# Interactive Digital Television — A Literature Review

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- **Sammendrag**/Abstract:

This research note reviews the literature on the use of and issues around interactive television in various environment, in particular the family and domestic sphere. This work examines the problem of defining the concept of interactivity and provides a historical background to the notion of interactive television. It outlines the various purposes of interactive television and the activities that users carry out or are expected to carry out via an 'advanced' version of their television set (including education, information, entertainment, shopping, banking and dealings with governments). An overview of the practical, cultural and ethical issues around such use is presented and implications for future research work are suggested.

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# Interactive Digital Television
# A Literature Review

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# 1 Introduction

> […] while one quite plausible technological vision of the future, what I want to call the screen machine – a single audio-visual terminal through which digital communications and information will enter and leave the household – is clearly technologically possible, its acceptance and perhaps above all the form or forms of its acceptance, is far from clear. And its consequences for how we might conduct our everyday lives is murkiest of all.
>
> (Silverstone, 1997, page 115)

## 1.1 Interactive television: the end of 'television as we know it'?

'Television as we know it' is broadcast to a large section of the public. As such, it is generally described and thought of a one-way, passive medium. According to Freed (2000), this very passivity was at the core of the advertising strategy of television networks.

> Producers of early television programs relied on this passivity to sell advertising. They knew that once the family had tuned in a channel and settled back on the comfortable sofa, they were likely to stay watching that channel all evening. There was no remote control yet, no channel surfing.

Another point worth noting is that the role of television as an information medium has not declined significantly after the acceleration of Internet use. According to the Benton Foundation (2000):

> Despite the current frenzy surrounding new media, TV is still the most watched and most trusted source of information in the US. Ninety-three percent of Americans watch a network television program in the course of a week, and 69 percent of Americans say TV is the most trusted source of information.

Interactive digital television can be seen as the product of the convergence of computer communications and broadcast technology. Torris *et al.* (2000) define interactive digital television as relying on three main elements:

1) A combined set-top box that delivers digital broadcasts, pay TV and interactivity
2) Interactive services carried in the broadcast signal
3) An interactive return channel through phones or cable wires (page 3)

The interactivity element is expected not only to change the face of the technology but to foster a radical shift in viewing habits, transforming the 'couch-potato viewers' of yesterday in full participants, totally 'in charge' of their viewing experience (Sorcher, 2000).

In contrast with 'traditional' broadcast television, digital interactive television essentially aims to cater to the needs and demands of smaller groups of individuals

(Swedlow, 2000; Hill, 2001; Stroud, 2001). Stroud (2001) sees personalization as a key component of interactive television and defines it as the process of narrowcasting, or 'pulling' information from individuals as opposed to broadcasting whereby the same message is 'pushed' to reach a large audience.

## 1.2 Defining interactivity

Although the concept of interactivity is commonly mentioned in everyday language and in the literature when referring to new technologies, it is not always clear what is meant with 'interactivity'.

Jensen (1999) notices that interactivity is one of the media community's most used buzzwords and is surrounded with a considerable amount of hype. He remarks that:

> The concept seems loaded with positive connotations along the lines of high-tech, hypermodernity and futurism, along the lines of individual freedom of choice, personal development, self determination, and even along the lines of folksy popularization, grassroots democracy, and political independence. At the same time, it seems relatively unclear just what 'interactivity' means. The positiveness surrounding the concept and the frequency of its use seem, in a way, to be reversely proportional to its precision and actual content of meaning. (Jensen, 1999, page 8).

A number of works have attempted to provide a definition of the concept of interactivity, often by dividing it into a number of dimensions. For example, McMillan and Downes (2000) propose a conceptual definition of interactivity based on six dimensions: direction of communication, time flexibility, sense of place, level of control, responsiveness, and perceived purpose of communication.

Basing his analysis on the works of Jäckel (1995), Duncan (1988), Iser (1989), Durlak (1987), Carey (1989), Rogers (1986), Szuprowicz (1995), Laurel (1991), Goertz (1995) and Heeter (1989), Jensen (1999) proposes a definition of interactivity as:

> A measure of media's potential ability to let a user exert an influence on the content and/or form of the mediated communication (pages 18-19).

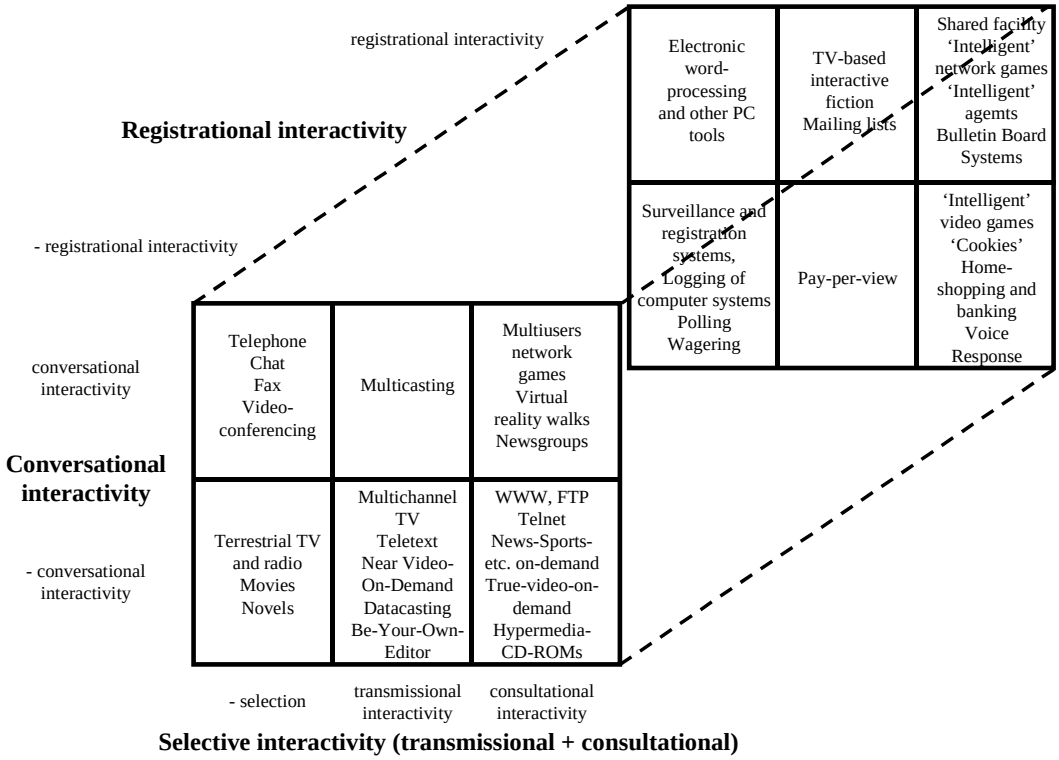
In his summary analysis:

> This concept of interactivity can be divided up into four subconcepts or dimensions which could be called:
>
> 1) **Transmissional interactivity** – a measure of a media's potential ability to let the user choose from a continuous stream of information in a one way media system without a return channel and therefore without a possibility for making requests (e.g. datacasting, multicasting, teletext, near-video-on-demand).
>
> 2) **Consultational interactivity** – a measure of a media's potential ability to let the user choose, by request, from an existing selection of pre-produced information in a two way media system with a return channel (Gopher, WWW, FTP, video-on-demand, on-line information services, etc.)

3) **Conversational interactivity** – a measure of a media's potential ability to let the user produce and input his/her own information in the media system in a two way media system, be it stored or in real time (video conferencing systems, news groups, e-mail, mailing lists etc.).

4) **Registrational interactivity** – a measure of a media's potential ability to register information from and thereby also adapt and/or respond to a given user's needs and actions, whether they be the user's explicit choice of communication method or the system's built-in ability to automatically 'sense' and adapt (surveillance systems, intelligent agents, intelligent guides or intelligent interfaces, etc.). (Jensen, 1999, page 19).

He provides a three-dimensional representation of interactivity through a 'cube of interactivity'.




The 'cube of interactivity': a 3-dimensional representation of the dimensions of interactivity (Jensen, 1999, page 18)

However, there is a need for a more basic definition of the concept. Cho and Leckenby (1997) provide a useful overview of the different definitions on interactivity in classifying them in three groups, depending on whether they focus on user-machine interaction, user-user interaction, or user-message interaction. Using this categorisation, one can see that Steuer (1992)'s definition of interactivity as "the extent to which users can participate in modifying the form and content of a mediated environment in real time" (page 84) belongs to the third category.

As noted in Liu (2001), definitions of interactivity that focus on the technological

aspects of the concept ('user-machine interaction') tend to be found in earlier work on interactivity. However, later work on interactivity consider that technology is not necessarily an important or even an integral part of the process of interaction. As outlined by Klein (2001), interactivity, taken as a descriptive characteristic of media, is not related to technology "despite its growth in popularity as a metaphor for computer mediated communication" (page 7).

## 1.3 Historical background

The idea of interacting with television is certainly not new. The remote control and the VCR could be seen as the fist steps in this direction and a few original and experimental endeavors have incorporated some element of interactivity with the television set. For instance, Freed (2000) recalls the example of *Winky Dinky and you*, a 1950's children television series whereby a special plastic sheet could be purchased either at local stores or through mail order and could be placed on the television screen and held by static electricity.

> In the show, the Winky Dink cartoon character would encounter many problems, like a tiger chasing him to the edge of a cliff. The announcer then asked children to help Winky Dink by using a special crayon to draw a bridge on the plastic screen, so the hero could escape from the tiger. […] Yet there was a problem with this format that ultimately drove the show off the air. Some children did not purchase the plastic sheets and special crayons. Instead they used their own crayons to draw directly on the glass of the TV screen. The precautionary reminders from the show announcer were ignored. Parental complaints finally convinced CBS to cancel the series. (Freed, 2000)

Torris *et al.* (2000) identify two main precursors to interactive television, namely enhanced teletext information services and Web-On-TV. They explain that both experiments fell short due to a lack of commercial investors' interest in efforts to re-build and re-design interface and infrastructure and to the relative high cost of set-top boxes compared to that of personal computers.

Television-driven interactivity may also include interactive activities *around* the television, in addition to interactive activities *with* the television. For example, Gartner's Dataquest estimated that 44 million people used a personal computer and a television in the same room in 2000 - up from 26 million in 1999:

> In 2000, 60 percent of telewebbers have used the Internet at least occasionally to get information on a product they saw on television. About 32 percent ordered a product that they saw advertised on television via the Internet. This compares with 44 percent getting information on a product and 20 percent ordering a product in 1999 (McCall, 2000).

According to Dataquest's analysts, this population of 'telewebbers' is a crucial starting point for the development of interactive television services, as they are most likely to be the early adopters of 'true' interactive programming through a single device. However, Dataquest recommends that interactivity should be developed in a way that makes it as little intrusive as possible, so as not to allow 'watching' to remain the primary purpose

of television.

> As an initial step, they should start with a minimal level of interactivity, such as offering instant viewers' polls, the ability to make purchases, and hot advertisement buttons that will provide more product information. News programs should consider displaying links to their Web sites on a news story, pointing to greater editorial detail. Interactivity may also extend to multiple viewer angles on a show, news stories or sports (McCall, 2000).

## 1.4 Attitudes towards and actual uses of interactive television

Relatively little in-depth research has been done into the actual uses of and attitudes towards interactive television services around the world. However, it is worth mentioning a few notable exceptions.

A study of the viewing patterns of 1,872 television viewers (Lee and Lee, 1995) suggests that people engage in television viewing with various levels of intensity according to the content of what they are watching, what they are doing and their motivation for viewing. In their analysis of viewing motivations, the authors uncover that one of the most important factors to viewers is 'mood elevation', aiming to relax, decrease the general level of stress and find an escape from their daily preoccupations. This may challenge the idea that interaction is an attractive or even a desirable feature for some parts of the television viewing population. They notice that the desire to relieve stress ("TV as a kind of Valium") does not allow for activities that require "intentness, alertness or heavy demands".

Svennevig and Firmstone (2000) observe that early adopters of digital television in the UK use it "primarily as a source of TV gratifications rather than for any new, internet-based activities". They put this observation in perspective in pinpointing that the UK market has in the past 'failed' to adopt highly innovative and advanced technologies despite the marketing efforts put into disseminating it. They mention, as examples of this phenomenon, "the Sinclair C5 electric vehicle; Prestel (a precursor of the Internet); the combined PC/TV; the laserdisk (a VCR rival)".

Peretz (2001) reports the results of a study by Statistical Research Inc. (SRI) – based on a sample group of 142 homes with interactive television and 59 homes without - that reveal that many consumers display little or no interest in a number of interactive television features available or currently being developed. Such features include interactive Internet links and other interactive Internet-based features, e-mail, interactive chat, and interactive games. However, consumers did display some interest in video on demand, personal video recorders and interactive programming guides, which aim to provide them with an increased amount of control over what and when they watch. On the whole, 72% of respondents reported that they were not interested in interacting with television programs and this lack of interest appeared to be as substantial in homes with interactive television as in homes without. One of the conclusions drawn from this study is that:

> ... in general, people use TV to relax and are not interested at this time in adding aspects that require activity. (Peretz, 2001)

This apparent lack of interest is also reported by Lake (2001):

> Vegetating in front of the TV while flipping through channels is still a popular activity with many people. Seven out of 10 adults aren't interested in any form of interactive television, according to a recent Cyber Dialogue survey of 1,000 American adults. And only 27 percent of Americans say they are interested in navigating the Web from their televisions. Slightly more, 30 percent, say they are interested in any type of interactive TV service. (Lake, 2001)

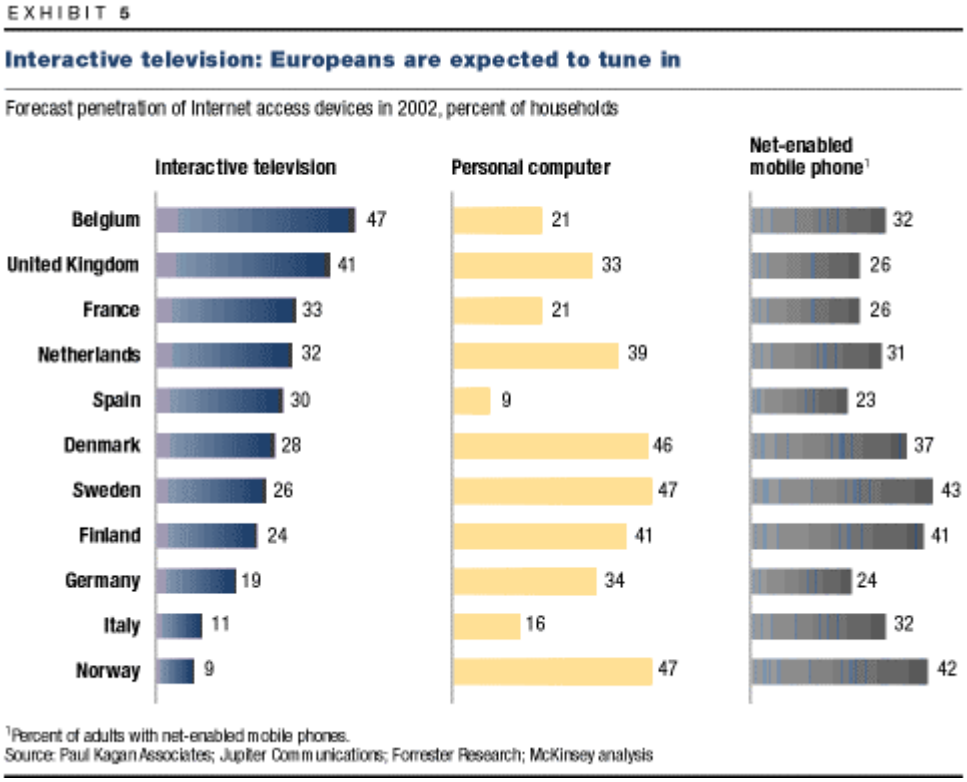
Nevertheless, one cannot discount the possibility that interests will shift as a growing part of the population is aware of and used to the interactive capabilities of ICTs.

> SRI stated that attitudes towards iTV could change as population demographics shift and the generation of people who grew up using the Internet ages. (Peretz, 2001)

Maude *et al.* (2000) contrast a relatively low interest for interactive television in the United States where Internet surfers seem to value more the versatility of the home computer with a wider rate of adoption in Europe.

> European viewers seem to like interactive TV's combination of entertainment and interactive applications; subsidies for set-top boxes and falling telephone tariffs also have sharpened European appetites (Maude *et al.*, 2000)

The statistics available in 2000 allowed for a forecast penetration of Internet access devices in 2002 as follows:




(Maude *et al.*, 2000)

# 2 Possible uses of interactive television

## 2.1 Education, training, general information and advice

Interactive digital television has been seen as having a high potential for education and training purposes, based on the fact that most households already own one or more television sets, at least in the western world.

Vincent (1999) foresees that:

> In the future, many things which once required individuals to go out of their way to acquire them will be available instantly and on demand. Detailed instructions on anything from speaking Spanish to designing gardens will be available 'on tap'. (page 242)

In the area of learning and educational technologies, interactivity is a highly sought-after feature. According to Mason (1994), this development has reached the point where one seeks and adopts interactive technologies without first examining the actual usefulness of this interactivity:

> No concept so characterises educational thinking in the 1990's as does interactivity. So embedded in the spirit of the age is it that there is relatively little questioning of its value, much less evaluation of its effects. (page 25)

However, teaching is typically a relational activity. Several authors (Graham *et al.*, 1992; DeVito, 1986) have suggested that establishing an ongoing interpersonal relationship between teacher and student is an integral part of a satisfying teaching experience. Research on distance education using electronically mediated communication channels indicates that important communication clues tend to be filtered out when communication between teachers and students is electronically mediated (Culnan and Markus, 1987), also when using interactive television as the main communication media (Mottet, 2000). In particular, interactive television has been criticized as filtering out and dulling important non-verbal messages (Mottet, 2000).

## 2.2 Entertainment and leisure

### 2.2.1 Cinema and video services

One of the most evident purposes of digital television is the possibility of sending films electronically. This is seen as potentially cutting the "expensive and limiting process of film duplication and distribution" (Entertainment and the Entertainment Industry, 1996, page 17). A significant advantage of the diffusion of films via interactive digital television is that it may allow "small films that could not be duplicated on film to be seen much more widely" and "eliminate the ageing and wear and tear problems with celluloid, which takes many films out of circulation within a few years of release" (page 17).

The obvious advantage for users is the 'time-shifting' potential of the device, i.e. the possibility to watch television program at any time that is convenient for them, with

VCR-like capabilities to pause, stop, rewind and fast-forward at any time.

Another advantage of such services is the possibility to individualize programs or to tailor them to a particular audience. For example, Oxygen, an interactive television network "by women, about women, and for women" (Schlotter, 2001), aims not only to produce dramas and offer news and magazine shows that meet the unique entertainment and information needs of women, but also to respond closely to its audience's programming demands through its interactive web site. Although the 'interactivity' takes place through the computer and not the television itself, this initiative provides an interesting example of interactive television programming.

### 2.2.2 News and events

Vincent (1999) notices that netcasts of public events such as football matches or concerts could be a central element of interactive television services. He foresees that:

> In the future, any significant event (even the local school sports day) could have a global audience of listeners, viewers, or recipients of real-time text reports. (page 242)

### 2.2.3 Games

The ability to participate in contests linked to popular shows or series may, according to Datamonitor (2001) count among the biggest sources of appeal for iTV games. It is expected that such interactive television games will bring in revenue both either sponsors or from the users themselves, as they may be charged a nominal fee to enter those contests. Viewers can therefore play against each other, or against studio competitors (Surveyer, 2000).

> Already, it is possible play all sorts of card, board, and quiz games on the Web, and with partners from around the world. Players can instant message with one another, kibitz, pout, and prance about just as if they were in the same room. With DSL and cable modems, players will be able to chat by voice or videoconference. Dungeons and Dragons-type role playing and adventure game creators are currently working on fests with hundreds of Web players interacting. (...)
>
> Game sites will allow players to modify some of the rules (you can already do this on some card and board game sites, establishing "house rules"), but eventually, users will be able to create and save their own games." (Surveyer, 2000)

Allowing viewers to 'solve the puzzle' and answer questions while simultaneously watching a quiz show is expected to appeal to a wide audience. As quoted in Townley (1999), Andy Kaplan, executive vice president of Columbia TriStar Television Group considers games shows to be the 'killer app' of interactive television:

> "They are participatory, completely intuitive and provide viewers with instant gratification from their viewing experience" (Townley, 1999)

Interestingly enough, in a world where games become increasingly sophisticated, operators such as Insight Communications "find that simple games like Solitaire are among the most popular element of the interactive pages on their digital offerings" (Bernoff *et al.*, 2001, page 4).

### 2.2.4 Gambling

Interactive television may contribute to making gambling more immediate and more widely accessible. Wakefield (2001) reports that gambling is expected to be the 'first killer app' of interactive digital television in the UK.

> Gambling is proving a big draw with many interactive TV viewers, especially services like that offered by Global Interactive Gambling that let punters place their bets on the sporting action as it unfolds, rather than just on the outcome of a whole match, Test series or tournament. (Turning onto interaction, 2001)

For example, viewers of a televised football match could place a wager on the outcome of a penalty kick between the time the referee points to the spot and the time the player strikes the ball. Ward (2001) quotes Charles Malir, marketing director of Orbis, a sports betting software supplier in the UK:

> "Imagine sitting down to watch the FA Cup Final with your mates, and being able to bet from your TV remote control on whether David Beckham will score the penalty - appeal for this kind of fun betting will be huge" (Ward, 2001).

One of the crucial features of interactive television gambling is that it may reach to a much wider and different audience than the 'traditional' gambling audience, cutting across genders and social milieus.

> "Interactive TV will change our attitude towards gambling in the 21st century. An activity viewed as solitary and male-dominated will become a socially-shared, 'fun' thing to do, with which both sexes will feel equally comfortable," says Donna Dawson, a consumer psychologist. (Ward, 2001)

However, the specific issue of gambling poses moral and legal problems, especially when considering that interactive television might increase young populations' access to gambling.

## 2.3 Daily activities

### 2.3.1 On-line shopping

Saliba (2001) reports that a study by Jupiter Media Metrix foresees that television will become an important vehicle for e-commerce transactions in the coming years. The study reveals that consumers are expected to shift their patterns of television-driven buying. Instead of calling by phone to buy the items demonstrated on television, viewers will prefer to transact via interactive television shopping programs using remote control devices.

Sachs (2001) reports that Jupiter analysts have identified three forms of interactive

television shopping that together are expected to yield $4.3 billion in revenue.

- **ITV Shopping Programs** ($3.4 billion): Viewers use a remote control instead of a phone to buy items showcased on infomercials or shopping channels such as QVC or USA Networks' Home Shopping Network.

- **ITV Malls** ($0.7 billion): Viewers tune in to a Web-like catalog or store that carriers and their merchant partners provide within their own areas.

- **Integrated iTV Shopping** ($0.3 billion): Viewers interact with offers embedded in commercials or programs, timed to take advantage of impulse buying. (Sachs, 2001)

On-line shopping is closely related to on-line advertising and Schenker (2001) provides a real-life example of how on-line advertising ties in with the preliminary phases of on-line ordering from an experimental Opel advertisement technique on the French digital satellite pay-TV channel TPS:

> Interested viewers could use their remotes to click on an icon and find out what colors the car comes in, what the interior looks like, how much the car costs and where they could finance it. What's more, they could assemble a virtual version of their dream car with all the desired options and e-mail it to Opel via their TV. Wish list in hand, Opel then searched for the closest dealers with the cars that most nearly matched and then contacted viewers to find out if they would like to test drive real-life versions of their virtual fantasy autos. (Schenker, 2001)

Although, in this example, the buying process is not carried out on-line, the crucial first phase of buyer-seller interaction is done with the help of digital television technology after a first contact initiated through interactive television advertising.

The disadvantages with on-line shopping via a television set can be expected to be the same as those that may be encountered when shopping on-line via a computer. Two of the most pressing concerns both for businesses and for consumers that engage in on-line shopping are the level of security of transactions and the possible breach of privacy (Ghosh, 1997; Collin, 1999; Baur, 2000; Brands, 2000). Shopping via interactive television faces other problems that are similar to shopping via the Internet, such as the lack of 'feel and touch' as well as the delays and extra costs associated to the necessity of shipping items from remote storage facilities to the end-consumer (Sachs, 2001).

In addition, the social aspects of shopping may become a much smaller part of the shopping experience or disappear altogether when shopping on-line:

> Shopping is a social activity. As well as its functional role it includes the pleasure of browsing, impulse buying, discovering new shops, casual conversation, and planned and unplanned meetings with other people. Electronic shopping is not the same. It is primarily a functional activity since most of the social activity cannot or is not supported. You cannot bump into a friend in the electronic shopping precinct. Window shopping is hampered by the primitive nature of search engines. The consumer is dealt with

> automatically by the computer systems of the supplier - it is a person to machine relationship and not a person to person relationship as is the case with traditional shopping. Whilst electronic commerce provides access at all times and provides a lot of benefit to certain groups, such as those who are house bound, it is very limited in terms of its social welfare capability. (Rogerson, 1998)

However, on-line shopping has also been described as an activity with considerable potential for (on-line) social interaction. Richardson (2001) mentions that businesses such as VirginNet offer a chat room in parallel to their on-line shopping features. In addition, the introduction of cyber characters (three-dimensional representations of shoppers that can wander through a virtual world presented on-line such as a presentation of Paris in Le Deuxième Monde) allows not only for a more entertaining shopping experience, but also for the possibility to create a 'club' atmosphere amongst shoppers (Ody, 1998).

### 2.3.2 On-line banking

In a report published in April 2001, Celent Communication investigate the market for TV-based banking (Celent Communication, 2001). They report that an increasing number of banks, especially in the United Kingdom and in France, have started to offer their services via interactive television. Such services include access to account balances, transfer of funds and payment of bills. The report reveals that one third of the top 20 European banks offer some form of interactive TV banking at the time of the survey.

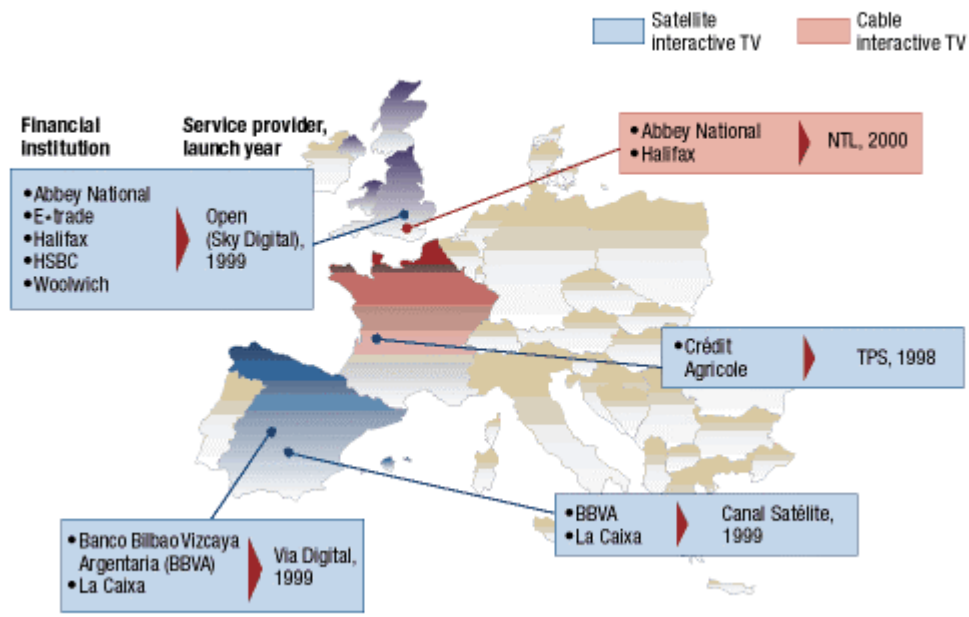
Maude *et al.* (2000) explain that interactive television gives financial-services companies a whole new scope for marketing:

> it permits them to display their products in full-length programs rather than commercials lasting a few seconds and to deliver financial advice in interactive formats, even in real time. Such companies particularly value the ability to hot-link traditional TV commercials to sites where viewers can buy products on-line. In addition, service providers on interactive TV can tailor their offers precisely by collecting detailed data about the way customers use the medium. Little wonder, then, that many European banks are jostling for position in this technology. (Maude *et al.*, 2000)

They offer an overview of the European financial institutions that provide on-line banking on interactive television:

EXHIBIT 7

**European financial institutions are banking on interactive television**




Source: Company announcements; McKinsey analysis

(Maude *et al.*, 2000)

However, according to Celent Communications (2001), interactive television is not expected to overtake the Internet as the dominant channel for e-banking in the foreseeable future.

### 2.3.3 Dealings with government and public institutions

Governments may choose to use interactive television as a way to disseminate government-related information or important warnings. Already many governments make an increasing number of services available on-line, mainly via the Internet (Peters and Porter, 2000). Vincent (1999) relates that:

> The UK Government has stated that 50% of dealings with Government should be capable of electronic delivery by 2005, and 100% by 2008. (page 242)

Electronic delivery of government-related information and services may reach a larger population when carried out via the television.

The Benton Foundation (1998) recommend that broadcasters cooperate with emergency communications specialists and with manufacturers so as to determine the most effective way to transmit disaster warning information and that regulatory authorities advise manufacturers of digital television sets about modifying them in order to handle emergency transmissions.

Interactive television can also be used as a tool for ‘remote voting’ for local or national elections and as a means to foster participation in the public debate. Featherly (2001) relates that Wink Communications, a California-based company, has plans to test an

interactive television voting system during a 2002 California primary elections. This system would enable US voters to casts election ballots using a television set that is equipped with a set-top box. Such a system is considered more secure than an Internet-based system because it is encrypted and makes up a completely closed system using secure servers. The voting service provided by this system includes election information such as a ‘voters’ guide’ as well as the possibility to review one’s vote and edit it if entered incorrectly.

## 2.4 Accessories

Among the ‘accessories’ that aim to facilitate interactivity with television, one can name the ‘e-cliner’, a reclining armchair with a built-in keyboard (Williamson, 2001; Herper, 2001). In addition, the ‘e-cliner’ is equipped with a built-in data port, surge protector, phone line, and electrical outlet. Other features of the ‘e-cliner’ include storage compartments concealed under the arms, providing space for remote controls, DVDs, CDs, videos, etc. (Pargh, 2001)

# 3 Issues

## 3.1 Culture, identity and social interaction

The cultural dimension of interactive television is a highly important factor of use.

> It has been noticed that the existing 'culture of use' of interactive entertainment is still relatively small amongst the population at large (Entertainment and the Entertainment Industry, 1996).

However, interactive entertainment is more and more becoming an integral part of what is commonly referred to as 'the youth culture' (Beavis, 1998). This may translate into the younger segments of the population acting as precursors and setting the trend for an increasingly wider enthusiasm amongst the population as a whole.

It is nevertheless widely understood that the social aspect of 'mass-broadcasting' is deeply engrained in today's media culture. In particular, the works of Lull (1990), Spigel (1989), Moores (1988), Scannell (1988), Katz and Dayan (1985), Dayan and Katz (1992), Becker (1995) Da Matta (1984) have outlined the importance of media events integration into daily routines and rituals. This social aspect could be seen as threatened by the rise of interactive services. As Grose (2001) points out:

> ... demand for nightly 'event' shows won't completely wither – viewers like to discuss some shows with friends and colleagues the next day. (Grose, 2001, page 18)

Lee and Lee (1995) mention that television watching, especially during 'prime time', is still an activity that mainly occurs in social contexts, and has remained chiefly a 'family affair', despite the growing number of households equipped with more than one television set. They refer to the concept of "social grease" when they mention the broadly accepted role played by television as a common reference point between a person and his or her social environment. They contrast the pleasure taken in talking about shared television experiences with the impossibility to share such experiences if everyone watches their own individualized program.

However, interactive television may form the basis for new social interaction, for example through 't-clubs' that hold live chats during television programmes (Spring, 2000). This type of feature is at the center of marketing campaigns for companies such as OpenTV, whose CEO, James Ackerman, declares that "communications applications such as email, and now chat and Instant Messaging, are natural additions to the interactive television functionality" (Knight, 2001).

## 3.2 Privacy

It is foreseen that interactive television offers an unprecedented power to collect customer data, "from how often you use the remote control to which commercials you skip to how long you linger over an episode of Baywatch" (Hopper, 2001). Lyman (2001) highlights the same problem, quoting a report from the Center for Digital Democracy that foresees that the privacy concerns of the Internet could be magnified by interactive television, as a significant amount of tracking is enabled from the living

room, including ‘income and favorite color’. The executive director of the Center, Jeff Chester, quoted in Hopper (2001), expresses concerns regarding how much a television can gather about viewers.

> “This is a device that people use regularly for seven to eight hours,” Chester said. “This is not a PC, this is a piece of furniture. People rely on it.” (Hopper, 2001)

Many authors have outlined the increased possibility for targeted advertising on interactive digital television (Everitt, 2002; Hill, 2001; Olavsrud, 2001; Reynolds Lewis, 2001; Swedlow, 2000) in particular due to the development of multiple channels with ‘niche’ audiences (Entertainment and the Entertainment Industry, 1996). Vincent (1999) also notes that on-line shopping may increase sellers’ knowledge of consumers’ personal preferences and lifestyle and foresees that “regulation will inevitably be needed, to guard against invasions of privacy” (page 242). However, as Richmond (2001) notices, legislation covering interactive television devices is “minimal at best”.

It is worth noting that, in a survey by Kshirsagar *et al.* (2001) comparing attitudes towards interactive on-line advice services via television and computer, respondents saw the PC as offering more privacy than interactive television.

> Recognizing that the distinction between TVs and PCs is blurring, the willing majority was almost indifferent to which of them would be used to deliver advice. For complex personal matters, however, participants preferred the PC because of the privacy it offers and its ability to handle calculation tools easily; joint decisions and interactions requiring less privacy and attention, participants thought, could be carried out just as satisfactorily on the TV in the living room. (Kshirsagar *et al.*, 2001)

## 3.3 Moral issues

Whether television sets are available in schools or in homes, the question of the suitability of the material accessible to children may be raised (Entertainment and the Entertainment Industry, 1996). The main concern surrounding children and television programs consist generally of selecting and filtering the material available so as to prevent exposure to violent and harmful depictions and exploitative advertising while allowing for programs that supplement schooling and good parenting (The Benton Foundation, 2000). This may be made easier through the use of interactive digital television, as Hundt (1996) pinpoints:

> “People say they want more control in their homes over the media. Digital TV can easily be coded with information about whether scenes are appropriate for kids. The V-chip could be overtaken in a digital age with software that selected shows according to parameters set by the viewer based on nongovernmental program information.” (Hundt, 1996).

## 3.4 Role in bridging or widening the ‘digital divide’

### 3.4.1 Enabling the disabled

The extent to which technology may help people with physical or mental disabilities has been the object of much discussion around the topic of traditional television and video (Kovalik and Kruppenbacher 1994), computer hardware (Anthes, 2001; Riviere, 1996; Williams, 2001) and software (Riviere, 1996; Robitaille, 2002; Voelkerding, 2002), the Internet (Benner, 2001; Berry, 1999; Delio, 2000; Kriz, 1999; Mayfield, 2001; Perine, 2001), mobile telephony (Solomon, 2000, 2001), etc.

Similar concerns emerge around the developments in interactive television technology. For example, the Benton Foundation (1998) recommends that:

> Broadcasters should take full advantage of new digital closed captioning technologies to provide maximum choice and quality for Americans with disabilities, where doing so would not impose an undue burden on the broadcasters. These steps should include the gradual expansion of captioning on PSAs, public affairs programming, and political programming; the allocation of sufficient audio bandwidth for the transmission and delivery of video description; disability access to ancillary and supplementary services; and collaboration between regulatory authorities and set manufacturers to ensure the most efficient, inexpensive, and innovative capabilities for disability access (page 61).

Watkins (2001) describes an initiative whereby a US research and development facility, the National Center for Accessible Media, partnered with America Online to explore ways to make interactive television accessible to blind and visually impaired audiences, in particular via new techniques enabling the presentation of information in an audible way and the integration of text-to-speech technology with television technology.

> "As technology advances beyond traditional passive television viewing into a more robust and interactive experience, we must ensure that blind and visually impaired audiences are not left behind," said Tom Wlodkowski, manager of NCAM’s Access to Convergent Media Project. "Our goal is finding ways to enhance the graphics-rich interface of existing set-top devices to allow blind and low-vision consumers to access the wealth of educational, civic, commercial, and entertainment resources that are now, or will soon be available." (Watkins, 2001)

Disabled access to information is particularly vital in the case of emergency warnings. The Federal Communications Commission (2001) issued a reminder indicating that a Commission rule adopted on April 14, 2000 requires video programming distributors in the USA to ensure that all emergency information provided in the audio portion of the programming also reaches persons with hearing disabilities. This may be done either through closed captioning or through visual presentation, such as open captioning, crawls, or scrolls appearing on the screen.

### 3.4.2 Reaching a wider population

Interactive television may play a role in widening the public reached for a particular interactive service and thereby reducing social exclusion and contributing to the 'democratization' of the digital world (Green *et al.*, 2001). Examining Britain's digital divide, Tran (2000) hypothesizes that interactive television (as well as mobile telephony) might offer on-line access at a lower cost than computer-based access and thereby allow "net skeptics" to benefit also from on-line activity.

Some interactive television business initiatives aim to reduce the digital divide by targeting minorities among whom on-line access rates are lower than average. An example of a such an initiative is NetForAll, an interactive television and web-surfing program, available in Spanish, English and Portuguese, which was introduced by its creators as a possible step towards reducing the digital divide within the United States. Baca (2000) quotes Miguel Kramis, president of International Commerce, NetForAll's parent company:

> "There is a gap, and Hispanics are behind in technology and Internet access."
>
> "Computers are more expensive and this way they can have access to the Internet through their television. They can cruise the Internet with a remote control, and when they need to type, they can use a wireless keyboard... You don't have to be high-tech people to understand it." (Baca, 2000)

Another goal of the NetForAll product is, according to Kramis, to create an interactive network whereby Hispanic families will be more easily connected to businesses as well as public resources such as schools, libraries, government agencies and heath care. In addition, the product is meat to foster a virtual community where Hispanics can share information and discuss their interests via the television set.

However, the cost of acquiring and 'running' interactive television from home may be such that the less affluent parts of society could be left out, thereby increasing the gap between the 'have' and the 'have-not'.

# 4 Conclusions

Although there is a wealth of commercial and journalistic literature outlining what interactive television aims to achieve, studies of actual patterns of use of interactive television services remain scarce. In particular there is a need to explore more deeply issues of cultural identity, social interaction, access and meaning given to this new technology, so as to understand how it integrates in the lives of users, their families and their broader social circles.

Research efforts based on empirical studies of individual and family use of this new technology could further our understanding not only of a new technological tool but also of a changing domestic media ensemble whereby new activities are performed and new possibilities and challenges are faced by individual, their families and their broader social environment.

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