DECONSTRUCTING INTERACTIVE TV NETWORKS

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Abstract

Interactive TV is a medium providing the users with hundreds of video channels, on-demand delivery of programs, information services, on-line shopping, tele-banking, etc. It is a seed-version of a comprehensive home communication medium. It is also a concrete, actual case of media convergence using developing information communication technology. It could also be a reference point to discuss the issue of telecommunications convergence. Interactive TV shows us how the telecommunications industry tries to expropriate information communication technologies according to their corporate visions. A large body of research measures interactive TV "a failure-success frame," particularly in economic and technological terms. However, the failure-success of interactive TV is only half the story. Interactive TV is certainly a failed technology in terms of technology and business. But the question is more than just "wrong technology, wrong business plans, or wrong timing." The problematic of interactive TV should go deeper than that. It should be reframed in the historical notion of cultural and political clashes between "the lateral mode" and "the vertical mode" in organising information communication technology in America. In short, the vertical mode of organising relates to a corporate-commercial move, whereas the lateral mode organising relates to an alternative-public move. The history of communication networks, whether broadcasting, telephone, cable, or even the Internet, in the US attests that it is a site of struggle between these two polarising ideals.

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Introduction

This paper is a study of a failed technology called "interactive TV" in America. Two interactive TV systems are the subject of this study — Time Warner's Full Service Network and Bell Atlantic's Video-Dial-Tone network. As a strong model of the information superhighway, interactive TV was greeted with great enthusiasm (Solomon 1993; Zoglin 1993). It was expected to open up a new horizon in TV, where the viewer has the power to transform the one-way structure of the existing mass media into a two-way communication environment. But, as history reveals, it died out imperceptibly, Mason 1997, 1998) and was thrown into the pile of failed technologies.

So far, interactive TV has mainly been measured in a "success-failure" frame, particularly in technological and economic terms. From that perspective, it was indeed the wrong technology and the wrong business strategy at the wrong time. But that is an oversimplistic framework and only half the story. Any analysis of interactive TV should be rather framed in the historical context of cultural and political clashes between "the lateral mode" and "the vertical mode" of organising an information and communication network in America. Interactive TV was a product of an on-going clash between the two different organising principles, not a one-time event.

In telecommunications terms, the 1990s opened with great public fanfare of information superhighway and the announcement of the National Information Infrastructure (NII) by the Clinton-Gore administration (Powell 1993; Elmer-Dewitt 1993). Telephone and cable television industries, in particular, envisioned interactive television as more concrete and viable architecture for the NII than the seemingly anarchic development of the Internet (NRC 1994). However, "interactive television" has more than 25 years of history. Since the early 1970s, the two-way cable television systems have occasionally been introduced. WarnerAmex's Qube is a notable example (Dutton et al. 1987). By the 90s, "interactive TV" was a sort of a business mantra for the telcos and cable industries. One report describes how interactive television was once again "the media mania of the moment" (Economist 1996, 88). But the new mantra did not succeed. Interactive TV trials flopped. At the same time, the vision of interactive TV faded away under the shadow of the Internet. Nonetheless, it has recently resurfaced in the form of the "one-superpipe all-communications" ideal for a broadband information utility for the electronic home of the future (Miller 1998; Lelen 1998).

By definition, interactive television is a medium providing "greater selection of programming on hundreds of channels, ... more control over and customisation of television content, ... on-demand delivery of specific programs or movie, ... real-time interaction between people in different households via game playing and communication" (Carey 1998, 1). In addition, information services, such as on-line shopping, tele-banking and telephony, were actually available on the interactive TV trials. In short, interactive TV was a prototype of the comprehensive home communication medium envisioned by many telecommunications companies. Indeed, this electronic vision — one-superpipe all-communications — projected in "interactive TV" is still alive in the rhetoric of the coming information age, in various telecom industry mergers and corporate alliances and in the ideal of telecommunications convergence.

This paper discusses those aspects of interactive TV : "that bias [interactive TV's] development and become part of a complex system of institutionalised power relations" (Mansell 1993, 35). It will also look at the nature and structure of interactive TV

networks and show how corporate visions distorted their own electronic ideals, let alone the communicative ideals envisioned in the interactive, two-way TV system.

A Brief History of Two Interactive TV Trials

From the early 90s, a number of telephone and cable television companies launched technical and market trials of interactive TV (Andrews 1992; Elmer-Dewitt 1994). From the telecommunications industry's standpoint, these trials were a logical extension of technological development, regulatory change and competition between telecommunications companies.

Time Warner's (TW) basic motive for the Full Service Network (FSN) project was to expand its business capacity by appropriating the new information technologies made possible by the fiber optic network and digital computer technology. TW claimed that the FSN was designed: "to provide customers with new ways of accessing information, entertainment, communication, health and education services, and to move Time Warner into profitable new business areas, providing new outlets for its creative products" (TWC/FSN Media Q&A, 2).

Bell Atlantic's (BA) video-dial-tone (VDT) project was very similar to TW's FSN: "video is a natural extension of out network business. Fundamentally, there's no difference between transmitting digital video than any other kind of digitised content" (Bell Atlantic 1995, 7). It continues that "video is a huge market, … the cost of network components … is dropping dramatically, … customers will want interactive television when the navigation and distribution systems are more fully developed" (p. 8). At one point in the early 1990s, apart from the BA's project, there were 28 VDT applications filed with Federal Communications Commission (FCC) by the telephone companies (Stern 1994). Put simply, "VDT" is a regulatory term meaning the telephone network that "grants equal access to all information providers… and enables consumers to "dial up" video or multimedia applications offered by third parties" including the telephone company operating that network (Dixit 1995, 64).

Among these trials, TW's FSN and BA's VDT were prominent because of their service range, technical aggressiveness and the size of their investment.

BA's VDT

Bell Atlantic's interactive TV trials began in 1992, with the announcement of its plan to provide "video-on-demand" services in its telephone service area. In the plan, the deployment of the service had three phases: (a) the laboratory stage; (b) technical trials with BA's 400 employees in 1993; and (c) commercial introduction in 1994. For BA, it was "a telecom business of the future" and the *New York Times* dubbed it as "an electronic video rental store" (Andrews 1992, D1). Nonetheless, BA's projection of its interactive venture was delayed for quite a while, due to technical and regulatory hurdles. The practical evolution of interactive TV proceeded at a snail's pace. The video service trials were only possible in 1993, after the court cleared the regulatory hurdle of 1984 Cable Act, which prohibited the telcos from offering cable TV in their service regions.

BA began its technical trial of interactive TV in Northern Virginia, using Asymmetric Digital Subscriber Line (ADSL) technology. It advanced to a commercial venture stage in 1995 at Fairfax County in Virginia, reaching one thousand households. By 1997, BA had retrofitted its existing telephone network in the Philadelphia area into a

switched broadband network, and tried the interactive TV service by building a Fiber-to-the-curb (FTTC) network system. In the same business vein, it began to provide Multi-point-Multi-Distribution Service (MMDS) in Hampton Roads, Virginia in the same year.

In another project, BA deployed an FTTC system in Dover Township, New Jersey from 1994. In the original plan, the Dover Township system was supposed to carry 384 digital channels and various interactive functions. BA teamed up with FutureVision, a programmer and a marketer of the Dover Township system. The system started with one hundred volunteer households and it extended to four hundred in 1996. Although the system was accessible to 21,000 homes in 1997, cutbacks and scale-down procedures meant that was reduced to a regular old cable TV network (Fazzi 1997).

During these developments, BA also founded Bell Atlantic Video Service (BVS) in early 1992 for interactive TV, and then formed a joint venture company called "Tele-TV" with NYNEX and Pacific Telesis in 1994. This would operate as a media subsidiary for marketing and programming. They also set up "Tele-TV Systems" which was responsible for technical maintenance and operation of the interactive TV network system. Like BA, NYNEX and Pacific Telesis began MMDS, Tele-TV services in their own service areas (Gunther 1996).

Although the infrastructure was built, marketing did not go successfully, and the programming issue was not resolved easily. VDT is, in a sense, a large warehouse system to which subscribers get access for their own purpose. The stock of the warehouse is therefore a critical issue for the system operators. At one point, BA tried to buy a public TV station in Pittsburgh to supply it with programs, because simply being a carrier was not enough to justify huge investment for the network upgrade (Tascarella 1995). Since content is a value-added product, BA tried to build a vertically integrated structure, with a distribution and a content production facility at the same time. Despite problems in technologies, programming and subscription growth, BA CEO, R. Smith, predicted that "in the next five years, viewers will cherry-pick programs and shows when they want to, not when networks schedule them" (Goldman 1995, B6).

In implementing each stage of the service, BA provided the subscribers mainly with "video-on-demand" services, in the form of premium channels, pay-per-view programs, some local information services and TV shopping services. At least on paper, BA planned a far greater variety of information and entertainment packages for the subscribers. However, these did not fully materialise over the network. In that sense, BA's interactive TV venture was no more or less than a traditional cable TV business administered by a telephone company. "The brave new world of interactive TV" metamorphosed into just a usual cable business — "a cable system carried over telephone lines" (Landler 1995, D10). BA's interactive TV ventures imperceptibly disappeared around 1997, without any official comment, and the Bell Atlantic's 1996 and 1997 Annual Reports barely mentioned its existence. It is indeed ironic to reflect how the telecommunications industry and the popular media presented interactive TV or interactivity over the cable or telephone network with much fanfare and hype.

TW's FSN

In 1987, a group of engineers in TW Cable tried an experimental design of two-way cable TV system (Farhi and Corcoran 1994). That was a beginning of TW's troublesome journey into its interactive TV system — the so-called Full Service Network (FSN). The actual implementation plan, however, was delayed until 1992, beginning almost at the

same time with BA's video-dial-tone system. TW began to build physical plant in 1994, in the suburban Orlando, Florida. It took more than a year and a half for the FSN to reach its projected 4,000 subscribers, around the middle of 1996. The need to build hardware technologies and to design a set of system operating software for interactive TV network proved daunting tasks, that effectively caused numerous delays and glitches to the FSN.

The FSN should have begun in April 1994, but it was delayed until later that same year (Markoff 1994). Even in June 1995, the FSN had only 62 home subscribers (Albright 1995). The announced services, such as news-on-demand and on-line banking, supposedly available on the FSN, did not fully materialise until almost at the end of 1995 (Stutzman 1995). Although TW built an infrastructure — Hybrid Fiber Coaxial (HFC) architecture — the technical sophistication and the range of FSN services required an enormous investment of resources like time, capital and an advanced level of network engineering.

The FSN was going to provide those households with a variety of networked entertainment, informational and transaction services, including traditional cable TV channels. The subscribers used the system simply by operating an on-screen menu with a TV remote control. Movies on demand, news on demand, interactive games, on-line banking, local tour guides, local shopping and so on were the main service components on the list, although they were not readily available in the FSN. The content and services on the FSN came from two sources: one was from TW's own stock of movies and various TV programs stored in its main media server, the other was from contracted information / service providers such as local newspapers, local banks, local shopping centres, etc. Since the FSN system was linked to various local business entities, the subscribers could even order a pizza through the system. TW would have like to provide Internet access over the FSN. That was not available, however, due to a number of factors, such as network interconnection and switching system.

In terms of technology and service features, the FSN was a far more advanced system than BA's residential video service. Time Magazine described it as "the world's most sophisticated — and expensive — interactive TV system … [It is] the holy grail of interactive television" (Elmer-Dewitt 1994, 125). TW's CEO, G. Levin, said proudly that FSN was "a medium providing people with unprecedented access to information and entertainment" (*Time* 1997, 67). At the same time, the FSN was the combined product of numerous telecommunications and computer companies, such as AT&T, Silicon Graphics, Scientific Atlanta and Hewlett Packard, who had worked on the design and construction of the network hardware and operating software.

TW announced the FSN phase-out early in 1997 by simply mentioning that the FSN played a key role in "providing the technical and marketing data" of interactive TV business (TWC/FSN 1997). But the FSN was not a technological research and development project at all, nor was it intended to be a marketing research project. After all, the FSN, like BA's VDT system, died out in 1997. As one local paper wrote, FSN might have been "a victim of its own hype" (Stuntzman 1995, 1). When it began as a joint venture of TW and US West, a Baby Bell, the FSN was assumed to be "the first to "integrate" cable, computer and telephone technologies across a fiber-optic and coaxial cable network" (Snoddy 1997, 15). In its press release, AT&T claimed that the FSN would allow "the convergence of television, computer and telecommunications" (AT&T Press release 1993, Apr. 14). However, even Time Magazine, one of TW's subsidiaries, ended up deriding the FSN as "the most expensive pizza delivery system ever invented" (*Time* 1997, 67).

Success or Failure of Interactive TV?

As pointed out earlier, conventional understanding measures interactive TV mainly within a "failure-success" frame, in technical and economic terms. Most existing research has concentrated on the technical functionality of the interactive TV network, on the economics of the system, and on the services and applications available, or potentially available, on interactive TV.

Studies focusing upon the technical functionality of interactive TV come largely from the telecommunications engineering community. For instance, a large number of technical papers on the interactive TV system were collected in Multimedia Communications (Philips and Desrochers 1993), in the proceedings of the 1993 IEEE International Conference in Communications, and in the 1994 ACM Multimedia Proceedings. These collections of papers in general discuss and suggest "how-to" schemes in terms of network design, management and performance.

In addition, numerous trade journals have published a huge stack of technical reports, ranging from simple descriptions of on-going interactive TV trials (Sutherland and Litteral 1992; Blank 1995) to a study of the overall trends of telecommunications technology development (Teger 1995). These articles compare different network architectures, like hybrid fiber coaxial (HFC) and fiber to the curb (FTTC) (Johnson and Reed 1992; Large 1995; Furht et al. 1995; Davis 1996). They consider interactive TV network design issue (Dixit 1995; Libman et al. 1995; Szurkowski and Warner 1995). There are analyses of customer premises equipment, such as set-top box (Little and Venkatesh 1994; Furht et al. 1995) and video servers in the central office (Natarajan 1995; Libman et al. 1995). They also report on a variety of services, like video-on-demand, pay-per-view, interactive games, shopping, distance education, etc. available on the network (Little and Venkatesh 1994; Furht et al. 1995; Szurkowski and Warner 1995).

According to these very technocentric studies, technologies for interactive TV already exist. The point is: how to optimise them for a successful video delivery system at a reasonable cost? These studies clearly come out of technical logic and exclude political, social and cultural contexts. For them, interactive TV exists in its own autonomous technical domain and it is a natural result of the development of telecommunications technology.

When it comes to economics and the issue of consumer demand, the story of interactive TV takes another narrow turn. Many studies point out that the key for broadband video technology like interactive TV is the cost of technology deployment and the provision of new, innovative services to create consumer demand (Chapman 1995; Jameson 1996; Rath et al. 1997; Mundorf et al. 1997). Although the technologies may be available, it is easier said than done to combine and build a workable end-to-end interactive TV system. So, without a significant market potential at the moment and the high cost of technologies, a switched broadband system is unlikely to succeed in the foreseeable future.

Following this reasoning, for example, FSN's failure is a logical outcome of the high cost of technology, lack of demand and unreliable technologies (Mason 1997; 1998). As for BA's residential video services, it should have gone beyond cable TV and video on demand. The Internet needed to be combined into the network for the future success (Rath et al. 1997). One piece of research even claims that the telecom-

munication industries seriously lack an understanding about how consumers will behave in the new telecommunications environment, and what services are more attractive to them. Nonetheless, its conclusion is the old cliché that more entertainment-oriented video and information services are the key to success (Batt and Katz 1998).

To sum up the discussion, interactive TV had serious problems from the very beginning, such as low demand and lukewarm reaction from the consumers; thin market and low revenue base; large capital investment in equipment and network; unreliable technologies; a shortage of program and service diversity and so on. Indeed, interactive TV was doomed to failure.

Although these issues are crucial and can be pursued further, the failure or success of interactive TV is only half of the story. Indeed, in many cases, studies on technical feasibility, economic viability, business strategies and so on regarding interactive TV are very narrowly contextualised, as if "success or failure" is the only issue. It is too much of a generality to argue that technical glitches, lack of experience and high capital costs contributed to the demise of interactive TV. According to this framework, the interactive TV system will succeed when technical advances ensure systemic reliability and the cost of software and hardware components drops, provided that market-proven applications/services are combined over the interactive TV network. This framework treats interactive TV as a gadget, without providing any context.

Without investigating the underlying ramifications of interactive television, these studies misrepresent the story of interactive TV. It is true that interactive TV trials were "either too small, service choices too limited or trial networks too expensive to represent a reliable proxy for true market sentiments" (Chapman 1995, 80). The point, however, is not the size of the interactive TV systems, rather it is what interactive television signifies in the longer-term trend of communication network development. Although interactive television is certainly a failed technology, that is not the end of the story.

Analytical Framework — Network Organising Modes and Corporate Strategies

It is more appropriate to look at interactive television from a structural perspective, seeing it as a systemic network. This means deconstructing the nature and the bias of the particular structure of the interactive TV network. In so doing we can draw a holistic picture of interactive TV, and identify the organising principle or world-view embodied in the interactive TV network.

A communication network is a systematic organisation of links and nodes. The design of the network, however, is not ruled by technology per se: "A world-view motivates the design, and technology enables its expression or bounds it" (McGarty 1992, 222). In turn, the world-view or the organising principle of a telecommunications network does not come out of nowhere, it is shaped by the history of telecommunications networks.

Historically speaking, whether for telegraphy, radio-television broadcasting, the telephone, cable television, or the Internet, communication networks in America have been the site of struggle between the two polarising modes of network organisation: the vertical mode and the lateral mode. The vertical mode means a network organised to maintain exclusive centralised control in a hierarchical structure: the broadcasting

network is a typical example, in which the network providers strictly dictate the terms of access and uses in order to retain integrity, reliability and control. Services and applications also are predetermined, and users — the viewers and listeners — are thought of as "consuming mass" being entertained by pre-defined services. In this sense, the network becomes a closed and proprietary system, in which a secure business model is constructed by controlling access, uses and service applications.

The lateral mode network is the opposite of the vertical mode. It is organised as a horizontal structure with decentralised control. The Internet is typical of this kind network organisation. Contrary to the centralised economic, geographic, and technical biases of the vertical mode, public access, information sharing and exchange, with equal, interactive relationships between the sender and receiver become important agenda items in a lateral network. In addition, users of communication technology are perceived as active political participants, not as mass consumers, in the public sphere of the network. The vertical mode is analogous to a commercial mode of information communication technology, while the lateral mode to a civic mode (Calabrese and Borchert, 1996).

Interactive TV should be viewed from this perspective, as it was certainly a product of the vertical mode organisation and control. Since the 70s, the rapid, seemingly anarchic, development of information communication technology has posed a serious challenge to the telecommunications industry. Social demands for information communication technology significantly increased and the economic system was transformed into a service economy largely based upon these technologies. The telecommunications market became more competitive and a deregulatory regime slowly began to secure its place. Under the circumstances, it was extremely difficult for the industry to harness and build a successful business model.

The telecommunications companies were unsure about how to build a new business model. They needed to find a way to incorporate new technical elements and at the same time retain network control and integrity. They had to adjust to uncertainties over regulatory, technical and demand issues. Technological development in the area of network intelligence, transmission media, digital switching, information processing, etc. certainly created a positive opportunity for them. However, at times those technologies "developed at great speed, often beyond the capacities of industry or regulators to respond" (Mulgan 1991, 37). Indeed, the complex interaction of all these factors put strains on the existing institutional structure.

At this point, the industries fell back to follow a successful media business model in the past based upon commercial TV. Their new business strategy might be called "the stand-off strategy" by which the telecommuncations companies tried to build a closed/proprietary system. The stand-off strategy was a reactive one, in which the firms built their own enclosure to fend off uncertain elements, maintain unified network control and incorporate only what they considered to be profitable and viable elements. For Bell Atlantic, video delivery, in other words, a cable TV business, seemed a winning formula. For Time Warner, an information service, plus the enhanced video-on-demand service, appeared to hold out the promise of being a successful model. At that time, the Internet was yet to be popularised and indeed came at a much later stage of their interactive TV experiments.

Discussion

Technically speaking, interactive television is a system having "the flexibility of selecting and receiving specific information using a hybrid paradigm of the TV remote control and information retrieval techniques" (Little and Venkatesh 1994, 14). Computer, cable television and telephone technologies make "interactive multimedia possible and [have] the potential to transform television from something which is passive and linear into something which is interactive" (Chiddix 1993, 1). By extension, "the goals and objectives of the software architecture of the FSN [and the VDT] are to provide a media rich user environment — the FSN [and the VDT] should provide broad support for text, audio, video, and graphics" (Brown and Callahan 1995, 2).

The BA's VDT and the TW's FSN were home information networks. But, they were very narrowly defined networks compared to the Internet. Whereas the Internet is a universal platform and thus a general-use network, these interactive television systems restricted themselves to their local service area and their contract information service providers. Information on the network was also restricted to pre-arranged services and applications. In this regard, the interactive TV network was a closed one. Their information networks ended with their central media server and their pre-arranged information providers. The FSN or the VDT could not play the role of a gateway, only that of a gatekeeper, so that the system providers could collect a sort of "road tax." Their systems therefore became insulated and closed, with standardised options and pre-determined routes. It was a broadband network, but broadband for one-way downstream and therefore interactive communication was restricted, according to network bandwidth allocation.

For two-way communication — the so-called interactivity, an interactive television system depends upon "switching" — information traffic control system. In the FSN or the VDT, "a switching system" was designed with the parameters (i.e. the options) set by the programmers following "worst-case" or "average-case" assumptions. Thus "interactivity" was fundamentally limited by the option-scenario encoded within the network system. The problem with this engineering logic is that those parameters are finite. Therefore, the system providers must choose a certain scenario based upon the largest common denominators and probability permutation (Wegner 1997). Fundamentally, the system was based upon the belief that human behaviour can be stratified and batched around common elements, and thus can be controlled. If the system, as an inextricable combination of conduit and content, surrendered control, its business and systemic operation became pretty much uncertain, disorderly and unpredictable. That was quite unthinkable for a centralised control system like the FSN or the VDT.

In this algorithmic design, an essential mode of interaction was no more than a mechanical on-off action. In other words, the network interaction should be reduced to predictable, statistical scenarios and controllable parameters. However, the problem is that the networks can only define a small number of parameters of human choices and behaviour, because of "the irreducibility of interactive elements and non-computable human factors" (Wegner 1997). The whole set of all possible parameters cannot be inscribed into such a system. This was the case for the FSN and the VDT.

Because of the closed nature of their network structures, the interactive TV system like the FSN and the VDT inherently restricted the active involvement on the users'

part. The fact that participation was fundamentally restricted, and that a limited range of information retrieval and access were available, made the FSN and the VDT effectively a one-way, asymmetric broadcast model, not a communication model. Essentially, TW and BA played the role of a local broadcaster maintaining large-scale request management capability.

All told, in private-controlled deployment, economy-driven, and supply-oriented projects like FSN and VDT, these fundamental problems could not have been avoided. Interactive TV was once envisioned as a decentralised and active medium to challenge the broadcast media. "Modern mass media are often deplored for the negative effects of massive centralisation. These new [interactive] media will reverse this tendency, as they encourage personalization and small scale interaction in powerful ways" (Levin 1982, 146). Corporate visions revolved around a TV-based structure that could not resolve the inherent problems of TV-type communication, which encourages passive media consumption, mostly of entertainment, through a one-way route of broadcasting, which in turn requires a low level of user engagement.

Conclusion

To sum, the explosive development of information communication technology posed a serious challenge for the telecommunications industry. In response to this challenge, the industry first took *the stand-off strategy* building a closed, proprietary network system following the conventional TV broadcast model.

Within a few years, by the late 1990s, the things changed dramatically. The unit cost of micro-electronic devices dropped sharply, while performance doubled (Owen 1998). Deregulation and competition allowed other firms to enter the race to provide broadband services crossing business boundaries. The firms could not now afford to be left behind, because risks and stakes remained high, and the whole industry was forced into the incessant search for a new business order. Market opportunities, technological capabilities and user demands forced the telecommunications companies to turn to a different strategy, which could provide more diverse service offerings. A variety of new market participants began to vie for local telephony, cable TV delivery, long distance business and Internet access. This new strategy might be called *an integrative strategy*: to consolidate telephony, TV and the Internet into one bundle in which, metaphorically speaking, the Internet would be *televisionised* losing much of its original cultural dynamics.

Whether they deploy the stand-off strategy or the integrative strategy, the primary mandate from the industry's standpoint is to maintain hegemonic control over the network. As Mulgan (1991) argues, networks compete to out-communicate others, which may include other networks (e.g. radio vs. coaxial vs. copper vs. fiber), other providers (e.g., telephony vs. cable TV vs. satellite) and even the users (e.g., asymmetric network configuration). In that sense, a telecommunications network, as a systematically organised mechanism, is deeply permeated with the idea of control. That idea expresses itself commercially through the stand-off and the integrative strategies deployed by such firms. It is here that commercial distortion of networks, in which the communicative potential of information technologies are suppressed and the existing structure reinforced, begins. Mason predicts that "the FSN concept, considered a failure when trialed in Orlando, will make a comeback …. [T]he consumer demand was there and the reduction in the costs of the components, coupled with the

familiarity of the Internet and the interactivity it has generated, will make the key differences" (Mason 1998, 8). The FSN-concept is in fact a version of telecommunications convergence and that prediction is very plausible in the current frenzy of convergence. Nonetheless, the return of the FSN-concept remains deeply questionable in terms of its communicative value. In that sense, the mega-pipe ideal of convergence offers a rather more sophisticated business strategy in which multiple video channels and information services centred upon the television set will be streamlined as the new home information centre. Interactive TV was clearly a precedent for this type of telecommunications convergence.

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