supply is entered into. This would include services provided which are charged on a monthly or quarterly basis or goods that are provided “on approval”.
- “Information or digital technology” includes embedded computers and microprocessors contained in smart cards, smart appliances, etc.
- “Mediation” suggests that the computer system does not only act to facilitate communication but has a transformative role in the activity. As such it excludes the simple fact that a telephone incorporates an embedded chip to store numbers or permit cellular telephony.
- “Locationally separate” is intended to exclude in-store purchasing systems, the use of smart cards in EPOS/EFTPOS systems, etc.

Consumer E-commerce: *E-commerce as defined above, where the client is a member of the public rather than a business.*

Business E-commerce: *Business-to-business e-commerce.*

This report focuses on consumer e-commerce.

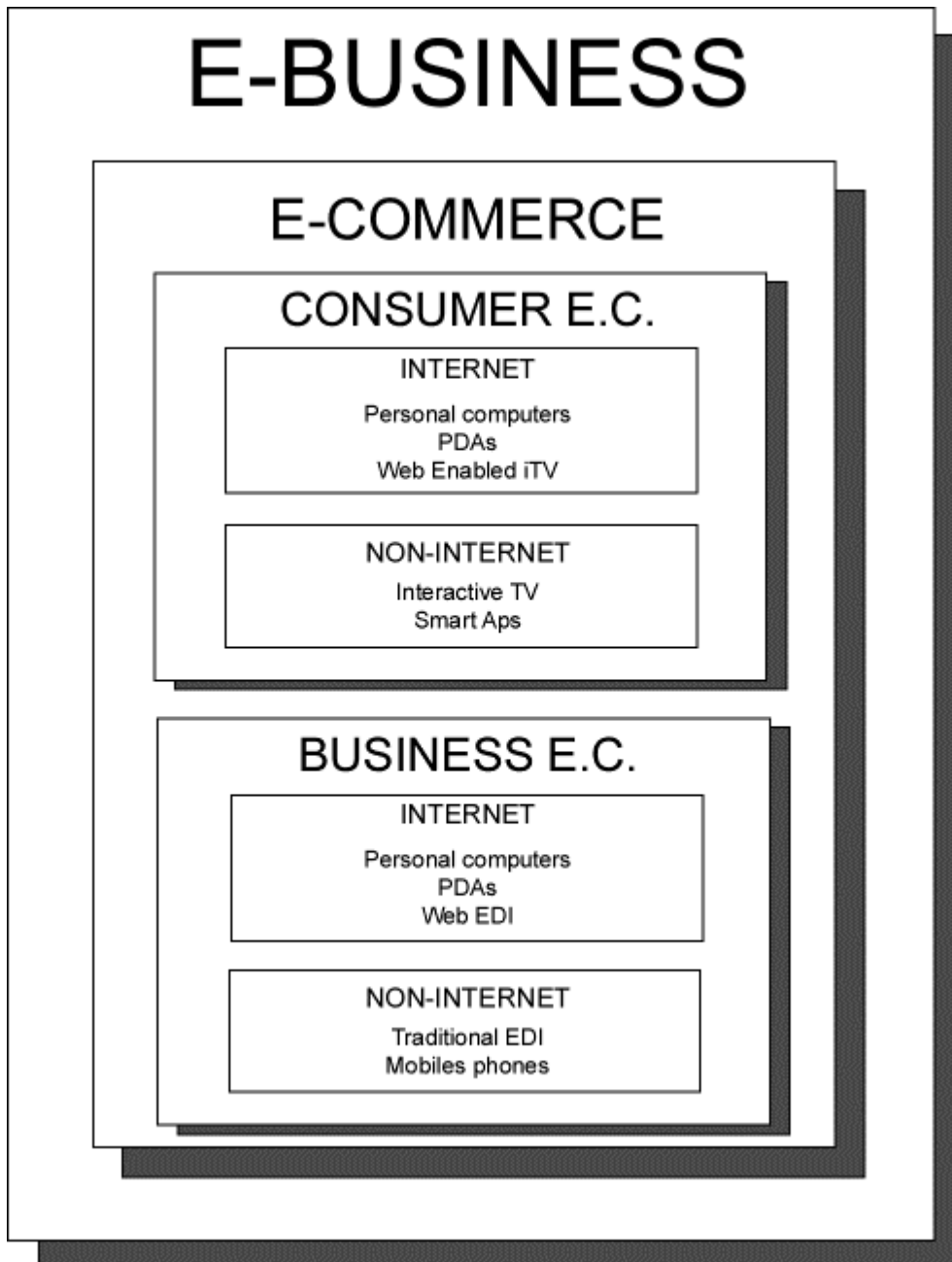
It should be noted that much traditional EDI is ruled out from this definition. Since EDI is business e-commerce, this is not a problem for the present report. However, the definition allows our focus to be wider than web e-commerce, since there are other possible lines of development involving, for example, smart cards or instructions issued over digital networks that have no use of web interfaces. (See Figure 1.)

This approach allows for distinctions to be made between e-commerce and other automated or computer supported transactions. Given this, in store retail (such as ordering of goods in a catalogue shop), transactions undertaken by voice over a phone (even digital one), and the exchange of goods or services for which no charge is made are not e-commerce. However, online banking, purchase of Internet access from an ISP, or access to information (for example to web sites or to a film ordered through a set top box) and online booking procedures are all forms of e-commerce.

"It's very encouraging to see an increase in consumers' confidence online and that shopping via the Internet has become a more positive experience. The increase in online purchases of holiday and airlines, show that those consumers are now seeing the benefits of shopping via the Internet, saving both time and money."

Alan Stevens, Editor, *Which? Online*.

Figure 1: E-Commerce as part of E-Business



Electronic commerce is a part of the broader category of *electronic business*. E-business incorporates services such as online customer support, account maintenance, provision of information resources, etc. that are elements of online business but do not directly involve commercial transactions.

3 SURVEY OF EXISTING RESEARCH

For details of Survey Methods used in this report see Appendix 2

This section presents findings of our survey of existing research. We have focused on issues relating to current and likely participation of consumers in e-commerce and the nature of this participation. According to the original brief, we have not included the infrastructural requirements on the supply side (e.g. implications for distribution and labour requirements).

The indicators and opinions are broadly focused on the UK (although there are some for the EU). We have intentionally excluded the surveys that are overly biased towards the USA, since we believe that European e-commerce development will follow a different trajectory (see section 2.1 below).

The box below details the main sources of primary research into e-commerce in Europe. Whilst a number of other organisations also generate analyses of e-commerce, they typically derive their base statistics from this smaller number of main sources. There are also a number of other important sources of data in the US that as yet only provide data on the US itself. Contact details for the main sources are given in an appendix to this report.

Main Sources of Primary Research Into UK E-Commerce:

BMRB International, Datamonitor, Dataquest, INTECO, Durlacher, Fletcher Research, FT Media, Forrester, International Data Corp., Jupiter Communications, KPMG, MORI, NOP Research Group, Ovum, Verdict

3.1 Comparison of e-commerce growth with the USA

Many commentators and research studies assume (whether implicitly or explicitly) that European countries will follow the US-model in e-commerce diffusion. This is particularly argued to be the case for the UK, which exhibits greater similarities to the US than the rest of Europe. The argument goes that the USA is typically a few years ahead of the UK, and that as our economic growth continues we should “catch up” with the US. For example:

“The UK has been experiencing growth rates comparable to growth rates in the US. With 15% of the UK adult population having ever accessed the Web, penetration in the UK is at the same level now as in the US two years ago. The UK’s web penetration is growing at a faster rate than [both France and Germany].

Lisbet Sherlock, European Marketing Services Director, Ziff-Davies

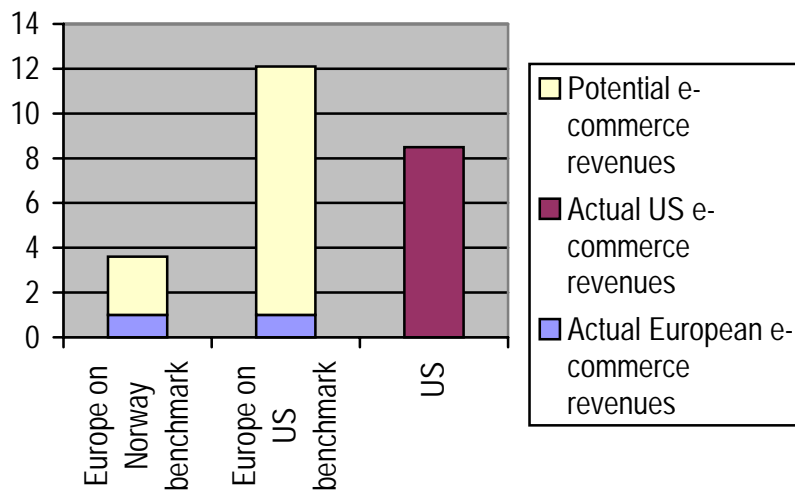
However, numerous differences between US and European economies make identical take-up patterns unlikely. These include:

- different demographics
- different geographies
- different economic structures, including divergent retail sectors

- different historical experiences with other distance shopping modes, such as mail order, telephone-based commerce, Minitel, etc.
- different systems of regulation
- different telecommunications and broadcasting systems and infrastructures

The assumption of similar growth patterns for e-commerce also implicitly assumes that this will involve similar media to the US, especially the use of the Internet. However, past European experience and current trends suggest that patterns of technological uptake differ from those in the US. For instance, it is widely argued that Europe will develop a larger digital TV market than the US, and that this will ultimately be a greater driver of e-commerce than the Internet alone. Already, according to Market Tracking International (1998)¹, more Europeans than Americans use interactive e-commerce applications specifically developed for digital TV.

The importance of these differences is well illustrated by the following graph from Andersen Consulting. The graph forecasts the level of e-commerce revenues that would be reached by Europe if the pattern of e-commerce expansion matched that currently obtained in Norway and the USA. A US-pattern of diffusion would suggest a massive market growth, to an even greater absolute level than the US itself. By contrast, the Norwegian model, far closer to that of the EU, would generate far smaller revenues, but would still more than double current levels. Given this divergence, it would seem that, even allowing for an explosion of e-commerce activity, Europe is unlikely to exactly track the US pattern. Indeed, Andersen's forecast is that Europe's relative share of global e-commerce revenues is expected to stagnate at approximately 10- 12%. [Andersen Consulting [n.d.] "eEurope"]



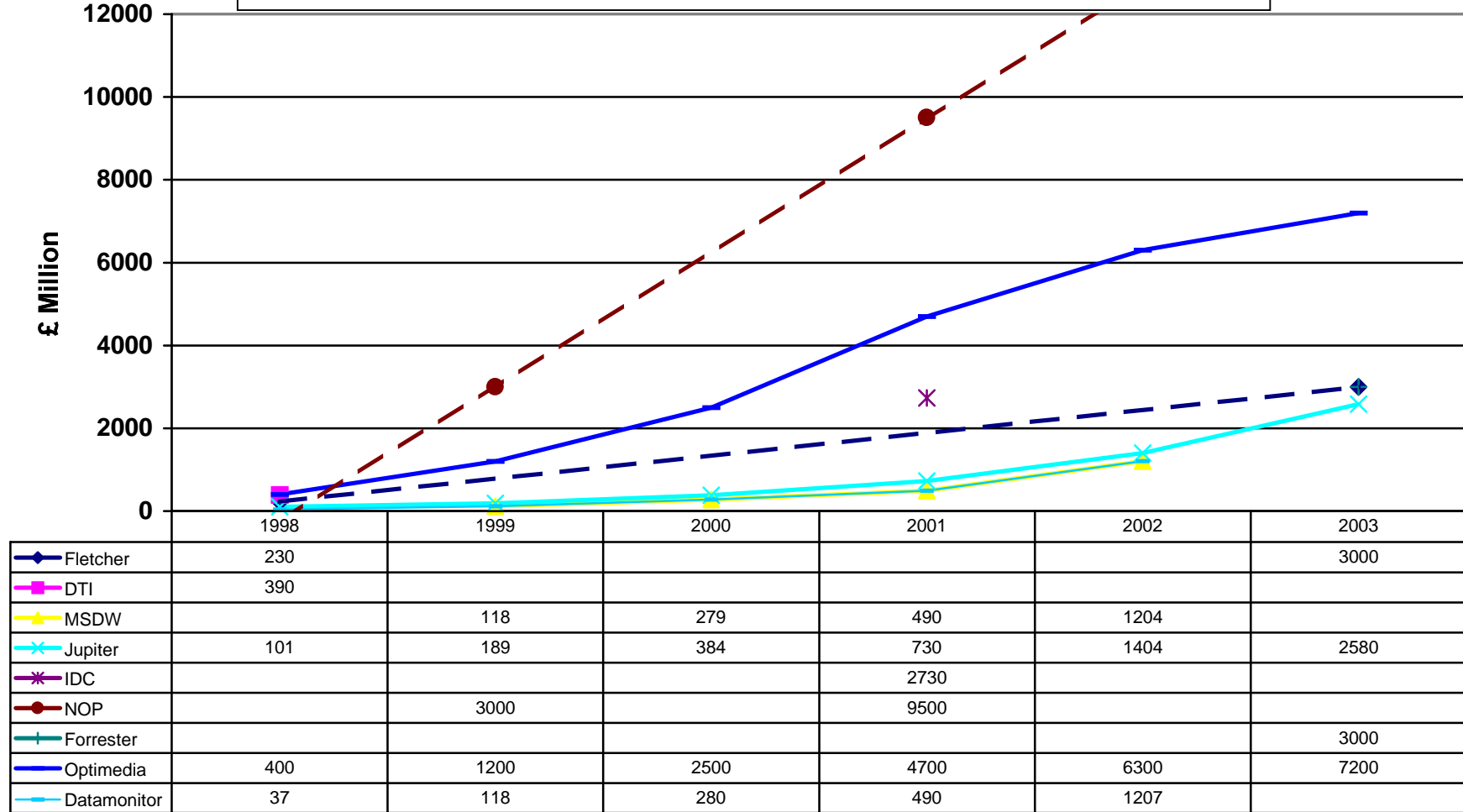
Sources: Forrester, Jupiter, IDC, Anderson Consulting

¹ Digital TV Worldwide, 1998 (with DMG Business Media) ISBN 0861084667

3.2 Growth of e-commerce in the UK

Figure 2 presents the main sources of primary research into the value of UK e-commerce. Whilst a number of other organisations also generate analyses of e-commerce, they typically derive their base statistics from this smaller number of main sources. There are also a number of other important sources of data in the US that as yet only provide data on the US itself.

Figure 2: The Value of UK E-commerce



petitive Future: Building the Knowledge Driven Economy”, Fletcher Research (1998) “Window Shopping”, Forrester: Dialogic Innovatie & Commerce”, IDC [1998] “The Big 5 Management Consultancy Firms in the UK - A focus on e-Commerce”, Jupiter Communications (1998) datamonitor data in Morgan Stanley Dean Witter (1999), “The European Internet Report”, NOP Research Group (1999) “Internet User Profile ures for *consumer* e-commerce will be available from Forrester in November 1999.

The differences in estimates of current levels and of future estimates can be accounted for in a number of ways. The following exhibit on methodology outlines the main reasons for the discrepancies.

Methodology

Estimates of the size of the e-commerce market are derived in two main ways. Surveys of the demand-side (i.e. consumers) can assess the average spend in order to derive a total UK consumer spend. Surveys of the supply-side instead assess the total sales of consumer e-commerce vendors in the UK in order to estimate the market size. There are several different reasons why these two forms of estimation may vary. Most importantly, UK consumers are able to buy globally, whilst UK suppliers can supply globally, and as such the markets derived are not equivalent. For instance, UK consumers may spend a large proportion of their e-commerce purchases at overseas sites. Moreover, the nationality of e-commerce sites is not clearcut. Should this be the nationality of the parent company, the geographical location of the particular subsidiary distributing the goods or service, or the country the domain name is registered under? For example, a UK-owned company may run a US-registered .com website whose orders are physically processed and shipped from Ireland.

Similarly, forecasts of future growth are derived in two distinct ways. The first method is to explicitly survey the future intentions of consumers, to derive a future demand curve. The alternative is to extrapolate or develop models based upon current figures, allowing longer-term forecasts of future trends. Whilst the former has the advantage of being directly tied to actual intentions, it cannot take into account whether broader market changes act to alter the behaviour of consumers or suppliers. Intentions are liable to be revised as events unfold, so these estimates are most applicable to the short term. However, the latter measure relies upon the accuracy of the original figures, and necessitates various assumptions about the nature of growth into the future. In particular, assumptions as to structural change typically have to be imported into such models, since there is usually inadequate data available on the comparative dynamics of different sectors or population components.

Another problem of many e-commerce and e-media surveys is their tendency to rely on online surveying techniques. These techniques suffer from a significant self-selection bias - i.e. it is predominantly experienced Internet users that tend to participate in such surveys. It is unclear, therefore, how even demographically representative samples of this sort should be extrapolated to the national level.

3.3 Consumers Access to E-commerce

To date the majority of studies have investigated e-commerce participation by first detailing Internet participation. Following the spirit of this research, we start with a consideration of Internet access.

3.3.1 Internet access and growth

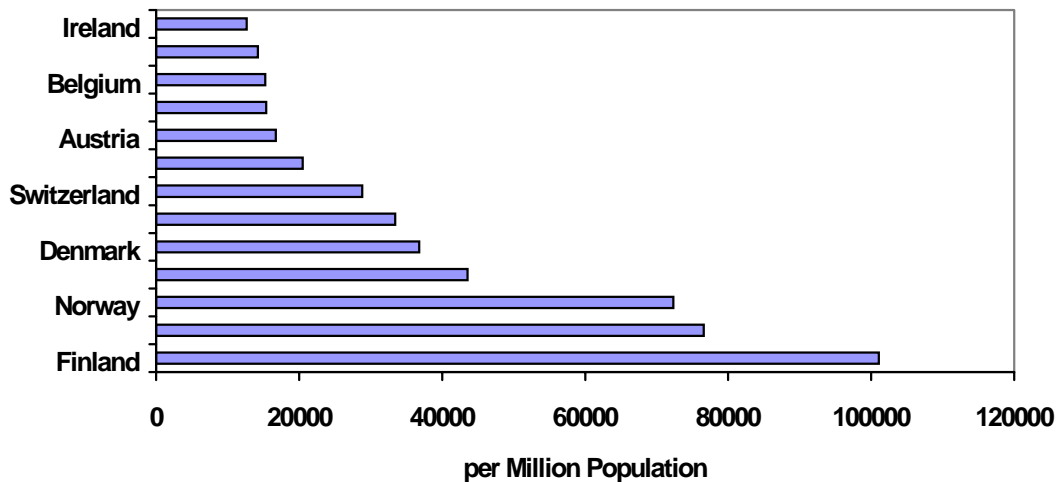
NUA Internet Surveys (<http://www.nua.ie>) recognise the problem with trying to quantify the number of Internet users when stating:

The art of estimating how many are online throughout the world is an inexact one at best. Surveys abound, using all sorts of measurement parameters. However, from observing many of the published surveys over the last two years, here is an 'educated guess' as to how many are online worldwide as of June 1999.

NUA estimate of world-wide Internet access - 1999	
World Total	179 million
Africa	1.14 million
Asia/Pacific	26.97 million
Europe	42.69 million
Middle East	0.88 million
Canada & USA	102.03 million
Latin America	5.29 million

Below, Internet access across Europe is measured not by access or use of technology but through the amount of domain name registrations. This gives a view of technological uptake which places the UK substantially behind other countries in northern Europe.

Figure 3: European Internet Access
Highest Internet Access in Europe Measured by Top Level Domain Names²



Research on numbers of Internet users have been presented as aggregate totals, or broken down into categories, including those that have access at home or at work, and between numbers of households contacted to the Internet and numbers

² Huws, U, N. Jagger & S O'Regan. 1999, Teleworking and Globalisation, The Institute for Employment Studies

of individuals. We have included some of each but our main graph is about current and likely aggregate participation of users (figure 4).

Research undertaken by NOP Research Group (<http://www.nop.co.uk>) indicates a rise in the number of people online (i.e. having used the Internet at least once) in the United Kingdom from 960,000 in June 1997 (2% of the population) to 4.3 million (9%) in March 1998 and, most recently, 10.6 million (18%) in December 1998.

Other relevant sources that analyse different variables include:

- 27% UK households have a PC, but only 11% are online (end 1998)
- 10 homes per 100 UK inhabitants have a PC, as do 37 businesses (making a total of 47 PCs per 100 inhabitants) (1998)

UK households connected to the Internet:

- ESIS - 6.23m (1998)
- Lehman Brothers - 13% (1998)
- ESPRIT - 1% population

Internet users:

- Condrinet: c. 10% population

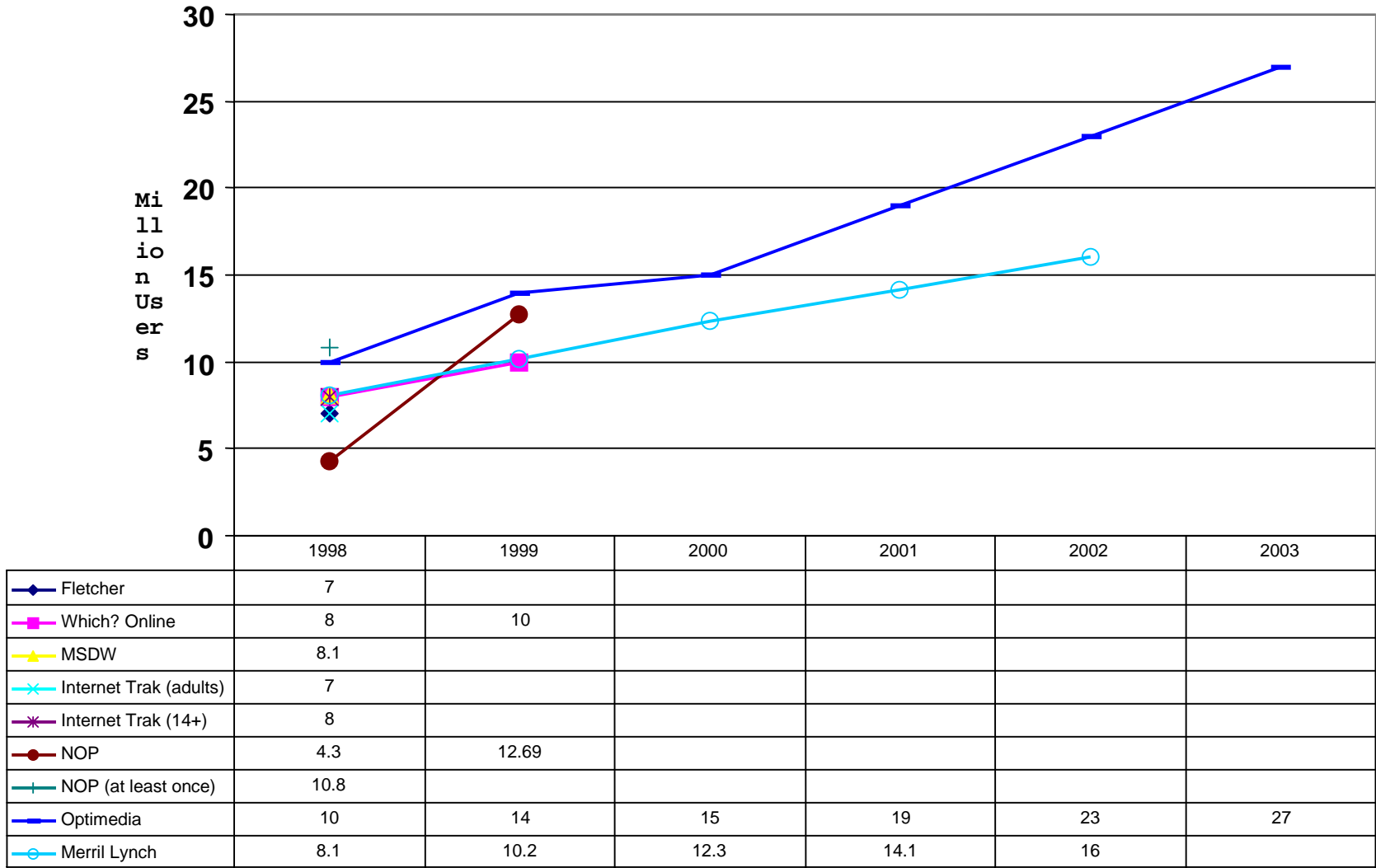
Sources: Inteco (1999), ESIS (n.d.) "Basic indicators - United Kingdom", Lehman Brothers (1999) "Bits, Bytes and the Internet", ESPRIT (n.d.) "Electronic Commerce - An Introduction", Condrinet http://www2.echo.lu/condrinethapters/En_Ch_1.htm (19/7/99)

The above studies make no comment about the different ways that users might access the Internet. Along with PCs, possibilities for future access to the Internet include interactive television and PDAs.

3.3.2 Propensity of Internet Users to Shop Online

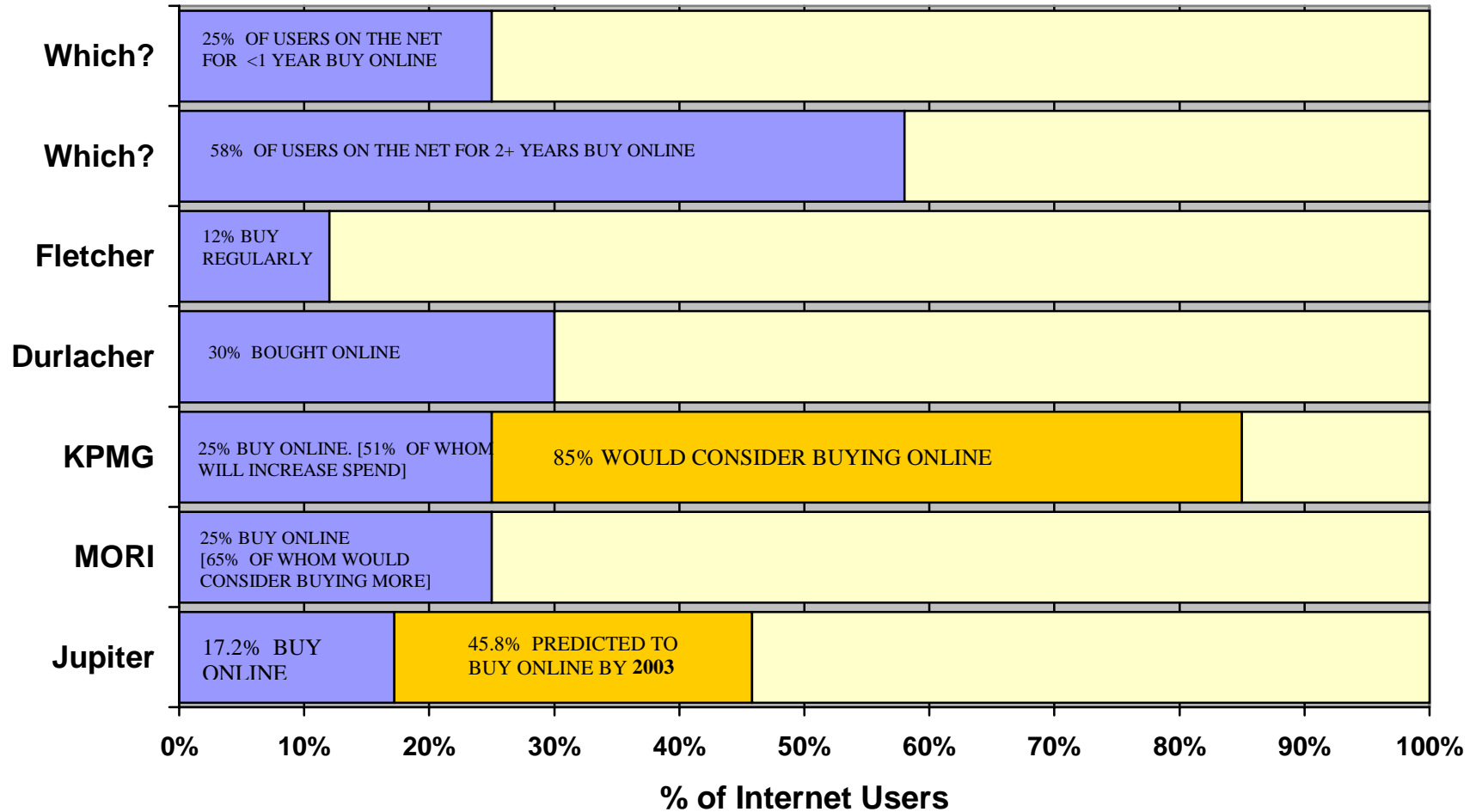
As indicated earlier, a large number of reports present their estimates of participation in e-commerce as a percentage of those that use the Internet. The main findings are presented in figure 5.

Figure 4: UK Online Users in Millions



Sources: Merrill Lynch 1999. "Broadband Interactive Services: The Next Wave"

Figure 5: The Propensity of Internet Users to Buy Online



Sources: Which? Online's 1999 Annual Internet Survey, Jupiter Communications (1998) "European Online Shopping", Fletcher Research (1998) "Window Shopping", Durlacher (1999) "Quarterly Internet Report", KPMG (& Ziff-Davis/Dell/Intel) [1999] "The New Mass Medium", MORI/Hewlett Packard (n.d.) "Does Britain Want to Shop Online?", Fletcher Research (1998) "Window Shopping".

3.3.3 Access to technology platforms required for e-commerce

There is a clear bias in the existing research towards PCs and the Internet as the primary mode for access to e-commerce platforms. Research on non-PC based access to the Internet and non-Internet e-media is far less developed. Although it is an area in which growing interest is being shown, there remains need for more research if the full picture is to become clearer.

Datamonitor consultant Jonathan Tikochinsky commented:

“Between 1998 and 2003, huge growth in the use of more diverse platforms for e-commerce will be seen. No longer is the PC the only way of accessing the Internet – the mobile phone and set top box will emerge, benefiting from the already high installed base of users each area has. However, there will still be a low penetration of the use of smart cards for online purchases. The infrastructure will still not be sufficiently well placed, consumers not convinced of their value. Although growth is expected, a significant market will not be created for some time yet.”

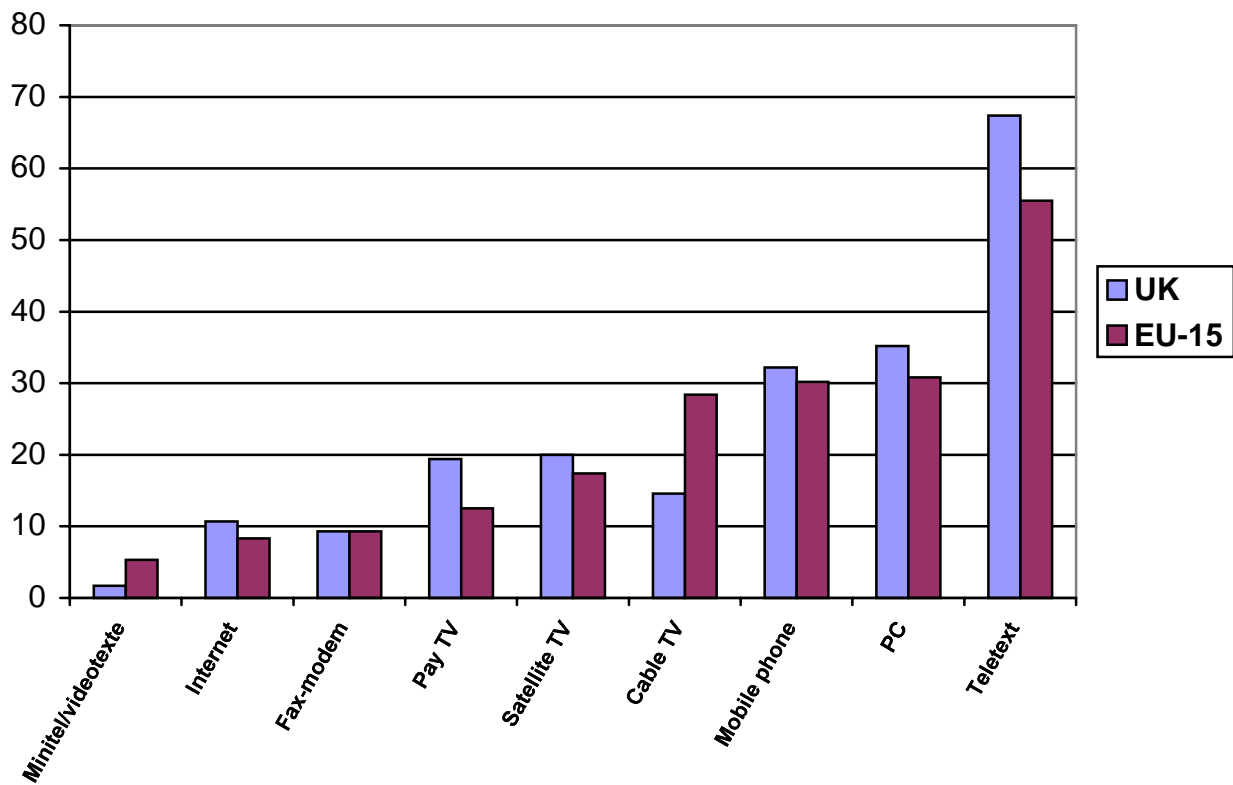
Figure 6 shows current EU and UK adoption of a number of technologies that have the potential to give access to e-commerce.

Currently, PC ownership is greater than Digital TV ownership. Digital television is being vaunted by some as the technology to bring wider access to the Internet.

“The television will bring the Internet to the mass market and digital television is the key. Services offered through the television have a greater potential for attracting the types of advertising revenues needed to make new Web-based services commercially viable”

IAIN STEVENSON, HEAD OF NEW MEDIA, OVUM

Figure 6: Access to technologies for e-commerce in the UK and EU (%)³



Datamonitor research has provided the following comparative predictions for online PC and digital TV uptake in Europe at the end of 2002

- 40m online enabled PCs
- 15m digital set-top boxes
- BUT PCs will peak at around this level whereas iTV will continue to grow.⁴

The Henley Centre support this view of PC adoption for the UK. They report that since the period of rapid adoption between 1980 and 1987, continued penetration has been extremely slow.⁵

However, digital TV is expected to grow substantially. For example, in the UK by 2005, Ovum predict digital access for just under 10 million, broken down by technology, as follows:

- 4m terrestrial digital subscribers
- 4m satellite digital subscribers
- 1.5m cable digital subscribers⁶

Merril Lynch, authors of a report that is widely cited on Digital TV, provide the following estimates, presented in Figure 7

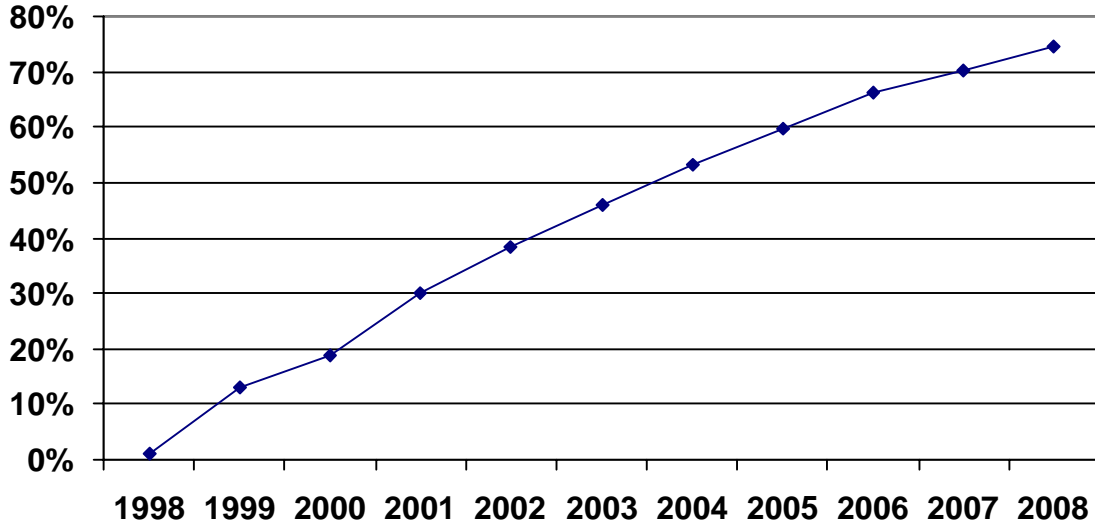
³ INRA (Europe). 1999, "Measuring Information Society"

⁴ Datamonitor (1998) "Consumer Interactive Services in Europe to 2002".

⁵ Henley Centre, 1998, "Planning for Social Change".

⁶ Ovum (1998) "Report - Digital Television"

Figure 7: Percentage of Television Households with Digital TV



Given the recent statement by Chris Smith who expected to be able to switch off analogue television, at some point between 2006 and 2010, when 95% of television households had adopted digital television we might reasonably expect adoption of digital television to be faster than these Merrill Lynch predictions. Similarly, forecasts by Henderson Crosthwaite predict 87% digital television penetration by 2008 with the following breakdown:

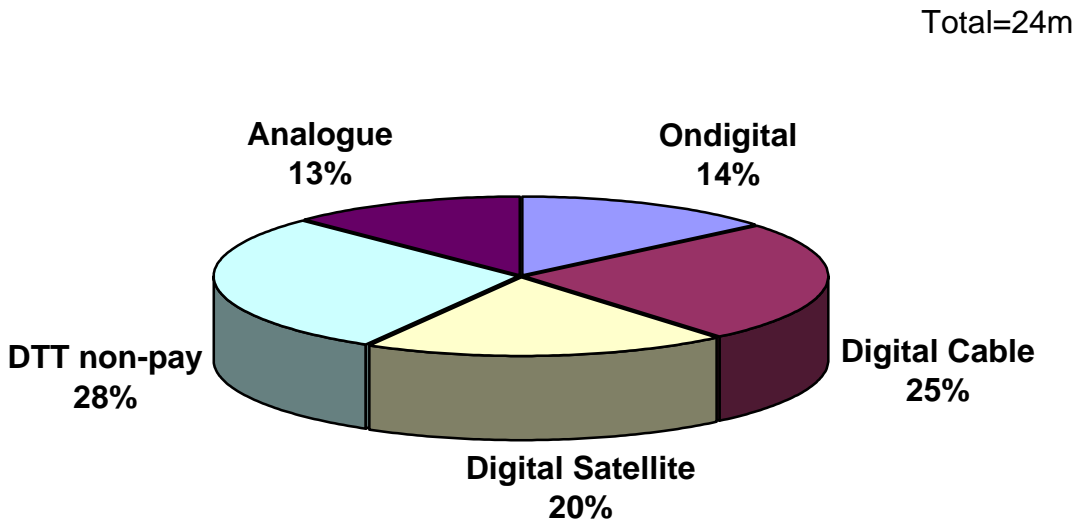


Figure 8: Digital TV Penetration by Provider in 2008

Source: Henderson Crosthwaite Institutional Brokers Ltd.

3.3.4 Demographic Analyses of E-commerce Activity

Current research has been positively poor at providing profiles of those that are involved in e-commerce activity. Again, the tendency has been to focus on Internet usage patterns. While Consumers International⁷ indicate the amount of data collected by e-commerce providers during transactions that is not essential to fulfilling the order but instead used to profile customers. Such data is neither comprehensive nor readily available.

In consequence, there is little that has been written about the profiles of e-consumers that does not conduct the analysis by looking first at profiles of Internet users. The assumption is clearly that the Internet will remain the dominant e-commerce medium.

One study that does explicitly attempt to provide segmentation analysis for e-consumers is the attitudinal study by BMRB.⁸ The basic results are in the table below.

It has also been suggested, for example by Boston Consulting Group⁹ and the Management Consultants Association¹⁰, that online retail shopping will appeal most to those for whom time is at a premium. The suggestion points particularly to high-earning professionals who work long and unsociable hours, value their leisure time and probably use the Internet already - in other words, those that prioritise 'value for time'.

⁷ Consumers International, 1999. "Consumers@shopping: An international comparative study of electronic commerce"

⁸ BMRB (1999) "E-Commerce – An attitudinal evolution"

⁹ Boston Consulting Group, 1998, "The State of Online Trading"

¹⁰ Management Consulting Association, 1999, "The Development of the Internet and the Growth of E-Commerce"

BMRB: Profiles of E-consumers – attitudinal categories**Realistic Enthusiasts**

This group accounts for 15% of the market and is characterised by an enthusiastic approach towards e-commerce. Examples of this include a willingness to use the Internet for purchases in excess of £500, they are prepared to purchase products from an unknown company and consider the convenience of Internet shopping to be more important than price. However, their enthusiasm is layered with a realistic approach to e-commerce. This is evidenced by the fact that they would like to see the product in 'real life' before making a purchase and they also consider that finding the product to purchase is a difficult process.

Confident Brand Shoppers

This group represents 16% of the market and is confident about using the Internet for e-commerce. Again members of this group would be happy to use the Internet the next time they want to make a purchase in excess of £500. This confidence is further illustrated as they agree that it is always possible to find a product with a cheaper price on the Internet rather than in the shops. This confidence stems from the importance they lay on purchasing well-known brands and the necessity to shop around. This group spent on average £275 in the last six months which is 20% more than the average.

Carefree Spenders

This group which also comprises 15% of the market is characterised by a carefree approach to purchasing online. Carefree Spenders are prepared to purchase from unknown companies and do not consider that purchases should be restricted to well known brands. Furthermore, they are willing to make the purchase without seeing the product first. Carefree Spenders are responsible for almost one third of online purchasing in the last six months and spent 55% more than the average.

Cautious Shoppers

One in five users fall into this category which displays a very cautious approach to e-commerce. These shoppers are not likely to purchase goods through an on-line auction, have concerns over quality of products that they purchase and would like to see the product prior to making a purchase.

Bargain Hunters

This group (16%) is not prepared to spend more than £50 over the Internet, would buy from an unknown company or any web site as long as it was the cheapest and is driven not by the convenience of the medium but by price.

Unfulfilled

This group which comprises 17% of users find the whole concept or process of online shopping an unfulfilling experience. They find it too difficult to find the products they wish to purchase on the Internet, they would not make a purchase without seeing the product first or purchase from an unknown company, they would not buy from any web site or through an auction and they think it takes too long for products purchased online to be delivered.

3.3.4.1 Profiles of Internet users

Given this paucity of data we can only assess the profile of current and potential e-commerce users via demographics of Internet and access to e-commerce relevant technologies. This we do in accordance with the existing research.

Internet user profiles are related to PC-owner profiles, since this technological platform is still the most common method for online access. Looking at PC use in the UK it is apparent that access substantially decreases with age of users:

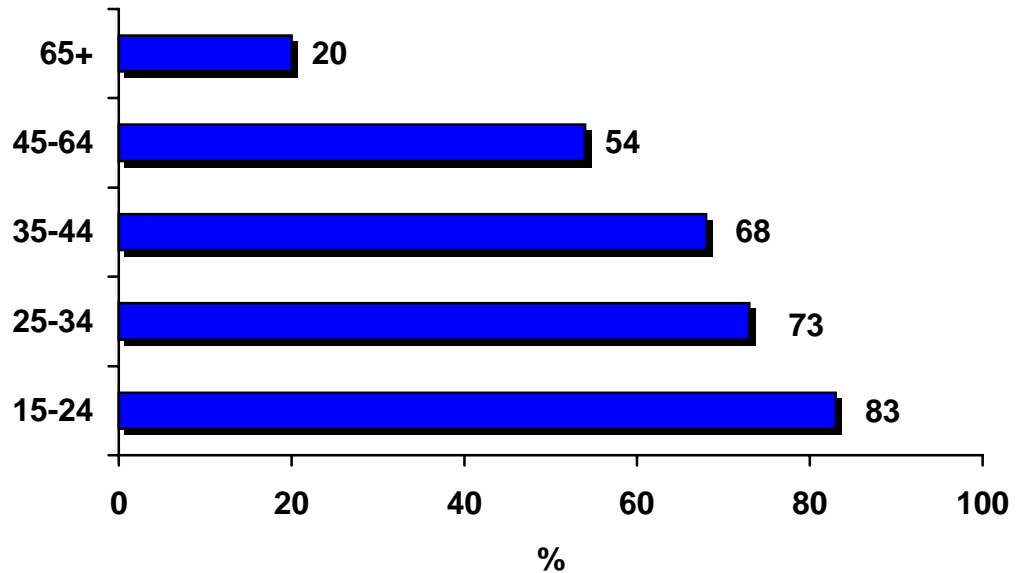


Figure 9: Use of PC by Age¹¹

This disparity is compounded when taking a look at PC access broken down by socio-economic class (see figure 10). It is apparent ***the older and poorer one is the less likely it is that they have access to new technologies*** and, by extension, the less likely they will have access to electronic commerce.

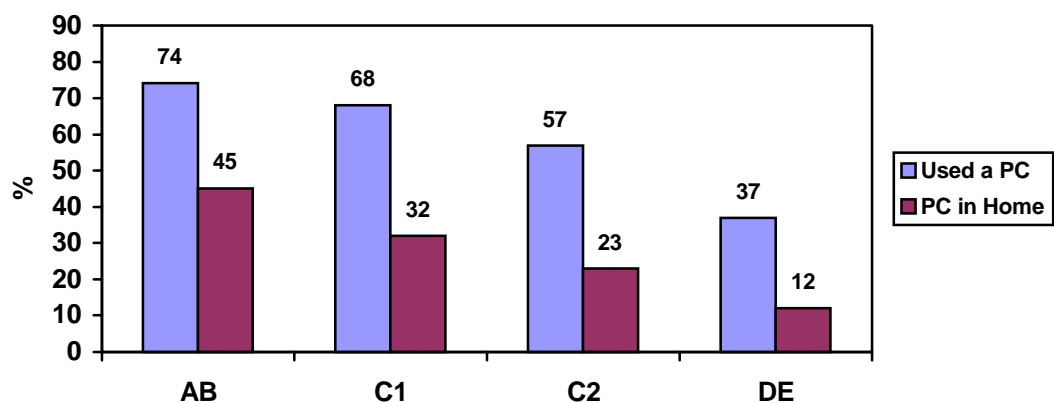


Figure 10: PC Use by Socio-Economic Group¹²

¹¹ Information Society Initiative, DTI. 1999. "Is IT For All?", <http://www.itforall.org.uk/>

¹² Information Society Initiative, DTI. 1999. "Is IT For All", <http://www.itforall.org.uk/>

Profiles of Internet users appear to tell a similar story (see figures 12-14). There is an established international link between access to the Internet and household income. According to the OECD, for every \$10,000 increase in household income, the percentage of homes owning a computer increases by seven points.¹³ It may be possible that this correlation will be weakened as PC prices fall, and the implications for e-commerce are also affected by cheaper and more accessible methods of using e-commerce being developed and becoming widespread. However, there is little doubt that factors such as credit rating and ownership of credit cards will remain constraining factors.

Some surveys also give profiles of “typical “users

- Single male, aged 22-30, owns his own home and car, lives in or near a metropolitan area, income exceeding 40k pa.
- More likely to read *The Guardian* than any other broadsheet, educated to degree level, more likely holds a senior position in the banking, finance or business services sectors than to have other occupation.
- Using the net for a year or more, uses it every day at work for Web browsing and email, spending more than 5 hours each week online.

Fletcher adopt a similar approach, giving the demographic picture:

- 7.0m adults are active Internet users, of which, 67% are male, the average age is 34, 61% are educated to degree level or higher, and 77% are social class ABC1.

Sources: “UK Internet Survey Results” <http://www.redsquare.co.uk/survey/> (09:16 24/8/99), Fletcher Research (1998) “Window Shopping”.

However, looking behind these thumbnails, where data is available, a slightly more rich picture is revealed. For example, the gender divide shows a great variation when looking at the age of Internet users:

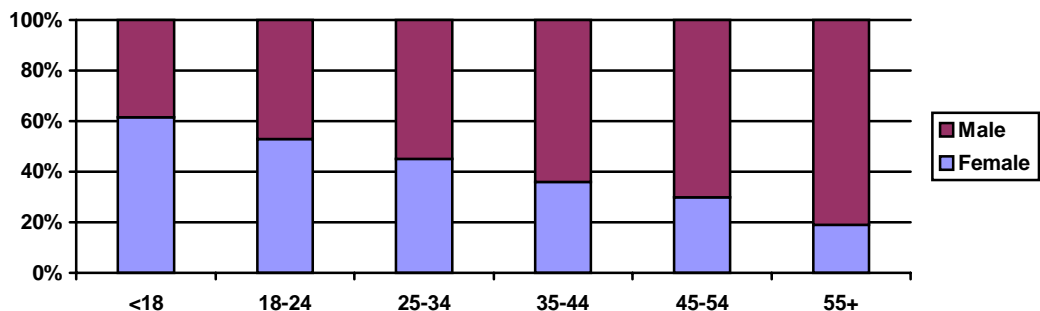


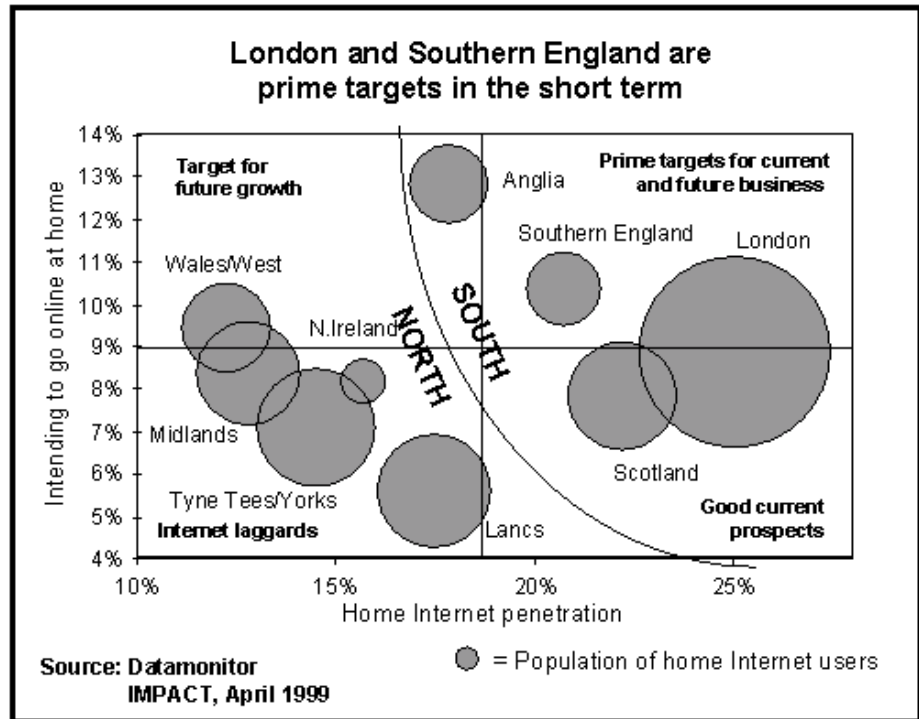
Figure 11: Gender Profile of UK Internet Users¹⁴

¹³ OECD, “The Economic and Social Impacts of electronic Commerce: Preliminary Findings and Research Agenda”

¹⁴ Fletcher Research 1999

Similarly, a geographic analysis of UK Internet users reveals that:

- Almost 50% of people in the south-eastern regions have access to a PC at home compared to less than 35% in Northern Ireland, Lancashire and the Midlands
- 20-25% of Londoners are online at home, compared to between 13%-17% in Northern England¹⁵



¹⁵ Datamonitor, 1999, IMPACT

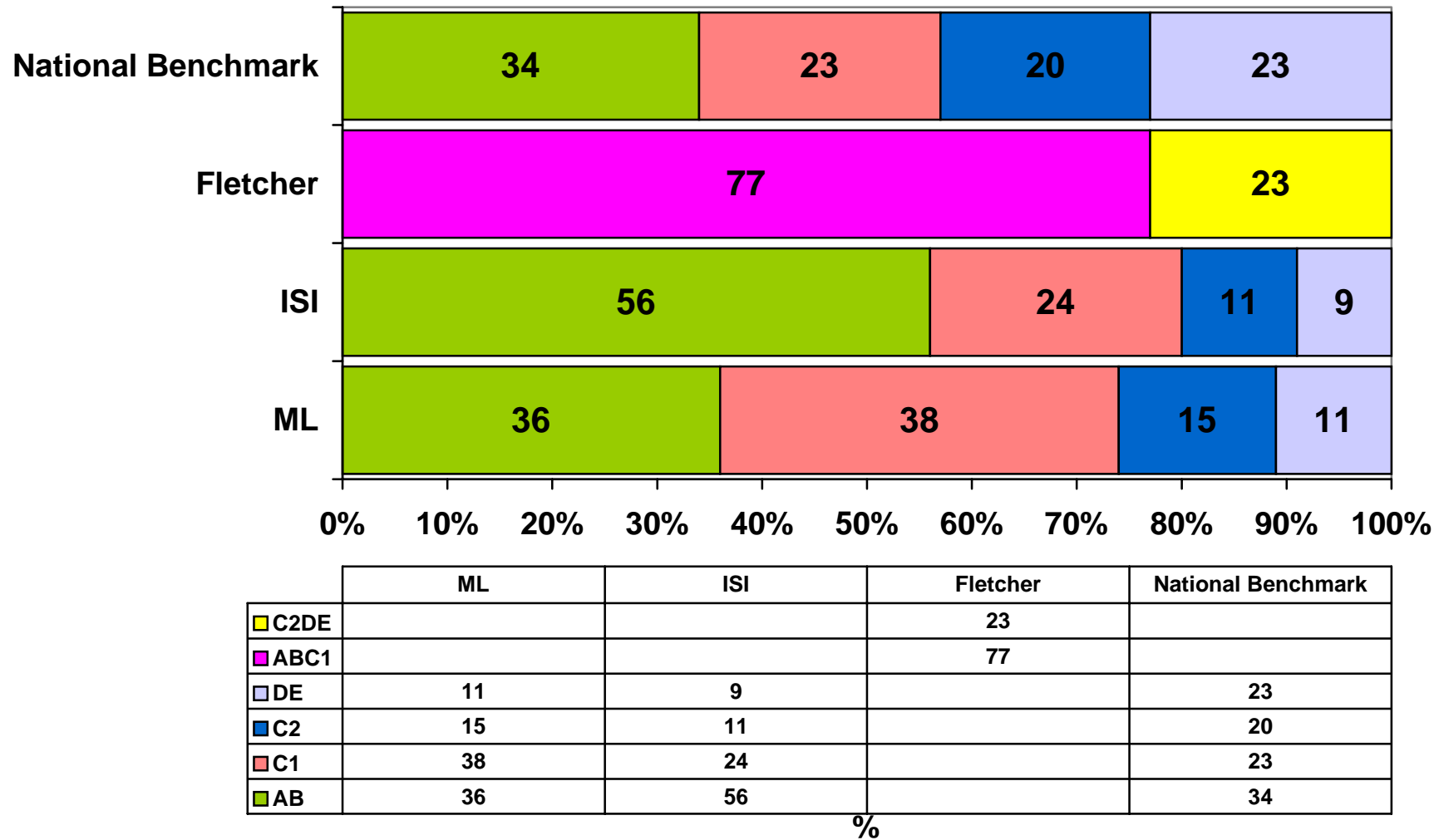


Figure 12: Internet Access by Social Group

Source for National Benchmark: Social Trends 1998

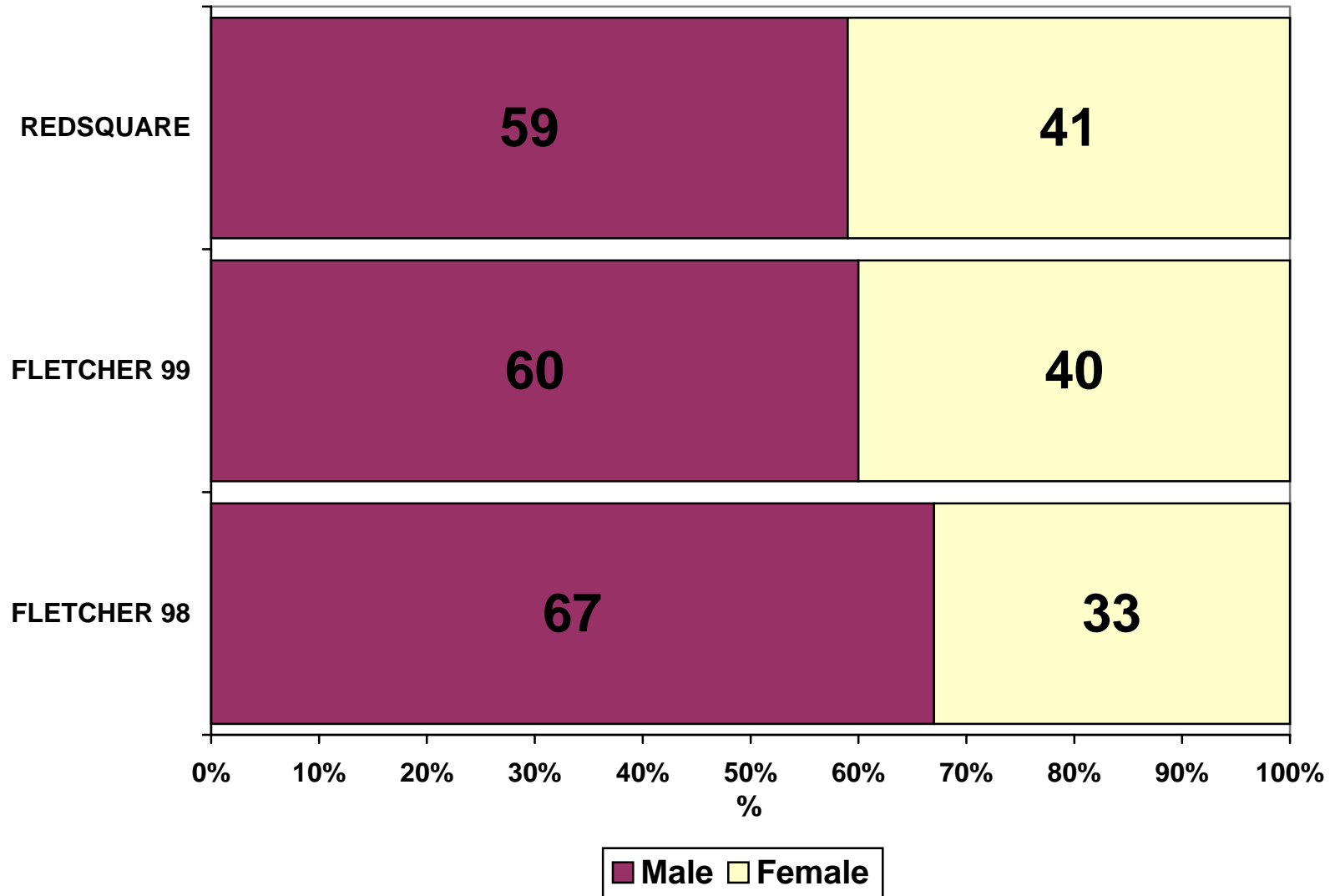


Figure 13: Internet Access by Gender

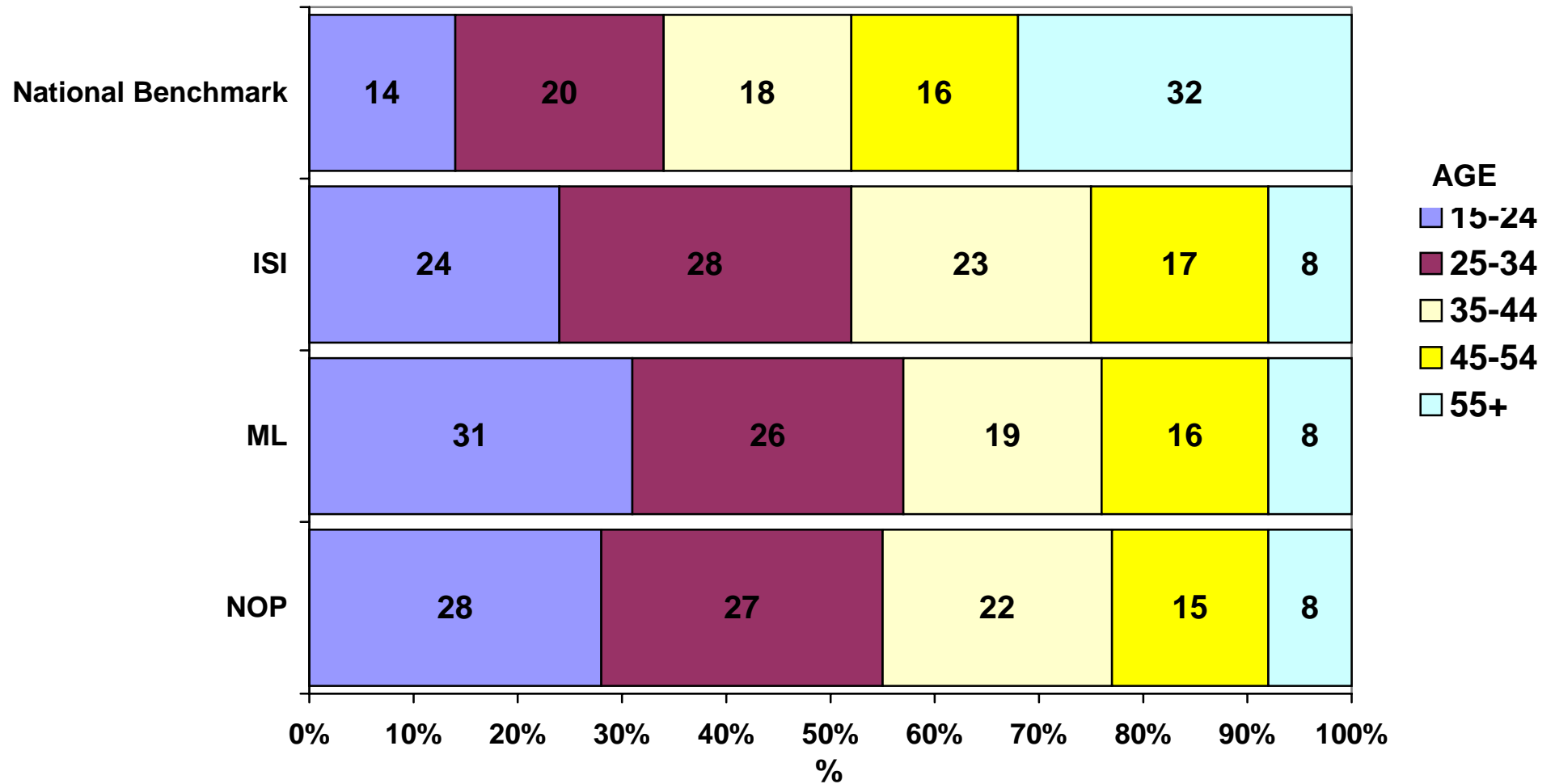


Figure 14: Internet Access by Age

Source for National Benchmark: Social Trends 1999

NOP figures calculated by CRIC assuming representative age sample of population

We have located no systematic estimates of future Internet usage by demographic composition. One survey that gives at least a hint of what might be expected comes from NOP, who present a profile of young people intending to use the Internet in the next 12 months (1999 survey)¹⁶:

3m children (7-16) use the Internet of which: 46% have browsed for purchase reasons & 17% have actually purchased online (typically using their parents' credit card;¹⁷ 80% (12-16 year olds) are willing to purchase online, but they are excluded from holding credit cards, whilst only 36% have a bank account, which is needed for a debit card¹⁸.

3.3.5 E-commerce sectors

The sectoral breakdown of e-commerce activity is presented in a number of different ways. The first estimates relate to the current sectoral composition.

Major categories as a percentage of total Internet commerce amongst shoppers online:

Databank 1998 (UK) ¹⁹		KPMG estimation for 1999 ²⁰ :	
Computers & software	25%	CDs	16%
Consumer products	13%	Books	22%
Finance & insurance	4%	Home PCs	20%
Manufacturing	8%	Leisure Travel	29%
Publication & information	10%		
Travel	5%		
Business & professional	20%		
Advertising	12%		
Other	4%		

Fletcher and Jupiter offer estimates of the future values of different e-commerce sectors:

¹⁶ NOP Research Group (1999) "Internet User Profile Survey".

¹⁷ NOP

¹⁸ KPMG "Reaching the Digital Generation".

¹⁹ Quoted in OECD, "The Economic and Social Impacts of Electronic Commerce"

²⁰ KPMG (& Ziff-Davis/Dell/Intel) [1999] "The New Mass Medium".

Forecast breakdown for Internet commerce by 2003

	Hardware	Travel	Books	Music	Software	Other	Total
Jupiter ^{21*}	£430m	£874m	£296m	£169m	£283m	£513m	£2,566m
			=£465m				
	Computers	Flights	Books & Music	Electronics	Entertain.	Total	
Fletcher ²²	£1,355m	£489m	£355m	£145m	£28m	£3,126m	

* All figures converted from data originally denominated in euro

Finally, Jupiter estimates the year by year change in sectoral composition from the present to 2003 (Figure 16). The survey provides predictions of the future breakdown that have been compared with current sectors offered by KPMG & Dresdner Kleinwort Benson.

²¹ Jupiter Communications (1998) "European Online Shopping" <http://www.jup.com>

²² Fletcher Research (1998) "Window Shopping".

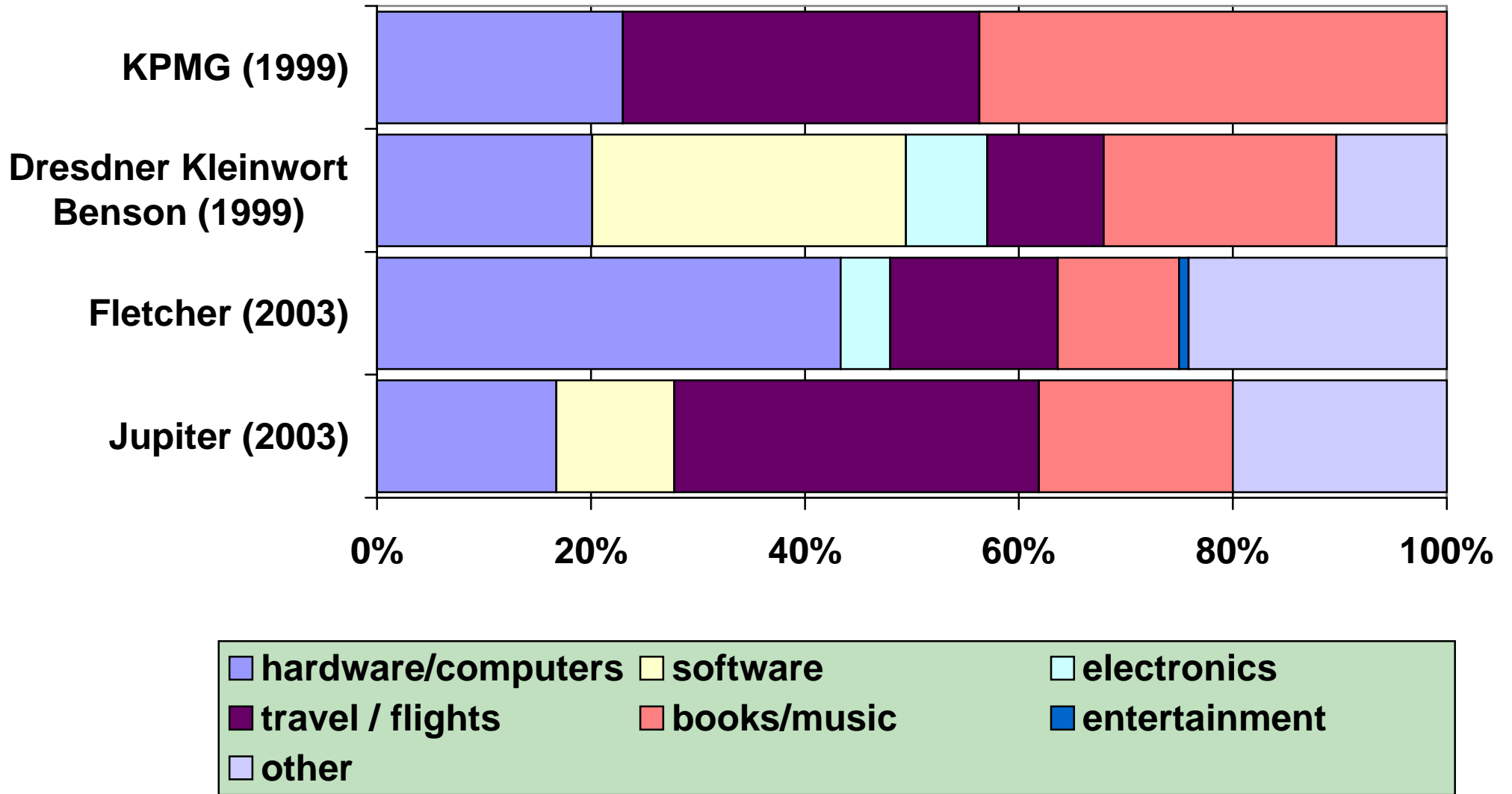


Figure 15: Sectoral Breakdown of E-commerce Market 1999-2003

Source: Jupiter Communications (1998) "European Online Shopping"

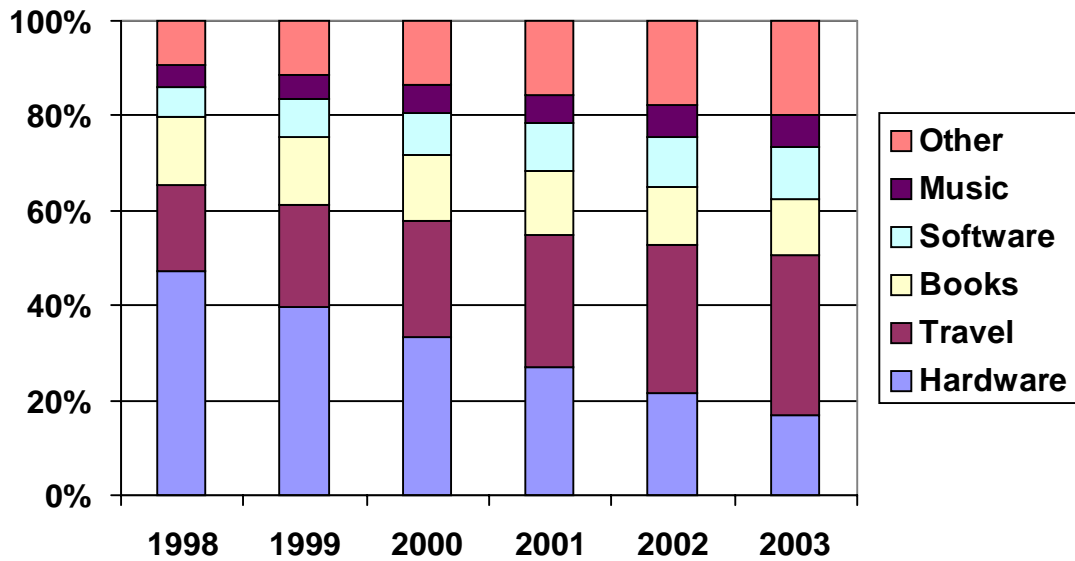


Figure 16: Evolving Sectoral Composition of E-commerce Activity

Source: Jupiter Communications (1998) "European Online Shopping" <http://www.jup.com>

3.4 Parameters Influencing the Use of E-commerce and Associated Technologies

Although the OECD claim that "anyone with access to the Internet has access to electronic commerce"²³ this is an over-simplification of the issues involved. Beyond the hyperbole surrounding the democracy of the Internet there is a prevalent recognition that the access and use of new ICTs is uneven, and has uneven effects through different sections of society.

²³ OECD, 1997, Policy Brief: No.1-1997 – Electronic Commerce

The speed of convergence, based around the burgeoning growth of the Internet, is only rivalled in significance by its potential for divisiveness. Optimists will argue that the price of computer hardware is falling so fast that the cost of a fully Internet capable computer system will soon be similar to that for a television receiver. Others will suggest that interactive 'intelligent' television receivers will themselves become the primary means of access to the world of convergence.

Both of these arguments overlook the facts that:

- software costs are not falling as rapidly as hardware costs;
- communications costs and Internet service provider (ISP) charges will remain significant; and
- many people will lack the confidence, or perhaps the rudimentary skills, to 'break the ice' in learning to use the new systems.

Converging Technologies: Consequences For The New Knowledge-Driven Economy, DTI. <http://www.dti.gov.uk/future-unit/>

This means that there are groups of people whose exposure to these technologies is substantially curtailed. These groups are normally identified as:

- The elderly
- People with disabilities
- People in low income households
- Women
- Certain ethnic minorities

For example, the 1998 *Which? Online* survey²⁴ of *non-users* found:

- only 30% intended to connect to the Internet, and 19% said this would not be for at least one year.
- 61% (30m people) **never** intend to go online (according to the 1999 survey this has dropped to 20million)²⁵
- and that this dramatically increases with age with up to 85% of those aged 55 and over never expecting to go online

The situation with regard to women is different however. NOP²⁶ found:

- 40% of new Internet users (i.e. within the last 3 months) were women
- 47% of 14-17 year old Internet users were female
- 57% of those intending to use the Internet in the next 6 months (1m people) were female

Although the heterogeneity of the Internet (and accordingly access to web-commerce) is slowly growing there is still a real concern that there will not merely be those that "have" and those that "have not" but also a layering of access and

²⁴ Conducted by MORI

²⁵ Which? Online's 1999 Annual Internet Survey

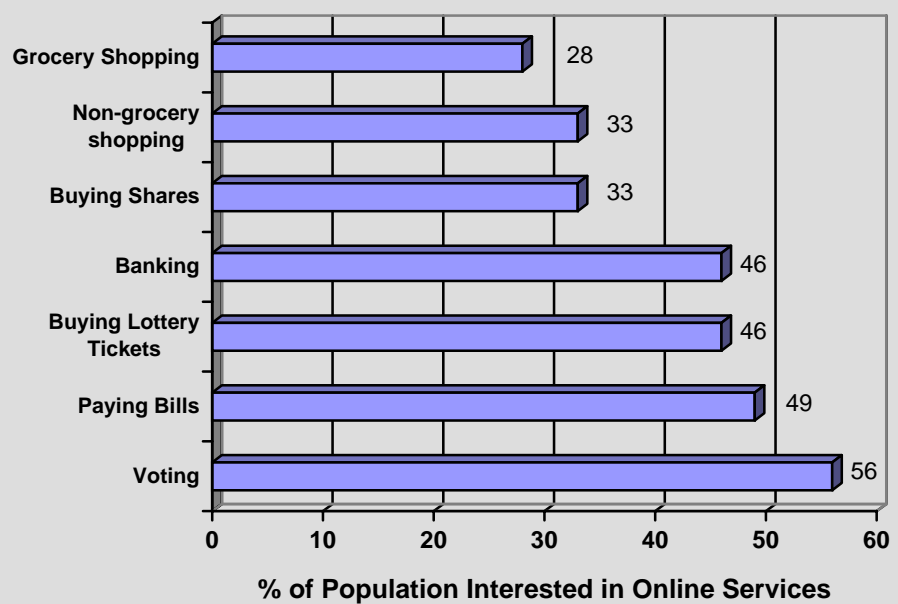
²⁶ 1998 Internet Trak Survey

social status.²⁷ Factors that differentiate access to ICTs will revolve around the following issues:

- a) General Awareness
- b) Physical Access
- c) Time Use
- d) Skills
- e) Services Used
- f) Costs and Subsidies
- g) Support and Back-up
- h) Digital 'Companions'
- i) Sub-culture Markers
- j) Institutional Differentiators²⁸

General Awareness:

Although take up may be sporadic and uneven there is a great level of interest in taking advantage of online services:



GB interest in services via TV or PC if available²⁹

²⁷ FAIR, "Constructing the European Information Society"

²⁸ FAIR Working Paper 44. 1998. "Measures of Participation in the Digital Techno-structure: Internet Access"

²⁹ ICL/MORI, 1998, "The Lifestyle Revolution"

Myth	Emerging Empirical “Facts”
<i>Myth 1: The biggest obstacle to Internet shopping is the lack of security.</i>	Risk is an inhibitor, but removing it will not be sufficient. Perceived value, positive shopping experiences, and good customer service are at least as important as minimized risk.
<i>Myth 2: Internet shopping appeals only to young male computer nerds and yuppies.</i>	Women who are affluent, technically literate, and interested in shopping can be favourably disposed toward shopping on the Internet.
<i>Myth 3: The biggest potential advantage of Internet shopping is time saved and convenience.</i>	Enjoyment of the experience appears to be as important as time saved and convenience, all of which are important for positive attitudes and intention to shop on the Web.
<i>Myth 4: The Internet consumer has access to a broad selection of lower-priced goods and services.</i>	Although shoppers are impressed with the number of different retailers on-line, they are disappointed with the depth of the product lines being offered. Shoppers do not find prices particularly competitive.
<i>Myth 5: Web storefronts offer high quality personalized encounters.</i>	Customer service information is nonexistent on the Web. For example merchants do not provide information on quality assurances of their offering, deliveries, and after-sales service. There is little attempt to develop on-line sustainable relationships with the consumer.
<i>Myth 6: The web is a retail channel very different from other direct selling channels.</i>	Although the Web is different, merchants do not exploit those differences to their advantage.
<i>Myth 7: Nobody knows you’re a dog on the Internet.</i>	Shoppers are concerned with the reliability and reputation of the Web merchants, and because of a lack of such information on the Web, they are drawn to stores with familiar names and brands.

Emerging Empirical “Facts” about Web-Commerce Myths³⁰

³⁰ Jarvenpa, Sirkka L. & Peter A. Todd (1997) “Is There a Future for Retailing on the Internet?” in Robert A. Peterson, *Electronic Marketing and the Consumer*, Sage, London, pp.139-154

The Internet is one of many new communication and entertainment technologies from which older Britons are becoming excluded, such as computing in general, mobile phones and cable, satellite and digital television

Which? Online 1999 Annual Internet Survey

As with access to technology, feelings about the pace of development are not evenly distributed. Breaking down responses by economic group reveals that more than five times as many people in the DE category are worried about being left behind by technology than the ABs. [AB – 9%, C1 – 21%, C2 – 23%, DE – 47%]³¹

According to a report by Consumers International on e-commerce, the UK has the highest average delivery time for domestic orders (15 days from order to delivery) when compared to other European countries, USA, Hong Kong, Australia and Japan.

Consumers@shopping, 1999

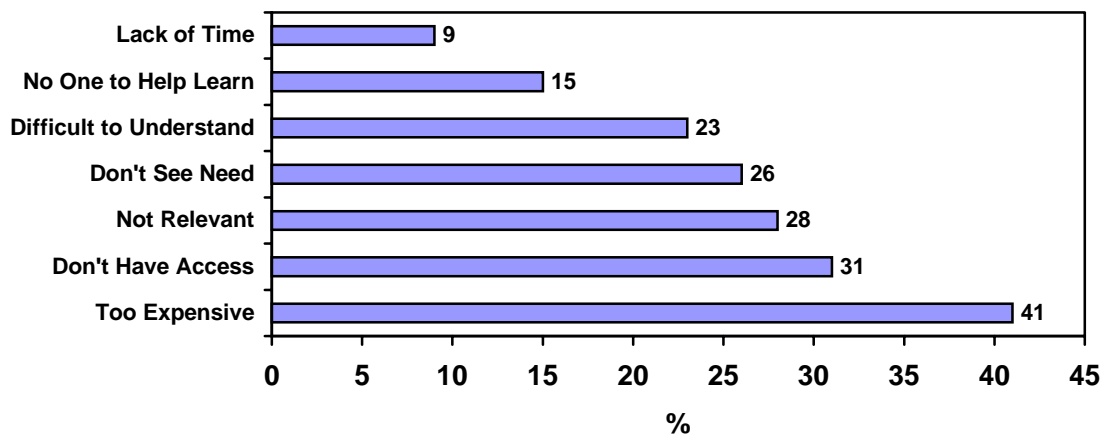


Figure 14: Barriers to Use of IT³²

In general terms, the motivation for consumers and business to participate in e-commerce will largely depend on their *perceptions* of potential benefits. There is, however, a belief that a **successful e-commerce venue involves a shifting of corporate culture from product to customer centred.**³³

³¹ Information Society Initiative, DTI. 1999. "Is IT For All", <http://www.itforall.org.uk/>

³² Information Society Initiative, DTI. 1999. "Is IT For All", <http://www.itforall.org.uk/>

³³ Patricia B. Seybold. 1998. *Customers.com: How to Create a Profitable Business Strategy for the Internet*, Random House, London

The key to driving retention and repeat sales will be for firms to encourage their clientele to view its representatives as an information source.

Jupiter Communications, 1999

Potential benefits for consumers of using electronic commerce include:

- Quantity of product information available
- Topicality of information – i.e. updated regularly
- Ability to perform non-linear searches
- Ease of comparison shopping
- Provision of hard to find products
- Reduced cost due to an electronically open marketplace
- Immediate delivery of certain products (e.g. software, electronic documents, access to parts of a site, etc)
- Convenience of online support via FAQs and e-mail³⁴

Potential benefits for businesses of using electronic commerce include:

- Electronic storefronts are cheaper to establish and maintain than physical ones
- Always “open” to a potentially global market
- Customers enter transaction knowing what product they want to buy
- Automatic data checking (credit card numbers, data consistency etc.)
- Reduces support costs
- Reduces advertising costs
- Reduces costs per transaction
- Provides data to inform “Just-in-time” management and improved forecast accuracy
- Ability to rapidly alter information of product specification, cost, etc
- Decreases time-to-market for new products
- Reduce variable and duplicate inventory costs
- Significant reduction in delivery costs for electronically deliverable products and services
- Relative ease of attacking niche markets and targeted customers
- Customer involvement in product and service innovation
- Increase in customer loyalty
- Equal access to markets (i.e. for SMEs vis-a-vis larger corporations)
- Increase profitability³⁵

³⁴ Hoffman *et al.*, 1995.

³⁵ Jones, Joseph, M. & Vijayasathy, Leo, R. 1998. “Internet consumer catalog shopping: findings from an exploratory study and directions for future research”, *Internet Research: Electronic Applications and Policy*, 8 (4), pp.322-33; Patricia B. Seybold. 1998. *Customers.com: How to Create a Profitable Business Strategy for the Internet*, Random House, London; ISPO, 1998, *Electronic Commerce – An Introduction*, <http://www.ispo.cec.be/ecommerce/introduct.htm>; Andersen Consulting, www.ac.com; OECD, “The Economic and Social Impacts of electronic Commerce: Preliminary Findings and Research Agenda”, , “Converging Technologies: Consequences for the New knowledge-Driven economy”, 1998, DTI. <http://www.dti.gov.uk/future-unit>

For business to business e-commerce, the saving can be considerable over conventional channels:

	Revenue Enhancement	Cost Reduction	Asset Intensity Reduction
Key E-commerce Economic Levers	New value propositions	Lower general and administrative expenses	Increased working capital turnover
	New channels, new reach	Lower marketing/selling expenses	Reduced physical infrastructure
	Individualized customer lifecycle	Lower cost of goods sold	
Improvement range in e-commerce enabled business	Typical range: 10-20%	Typical range: 20-45%	Typical range: 20-60%
	Best case: 55%	Best case: 70%	Best case 90%

Although electronic commerce offers the consumer the potential of facilitating controlled, non-linear search for up-to-date information, simulated product/service testing and assistance with comparison shopping and decision making³⁶ there exists a number of qualitative reasons why uptake of electronic commerce may not be as rapid as might be expected.

Ease of access is perhaps the most significant barrier to adoption of electronic-commerce by individuals.³⁷ This includes the following issues:

- Quality and cost of Internet Service Providers (ISPs)
- Cost of time online and phone use
- Access to computer/software/modem/phone line bundle
- Availability of bandwidth (the greater the bandwidth the “faster” the transactions)
- “Friendliness” or usability of Internet software and electronic-commerce applications
- Perception of security, privacy and level of trust

³⁶ Jones, Joseph, M. & Vijayasathy, Leo, R. 1998. “Internet consumer catalog shopping: findings from an exploratory study and directions for future research”, *Internet Research: Electronic Applications and Policy*, 8 (4), pp.322-33

³⁷ Hoffman *et al.* 1995

Trust is a highly important parameter when considering the uptake and use of e-commerce. Research done by Feher and Towell³⁸ suggests that approximately three quarters of companies believed that “the Internet is not yet secure enough for corporate communications or electronic commerce” (p.196). *Which? Online* report that almost half the population believe that the Internet encourages fraudulent practices.³⁹ Potential users of both business-to-business and business-to-consumer e-commerce are wary of:

- Lack of security (re. quality of goods, service, etc)
- Uncertainty about how consumer details may be exploited (credit card detail, e-mail address, etc)⁴⁰

The information highway allows companies to transform the way they do business, creating and accessing new markets and changing the way they relate to their customers, suppliers and competitors. Customers can tap into a whole new range of information about products and alternative suppliers. Businesses can gain access to large amounts of commercial and technical information from around the world. The access to codified knowledge facilitates the spread of best practice and new ideas and increases the speed of innovation. All these developments increase the intensity of competition, call into question traditional sources of competitive advantage and carry implications for firm organisation.

Building the Knowledge Driven Economy, DTI, 1998

Transaction security was cited by 31% of non-purchasing Internet users in an NOP conducted survey. There were similar concerns about data protection, amongst 7% of respondents. Moreover, 59% and 56% of respondents would be encouraged to shop online if transaction security was guaranteed by major financial institutions &/or vendors respectively.⁴¹

These concerns are more acute when dealings are with a new company and are not necessarily linked to technical security issues, such as developments in firewalls or encryption procedures, which are seen as no protection against dealings with “disreputable or careless people” (p.316). Indeed the importance of friends, family etc. who already use forms of e-commerce as an important factor in trust towards the up-take of such forms of retail must not be underestimated.⁴² There has been some suggestion that e-commerce users will favour familiar brands, given the problems of demonstration of reliability and product quality online. However, the scope for automated or broker-based searching for the cheapest product offerings may work against this, at least for some consumers and some products.

³⁸ Feher, Annamaria, & Towell, Elizabeth. 1997. “Business use of the Internet”, *Internet Research: Electronic Applications and Policy*, 7 (3), pp.195-200

³⁹ Which? Online Annual Survey 1998. <http://www.which.com/nonsub/special/ispsurvey/frontpage.html>

⁴⁰ Ratnasingham, Pauline. 1998. “The importance of trust in electronic commerce”, *Internet Research: Electronic Applications and Policy*, 8 (4), pp.313-321.

⁴¹ in KPMG (& Ziff-Davis/Dell/Intel) [1999] “The New Mass Medium”.

⁴² Jones & Vijayasarathy, 1998

This would suggest that participants in e-commerce would favour sites that:

- are operated by established and recognised organisations
- take steps to build an online community of their customers
- provide online details of security measures used and methods of communication in the event of a difficulty
- provide a successful initial service

In addition to this it has been suggested that as lack of trust in electronic commerce is least apparent in “young individuals”, it would be beneficial for e-traders to focus promotion in this group.⁴³ Internet usage still largely conforms to its young, wealthy, male stereotype, despite its growth in recent years. The introduction of the “National Grid for Learning”, which will in theory provide every school child with access to the Internet by 2002, may act to make the usage profile more representative in time, dependent upon other access issues. (E.g. the male/female gap in Internet access at educational establishments is reported to be much lower than for home or work access⁴⁴).

Given this, it becomes apparent that rather than the almost unstoppable expansion of e-commerce sites onto a level playing field, it is more likely that there will be growing number of users visiting a select number of the largest e-commerce providers. Such a concentration can already be seen in general web use, according to US research, which found that although the number of Internet users and the time they spend online continues to grow, the range of sites that they visit is dropping.⁴⁵

More specific parameters include:

- Nearly 25% of consumers use credit cards online, though this is less than the ‘call back’ payment method.⁴⁶ But credit cards are not universally available, and are denied to under 18s. However there is low acceptance of debit cards online, which only require a bank account, and can often be held by under 18s.⁴⁷
- An interesting issue concerns the Internet at work, which is still used as an access point by the majority of users.⁴⁸ Namely, whether there is a division in the workplace amongst different age groups, the sexes, and occupational groups in access to the Internet. Moreover, there is the issue of whether the Internet will grow to become indispensable to large groups of workers or will shift to a greater leisure &/or e-commerce emphasis, and employers will act to restrict access in the workplace.
- With the explosion of free ISPs in the UK, telephone charges have become crucial to Internet access. Although recent partnerships between telecommunication firms and ISPs have considered call pricing, in general, current local call billing is far less conducive to access than the US system (flat rate fees for unlimited access). The UK charges are also higher than

⁴³ Jones & Vijayasathy, 1998

⁴⁴ “UK Internet Survey Results” <http://www.redsquare.co.uk/survey/> (09:16 24/8/99)

⁴⁵ Media Metrix, July 1999. <http://www.mediametrix.com/>

⁴⁶ NOP Research Group (1999) “Internet User Profile Survey”.

⁴⁷ KPMG “Reaching the Digital Generation”.

⁴⁸ “UK Internet Survey Results” <http://www.redsquare.co.uk/survey/> (09:16 24/8/99)

many other European countries, e.g. being three times higher than those in the Nordic countries.⁴⁹

- Arguably, over the longer term, interactive TV presents greater opportunities for the expansion of e-commerce. However, the future development of the UK iTV network remains unclear. The proposal for a digital licence supplement is germane here, with a recent survey by the Guardian finding that 59% of respondents (and 64-74% of poorer respondents) would be dissuaded from acquiring digital technology by the imposition of such a supplement.⁵⁰ However, this factor needs to be balanced against the leading-edge role that the BBC wishes to take in the development of iTV in the UK.
- Other relevant issues may include the impact of additional taxation or tax breaks upon e-commerce; greater regulation, which may foster greater consumer trust but could stifle commercial development; and actions taken by the non e-commerce sector to retain market share.

The uptake of television based services is likely to complement rather than replace the home computer and those with computers will continue to expand the number of applications they use. Indeed, among current computer users, the computer is the preferred platform for home banking and other financial services. However, interactive television is likely to dominate the market in the long-term.

MORI Nov 1998

⁴⁹ Datamonitor

⁵⁰ The Guardian 17/8/99.

4 IDENTIFICATION OF GAPS AND NEXT STEPS

4.1 Accessibility of Existing Research:

- The relevant governmental material has been readily available.
- This report covers all major research that is available in the public domain.
- The report also includes material that is not widely available, which we are able to present with permission from the survey authors. Some of the commercially sensitive material cannot currently be published in the public domain.
- Although academic work on e-commerce is ongoing, the nature of the peer review and publication process means that much of this work is not yet in the public domain.
- We have, however, been able to obtain a number of unpublished key reports from academics, who have given invaluable assistance.

4.2 Problems in Comparing Existing Research

- There is a general lack of clarity and transparency of methodologies employed by existing research – for example, confusion between sectoral classifications; unclear units of analysis such as population versus household; home versus office access; regular versus occasional purchase; vague sampling techniques; etc.

4.3 Gaps in Existing Research

- There is currently no systematic research that considers demographic profiles of e-commerce users. Existing research typically uses demographic profiles of Internet use as a proxy for e-commerce activity. We believe this assumption to be inadequate and potentially misleading.
- Work that has explored issues of disability has focused on access to technologies and facilitation rather than e-commerce. We believe that the e-commerce requirements and use in such groups may be different.
- Exclusion from e-commerce because of location (e.g. rural or non-metropolitan areas) and its implications needs further exploration.
- There is little research on users' online behaviour or on integration of e-commerce activity into patterns of daily life.
- There is little data or reliable forecasts on the use of non-PC and non-WWW methods of access to e-commerce (e.g. iTV, interactive mobile phones, PDAs, etc.) We believe that these technologies will soon form the larger part of routes to e-commerce, and are consequently of paramount importance to the future growth of e-commerce.
- There is a paucity of forecasts for future Internet access in the UK.
- There is no current UK research on non-retail elements of e-commerce such as gambling, share trading, online auctions, etc. We believe that these activities will become increasingly important.

4.4 Finally....

This report has detailed current work and forecasts for UK e-commerce issues. However, the technology, market and consumer profiles are developing rapidly. Given this, a report such as this must be open to continual development through:

- Appropriate updating to reflect emerging research and forecasts.
- Integrating expert opinion to reflect emerging thoughts and practice.

5 APPENDICES

5.1 Appendix 1: Acknowledgments

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5.2 Appendix 2: Survey Methods

5.2.1 Existing Research

- The initial survey carried out by the CRIC e-commerce team located relevant information from searches of the Internet, business libraries and university libraries.
- Requests for information and further contact details were sent to over 100 organisations and individuals, from government, industry, academia, management consultants, city analysts, the media and other bodies closely associated with business-to-consumer e-commerce. Contacts were asked for information concerning the following issues:

1. the current and likely take-up of the media relevant for e-commerce (i.e. PDAs, online PCs and digital television).
2. the current and likely take-up of e-commerce via available media.
3. the key market parameters that will influence the take-up of the media relevant for e-commerce (i.e. PDAs, online PCs and digital television).
4. the key market parameters that will influence the take-up of e-commerce via available media.
5. the extent of exclusion from the necessary media required for access to e-commerce.
6. the relevant parameters that relate to the exclusion of access and those that might alleviate this lack of access.

- The initial round of requests elicited a sizeable second list of further contacts - requests for information were sent to these. All who responded are listed in Appendix 1.
- Substantive responses to the requests were promising. All of the data presented here is either in the public domain or permission has been arranged (with credits).

5.2.2 Scenarios

- CRIC (in consultation with Chris Townsend and Stephen Locke from the E-commerce taskforce) devised three future e-commerce scenarios. These scenarios are anchored in the usage patterns of the new services, rather than in the particular interface media and systems used. The latter features are issues that we seek to elaborate in the scenario analysis.

Further information on scenarios is contained in the separate CRIC authored document.

SCENARIO A:

High rates of growth in the market value of e-commerce based transactions, but with reduction of social exclusion - existing differences between social groups are largely eroded (though there may be a small proportion of groups that remain largely excluded for one or other reason).

SCENARIO B:

Relatively high rates of growth in the market value of e-commerce based transactions, but with a high level of social exclusion - existing differences are largely maintained or even accentuated, with (most) poorer, disabled, rural, elderly, ethnic minority, and female groups displaying considerably less access to and take up of e-commerce services. (There may be a proportion of these groups that bucks the trend.)

SCENARIO C:

Relatively low rates of growth in the market value of e-commerce based transactions. Obstacles to its development in the UK predominate over the time horizon considered.

The scenarios have been used to obtain information and expert judgements with which to amplify and fill out the very broad-brush framework sketched out above. For each of the scenarios, we have used the following short list of topics for guidance:

SCENARIO TOPICS:

1. General considerations as to factors facilitating or impeding the development of each scenario.
2. What the level of use of e-commerce services might be in terms of market value in the scenarios? How this would vary across social groups?
3. What the pattern of use might look like in the scenarios, in terms of activity across different retail sectors (including entertainment and financial services), and modes of use of e-commerce (for example, music purchases might be acquired via delivery of CDs or by file transmission through the Internet).
4. The specific devices and media consumers use in each scenario to access e-commerce services (e.g. interactive TV, PDAs, mobile phones, PCs and laptops, any of these with or without smart cards). How this would vary across social groups?
5. The types of telecommunication infrastructure that would be predominantly used in each of the scenarios.
6. The nature of information intermediaries involved in e-commerce (e.g. web browser and portal services, Internet Service Providers, digital TV companies, online shopping malls and syndicates, etc.) in the scenarios.
7. The distribution and physical infrastructure involved in e-commerce, the role of existing high streets and shops in the scenarios. Is the future one of complementarity or substitution, and does this vary across sectors?
8. Implications for consumer ways of life and well-being in the scenarios. Who might be excluded?
9. The role in each scenario of new entrants, small firms and shops.
10. Implications for environmental sustainability in each scenario.

- Requests for comments on scenarios were sent to all members of the Retail and Consumer Services Panel, the E-Commerce Taskforce, the Retail Logistics Taskforce and Tim Jones (NatWest Bank) and to a number of media commentators.
- These experts were asked to consider both the methodology that we are using and to sketch out their impressions of each scenario according to the topics listed.
- However, responses were forthcoming from very few people and the most productive discussions were face to face with members of the taskforce. Ideally, more elaborate scenarios workshops would be employed to validate and elaborate the scenarios further.