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A b s t r a c t

Interactive TV, also referred to as iTV, combines the appeal and mass audience of traditional TV with the interactive nature of the Web. As such, it offers viewers an active entertainment experience and industry players new business opportunities to learn better about and serve their audience and prospective customers. Interactivity, in particular, implies a two-way communication between the viewer and the medium, allowing for unprecedented personalization of programming and services. In this paper we deal with the topic of advertising over digital interactive TV and describe a specific approach to the delivery of personalized interactive advertisement content to viewers based on their individual profiles. The emphasis is placed on the transformation of industry business models that the new technological developments imply. The main implication of iTV advertising is a whole new set of information and information flows among industry players that are introduced to take advantage of interactivity and personalization. We suggest that a new value chain and new market intermediaries will be needed to harness the new information flows, proposing an integrated industry business model for a future technological platform.

Personalized Interactive TV Advertising: The iMEDIA Business Model

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A u t h o r s INTRODUCTION

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As digital technology and consumer behaviour evolve, marketers can and need to continuously enhance the value of their digital marketing offering. The birth of the World Wide Web (WWW) in 1993, particularly its graphical user interface, offered marketers opportunities that were previously unimaginable (Poon and Jevons 1997). The WWW allows for advanced marketing activities and, moreover, for interactive marketing, as the user is actively involved in responding to the vendor's promotion campaign. This kind of interactivity is not commonly found in marketing activities conducted through traditional broadcast and print media, with the exception of interactive television (Poon and Jevons 1997).

One of the most important consequences of interactivity is that it opens up new opportunities for personalization. In traditional media the vendor, or advertiser, has to seek customer information elsewhere, from sources such as market research companies or direct consumer surveys in order to customize the service or advertisement. Moreover, it is difficult to ensure and to verify that the service or advertisement is correctly targeted to the intended customer groups. In interactive media, the customer identifies herself and often reveals her personal profile either by providing

such information directly or implicitly through her interactive behaviour. Thus personalization in its literal sense is only possible through interactive media where consumers are identified individually and not just in groups.

Interactive TV, also referred to as iTV, combines the appeal and mass audience of traditional TV with the interactive features such as those currently available on the Web (Developer 1999). For example, a viewer can request online to browse local news headlines while watching her favourite network show. Another viewer may search for individual player statistics while watching a football game or order the products he sees in commercials with the click of a button. Interactive TV makes all this possible by integrating content similar to that we commonly find on the Web with traditional TV programming.

Interactive television gives viewers an active viewing experience and may take back some of the consumer's time that has been taken away by the Internet. In this sense, iTV may, potentially, increase the average time a person spends on television, depending on the willingness of a viewer to become active and the level of interactivity he is engaged into. For television producers, interactivity allows the creation of layers of content that enhance and extend the traditional TV storytelling mode of operation. Advertisers can create more compelling ads and make it easier for consumers to purchase products from home. For network and local broadcasters, and for cable and satellite operators, interactivity provides a competitive advantage by making it possible to deliver relevant, personalized information to viewers on demand. At the same time, interactivity makes possible new revenue streams through interactive advertising models and special services, like data broadcasting (Microsoft 1999).

Interactivity in itself is a complex concept. It relates to numerous important sociological, behavioural and economic issues of media research. For example, the degree of viewer involvement and the level of interactivity are conditioned by the broader social context, the viewer's behavioural predisposition and the economics of the iTV service. However, such issues are outside the scope of the present paper. Instead, we focus on the specific topic of advertising over digital interactive TV and describe a specific approach to the delivery of personalized interactive advertisement content to viewers based on their individual profiles. This approach has been developed within the iMEDIA (Intelligent Mediation Environment for Digital Interactive Advertising) research project (IST-1999-11038), funded by the Information Societies Technology Programme, 5th Framework, of the Commission of the European Union.

More specifically, the second section of the paper examines the definition of advertising over digital interactive TV platforms and relates this to the interactive advertising experience over the Internet. Alternative approaches and pending problems are also considered. This section is followed by an overview of the iMEDIA architectural approach to offering personalized interactive

advertisement services to TV viewers. Section four presents the methodological approach employed for the derivation of the iMEDIA business model. Section five analyses the implications that this approach has for the TV advertising industry and explores alternative business models that can emerge. We conclude with some ideas regarding further research and development in this area.

INTERACTIVE TV ADVERTISING

Interactive television originated in the context of the possibility of technological convergence in the early 1990s. Since then it has developed in various directions, depending on the strategies of technology developers and of key players in the media industry. Still today, market dynamics constantly reshape and redefine the applications of iTV and the potential for mass-market adoption of different services. Applications have ranged from simple ideas such as better viewer feedback and greater flexibility in the choice of programming, to complex services such as fully interactive experiences akin to those implemented on the Web. Similarly, interactive TV advertisement may vary from registering interest in a product, to interacting with the ad content (as in a computer game) or making a purchase through the same medium.

Interactive TV can be delivered over terrestrial, cable and satellite transmission. Viewers can watch interactive TV either on television sets or on personal computers. Interactivity requires that the viewer has access to advanced controls and that the network has access to local information. This requirement is naturally satisfied in the case of the personal computer accessing the Internet. Special software and a compatible TV tuner card are the typical system requirements. Traditional television is a one-to-many broadcast medium with passive viewers. A set-top-box, i.e. a special device that integrates the TV broadcast signal with interactive content is needed in this case.

Interactive TV programming can range from very simple productions, that include links to additional content or related Web sites on the Internet, to highly involved interactivity that merges a TV image with menus, graphics, and supporting text all timed to appear in synchronization with a particular show. Different kinds of interactive programming invoke different levels of interactivity from the viewer. Thus, interactivity can be seen as a two-dimensional construct, determined by the nature of the content and the viewers' predisposition to interact.

During an interactive show, a clear and active evidence of the interactive nature of the programme (e.g. an icon or a button) allows the viewer to initiate the interactive experience. Interactive content can include anything that enhances the viewer's appreciation of TV, for example local news headlines, sports scores, programme line-ups, links to Web sites, public opinion polls, etc. (Microsoft 1999). In general, the philosophy and nature of the interactive programming depends on the underlying architecture and

the platform for interactive content development and distribution.

Interactive TV advertising follows the same principles, integrating commercial with interactive content. The interactive content associated with an ad could contain answers to specific questions about the products or services being advertised, could offer viewers free product samples or the possibility to arrange a product trial (e.g. test drive a car), could even support the viewer throughout the buying process by allowing for direct ordering and after-sales support. Apart from the typical commercials appearing during an advertisement break, interactive television also allows for banner ads or other clickable graphics, which can be constantly displayed, even as the video continues to play.

For interactive commercials appearing during an advertisement interval, advertisers, advertising agencies, TV channels and set-top-box technology providers, are currently struggling with the problem of what happens when viewers click an interactive link. The critical issue is that viewers may have to abandon the following ads and the main programme flow. This concern is partly addressed with special personal video recorders, which employ a hard disk for temporary storage of programming. TiVo (www.tivo.com) and ReplayTV (www.replaytv.com) have pioneered this category, but all major manufacturers (Microsoft, OpenTV) are reported to be developing similar products. To overcome or avoid this problem, alternative modes of interactivity can be implemented:

- Advertisements of the 'contact me' type. By 'clicking' on the screen the viewer requests further product information. This can be a follow-up phone-call or a visit by a company representative or a sample or other item delivered to the viewer's home. This type of advertisement implies that the interaction does not require more time than the duration of the advertisement. Thus subsequent advertisements (and programming) appear normally as scheduled and are not foregone by the viewer.
- Advertisements that give the viewer the ability to 'bookmark' them and browse their interactive content at a later point in time. The viewer can bookmark the advertisement, continue watching the regular programme flow and browse the interactive content of the commercial later on, at his/her own convenience. This possibility raises the risk that an impulse response generated by an advert may quickly fade away as the viewer's attention is dispersed to other TV messages or personal concerns over time. Effective personalization and targeting of adverts is the only antidote to such dissipation of interest in this scenario.
- A third alternative is to split the television screen into partitions (windows) and thus maintain more than one active stream of content (e.g. one main programme feature and a multimedia interactive advertisement). Clearly, the disadvantage of this approach lies, once more, on the dissipation of viewer's attention and on the

deterioration of viewing experience for both streams. As a result, the potential impact of the advertisement may be significantly reduced.

The above alternatives represent new possibilities for the viewer, who can directly access relevant information and other services being just 'one-click' away. For the marketer, the great potential of interactivity rests in the capability it offers for better understanding the viewer's behaviour and building personalized relations with individual consumers. As the case of the Internet has demonstrated, tracking the user's interaction with the system, including navigation, content preferences, purchasing habits etc, can greatly support many of a marketer's objectives and activities. These may be: measurement of interactive advertisement effectiveness, better understanding of consumer needs and preferences, effective targeting of advertisement and, ultimately, personalization of advertisement messages, site content and services.

In the context of iTV advertising, personalization refers to the use of technology and viewer information in order to tailor commercials and their respective interactive content to each individual viewer profile. Using such viewer information, either obtained previously or provided in real-time, the stream of advertisements adapts to fit that viewer's needs, whether they are stated directly by the user or they are inferred by the advertiser.

While personalization is a practice used widely on the Internet by many sites that exploit the huge amount of customer information they collect, applying personalization techniques over interactive television presents at least two significant obstacles:

1. *Broadcast environment*: unlike the Internet, where each web-page is delivered individually to each user's computer upon request, iTV content is broadcast to all TV sets. Delivering personalized content over a broadcasting platform is a contradiction in terms. This would require transmitting as many streams as the different TV sets. Thus, other techniques need to be applied in order to make this happen. These techniques typically involve a set-top box or other similar terminal device that stores some personalized content and controls the interactivity. Further adaptations are needed in the whole iTV infrastructure network and the broader industry business models that provide and support such interactive advertisement services.
2. *Viewing environment*: whereas the personal computer typically has only one user at a time, the television is often viewed by groups of people in both private and public areas. Consequently, personalizing and targeting advertisements effectively presents technological, business-related and practical challenges. Even if we only consider household viewership, it remains a difficult issue how to identify and target individual household members or whether to target the whole household as a group. While it is technically possible to identify which member(s) of the household is (are)

currently watching TV (e.g. through 'hidden eye' technologies or remote-control functionality), this is something not perceived positively by viewers. Thus, in this paper we make the assumption that viewers actively select their profile by some form of system logon.

In the following section we suggest a possible solution to the above problems for delivering personalized advertisements over digital interactive TV platforms.

AN APPROACH TO PERSONALISED INTERACTIVE TV ADVERTISING

Information is the basis of applying specialized marketing techniques, referred to as 'information-based' marketing (Weiber and Kollmann 1998). Interactive television represents an information-rich environment that opens-up new possibilities for marketers. Following the case of the Internet, iTV can be expected to revolutionize marketing practices and lead to a paradigm shift in the way advertising is developed, conducted, and analysed (Hoffman and Novak 1996). However, unlike the Internet, iTV poses certain obstacles to the full exploitation of information and the personalization of programme and advertisement flows. In this section we analyse the approach to offering personalized interactive TV advertisements that has been developed as part of the iMEDIA research project.

iMEDIA aims to provide an intelligent mediation platform for enhancing consumer and supplier relationships, by establishing the necessary methodologies, practices and technologies for:

- the broadcasting of personalized interactive advertising to targeted consumer clusters, providing gateways for access to product catalogues in other digital environments;
- the analysis of interactive consumer behaviour for assessing advertising effectiveness; and
- the empowerment of TV audience as interactive viewers and active consumers with total control over their private personal information.

The main objective of the project is to introduce interactivity and personalization in the traditional broadcasting environment with a view to attracting viewer's participation in digital interactive scenarios in order to further promote the electronic marketing and selling of consumer goods. The rationale for the project is based on the fact that Digital TV penetration will evolve rapidly because television is already much more familiar than computers and the Internet to consumers all over the world.

The proposed iMEDIA architecture is depicted in Figure 1. This architecture has been arrived at through facilitated workshops among iMEDIA partners. The architecture is divided into two main modules: the iMEDIA *Mediation Server* and the viewer's *Set-Top-Box* (STB) component. The first implements all the back-office operations and the services towards the partners involved. In this case the main partners are: (i) content providers, or else TV channels, broadcasting content through the iMEDIA iTV service, and (ii) advertising companies, booking and scheduling advertisement air-time. The STB component is located at each viewer's home, associated with a TV set. The STB monitors the viewer's behaviour and controls which commercials are presented to whom.

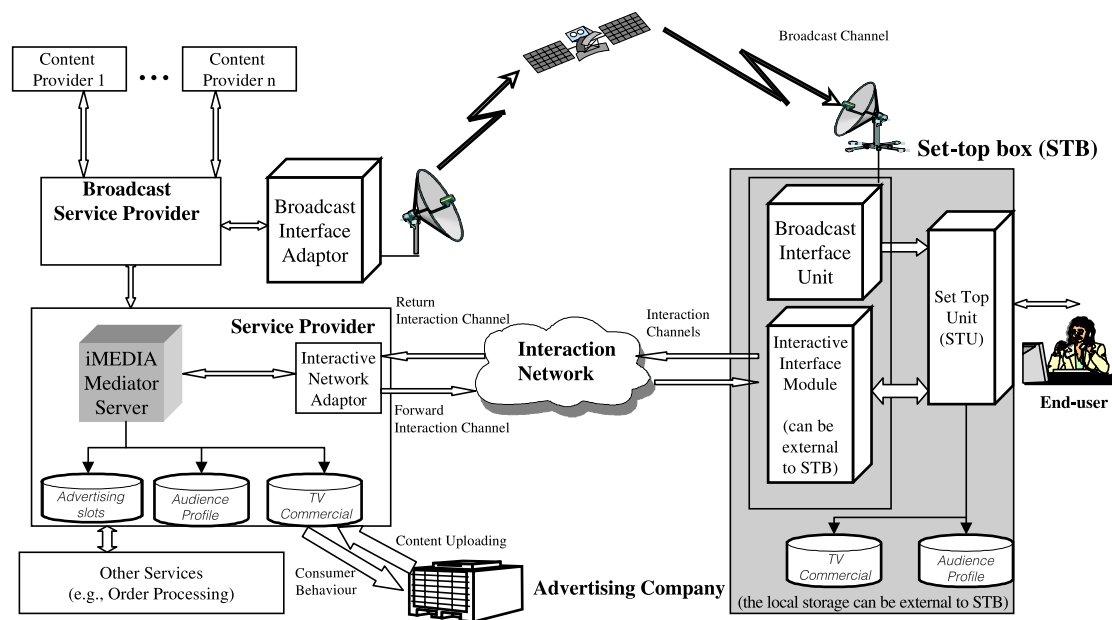


Figure 1. Overall iMEDIA Architecture

The architecture provides services supporting the booking, scheduling, monitoring and evaluation of interactive advertisements. However, what is of interest here is to explain how personalization works in this context. The personalization process goes through five steps as follows:

1. The process is initiated with a request by the advertising company to present an advertisement for a product or service to a very specific target group during a certain time period. The target group is identified by certain characteristics or rules that may lead to very fine-grained targeting, even to individual persons. For example, an advertising company may select to present a commercial to those viewers who previously interacted with a related advert.
2. The advertising company, using services of the iMEDIA Mediation Server books the required advertisement air-time, providing as input the target group characteristics, the required time zone and the time period, and loads the advertisement content, both regular and interactive, to the iMEDIA Mediation Server.
3. The iMEDIA Mediation Server sends to each viewer's STB, at regular intervals, all the advertisement content that is scheduled to appear during a certain time period, e.g. all the commercials that will appear during a certain week. The advertisement content is broadcast through a dedicated channel and is stored locally by each STB. This possibility is provided by the new generation set-top-boxes that have enough hard-disk space to store as much as 4 to 5 hours of video stream. Apart from the advertisement content, the iMEDIA Mediation Server also sends to the set-top-box component the target group identification for each advertisement.
4. The Mediation Server also transmits information as to which target group is associated to each personalized commercial. This information is transmitted before the advertisement break in vector form and is also stored at the STB either as a whole or selectively.
5. During the actual break, the STB component performs the following logic: 'If there is a target group definition associated to 'my' viewer, then select the respective commercials from the local hard-disk, as described in the transmitted vector, and display them; else, allow the regular stream of advertisements to appear'. It is assumed that the viewer has identified herself and the STB has knowledge of that viewer's profile, whether it is an individual's or a group's (e.g. family) profile.

The above process implies that the set-top-box component monitors the viewer's behaviour and other characteristics, which are sent back and aggregated in the Mediation Server. Based on this information and upon requests from the advertising companies, the Mediation Server can then allocate viewers to specific target groups, upon which targeting is performed. Clearly, this exposition only gives a short overview of the proposed architecture and leaves out important technical details relating to implementation (iMEDIA D2.1).

Having said that, it is important to raise the issue of privacy at this point. Interactive television and, especially, personalized interactive advertisements raise important privacy concerns that extend beyond the scope of the present paper. Ethical, legal and policy considerations have to be taken into account, particularly in regions where legislation imposes specific constraints (notably in the European Union). The iMedia project addresses these concerns to great lengths separately (iMEDIA D1.1). In this case, self-regulation is the overarching principle adopted. It is envisaged that consumers will have complete access to information regarding the collection, processing and distribution of their personal details and will have a choice as to whether to disclose such details or not. This choice can be exercised upon subscribing for the interactive service and/or online while using the system.

METHODOLOGICAL APPROACH TO THE DERIVATION OF THE NEW BUSINESS MODEL

Although it is widely understood that e-commerce and the new digital media induce the development of unprecedented business models and despite the wealth of literature on analysing industry structure, coordination mechanisms and business processes, there is no widely accepted methodology for constructing business models, either for descriptive or normative purposes. In his seminal work on business models, Timmers (Timmers 1999) emphasizes this lack of a generic methodology. Our purpose in the case of interactive TV advertising is normative in the sense that we aim to suggest a plausible market organization that can sustain the technological architecture outlined in the previous section. To this end, we devised a pragmatic, yet informed by theory, methodological approach [iMEDIA D1.1]. The iMedia project involves industry partners representing advertisers, advertising agencies, TV channels and technology providers from Greece, Italy and Spain. The role of project partners was instrumental in our approach. Structured interviews and facilitated workshops with these organizations have been the key methods used throughout, supplemented with market analysis material. Consensus has been sought and achieved at critical stages where business models had to be finalized. Our methodological approach is briefly outlined below in ten sequential steps. The first five steps are a systematic approach to define the current business model of the TV advertising industry. Each step addresses different components of the business model, namely the players, their relationships, their objectives, value contribution and competitive drivers. The current business model is then taken through a process of 'controlled evolution' in the next five steps. Each step considers features introduced by the proposed iTV architecture (previous section) and incorporates them into the industry business model. In step 7, where the roles of industry players are reconsidered under the light of the proposed iTV service, a new role is

identified. This new role is named the iMEDIA service provider and steps 8 to 10 focus on its implications for the future business model.

1. *Examining the relationships currently developed by key players in the TV advertising market.* The main theoretical basis for this task is identifying the role of stakeholders (Pouloudi *et al.* 1999) in this market. The project partners provided input on the nature and content of their current relationships in the market.
2. *Defining current business objectives for each key player.* Basic advertising and broadcasting operation literature has been used in this step (Belch 1995). The findings have been verified through the participative processes described above.
3. *Identifying current value flows in the marketplace.* We adopted the concept of the marketplace (Kim and Mauborgne 1997; Malone *et al.* 1997) in order to establish the value contributed by participating players within the scope of the proposed architecture described previously. For the purposes of further analysis, the interactions and exchanges among business entities can be decomposed into financial, service and information flows.
4. *Identifying key competitive drivers in the market.* We identified the main drivers of competitiveness by analysing the informational role of each player in the marketplace. Additionally, we explored the role of feedback loops for verifying and measuring advertising effectiveness.
5. *Synthesizing the current business model.* Based on previous analyses, we derived the complete chain of value creation in the marketplace, depicting both financial and information exchanges.
6. *Embedding the iTV advertising architecture into the current business model.* Following Dutta's framework of business performance improvement (Dutta and Manzoni, 1999) we evaluated the fundamental impacts of the proposed technological architecture to the TV advertising industry, in terms of capabilities, processes and relationships. Through further workshops with project partners, we identified anticipated new or revised roles and potential business benefits for each player in the marketplace.
7. *Defining requirements for technological capability development for existing key players.* We adopted Bane's [Bane *et al.* 1999] framework for industry convergence to specify the roles required in the emergent iTV-advertising marketplace in order to exploit the opportunities afforded by the technology. This exercise has revealed a missing role. A new entity is required to exploit the full potential of the proposed architecture. We defined this intermediary as the iMEDIA service provider and we described the activities necessary to fulfil this role.
8. *Defining the mediating functions performed by the iMEDIA service provider.* At this step we specified the

functional behaviour of the iMEDIA service provider in value-adding terms. Using the findings of step 6 above, transaction cost considerations (Williamson 1986) and personalized digital marketing theory (Deighton 1996; Iacobucci 1996), we defined a list of potential services for the iMEDIA service provider. These were checked for consistency with the rest of the findings and were validated through further workshops with project partners and other industry stakeholders. Essentially the iMEDIA service provider centralizes and controls the interactivity and the feedback loops and provides related information services to other industry players.

9. *Developing a new coordination scheme in the iMEDIA marketplace: exploiting the role of the iMEDIA service provider.* In this stage, emphasis was placed on defining the nature of communication and cooperation (coordination) between the iMEDIA service provider and the advertising companies on one hand, and between the iMEDIA service provider and the TV channels on the other. The analysis here drew heavily on coordination theory (Malone *et al.* 1987).
10. *Synthesizing the proposed business model.* In the final stage of our methodological approach, the current business model (stage 5) was revisited. Specifically we adjusted the business objectives of key players in the presence of the iMEDIA service provider, we traced changes in the structure of value creation in the iMEDIA marketplace and we explained how communication value added is augmented by additional feedback capabilities derived through the interactivity capabilities of iMEDIA. At this point we have arrived at a consolidated business model explaining the presence and value added of key players in the iMEDIA marketplace.

THE iMEDIA BUSINESS MODEL

As shown in the previous discussion the project introduces new value adding services enhancing the traditional value chain of TV advertising. As such, it extends the traditional business model with new types of mediators and introduces new players in the marketplace. The aim of the extended business model is to facilitate the new complex information exchanges using information technologies. In the following paragraphs we make an attempt to define some of the anticipated changes that will emanate from the introduction of the iMEDIA platform and services in the interactive TV environment.

Adopting the perspective of business performance improvements, two types of changes are expected to contribute to the transformation of value chains (Kim and Mauborgne 1997; Malone and Crowston 1994). These are:

- *Business Opportunities:* Offering new products and services increases the market penetration of extant

players. When significant demand for new products or services is generated, a whole new market is created and a number of companies compete and cooperate in an effort to capture a share of the new market.

- *Technology Advances*: Production of innovative new technologies or replacement of older techniques with new ones, leads to faster growth, efficient and effective accomplishment of business objectives, and gives the ability to develop new products and services. A technological innovation may create competitive advantage for the first movers who can realize gains from efficiency improvement and growth.

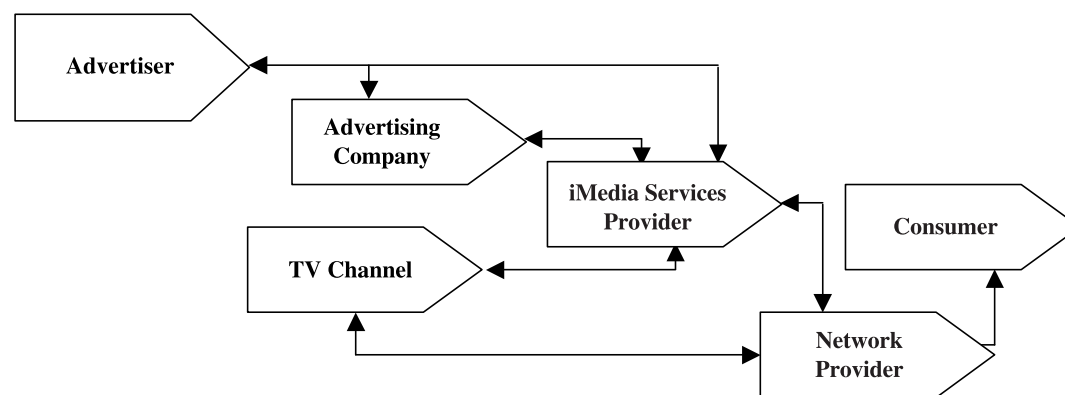
The iMEDIA platform constitutes a technological innovation improving business performance through the possibilities it offers for better targeting and interactivity. Interactivity and personalized advertisement through sophisticated targeted mechanisms, first introduced in the Internet environment, represent new business opportunities for turning passive viewers into active participants. Interactivity and personalization focus on the customer. The main objective of this customer-centric approach is to reverse the operation of the TV advertising value chain towards a more demand-driven (as opposed to the traditionally supply-driven) scheme.

The outcome of the process described in the previous section is the proposed business model for the iMedia interactive television advertisement. It is outlined graphically in Figure 2. The diagram identifies the key actors in the industry and the main interactions among them. It resembles a value chain and it borrows concepts from value chain modelling but it is not a value chain. Instead, it aims to provide a basis for analysing roles, interactions and processes as well as business interests, benefits and effectiveness. For example, further analysis can be applied to decompose the interactions among business entities into various elements such as information flows, feedback loops, financial flows or service flows. In the present exposition of our approach we offer a general overview of a likely future industry structure. This business model aims to characterize the value added of each actor in three main respects, namely, (i) its objective, (ii) its main benefits and (iii) its

key relationships with other actors. These properties are elaborated in Table 1.

Today the Internet and the Web are the pioneers and benchmarks of interactive electronic media. The proposed architecture and business model for interactive TV advertisement adopts certain characteristics from the Internet but it is still short of offering the wealth of possibilities available on the Web. Some differences arise from the context of use. Whereas the personal computer (the typical access point to the Web) is used individually, the television lends itself to group viewing. Other differences arise from the nature of the network infrastructure. The broadcast TV network is a one-way channel, which inherently cannot support interactivity. In contrast, the Internet is a fully distributed network. Table 2 summarizes some key differences between iMEDIA and the Internet in general.

It has to be noted that any actual manifestation of this business model may give rise to variations in structure, roles or interactions. To emphasize this point further, in a potential future reality multiple variations of the proposed structures, roles and interactions may coexist in the same marketplace as each business identifies different market opportunities and jostles for competitive positioning. This is particularly relevant in this industry which involves high competition and large financial stakes. The proposed business model suggests new roles and relationships in the industry. However, extant players, rather than new entrants may well undertake these new roles. Having said that, the relevance or usefulness of our model is not diminished. It is a conceptual model, a basis for further analysis and a tool for decision and policy making. It is not a rigid prescription for specific actions. For example, we anticipate that the iMEDIA Service Provider may undertake to broadcast interactive content, to upload interactive content from advertising companies and to feed user profiles and online behaviours back to advertisers and advertising agencies. However, it is also possible that other industry players may undertake some or all of these functions and that the TV channels will continue to 'own' and sell the main source of revenue in this industry, i.e. the advertisement space. Similarly, the role of the network provider may be fulfilled by the TV channel or by a separate business entity (as it is



7 Figure 2. The Proposed Business Model

Table 1. Defining the Value Added of Industry Actors in the Proposed Business Model

<i>Properties</i>	<i>Objective</i>	<i>Main Benefits</i>	<i>Key Relationships</i>
<i>Actors</i>			
Advertiser	To sell goods/services, to acquire new customers and to manage customer relations	Effective targeting, better customer relationship management, new sales channel	Requests, negotiates and buys advertisement services from the advertising agency. Monitors advertisement effectiveness with the advertising agency and the iMEDIA service provider
Advertising Agency	To manage personalized advertisement campaigns through interactive content	Dynamic segmentation, online feedback, online market research	Produces interactive advertisement campaigns for the advertiser. Books the advertisement campaign with the TV channel and handles consumer interactivity through the iMEDIA service provider
iMEDIA Service Provider	To coordinate interorganizational processes in order to support interactive personalized advertisement campaigns	Exploits consumer profile and interaction information by controlling it and making it available to other actors	Controls consumer profile information on behalf of all actors. Controls consumer interactivity. Manages the distribution of interactive advertisement content with the TV channel
TV Channel	To source or create and market interactive television programming. To sell advertising capacity	Better programme scheduling for advertising, fine-grained viewership feedback	Communicates TV programming and advertisement capacity to the iMEDIA service provider and to advertising agencies
Network Provider	To own and manage the network infrastructure	New value added services, new business opportunities through technological innovation	Transmits the TV channel's content to consumers. Feeds interaction events to the iMEDIA service provider
Consumer	To interact with advertisements and buy goods/services	Interaction with the medium, personalized service	Receive and interact with interactive advertisement content

Table 2. Some Key Differences Between iMedia and the Internet

	<i>Internet</i>	<i>iMedia</i>
Content origination	Pull	Push
Interface	Multimedia	Enhanced
Viewing context	Individual	Group
Terminal functionality	Complex	Limited
Entry barriers	Low	High

already observed). It is very difficult to decide now what functions each actor will perform. This will emerge as the evolutionary outcome of competitive market dynamics and may well lead to coexisting variations.

In summary, the construction of the proposed business model along the lines discussed above offers us the opportunity to:

- identify and justify the new roles that key players will need to assume in order to exploit the iMEDIA related business benefits;
- identify and justify new business functions that arise because of the proposed technological architecture

(in this case the iMEDIA service provider). These new functions are necessary in order to deliver the promise of the technology in an effective and sustainable way.

CONCLUSIONS AND FURTHER RESEARCH

According to Forrester Research (8/1999) interactive TV services will generate \$11 billion in advertising, \$7 billion in commerce, and \$2 billion in subscription revenues by 2004. The companies pushing interactive TV are relying on advertising to turn a profit. The idea is for central computers in the cable control room to gather demographic and viewing information about subscribers and provide aggregated lists to marketers. Bell Atlantic, for instance, believes people will use their remotes to call up additional information on new products and services that are specifically targeted to those viewers. But such advertising depends on viewers' willingness to sell off their privacy in return for cheaper programming, by participating in what are essentially direct marketing campaigns.

These figures and attitudes demonstrate the great potential behind iMEDIA's approach to personalized

interactive TV advertising, but also the issues that arise. They also imply changes to the market structures and the respective business models, as has been briefly discussed in the previous section.

The topics that need to be studied and resolved before this new technology is fully exploited are still innumerable. Indicatively, we mention here issues such as ‘how can we exploit the additional information that is available in order to apply more effective targeting and personalization techniques to both advertising and services?’, ‘which new services and business models emerge?’, ‘how will the consumer behaviour evolve in the new digital environment?’, ‘how do we define and apply interactive advertisement measurement in that context?’. These topics need to be addressed from both a technical, business and scientific perspective, opening up a whole new area for development and research.

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