# Interactive Television – A Brief Media History

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**Abstract.** The paper is an attempt at tracing the history of interactive television. The lead that is followed is the various experimental attempts with and the commercial launches of interactive television that have been conducted, as well as the results that have been achieved. This will be done by identifying the various historical phases with different characteristic technological waves, business models, services and contents concepts.

**Keywords:** Interactive Television, interactive media, media history.

## 1 Introduction: Holy Grail or Vapourware?

Gathered from the information in the contemporary press, the electronic media and even scientific journals one is easily left with the impression that interactive television is a new phenomenon, or maybe even that it belongs in the future [1, 2]. In reality, however, interactive television has a long history – actually, just as long as television itself. Back in the 1920s, when television technology was invented, interactive communication was – here in the shape of one-way video and two-way audio – actually among the formats that was seriously considered and tested.

However, this was not to be the dominant form that the television media assumed when it was eventually presented and generally accepted. Quite the opposite, television more or less became the model example for a 'push' media and one-way mass communication. Nevertheless, the idea of making television interactive has emerged time and time again throughout the development of the media.

Most often, however, this other side of the history of the television media – the flipside of the mass media and one-way communication – is overlooked or forgotten. That this historical perspective is missing is – as, e.g., John Carey draws attention to [1, 2] – unfortunate since quite an amount of knowledge, experiences and points are gathered within this part of the media's history. Knowledge which relates to technological problems and problem solutions, business models that worked or did not work, consumers' preferences, demands and reactions, etc., which are highly useful in the current development of new forms of interactive media.

During the last five decades, there have been numerous attempts with both experimental and commercial testing of interactive television concepts. However, different problems – unripe technologies, underdeveloped infrastructure, lack of contents, failing demand – have for the most part hindered an actual breakthrough. In a sense interactive television has been under way for the last 50 years.

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At the same time, interactive television is one of the most hyped technologies of that period. Repeatedly, it has been announced that we now faced a decisive technological and commercial breakthrough for interactive television. Every other year, the birth of the technology has been proclaimed. More or less every time, however, the matter transpired to be a false alarm. Presumably, no other technology has been characterised by so many 'false starts', so many hyped beginnings, and so many stumbling launches. Seen in this perspective, interactive television must be one of the last half centuries most failure ridden technologies. Unrivalled, it must take the price for being the ultimate 'vapourware' of the last 50 years – a designation, which in the computer business refers to soft- or hardware that is announced and advertised for long before their launching – and which often are never realised.

There have been numerous attempts at finding the 'killer application', which by itself would drive the spreading of the technology. This has happened to the extent that interactive television has been named the Holy Grail of the Information Age by some commentators. For in the same manner as the medieval knights, according to the King Arthur legends, went forth to find the Holy Grail – the chalice of Christ – the most priced of all objects, which would grant eternal life and happiness to its finder; so the 'knights' of the media industry goes on a crusade to track down the never yet found nor seen wonder product. A product which is expected to catapult the media industry into new and profitable arenas.

Just as the birth of interactive television has been declared repeatedly, so has its death. Countless times the more sceptical part of the observers has passed the death. For example, in the mid-90s, E. Schwartz [3] wrote off the entire idea of interactive television in an articled in *Wired*, in which the title rhetorically inquired: "People Are Supposed to Pay for This Stuff?" At the end of the 90s, the *New York Times* proclaimed the death of interactive television. And as late as June 2004, A. Rise [4] wrote a commentary in *adage* entitled: "Why Interactive Television has no Future". However, the rapports of the death of interactive television have been – to paraphrase Mark Twain – greatly exaggerated. The notion of adding interactive elements to the television media continues to stir.

This paper is an attempt at tracing the history of interactive television. The lead that is to be followed is the various experimental attempts with and the commercial launches of interactive television that have been conducted, as well as the results that have been achieved. This will be done by identifying the various historical phases with different characteristic technological waves, business models, services and contents concepts, primarily with point of departure in Europe and the United States.

Within the framework of this paper, 'interactive television' will be understood in the broad sense as the merger between conventional television and new interactive information and communication technologies. More specifically, interactive television is a form of television that also bases itself on actual physical interaction with the media in the form of choices, decisions, and communicative input. In this manner it becomes possible for the viewer to gain control over what is seen, when it is seen, and how it is seen, or there is opened up for the actual possibility for active participation in programmes or upload of content generated by the user [5, 6, 7, 8, 9].

## 2 Phase 1: Video Telephony in the 1950s and 60s

The actual beginning for the modern era of interactive television is often linked with the telephone companies' special version of interactive television: video telephony [2]. In the United States, Bell Telephone Laboratories began to experiment with sending and receiving pictures via the telephone lines as early as the 1920s; in 1956, the first prototype of a 'PicturePhone' was completed; and at the 1964 World's Fair in New York, the first model, named 'Mod 1', was introduced to the audience. Visitors at Bell Labs booth were here invited to call a similar booth in Disneyland. With this technology, which was already at that time described as 'crossing a telephone with a TV set' in advertisements, one could not only hear but also see the person with which one was telephoning. During the following years, 'The PicturePhone' was tested in cooperation with AT&T in different market tests and limited services. And by the end of the 60s, it was launched as an actual product, primarily aimed at the business world. At the launch of the commercial PicturePhone service in Pittsburgh in 1970, leading personnel at AT&T predicted that the PicturePhone's spread would exceed one million by 1980.

However, the PicturePhone never really caught on. There were several reasons for this. A. Moyers writes: "Survey results showed that most people did not like the PicturePhone. The keyboard was clumsy, and the picture was small. Moreover, most people felt uncomfortable at the idea of being seen during a telephone conversation" [10]. In addition, the picture quality was poor, the price or the service was too expensive, and the user could only communicate with the network of persons who already had a PicturePhone, which for obvious reasons had to be a limited amount. Actually, the need and demand for being able to see other persons turned out to be limited in most situations where the device was tested [2]. In 1973, AT&T took the Picture Phone off the market after having invested an estimated 130 to 500 million US dollars in the projected [11].

The picture telephone is thus another example of a technology which has experienced several 'false starts'. In principle, it has been technologically possible to produce and sell picture telephones in the last four decades. But it has never been possible to make the technology catch on. We have to go to this side of the millennium before video telephony is – albeit once again slowly – spread in connection with 3G mobile telephony.

## 3 Phase 2: Analogue ITV in the Late 70s and Early 80s

The first round of testing of actual television based interactive television took place in the latter half of the 70s; a period that was relatively rich in tests involving interactive television. These tests were not based on digital technologies but were all analogue. Nevertheless, they, to varying degrees, did have interactive elements.

In 1977 Warner-Amex, now called Time Warner, launched the QUBE system in Columbus; the first commercial interactive service on a larger scale. In connection with the history of interactive television, this system has reached a special status since it often is sited as an example of early launch of interactive television which failed.

QUBE was a cable television system based on 30 analogue television channels distributed among ten broadcast channels, ten pay-per-view channels, and ten channels with original, interactive services. In addition to these downstream channels, the system was equipped with a narrow-band upstream return channel, which was used by the interactive services. The QUBE clients were equipped with a decoder or set-top box with five knobs. Via this they could participate in game shows, choose sports events, order pay-tv, participate in opinion polls and voting, etc. The viewers pushed the knobs on the box, the selections were processed by a computer, and later the result was announced on the screen. From the beginning, the press coverage of the system was enormous, and many households subscribed to the service.

However, the actual use of the interactive elements was generally low with the exception of, for instance, certain gaming formats which attracted some viewers and produced an intense interactive participation. In addition to that, certain major events generated some viewer participation, as for instance when subscribers were asked to voice their opinions on a speech just given by President Carter.

In the long run, the system turned out to be expensive in terms of maintenance: the technology was expensive for the consumers as well as for the cable operator; and it was expensive to produce the interactive programmes and to maintain the return channel. "It caused problems for the interactive service as regards operational security", writes Carey and continues: "The budget for QUBE-programmes was very low compared to budgets for broadcast networks. 'Interactivity' with low production costs could not compete with the network programmes. In addition to this, those who produced the programmes had to begin from scratch: there were very few previous experiences with designing programmes" [2].

Thus, the attempt to turn the service into a commercially viable business never succeeded. And in 1984 the system was quietly closed down. One of the most direct consequences of the QUBE experiment was that the testing of the interactive formats led to the development of new program components, which later became the basis for the creation of renowned media phenomena such as MTV, Nickelodeon, QVC and The Movie Channel.

## 4 Phase 3: The Interactive Revolution in the 1980s

Generally, the 1980s were characterised by the breakthrough for and the spread of a broad spectrum of new interactive media and technologies that invaded the domestic setting, the workplaces and places of education and which offered a greater degree of control over the use of media: video cassette recorders, gaming consoles, videogames, personal computers, cash dispensers, microwave ovens, information stalls in public places and so on. This breakthrough had a scope and a depth that it actually makes sense to talk about a sort of 'interactive turn' in the media culture. A turn in the direction of interactive technologies and services which generally trained the consumers to interact with technological consumer products, delivered new forms of interaction with machines and contents, and generally opened up for the user to have more control over the media experience.

Within the area of interactive television, the era was generally characterised by a scaling-down of the very ambitious interactive television services to more simple

technological solutions in the direction of interactive texts on television and opinion polls during television programmes via special telephone services.

Within the area of cable, Cox Cable launched the videotext service Indax in Omaha in the early 80s. A service which ran over a two-way cable and offered home banking, shopping, information services, and educational contents, solely based on text and simple graphics. And correspondingly, Time Inc. launched the service Time Teletext in Orlando and San Diego. A one-way teletext service which, however, did use an entire cable channel and hence could transmit data in an extent and at a speed that made it possible to simulate interactivity in connection with, for instance, games and quizzes. Both Indax and Time Teletext were withdrawn upon the end of the test period. Even though users stated that they found Time Teletext attractive as a service, the expenses in connection with the technology were too high for it to be established as a viable business model [2].

The telephone companies also experimented with videotext-services. Knight Ridders offered the service Viewtron, and Times Mirror launched the service Gateway. Both were based on a box which could connect the telephone line to the television set, enabling the contents to be seen on the television screen. Also in this case, however, the price for the box as well as the subscription was too high to create an adequate customer base, and both services had to be withdrawn. However, surveys did indicate that the consumers were positive minded towards certain types of services and features, among these especially games, several different forms of communication, frequent updates of information, and contents control [2].

In addition to this, telephone companies such as AT&T, also developed services in this period which made it possible for viewers to call a special number and vote or participate in opinion polls during a broadcast. The results from the poll or survey could then subsequently be displayed on the television screen. This technology – where the regular telephone line was used as the return channel for interactivity in connection with television programmes – was used by many broadcasting companies from the late 80s and onwards.

## 5 Phase 4: Comprehensive Experiments with ITV in the Early 90s

Beginning in the late 80s, but especially pronounced in the 90s, the telephone companies and cable operators began a complex competition and cooperation strategy in an attempt to define the future of ITV. In the period up until 1994, most of these initiatives, however, were based on a limited form of ITV or offered a limited amount of services.

One of the early, relatively broadly focused experiments with programmes and use of ITV was carried out by AT&T in Chicago in the beginning of the 90s. The test was based on a group of 140 employees and spanned a period of two years. Even if the test population was not representative, since it was chosen from employees at AT&T, the conclusions that were derived from the experiment were in many ways interesting and informative; partly because the studies that were carried out in relation to the test were relatively comprehensive and based on scientific methods, and partly because they in many ways accumulate the results from many similar tests.

Among other things, the studies showed that the test persons' reactions were relatively positive and that the main interest was focussed on educational programmes for children, sports programmes, and games, in which the households could compete amongst each other [1]. It was also concluded that in order for a programme to become popular it had to feature "four qualities: entertainment, transaction, information, and communication. In other words, people want to have fun, have something, learn something, and tell somebody about it" [11]. On the other side, it was of less importance "what the service was about (game, storytelling, information and so on) than how it was offered and what it allows people to do" [11]. Here, as in many other places, it was concluded that "the service must be simple to use for the consumer. They want television, not computers, and they do not want to use anything that implies even a hint about complex pc-operations" [11]. Finally, the lesson learned was that: "attractive services are heavily dependant on varied contents". [11]

However, the far majority of the ITV technologies that was introduced and tested up until 1994 were comparatively limited in relation to the services and experiments which were announced and launched in the mid-90s. This period in the mid-90s can in many ways be regarded as if not the golden age of interactive television then, at any rate, the gold rush of interactive television.

The without a doubt most renowned of these test sites for interactive television in the mid-90s was Time Warner's so-called Full Service Network (FSN) in Orlando. The name Full Service Network was meant to indicate that the system covered the full spectrum of interactive services, including: program guides; video-on-demand; music-on-demand; news; shopping; classified ads; games; t-learning; t-banking; health services; ticketing; transactions with public institutions; municipal authorities and library; terrestrial and wireless telephone services; high speed, two-way communication facilities for exchange of high resolution video and graphics within the business sector, hospitals, schools and so on.

FSN was begun in 1993 and was planned to commence in 1994. However, due to a series of technical difficulties in connection with the digital video servers, software, set-top boxes etc., the launch was postponed to 1995. More than 4.000 homes had access to the service via fibre network [12]. However, FSN did not fulfil the expectations, neither for the users nor for the suppliers. And after a test period of only two years, FSN was closed down in 1997 after – what the press described as – "a cash drain and a technological nightmare" for Time Warner [13]. Swedlow [12] mentions figures of up to 100 million dollars.

Swedlow is, however, relatively positive in his assessment of the experiment as he quotes Levy, an executive staff member on the project: ""It was far too expensive, but we knew that when we began", he [Levy] says. Contrary to the public opinion of the project, "we knew that FSN would only be taken into use much later. It was not a waste of energy: we learned a lot". Levy also points out that a few things gathered from the experience were invaluable: These were: 1) the service itself must be available to the consumers free of charge; 2) different gradual price models do not work; 3) VOD is a very popular use of the technology; 4) people want really simple interactive possibilities" [12].

Just like FSN, many of the mid-90s experiments were either cancelled or reduced in relation to the original plans. Thus, by the last half of the 90s, much had changed.

To build advanced ITV systems had turned out to be very difficult, just as it had turned out to be difficult to develop the services and the contents that made sense for the consumer in everyday life.

## 6 Phase 5: Convergence of Television and Internet in the Late-90s

Seen from a mid- and late-90s perspective, there seems to be three (information) highways that interactive television could travel down. The first was – what could be called – the B-ISDN/Full Service Network, as mentioned above. The second was digital broadcasting. Finally, the third was of course the internet.

ITV and the story of the internet are in many ways diametrically opposed. As the internet came into existence from the end of the 60s to the mid-90s, it more or less happened by cheer chance. From the beginning, no one had planned the internet as it appears now, no media concerns operated with massive investments and development projects in order to further it, and no one believed in it as a medium and commercial possibility. Especially after the launch of the World Wide Web and the introduction of the graphic browser in 1993, the internet grew at an incredible rate. By the latter half of the 90s, the internet and WWW reached growth rates that surpass all earlier known media technologies.

If ITV can be seen as the greatest technological failure of the last fifty years, then the internet is the foremost success of the 90s – maybe even of the entire twentieth century. And in many ways, these developments are more or less connected, since the inert development of ITV and repeated setbacks during the 90s to some extent can be seen as an expression of the fact that the technology, as regards contents development and contents supply was overtaken by the internet media.

An obvious strategy for ITV was therefore to follow in the footsteps of the internet and profit from some of the headway produced by the internet's incredible drive. During this phase, a prominent concept for interactive television was therefore the convergence of broadcast and internet. M. Krantz's article from 1997 constitutes a significant sign of the times. Under the heading: "Marriage of convenience", he wrote: "interactive television, once a mighty idea, which has resulted in a long line of failures, is back … a mixture of computers, television, and World Wide Web is the recipe for an actual success" [14].

Internet on television or television based internet access should make it possible for the users to carry out many activities via the television set, which are normally carried out on a personal computer connected to the internet, including reading and writing e-mails, participating in chat and discussions groups, searching the internet by key-words or category etc.

In the late 90s, to grant access to popular web pages via the television set was seen by several television service providers as a service that would be very attractive for the consumers. The idea was as follows: If we combine the universal market spread of television and the anarchistic multimedia contents of the web, we have the ultimate killer application. Or, put differently: It is the internet itself that is the killer application. And all that is required is to bring the Web to the 'non-connected' majority of the public who are situated where they already sit and wait – on the couch.

## 7 Phase 6: Enhanced TV, Personalised Television, and SMS-TV at the Turn of the Millennium and Beyond

A part of the outlined tendencies within ITV during the earlier phases lives on in the new millennium. Particularly, this is the case in connection with DVB. Other tendencies within ITV seem to lose their momentum and succumb to inertia. This is the case, among other things, in connection with the combination of internet and television or internet access via the television set.

Moreover, at the turn of the millennium, several new tendencies surfaced, which seems to revive the interest in ITV. Primarily, it is centred on the following three trends: Enhanced TV, personalised television, and SMS-TV. In connection with all three, the case is one of relatively low-tech solutions and downscaled models for interactivity in connection with television, which focuses on a specific and delimited aspect as opposed to opting for the advanced or full interactivity and the entire spectrum of services.

Enhanced TV refers to any type of contents – mostly, however, text and graphics – which is superimposed, that is, placed on top of the actual video contents, and which may be accessed interactively by the user. Mostly, the extra enriched content is sent continuously via the spare capacity in the actual broadcast signal, where the interactivity consists of the viewer selecting between the information that the operator has embedded in the signal. Seen in this perspective, Enhanced TV can be perceived as an improved teletext service, a sort of super teletext or, alternatively, as a technology that can add web contents to television broadcast. Typically, the user browses the desired information – mostly displayed on the screen together with the actual video stream of the programme. Generally, enhanced TV is thus characterised by taking its point of departure in existing television formats and hence also the traditional qualities of broadcast television in an attempt to further develop and improve these qualities [15].

Another new group of interactive applications, devices or media that have surfaced is personalised television. Personalised TV – in some cases also called individualised TV or customised TV – takes on several different forms. In its most widespread version, personalised television is linked with a piece of hardware in the shape of a Personal Video Recorder (PVR) or systems with equivalent PVR functions. In principle, PVR functionality means that the user achieves the same control over the broadcast stream which earlier was tied to the video recorder. That is, the possibility to pause, rewind, fast-forward, slow motion, frame advance and so on. In this manner, the user can perform time shifts in relation to the broadcast stream. PVR functionality also includes programming facilities for automatic recording of programmes according to title, time slot, actor, theme, keyword, rating, and so on, where the PVR may even adapt itself to possible changes in the broadcasting stations' programming. Hence, a Personal Video Recorder generally makes it possible for the viewer to see what they want, when they want it.

The third new, dominant form of interactive television is cross media interaction. Since most localities still do no have advanced interactive two-way systems, and since most users still do not own advanced, digital set-top boxes let alone Personal Video Recorders, by the end of the 90s and especially at the other side of the millennium, it has become increasingly normal to establish different forms of 'two-channel' interaction in order to produce interactive television programmes or interactive moments in

television programmes. This means that another media steps in as a 'return channel' from the television viewer to the programme broadcaster, for instance, the telephone, e-mail, web chat, fax, SMS, and MMS. Compared to fully integrated ITV systems, the obvious advantage of this form of cross media interaction is self-evidently that the so-called 'terminal barrier' has already been pulled down. Hence, cross media interaction does not presuppose any major investments in hardware and software neither as regard the provider of the service, the distributor or the viewer. Among the different cross media formats, it was in particular the SMS services via the mobile telephone as a return channel to live television programmes that reached a great degree of proliferation and popularity during the period. This form of television has already been termed: SMS TV. In a research report that characteristically bore the title: *SMS TV: Interactive Television Reinvented* [17] van Dusseldorp indicates that one of the most unexpected development within the area of ITV at this time was exactly that the television broadcasters threw themselves on SMS text messages as a new return channel by which to enrich their programmes with interactive features. The most popular SMS-TV formats have been polls, games, and chat in the form of SMS messages sent in by viewers.

A common feature for these tendencies in recent years is that we are dealing with relatively written down and low-tech experiments that are based on existing media and technologies. They are – as Tan Ee Sze has formulated it in another context – "not quite the holy grail of two-way interactive television" [18]. Rather, they express what, in some contexts, has been called an 'evolutionary' approach to interactive television, as opposed to the 'revolutionary' approach, which perhaps primarily characterised the mid-90s. A less ambitious strategy that develops simple services based on existing, tested and thus relatively cheap technologies.

## 8 A Happy Ending to the Story?

As is appears from the above, interactive television has a long and rich history behind it with numerous changing phases characterised by different dominant strategies, technological forms, and types of content and services. The majority of these versions of interactive television, however, failed or only had a limited amount of success, and the far majority were taken off the market again fairly quickly. Thus, interactive television has been arriving for the past 50 years.

Overall, the history of interactive television as a novel technology, as a novel media or a novel service is, hence, the history of a failure. A history of a long list of 'false starts' of a media technology that yet could not manage to succeed in the market because: it was not technologically mature; it was not supported by viable business models; the context of other concurrent, competing technologies and supply were unfavourable; content and services did not have enough added value in relation to competing content and services to drive the demand forward, etc. Hence, after five decades with experiments with interactive television and commercial roll-outs, there still is no sure model for establishing interactivity in connection with television viewing, let alone any sure knowledge on what the user demand is.

In spite of this all but glorious past history, there is still much that now indicates that interactive television as well as digital television will enter into a growth phase in

the years to come. According to projections from, among others, Forrester Research, the proliferation of digital television in Europe will increase by 50 percent in 2009.

So, to the question of whether interactive television has the status of either a 'holy grail' or 'vapourware', the straight answer probably has to be: neither one nor the other. On the one hand, there is nothing that indicates that suddenly it will be managed to find the irresistible, magical killer application that can power a swift mass proliferation of the technology. Interactive television is, on the other hand, already more than just an ephemeral figment of the imagination – it is already out there in multiple variants and early formats such as SMS-TV, programmes with web communities, and actual digital and interactive television platforms and services.

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