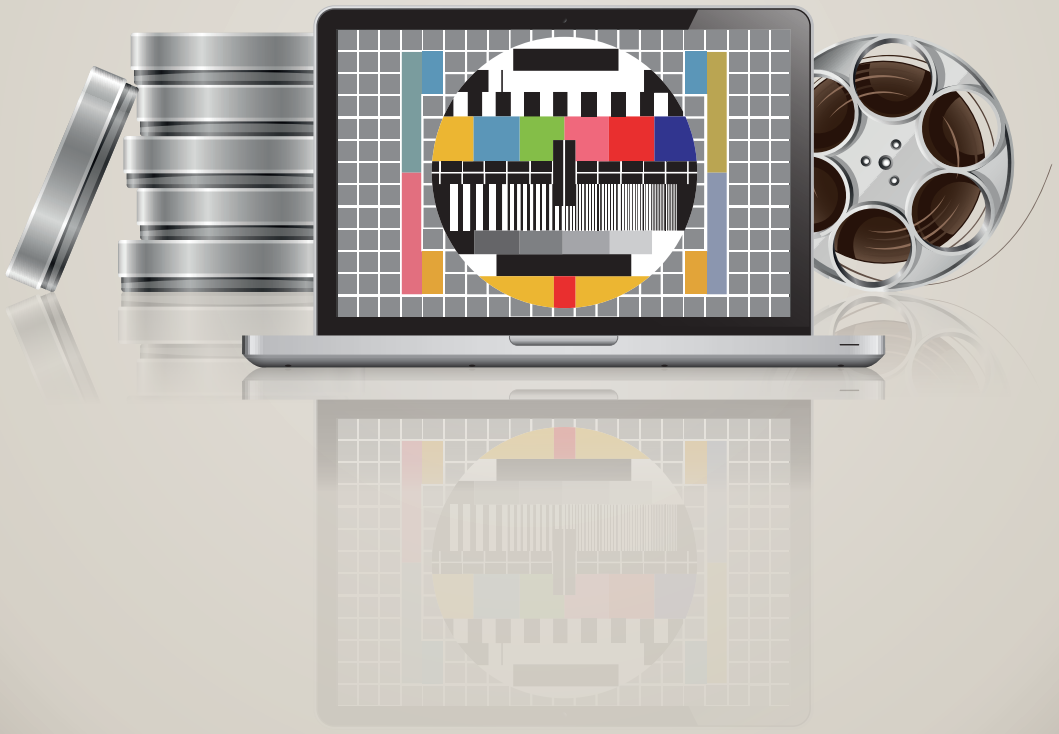
A CUSTOMER PERSPECTIVE ON MOVING IMAGES

The design and adoption of public audiovisual heritage services in the Netherlands



GUIDO ONGENA

A CONSUMER PERSPECTIVE ON MOVING IMAGES

THE DESIGN AND ADOPTION OF PUBLIC AUDIOVISUAL HERITAGE SERVICES IN THE NETHERLANDS

Guido Ongena

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THE DESIGN AND ADOPTION OF PUBLIC AUDIOVISUAL HERITAGE SERVICES IN THE NETHERLANDS

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Having a great intellect is no path to being happy

Stephen Fry

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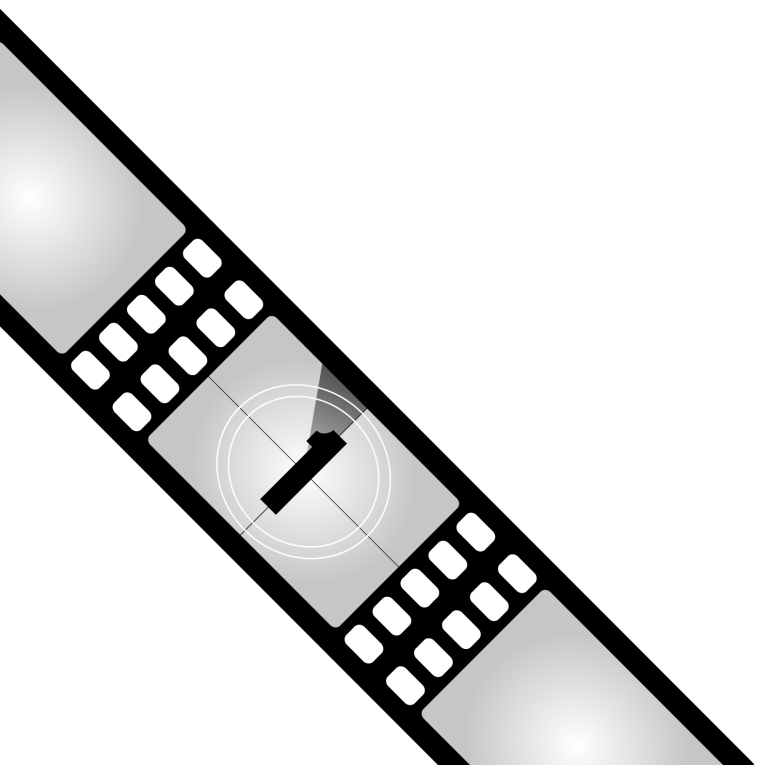
CHAPTER 1

INTRODUCTION



1.1 Problem statement and motivation

At the moment of this writing, television celebrates its 60th anniversary. Although its historical and cultural value is just recently underlined, many countries already established audiovisual heritage archives to preserve television broadcastings for future generations. Thereafter audiovisual archives started to develop services to provide access for consumers and other groups. Although the archives' content entails potential value (Comité des Sages, 2010), many audiovisual archive experimental unlocking initiatives are under-utilized and thus do not come to fruition. It should be noted that the cultural heritage sector in general struggles with the use of their services. Furthermore, the viability of services becomes of greater importance as cultural heritage, and audiovisual heritage in particular, is becoming more and more commercialized. But why do audiovisual heritage services have troubles in developing viable services? What are factors that contribute to the use of these services? And can a service be build that overcomes the problems of prior initiatives? In answering these questions, the results of this research hopefully contribute to the knowledge on providing access audiovisual heritage to consumers, thereby enabling better practices and improving policy.

1.2 The rise of audiovisual heritage

> *"I watched the moon landing on old black and white set with my Mum, Dad and younger sister Nickie. In 1969, it was the only set in the house, so we were all sat in front of it, my Dad passing round a tin of Quality Street, my Mum holding a glass of sherry ready to celebrate. Across the world, 500 million people did the same. It was an intimate, powerful, shared experience which was to inspire many future scientists and engineers." (Maggie Philbin, BBC radio presenter and former presenter of 'Tomorrow's World')*

Philbin describes her experience with one of the most iconic television moments in history, the moon landing. "That's one small step for [a] man, one giant leap for mankind" was Armstrong's proclamation when setting his left foot on surface on the moon at 2:56 UTC July 21, 1969. This moment frequently adorns at the top of rankings that addresses the most memorable television moments in history. According 25% of the British population the moon landing of Neil Armstrong is the most iconic television moment of all time. This ranks the footage on the second place. The September 11 Terrorist Attacks (9/11) in 2001 holds the first

place with 35% of the votes (YouGov, 2009). Other examples of significant broadcasted footage include the fall of the Berlin Wall in 1989, the John F. Kennedy assassination in 1963 and Nelson Mandela leaving the prison in 1990. These moving pictures broadcasted via mass media play a central role that defines nations and particularly television is a crucial medium in this and is perhaps the most fundamental to the nation building process (Schlesinger, 2000; Barker, 2005; Castelló, 2009). The audiovisual material is the legacy of this process, thus the nation's cultural heritage, and the physical evidence that contributes to a nations' existence. This section provides a brief historical overview of the increasing importance of these moving images and the rise of archives preserving and giving access to this material.

The nation's identity cannot be understood in isolation from the cultural dimension (Castelló, 2009). The identity of a country is to a large extent based on its cultural heritage, which entails external representations of its legacy. These external representations, thus a nation's cultural heritage, basically consist of intangible and tangible assets reflecting the collective memory of a nation. Intangible assets include social values and traditions, customs and practices, aesthetic and spiritual beliefs, artistic expression, language and other aspects of human activity. Storytelling, also revert to as the oral tradition, is one these intangible cultural materials. The oral lore consists of verbal messages that are reported statements from the past beyond the present generation (Vansina, 1985). Tangible cultural materials, on the other hand, yield the physical objects that reside within national borders. These objects can range from buildings, sculptures, paintings, and books. The latter is fueled by the introduction of the printing press by Gutenberg around 1440.

For years, book printing was considered a true, but only art form. Parallel with the industrial revolution, however, new forms of tangible memories associated with sound and images emerged at the end of the 19th century. Propelled by innovations of the camera, photography brought a new visual source of art. Initially in black and white, later in color marketed by the Lumière brothers in 1907. Then sound transmission surfaced by the advent of the radio. Finally moving pictures came, which started out with silent movies, but were later colored and supplemented with sound. These new approaches to collective memory gave birth to two new media: cinema and television.

Cinema initiated new ways to express creativity. By the use of moving pictures and progressively sound a new art form was created. Initially similar to existing performing arts, but gradually developing its own aesthetic, techniques and standing with the public. Cinema may be the greatest invention of the 20th century for the artistic community as is has the capacity to evoke reality and is able to build new realities. Cinema evolved from a carnival

novelty to one of the most important tools of communication and entertainment, and mass media attracting millions of people daily. With the advent of cinema and its popularity a whole industry revolving these motion pictures emerged. The production of films gradually moved from independent filmmakers to studio-based movies. From roughly the late-1960s movies that were made were part of a studio system, which is often referred to as the post-classical Hollywood. Film studios were established producing and distributing substantial number of movies annually. Current major film studios include among others 20th Century Fox and Walt Disney Motion Pictures Group. To date these studios have a tremendous annual turnover yielding billions of dollars. Hence, one can state that motion picture films have substantially affected business and society.

Next to the cinema, moving images also paved the way for television. Television is not only another technology then cinema, but also different in a social perspective. It is not characterized as special events, which an audience attended. Rather, television progressively became part of everyday life, complementary artifacts of communication between individuals and the world around them. Television transmitted immediacy like no other technology had done before and gave individuals a new position in the relationship with the world around them as it provided access to their environment. Nowadays, television is part of our daily life and is one of people's basic needs. Television became the window through which we now access our environment and brought the world into every home, mixing information with fiction, entertainment with culture (Teruggi, 2004). It conveys and reflects everyday life by these different genres, which also means that the memory of a society reside in these images. The moon landing as Philbin described at the beginning of this section is just one of many critical events or memories through which a society or culture assesses its significance. Over the years, a huge repository of our collective memory is captured in this audiovisual material as moving images accumulated over time. It is therefore a natural outcome that this audiovisual material is increasingly seen as a vital component of a nation's historical cultural heritage, besides historical artifacts and documents in print (Auffret & Bachimont, 1999). Although the material as a new historical source was already stressed in the end of the 19th century (Matuszewski, 1995), it is just recently endorsed and added to the nation's heritage. This endorsement ultimately resulted in the establishment of the *World Day of Audiovisual Heritage* by UNESCO. October 27 is proclaimed to promote the value of audiovisual heritage. This event is intended to raise awareness of the importance of audiovisual documents as integral part of national identities and the world's memory, and to draw attention to the urgent need to safeguard them. The safeguarding is not limited to the iconic television moments related to actuality, which are

sketched in the first paragraph of this section, but also include fictional content. Castelló (2009) successfully argues that fictional content are an important tool for (re)constructing national culture. Due to this importance, both fictional as well as non-fictional audiovisual content are gradually preserved for future generations.

1.3 Preservation and providing access by digitization

The increased attention to the historical value of audiovisual material gave birth to archive institutions that were given the responsibility to centralize and preserve the content. As the analogue carriers that were used to store the content were rapidly decaying, plans to digitize ageing and fragile analogue holdings emerged. The material stored on discrete analogue and digital carriers (e.g., DVDs) is coming of age and are often degrading fast. Repeated projection or playback causes physical damage while chemical decomposition, such as the vinegar syndrome, slowly deteriorates the original copies. As a result, together with the images, valuable memories slowly fade away. It is estimated that the earliest productions up to material composed in the 1980's are at risk (Kokaram, 2004; Wright, 2001). Simultaneously, original playback devices are becoming obsolete; implicating that for archives that want to maintain the ability to use their content migration into a sustainable digital form is the only answer (Addis et al., 2005). In contrast to analogue content, digital format is easily moved over networks, and international standards already exist for digital content (Hooper-Greenhill, 1995). Digital format, then, became a much cheaper way than analogue to preserve audiovisual materials (Tanner & Deegan, 2003). Moreover, digital content is interoperable, searchable and flexible (Oomen et al., 2009), and it offers users more flexible and powerful search techniques (Barnett, 1998) than analogue content. Notwithstanding the apparent need for digitization, operations to restore, ingest and store are extremely costly. For instance, it is calculated that film costs up to €2,000 per hour (Wright, 2001). To date, this costly transformation to the digitalization of the large quantities of audiovisual heritage is mainly funded by large donations from national governmental bodies motivated by the need for cultural preservation (Courtois et al., 2010). Furthermore, large proportions of European government-funded projects are focused on audiovisual heritage (Manžuch, 2009). Hence, audiovisual heritage organizations are transforming large portions archive content by digitizing the analogue material, transcribing and augmenting metadata to create a file-based library system.

Previous section stressed the rationale of digitization for preservation reasons. However, it also enables online access to audiovisual content (Wright, 2007). In combination with the

advent of information and communication technologies it is considered to be a driver for making such heritage and cultural creations available to a wider number of citizens (Commission of the European Communities, 2005). Although granted European government-funded projects focus on digitization and the cultural heritage from the past, these projects should include what is added in the present because the past and the present must be available to future generations. Governmental bodies increasingly stipulate that the digitized material must be accessible. At a European level it is stated that giving access to the audiovisual material must be the yardstick of all initiatives taken in this field (Comité des Sages, 2010). But also national governmental bodies (e.g., Ministry of Education, Culture and Science) indicate that cultural heritage must be accessible for the public at large as access to the cultural heritage is a right (Crane, 2002). The provision of such access is the visible evidence and the political justification of publicly funded audiovisual archiving. Furthermore, it is the raison d'être of archiving and the status of the profession depends to a large extent on how well it is done (Edmondson, 2004). Although the provision of access is a focal point in the projects funded by governments, access to most audiovisual archives is still minimal (Prelinger, 2007).

1.4 Defining audiovisual heritage

The recent advent of attention to the historical and cultural value of television content, as described in previous sections, led to a progressive recognition by archives, libraries and museums. An audiovisual archive may show similarities to conventional archives in terms of objectives and clientele. Collection policies, the principles of arrangement, providing access are however different (Harrisson, 1997; Edmondson, 2004). Different archive groups are handling audiovisual heritage. Firstly, broadcasting archives (national, regional and local) contain television and radio programs that are used as a resource for utilization during the production of broadcastings. Secondly, audiovisual museums often use sound recordings and moving images to provide historical context to tangible artifacts such as cameras, projectors, suits and other types of memorabilia. Thirdly, national audiovisual archives have a mandate to collect, preserve and maintain (a significant part of) a country's audiovisual heritage. The case of the Dutch national audiovisual archive is addressed in Chapter 3. Fourthly, studio archives of (large) production houses retain audiovisual material for their own purposes. Fifthly and lastly, archives, libraries and museums generally have audiovisual heritage in their archives. Although these institutions often have no audiovisual department with specialist staff, they often have accumulation of audiovisual content. In sum, there are various organizations handling audiovisual heritage.

There are two main types of audiovisual archive content: moving images and recorded sound, which in short can be labeled as audiovisual media. Audiovisual media are relatively new compared to printed media and were often referred to as 'non-printed materials' (Fønss-Jørgensen, 1998). In general such materials or documents can be characterized as self-contained units representing an identified intellectual contribution and published on a media for some specific purpose (Furuta, 1997). These audiovisual documents are part of a larger concept, which can be characterized as audiovisual heritage. The connotations and scope of this concept vary across cultures, countries and institutions (Edmondson, 2004). Based on the definition by the Australian National Film and Sound Archives, Kofler (1991) proposed the most comprehensive and exhaustive enumeration of the subject of this dissertation. The following definition is proposed, where it is stressed that the audiovisual heritage of a country shall include, but not be limited, to the following;

> *Recorded sound, film, television or other productions comprising moving images and/or recorded sound created or released within [country] or by or with nationals of [country] and/or with any other relevance to [country], whether or not primarily intended for public release.*

Digital services that entail productions as described in the above definition can be placed under the umbrella of new media. New media development can be characterized by both a structural (i.e., integration, interactivity) and technical (i.e., digital code, hypertext) communications revolution (Van Dijk, 2012). In terms of structural communication revolution, which refers to fundamental changes that take place in the coordination of space and time, a high level of integration or convergence characterizes digital audiovisual heritage services as it implies the use of multimedia. Moreover, the information traffic pattern of consultation is enhanced by digital audiovisual heritage services as it supports access to the audiovisual heritage archive. The level of interactivity thus plays a central role in the development of the digital audiovisual heritage service. In terms of technical communication revolution, which refers to fundamental changes that take place in the structure of connections, artificial memories and/or the reproduction of their contents (Van Dijk, 2012), digital code characterizes digital audiovisual heritage services. A digital audiovisual heritage service consists of a uniform code of bits and bytes for all types of digital media. Moreover, it entails a uniform code for linking different chunks of all types of data in digital media (hypertext). In sum, as the new media created structural and technical communications revolutions, digital audiovisual heritage services will probably also create these communications revolutions.

1.5 Research questions and scope

This dissertation aims to create knowledge and understanding how to unlock the audiovisual heritage archives for consumers. This knowledge is acquired through the process of building and implementing an IT artifact (for more details of this approach see Chapter 2). Hence, the primary objective of this dissertation is to build and evaluate a digital audiovisual heritage service. This objective can be subdivided into two research goals. Firstly, the goal of this research is to enhance design knowledge about digital audiovisual heritage services. This goal is achieved by operationalizing general design principles into technical and user design components for a digital audiovisual heritage service. Secondly, the goal of this research is to enhance theoretical knowledge about consumer behavior regarding the adoption and usage of digital audiovisual heritage services. By reaching these goals this research is set out to provide managers of audiovisual heritage archives with design knowledge and knowledge about consumers' behavior that may help them in the development of services that are aimed at disclosing their archives for the general public. Based on these goals the main research question (MRQ) in this dissertation is hereby laid down:

> MRQ: *What constitutes a viable digital service that provides access to audiovisual heritage archives for the general public?*

This research question is specified in a number of sub-questions. Each sub-question is detailed below. The first sub-question addresses the supply side of audiovisual heritage. This question intends to assess the anatomy of the audiovisual heritage domain. The examination entails the identification of external drivers that affect the audiovisual heritage domain. Furthermore, it comprises of an elaboration of the current status of the digitization and unlocking of audiovisual heritage content.

> Sub-question 1: *What are the internal (i.e., stakeholders, extant services, financial arrangements and technological issues) and external factors (i.e., technological advancements, market dynamics and legislation) that affect the Dutch audiovisual heritage domain?*

Before continuing the explorative research in this dissertation, relevant theories that are used and referred to throughout this dissertation are detailed. As Lewin (1951, p.169) already stated: 'There is nothing so practical as a good theory'. It is therefore imperative to examine extant literature, which provide input in the different stages in the research process.

Relevant literature constitutes of adoption theories from different disciplines (see section 1.7).

> Sub-question 2: *What relevant existing technology acceptance theories can provide insight in the adoption of digital audiovisual heritage services?*

With the second sub-question, this dissertation further shifts its attention from a supply perspective (sub-question 1) to a demand perspective. It is stressed that a need-pull has effectively more chance to be used then technology-pushed applications. In order to design an artifact, which suits the user needs, it is imperative to explore and formulate these needs. The needs form the basis for the requirements needed to determine the design of the service.

> Sub-question 3: *What are consumer needs that can support the design of a digital audiovisual heritage service?*

When the user needs are formulated, it is necessary to develop an expository instantiation. The term instantiation is coined within design science literature (see Chapter 2) to formulate a physical implementation of the artifact that can assist in representing an expository device and for purposes of testing. The instantiation is implemented by means of patterns and algorithms that already exist in the computer science discipline. Thus the major design components, which entail the technical architecture and the interface elements, of the audiovisual heritage service are investigated.

> Sub-question 4: *What are the technical and user design components of a digital audiovisual heritage instantiation?*

Based on the literature consulted an initial model is constructed. This model comprises of possible determinants that could affect the adoption of the audiovisual heritage service.

> Sub-question 5: *What determinants could affect the adoption of digital audiovisual heritage services?*

Finally, an empirical evaluation of the designed prototype is conducted. This evaluation is primarily aimed at the user adoption of the artifact in the residential context and is based on the model that is constructed under sub-question 5. Furthermore, this sub-question specifically examines the user willingness to pay for services. It thus explores the viability of the service and is imperative to refine the initial prototype.

Sub-question 6: *What is the anticipated adoption and willingness-to-pay potential of the digital audiovisual heritage service instantiation in the Netherlands?*

Before heading to the relevance of this research, the scope of this dissertation is addressed. First, the scope of this dissertation is limited to the Dutch population. This research takes place in the Netherlands and is henceforth the country wherein this research resides. Thanks to a high degree of centralization of the broadcast archive and the availability of monetary assets for digitization of the content necessary conditional steps are taken at the supply side. At the demand side, the Netherlands shows a high penetration of broadband access among households and is ranked fifth of all OECD countries (OECD, 2011). It is expected that due to this high penetration level the Dutch citizens have a considerably high level of Internet skills (Van Deursen, 2010). The Netherlands thus is considered a good starting point for exploring the research question, because some steps that other countries still have to go through have already been taken in the Netherlands. Although other countries are not included they can benefit from the results of this research as audiovisual heritage also gains increasing attention in other countries, the Netherlands can be seen as an exemplary case for other countries.

Second, the scope of this study is limited to a consumer use context. The material in the archive can be meaningful and useful for a variety of user groups (Oomen et al., 2009). The material that is stored in the archive is valuable to for example media professionals (Huurnink et al., 2010), educational institutions (Michael et al., 2009), and broadcasters themselves. This research focuses on services aimed at a residential user. Although the focus of this dissertation is targeted at a consumer context, audiovisual archives can benefit from the outcomes in this research for unlocking of its content to other user groups.

Third, this dissertation is limited to remote and asynchronous access to digital audiovisual heritage. This has some implications: there is no ambition to generalize to collocated services. Many national audiovisual archive institutions provide public exhibition that entail on-site experiences for visitors. This dissertation however focuses on access to the audiovisual heritage archive at home. Furthermore, the focus on asynchronous access holds the implication that no attention is paid to real-time video streaming. Linear broadcastings, such as television, are thus not taken into account. Lastly, it is imperative to stress that the research in this dissertation concentrates on digital audiovisual heritage as this has many advantages in contrast to analogue content (see section 1.3).

1.6 Relevance and contribution

This section discusses the relevance of the studies that are conducted and described in this dissertation. Both the scientific rigor as well as the practical relevance of the research is addressed.

1.6.1 Scientific relevance

Audiovisual archiving has begun emerging as a field of research in only the last few years (Edmondson, 2004). The results of this research contribute to an increasing yet little embodiment of literature on audiovisual heritage. Over the past years, much technological work has been done to develop formats and standards (Chiariglione, 1995; Rakow et al., 1994) as well as metadata (Böhm & Rakow, 1994; Gabriel & Ribeiro, 2001; Wactlar & Christel, 2002) for archiving audiovisual content. Parallel with the increased attention to technical issues of preserving and archiving, the library and archive community addressed managerial challenges for audiovisual archives such as copyright (Johansen, 2001; Evens & Hauttekeete, 2011). Meanwhile television historians and media scholars stressed the television's role as an agent and instance of technological, economic, political, cultural and social change in a European context (Bignell & Fickers, 2008) as well as the international context (Smith & Paterson, 1998). This established a strong case for audiovisual heritage as an important asset with high historical and cultural value. Only recently academics merited interest in the unlocking of the audiovisual archive and how to attract the prospective audience of the content (Evens et al., 2010) and proposed concrete steps towards digital access (Hauttekeete et al., 2011). Hitherto, there remains an empirical gap were prospective users are consulted in relation to unlocking opportunities of the audiovisual heritage material. This research fills that gap by taking a consumer perspective on the design of services that aim to provide access to audiovisual heritage archive content. Hence, this dissertation is of interest to the scholars in the field of audiovisual heritage archives and furthers the establishment of audiovisual heritage studies in academic research.

This dissertation exercises the ideas of design science research (see for more details Chapter 2). This research does not aim to fully evaluate the groundings of this type of research. However, the design science research community benefits from this research as it provides an example of how to conduct research that utilized this approach. Since, the establishment of design science research in academic international literature is rather novel, this dissertation extends the discussions within that community.

Next to the contribution to the community of design science research, the results of this research contribute to the body of knowledge on the adoption and use of new technologies. This is of interest to researchers in various domains such as social sciences and information science. New conceptual ideas that will be laid down in this dissertation will supplement existing theory and knowledge. These insights may be used to further model the adoption and usage processes of new technologies. Although several theories are taken into account and models are used as stepping stones for the empirical investigations in this dissertation, the presumption is not to test existing theories. However, this research aims to reflect on the used theories to provide new conceptual ideas which will supplement existing acceptance theories and knowledge.

There will also be more methodical insights provided by the research in this dissertation. An existing business model framework is used to assess the audiovisual heritage domain. This approach gave guidance to map the Dutch environment revolving around audiovisual heritage. This method proved to be of value to analyze this environment. Furthermore, a vignette study is used to gain insights in the requirements of an audiovisual heritage service for the general public. Although, a vignette study has some drawbacks, section 5.2 shows value in using this method to involve users in an early stage of development.

It should be noted that the aim of this dissertation is not to establish *the* design theory or explanatory theory. Design science research is highly associated with the pragmatic school of thought and is thus considered to be an applied discipline (Iivari, 2007). Furthermore, the artifact that is subject of interest has to be created instead of being 'out there'. This makes that in contrast to explanatory research, which can be both inductive theory building and hypothetical-deductive theory testing, design science research is considered more explorative of nature (Holmstrom et al., 2009). However, valuable input into the design science cycle is provided by established explanatory theories to enhance the scientific rigor of the research conducted and knowledge will be added to these theories. Section 2.2 will report more detail on this matter.

1.6.2 Practical relevance

This dissertation aims to add knowledge that is beneficial to professionals and managers responsible for service-enabled processes and activities as this is one of the most important constituent community for the output of information systems research (Carlsson, 2007). Organizations from different business sectors can benefit from the studies as conducted in this research. First, it helps national and regional archive organizations in developing

services upon their audiovisual archives. The results support the sustainability of these organizations due to the fact that it attempts to seek viable business models for the services that are to be developed. Hence, it contributes to the profitability of the organizations. Second, also commercial businesses that are involved in video streaming or distributing can benefit from the results of the studies. For instance, the research provides insights in determinants to the consumption of online video and moreover it offers analyses regarding the user experience of online video.

Society also benefits from the results as the research primarily focuses on audiovisual archive organizations in the public domain. On the one hand, this research helps these organizations with viable business modeling regarding the consumer side of service development. It thus helps to maintain the operational activities of these organizations. Subsequently, this enables the preservation and conservation of the cultural heritage artifacts. On the other hand, the research supports the unlocking of audiovisual content, thus providing the society access to cultural heritage. By gaining insight into the factors that influence the adoption and usage of new technologies, it is more likely that future developments will be better tuned to user's wishes. Also, thresholds that users experience can be identified and possibly resolved so that users face fewer thresholds while going online. Additionally, by asking (potential) end users more often what they do and why they do it, they may feel more empowered. Hence, findings in this research contribute to the satisfaction of individuals' needs and increases society's innovativeness and prosperousness.

Is should be noted that this research aims not to develop a killer application that is most successful and engenders a high revenue stream. Design can be characterized as an explorative process. It comprises of a search for an effective artifact utilizing available means to reach desired ends while satisfying laws in the problem environment (Hevner et al., 2004). Audiovisual heritage is a fairly novel research domain; this dissertation thus does not intend to develop the silver bullet for audiovisual archive services.

1.7 Research area and foundations

The research presented in this dissertation is of a multidisciplinary nature. Over the years, multiple disciplines have contributed to an understanding audiovisual heritage. The interdisciplinary research in this dissertation builds on work conducted in *cultural studies*, *communication and media*, *computer science*, and *library and information sciences*. *Cultural studies* stresses the new historical consciousness for the cultural heritage by

reflecting on television as an important part of a nation's or even continental's cultural heritage. The *communication and media* discipline is dealing for a long time with research topics concerning the how en why of people watching television. Furthermore, scholars in this discipline examine the use of online video (e.g., YouTube) and other forms of video-on-demand applications. *Computer science* contributes procedures and algorithms to increase the searchability of the archive and to create metadata (e.g., automatic speech recognition). The community revolving around *archives, libraries and museums* develops preservation strategies and addresses managerial issues. Figure 1.1 positions audiovisual heritage in context of the aforementioned reference disciplines.

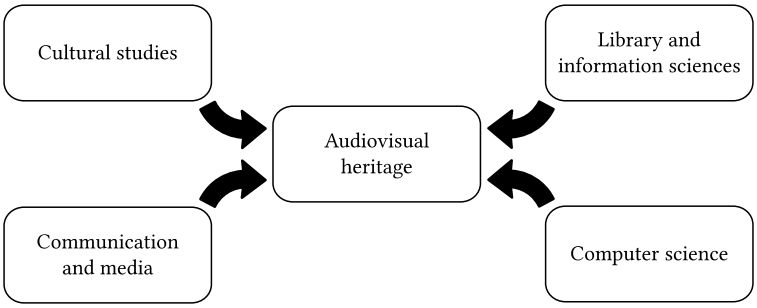


Figure 1.1. Interdisciplinary nature of audiovisual heritage research

Audiovisual heritage thus acts at the interplay of different domains. Similarly, the information systems discipline is also considered interdisciplinary by nature (Benbasat & Zmud, 2003, p.185). The reference discplines of audiovisual heritage as mentioned in Figure 1.1 are considered allied to that of information systems. In the figure, audiovisual heritage can easily be replaced by the term information systems. As the research in this dissertation is conducted in this nexus, information systems is considered as the single best discipline for the research emploit in this dissertation. Furthermore, the information systems discipline also provides an extensive knowledge base about creating and evaluating information systems (the instantiation of an audiovisual heritage service in this dissertation).

1.8 Dissertation outline

This dissertation consists of nine chapters that are divided in three parts. The first part contains the introduction (this chapter) and the adopted research methodology. Chapter 2 sketches the research methodology adopted in this dissertation. The chapter introduces the design science paradigm (section 2.2), presents the design science research framework

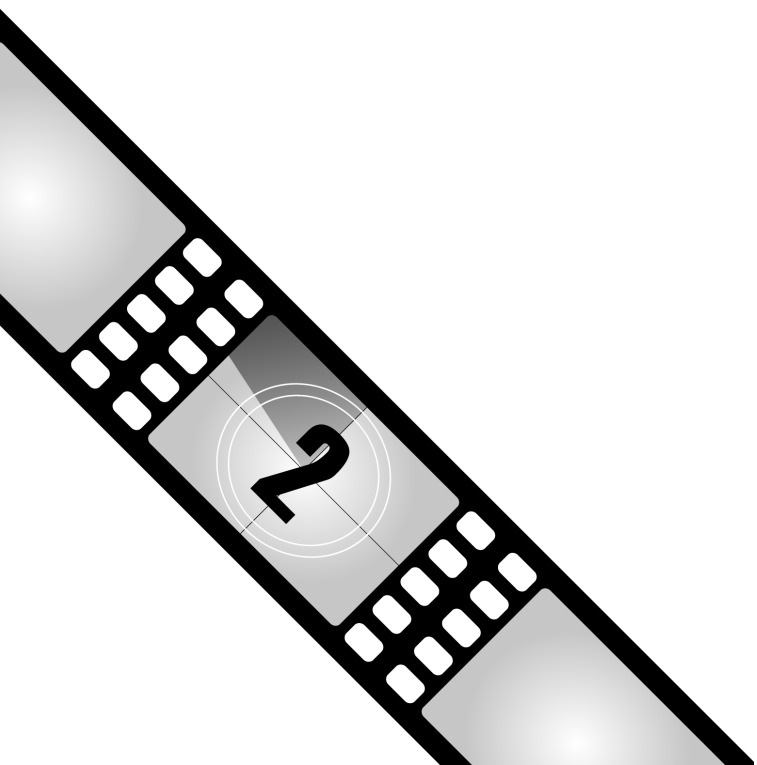
(section 2.3) and the general methodology of design science research. Lastly, the employment of this framework in this dissertation is detailed (section 2.5) and the position of this research in the innovation process is lay out (section 2.6).

The second part, which is considered the core, encompasses the empirical studies that are conducted. This part is subdivided in seven chapters. The first chapter (Chapter 3) explore the context of this study and describes the audiovisual heritage domain as it is shaped in the Netherlands. Taking a case study approach the Dutch situation is assessed by means of an established business model. This model provides the building blocks for the assessment. Chapter 4 then describes relevant adoption theories, which provide input to construct a research model of audiovisual heritage adoption. The next chapter contains an exploration of the user needs regarding audiovisual heritage (Chapter 5). This exploration consists of three studies. The first study entails a vignette design often labeled scenario design (section 5.2). The primary benefit of a vignette study is that, in their quasi-experimental setting, they can capture more natural real-life decision making than in survey studies. The designed vignettes were manipulated on a number of variables in order to investigate determinants of early acceptance. The second study describes an investigation to existing comparable solutions of audiovisual content (section 5.3). This study aims to learn from similar services in order to apply this knowledge on the problem in the case of audiovisual heritage. Third, and finally, a rank-ordering study is included (section 5.4), which consists of a prioritization of potential requirements of the to be designed service by consumers. Then the prototype that is build is outlined (Chapter 6). This chapter details the conceptual model and the user interface. Fueled by the theories described in Chapter 4 a research model is constructed to examine the determinants to use an audiovisual heritage service (Chapter 7). Finally, the results of a quantitative study are reported (Chapter 8). The purpose of these chapters is twofold. First, it assesses the adoption of the new service by evaluating the intention to use the service by means of a constructed model of acceptance. Second, it addresses the willingness to pay of audiovisual heritage services.

The third part consists of the concluding chapter (Chapter 9) that discusses the results found in the research. The concluding chapter summarizes the results found in the conducted research in twofold by addressing the results of the consumer adoption, and of the design of digital audiovisual heritage services (section 9.2 and 9.3). Next, the theoretical (section 9.4) and practical implications (9.5) and limitations of the research that also stresses points for further research (section 9.6) are addressed. Some concluding thoughts closes this dissertation (section 9.7).

CHAPTER 2

RESEARCH METHODOLOGY



2.1 Introduction[1]

This dissertation employs a research approach known as *design science research* to address the problem at hand and is congruent with this paradigm. Although related work predates the use of the term, it is considered as a relatively new approach. This chapter explains the historical development of the approach, its philosophical basis in section 2.2. In section 2.3 the main design science research framework developed by Hevner et al. (2004), which played a significant role in the advent of the paradigm. The framework provides some guidelines to establish good design science research. Section 2.4 describes a conceptual process, the general methodology of design science research (Kuechler et al., 2008), which entails a nominal process for conducting design science research. Both the framework and the conceptual process guides the development and evaluation of the audiovisual archive service as proposed in the main research question. Section 2.5 details the mapping of both guides on the research conducted in this dissertation. Hence, this section describes the research steps and its interrelationships. As this research also examines the adoption of audiovisual heritage services, next to its design, section 2.6 addresses the position of the research in this dissertation in the adoption process.

Within this approach this research undertakes both qualitative (textual) and quantitative (numerical) data collection and analysis. A hybrid approach that encompasses both domains is a necessary consequence of building and evaluating a framework that entails the use of measurements by consumers in a residential context. In sum, the main purpose of the adopted research methodology is to structure and guide the exploratory process on the way to the problem-solving research reported in this dissertation.

2.2 Design science research

The science of design research is a relatively new entrant to the set of methodologies, paradigms and orientations. The emergence of design science research the last years is often attributed to the publication of Hevner et al. (2004). In this paper the authors highlight design science as a clear alternative to conventional paradigms in terms of theory-building and theory-testing (Purao, 2002). Their paper had a strong impact and paved the way for

[1] Parts of this chapter have been previously published in the proceedings of the EuroITV 2009 conference (Ongena, 2009) and were presented on the doctoral consortium of the European Conference of Information Systems (ECIS) 2011.

more design science research (Hevner & Chatterjee, 2010, p.13). With this publication as support, applications, variations, and extensions that investigated the importance of design science research in information systems discipline have continued to appear. Through an increasing number of publications, the field of design science has grown significantly in the last decade. Work that has been done include the research on philosophical underpinnings for design science research in the information systems discipline (Purao, 2002), the development of methodologies or processes with design science research (Peffers et al., 2008; Offermann et al., 2009; Carlsson et al., 2011; Vaishnavi & Kuechler, 2008), frameworks to develop design theories (Gregor & Jones, 2007) and their link with other types of theories (Gregor, 2006), and the examination of the paradigm from different views such as the critical realist perspective (Carlsson, 2005). Hence, over the years researchers have successively argued the case for the validity and value of the approach in the information systems discipline (Purao et al., 2008).

Although the establishment of design science research is rather new, its foundations can be traced to earlier work. The sciences of design was already recognized by seminal publications of Simon on the *Sciences of the Artificial* (Simon, 1969) aimed at the computing science community, which at that time was considered a novel research area. Another milepost was the introduction of design science within the information systems community by March and Smith (1995). They stress the differentiation of information technology research studies of the artificial as opposed to studies on natural phenomena. The latter aims to provide an understanding of reality and relies heavily on hypothetico-deductive method, which entails theory-testing on relevant empirical data by means of observational hypotheses that can be deduced from these theories (Bechtel, 1988). Natural science includes traditional research in physical, biological, social, and behavioral domains (March & Smith, 1995). Hevner et al. (2004) coined the term behavioral science in their work. This term will be used throughout this dissertation when referring to this paradigm.

Hevner et al. (2004) situate design science next to behavioral science as an additional paradigm. Where behavioral science aims to provide truth about what is 'out there' natural phenomena (Holmstrom et al., 2009), design science has the purpose to provide utility to specific problems. This ontological difference means that with design science the phenomenon has to be artificially created by the researcher. Design science is therefore often called as a problem-solving paradigm. It is believed in design science research that knowledge can be generated through the process of designing such an approach and implementing it as an IT artifact (March & Smith, 1995). Hence, the main differentiator with

behavioral research (analytic) is that design science research (synthetic) is usually problem driven, and seeks utility rather than truth as the research goal and outcome (Hevner et al., 2004; Venable, 2006). Although the distinction between behavioral and design science is made, it does not invoke separation. Design science research stems from technical disciplines. Similarly to the inseparability between technology and behavior, design science and behavioral science can also not be entwined. The argument for this comes from the pragmatist philosophy that argues that truth (justified theory) and utility (effective artifacts) are two sides of the same coin. Scientific research should be evaluated in light of its practical implications, which implies that the practical relevance of research should be valued equally as the scientific relevance (rigor) of the research (Hevner & Chatterjee, 2010, p.12). All in all, the paradigm that is now labeled as design science research, is defined as follows:

> *'Design science research is a research paradigm in which a designer answers questions relevant to human problems via the creation of innovative artifacts, thereby contributing new knowledge to the body of scientific evidence. The designed artifacts are both useful and fundamental in understanding that problem.' (Hevner & Chatterjee, 2010, p.5)*

This definition reflects the roots of design science research as it stresses two pivotal points that were the center of debate in the information systems discipline. First, it places the artifact on the axial of research. Orlikowski and Iacono (2001) argued that the field has not deeply engaged its core subject matter, the IT artifact and called to begin theorizing specifically about IT artifacts. Second, the focus on the artifact is combined with a priority on professional relevance, thus advocating the pragmatic view of artifacts. Scholars in the field of information systems perceived a lack of relevance in literature (Hirschheim & Klein, 2003; Benbasat & Zmud, 1999). Since, design science research calls for the creation of innovative artifacts to solve real-world problems it adheres to the debates to increase practical relevance and therefore corresponds to a school of thought related to pragmatism (Iivari, 2007). It should however be noted that practical utility alone does not define good design science research. It is the synergy between practical relevance and scientific relevance (rigor) that define good design science research (Hevner, 2007). Although design science research can be indicated as practical science, the aim is to increase fundamental design knowledge that is extremely useful (Hevner & Chatterjee, 2010, p.3). Design science research should be inspired by considerations of use but also should entail a quest for fundamental understanding. It thus is understood to have potential practical utility, but researchers who conduct such research do not lose sight of the goal of advancing scientific understanding. On this note, it

is worthwhile mentioning that design science research should not be confused with routine design practice. Applying best practices and conducting routine design does not involve the creation of new knowledge. When knowledge is added to the scientific repository by documenting that the new artifact is better, faster, or more optimal through rigorous evaluation methods and comparison with similar artifacts, then new knowledge is indeed created and this would be considered design science research (Hevner & Chatterjee, 2010, p.7).

2.3 Design science research framework

Hevner et al. (2004) adapted the seminal thinking of sciences of the artificial (Simon, 1996) to manifest their ideas about what good design science research constitutes. In their influential paper the authors introduced the design science research framework. The framework aims to provide an understanding of how to conduct, evaluate, and present design science research to information science researchers and practicing business managers (Hevner & Chatterjee, 2010, p.12) and is depicted in Figure 2.1.

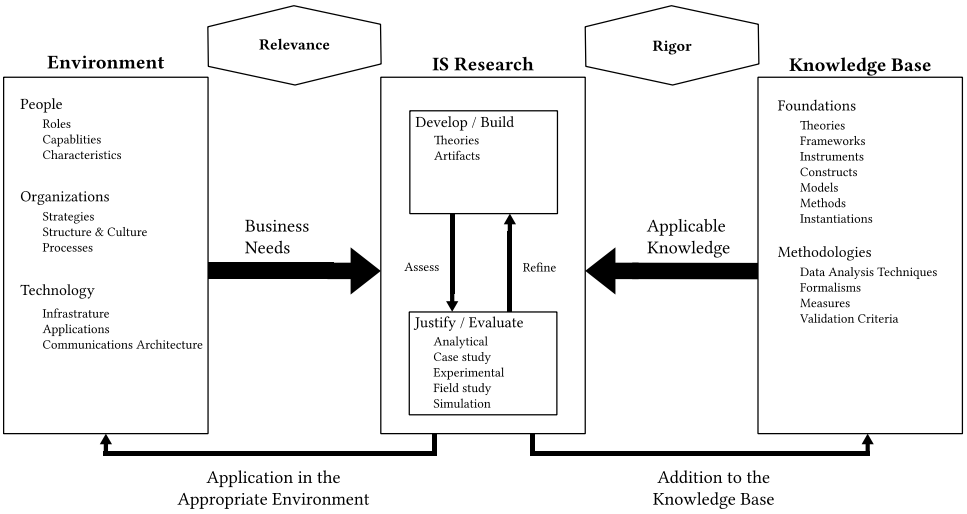


Figure 2.1. Design science research framework

The environment reflects this problem domain or problem space (Simon, 1996) in which the phenomena of interest resides. The context or environment consists of people, organizations, and technology. This environment contains the 'goals, tasks, problems, and opportunities'

that define the needs. This need is imperative as the objective of design-science research is to develop technology-based solutions to relevant business problems. Applicable knowledge, including knowledge from past research (e.g., theories, frameworks, constructs, and methods) and knowledge about research methodologies (e.g., data-analysis techniques, formalisms, measures) are used as a foundation to study an artifact or theory in a particular context. Both (business need and applicable knowledge) give input in the to the research process. This research is conducted in two complementary phases. Behavioral science addresses research through the development and justification of theories that explain or predict phenomena related to the identified business need. Design science addresses research through the building and evaluation of artifacts designed to meet the identified business need. Both phases result in an appropriate application in the environment, and enhance the knowledge base with additions from the information systems research part.

2.4 Design science research methodology

Design science research offers an important paradigm for conducting applicable, yet rigorous, research, i.e., research that is closer to information system's applied raison d'être (Peffers et al., 2008). Although the framework by Hevner et al. (2004) provides some guidance to define design science research, others filled the void of an existing a conceptual process and mental model for carrying it out and presenting it. Such a conceptual process helps researchers with their conceptual process for successfully carrying out design science research and a mental model for its presentation. Based on the work of Takeda et al. (1990), Vaishnavi and Kuechler (2008) developed the general methodology of design science research. This consists of a nominal process for conducting design science research. The research phases cover elements that are proposed in similar design science research processes or methodologies (e.g., Verschuren & Hartog, 2005; Peffers et al., 2008; Offermann et al., 2009; Carlsson et al., 2011). It should be noted that this process is similar to the regulative cycle (Van Strien, 1986; Van Dijk et al., 1991), which is used in social sciences. The design science research methodology comprises of five process steps (see Figure 2.2), each with their own output. Main differentiator with other design science methodologies is its emphasizes on knowledge generation inherent in the method and because it originated in an analysis of the processes inherent in any design effort. Each process step will be elaborated on in the next sections. The methodology has previously proven its value by its successful application in the context of for instance, the facilitation of reusing experience among software project managers (Petter & Vaishnavi, 2008), IT performance management (Ardakan & Mohajeri, 2009) and user innovation workshops in Second Life (Helms et al., 2010).

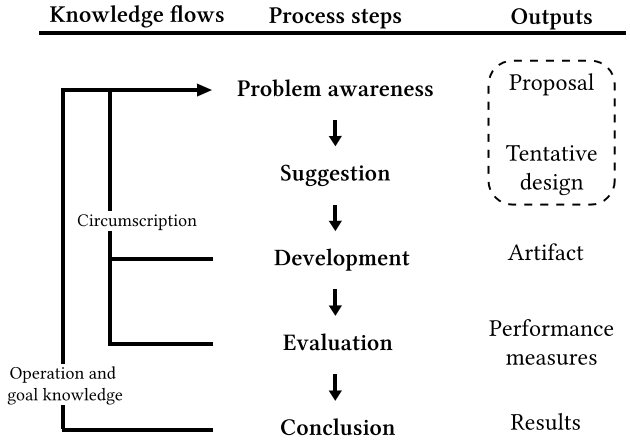


Figure 2.2. The general methodology of design science research

2.4.1 Problem awareness

This phase is the beginning of a design science research and encompasses the problem identification and motivation (Peffers et al., 2008; Carlsson et al., 2011) and identifies the need (Rossi & Sein, 2003) that will be addressed by the proposed research as good design science research often begins with (Hevner, 2007). The problem needs to be adequately defined so that it is notable and worth further investigation. It also needs to be properly scoped so that the solution can be properly developed and effectively evaluated. An awareness of an interesting problem can come from multiple sources: new developments in industry or in a reference discipline. The output of this phase is a proposal, formal or informal, for a new research effort.

2.4.2 Suggestion

Following the proposal is the suggestion phase, which is intimately connected to this. This is depicted as the dotted line marked around proposal and tentative design, subsequently the output of the suggestion phase. A tentative design and the predicted performance of a prototype based on this design would naturally be an integral part of a design science research proposal. The idea of a proposal can be discarded by the researcher if, after careful consideration, a tentative design does present itself. The essentially creative new step, based on a novel configuration of either existing or new and existing elements, leading to functionality, is termed suggestion. Human creativity as a still poorly understood cognitive

process, allows for the following criticism of this step: the introduction of no repetition in the design science method. An example that this step has necessary analogues in all research methods can be explained through positivist research. In this type of research, it is eminent that creativity is inherent in the leap from curiosity about organizational phenomena to the development of appropriate constructs. These in turn operationalize the phenomena and an appropriate research design for their measurement.

2.4.3 Development

In this phase the further development and implementation of the tentative design takes place. In order to complete the design from the tentative stage, creative effort is required. Depending on the artifact to be constructed, a variety of implementation techniques are possible. In order to verify an algorithm, construction of formal proof may be required. Software development, using a high-level package or tool, is another requirement when dealing with an expert system in a certain area of interest involving novel assumptions about human cognition. For the given artifact, the implementation can be rather straightforward, involving novelty to solely the point of state-of-practice, as the novelty is not required in the construction of the artifact but mainly found in the design.

2.4.4 Evaluation

After construction, the proposal (awareness of problem phase) shows the explicit criteria against which the artifact is evaluated upon, however the evaluation that takes place is almost always implicit. From both a quantitative and qualitative viewpoint, any deviations from the expectations must be prudently noted and tentatively explained. This is due to the analytic sub-phase (within the evaluation phase) in which hypotheses are made about the behavior of the artifact. Analysis can either confirm or contradict a hypothesis according to positivist research. At this point in general, the research effort can be considered to have concluded, however the ball has just started rolling for the design science researcher. In design science research, initial hypotheses with regard to behavior are mostly evaluated by additional information about the construction and workings of the artifact as well as the results from each phase. By making new observations, explanatory hypotheses are modified and are almost never abandoned. The variations in theoretical performance leads to different directions of new library research, which in turn suggests a new design. Philosophers of science from many communities have observed this trend and are working from it. New theories that emerge in this way do not necessarily have to be discarded.

2.4.5 Conclusion

Despite the existence of variance in the behavior of an artifact from the multitude of hypothetical predictions, the results are deemed satisfactorily sufficient, thereby making this the final stage of a specific research effort. The obtained knowledge from the results of the effort are mostly seen as substantial facts and described as such, thereby giving them the status of being learned and available to be repeatedly applied or as behavior that can regularly come forth. In contrast the obtained knowledge can also be seen as behavior that contradicts any explanation and must be subjected to further research.

2.5 Design science research in this dissertation

This dissertation research exercises the principles of design science research and adopts subsequently the conceptual ideas of design science research as discussed in the previous section. With an understanding of design science research the research methodology as employed in this dissertation can be presented. The general design cycle (Kuechler et al., 2008) is used as a roadmap and serves as a guide through the design science research process as described in this thesis emphasizing on artifact development and knowledge generation. Figure 2.3 depicts the overall research methodology as employed in this dissertation.

The figure indicates a strong interrelationship between the theory of design (design science) and theories about explaining and predicting (behavioral science). The latter yields theories that say what is, how, why, when, and what will be (Gregor, 2006). The interrelationship entails the following. Knowledge of people and information technology capabilities informs the design and development of new information system artifacts. These artifacts can then be studied in terms of explaining and predicting theory, for instance what effects do the artifacts have in society. There are many examples in the history of science of the interaction between scientific knowledge and technologies. The following example put forth by Gregor (2006) clarifies this relationship. The invention of the telescope allowed Galileo to make astronomical observations and confirm predictions made from theory about the phases of Venus (Gribbin, 2002). Yet, a design theory for a telescope relies on knowledge of optics for its design principles. The artifact is used similarly to the example. The artifact built in this dissertation is used as experimental object to justify the developed model. In sum, behavioral science and design science are heavily intertwined in this research. The research phases will be detailed below, which include the purpose of the phase (the reason for conducting the study or the aims of the study), the methodology that is used (the approach to the topic and

the theoretical or subject scope of the study), and referrals to the analyses and results in the related chapters.

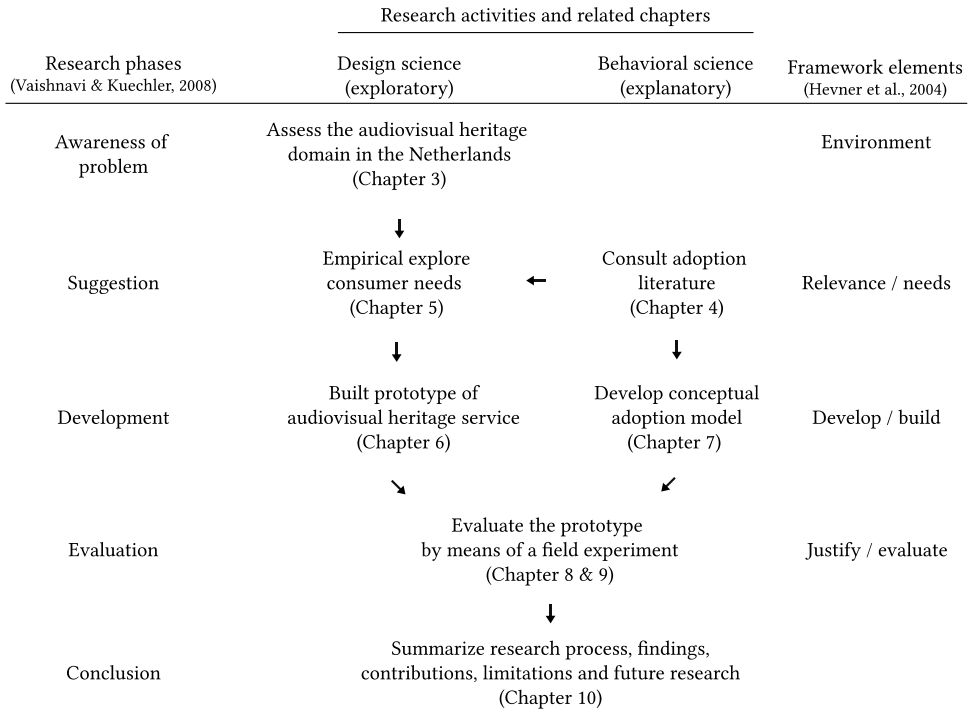


Figure 2.3. Summary of research activities and chapters related

2.5.1 Awareness of problem

This step entails the assessment of the audiovisual heritage domain in the Netherlands. Hevner et al. (2004) state that the artifact is applied in the appropriate environment. To date it is unclear what the audiovisual heritage domain looks like. The purpose in this phase is therefore to outline the Dutch audiovisual heritage domain by identifying the research domain and investigate the problem space. The identification and understanding of the research domain serves as a starting point for research problem development and for conducting research. The rationale for this study is twofold. Firstly, it sketches the context in which the to be designed audiovisual heritage service has to be implemented. Moreover, it provides an overview and assessment of current employed audiovisual heritage services. Secondly, the phase includes the acquaintance of the problem domain by the designer or researcher (Verschuren & Hartog, 2005). If the researcher is not up to date and well informed

in this respect, the artifact to be designed and produced most probably will not be sufficiently innovative (Csikszentmihalyi, 1996). Hence, it supports the familiarization of the problem area, which is considered an important step in the problem area identification (Vaishnavi & Kuechler, 2008, p.86).

The environment is analyzed by means of a case study. Case studies are tailor-made for exploring new processes or behaviors or ones that are little understood (Hartley, 1994). Hence, the approach is particularly useful for responding to *how* and *why* questions about a contemporary set of events (Leonard-Barton, 1990). The case study examines the global nature of the audiovisual heritage domain and takes thus the form of holistic design (Yin, 2008). A generic business model (i.e., STOF model) is used to guide the analysis and description of the case study. Chapter 3 reports more details on the case study of the Dutch audiovisual heritage environment.

2.5.2 Suggestion

This step is concerned with the empirical exploration of user needs. The suggestion phase aims to gain further insight into the problem domain and form a basic solution through initial analysis. To work towards the design of the audiovisual heritage service, one of the main sources used in design science research is creativity (Hevner & Chatterjee, 2010, p.13). Based on logical reasoning, integration of disparate knowledge, and sometimes imagination, reasonable hypotheses and potential solution ideas are generated. Although it is important to keep in mind that every design science project requires a certain level of creativity by the designer (Hevner & Chatterjee, 2010, p.31) the role of the end user is minimal. Hovorka and Germonprez (2011) argue that fundamental individual behavior is currently not recognized in most design science research. There continuously exists a culture based on the notion of trying to achieve perfect software, which heavily relies on the creativity of the designer or as Koopman and Hoffman (2003) labels it: an in-your-face manifestation of designer-centered design. In contrast to prior design science research this dissertation assumes that the purpose of artifacts is to enable human participants to accomplish goals related to information or decision-making, and are not ends in and of themselves. This places technology in the role of mediation, which enables and constrains individual behavior, and expands the system design boundary beyond the technological artifact. Technology provides and imposes structure, context, and negotiation between participants and a system, which is in line with Bevan's view of the artifact as described in section 1.5. This dissertation thus views individuals as active and intentional actors, and not merely collections of cognitive processes and characteristics (Bannon, 1991). This research therefore explicitly includes an exploration to

the needs of prospective users concerning an audiovisual heritage service as a source to suggest a design of the artifact (Chapter 5). The basis of this exploration is provided by theories from previous adoption studies. Hence, before heading to the exploration of the user needs the theories are stressed. Chapter 4 describes in more detail theories of user acceptance and use, which are commonly used in the field of communication science, and information systems research. These theories also provide input in the model (Chapter 7) that is used for evaluation purposes.

2.5.3 Development

This step then entails the development of built the prototype of the audiovisual heritage service. This stage thus implements the suggested design into a working prototype. This activity includes determining the artifact's desired functionality and its architecture and then creating the actual artifact (Peffers et al., 2008). As this dissertation takes a consumer perspective the artifact primarily functions as experimental object (cf., Vaishnavi & Kuechler, 2008, p.16). The development of a prototype as artifact supports the exploration and understanding of the proposed approach and enables the enrichment of the scientific (behavioral) knowledge base, but also utilizes this knowledge base to apply knowledge in the development process. The prototype can be characterized as an (expository) instantiation and is used to illustrate how a systems functions (Gregor & Jones, 2007). Prototyping has been referred to by many researchers as a good way of getting feedback from end-users (Mathiassen et al., 1995). Chapter 6 details the architecture and the interface of the audiovisual heritage service prototype.

Furthermore, based on the different theories from allied disciplines a conceptual model is developed, which is utilized for the evaluation of the artifact. This dissertation takes a side trip to behavioral science theories. Since user adoption is considered a pivotal factor in determining the success or failure of a technology (Davis, 1993), a model of the adoption of audiovisual heritage services is developed. Hypotheses are formulated based on prior academic work. The model and its related hypotheses are outlined in Chapter 7.

2.5.4 Evaluation

This stage determines how well the prototype addresses the research questions and tests the developed model against the built prototype. For design science research, there are a wide range of evaluation methods and patterns that can be used, including traditional experimentation, simulation, case study, user study, action research, etc. (Baldwin & Yadav,

1995; Zelknowitz & Wallace, 1998; Hevner et al., 2004). For the assessment of the developed model against the built audiovisual heritage service a field experiment method is adopted. Since this research aims to provide insights in the development and adoption of an audiovisual heritage service for the general public, the survey method provides a usable approach. Surveys are useful in describing the characteristics of a large population. This capability to generalize to the population at large is a unique feature possessed by this method. Furthermore, it is the most common used method in the studies that are examined in the suggestion phase. Via this method the model is tested and the prototype is evaluated. The results of this evaluation are reported in Chapter 8.

In addition to the quantitative assessment of the adoption model, the willingness to pay is examined. To investigate the viability of the service, this dissertation assesses the willingness to pay among prospective users. The willingness to pay for audiovisual heritage content is answered in the same chapter.

2.5.5 Conclusion

At this stage, the findings from development and evaluation stages are analyzed, summarized and reported. It signals a periodical conclusion of the research but can inspire further work or future studies. The findings may be theorized and contribute to a mid-range design theory (Gregor & Jones, 2007) that can guide the development and application of similar approaches and systems. In this dissertation, concepts of the system were theoretically defined and summarized after the development and evaluation, and a set of theoretical propositions were made to inform a mid-range theory. Chapter 9 reports some discussion on theorizing the design, contributions, research limitations and future research.

2.6 Positioning the research in the diffusion process

Before heading to the methodological chapter of this research, it is imperative to discuss the position of the research in light of the diffusion process. A novel innovation is diffused in several phases. In this section, the position of the research in this dissertation is discussed by means of the conceptual ideas of Rogers. Rogers (2003) is considered the 'godfather' of scientific research into the diffusion of innovations or technology[2] (Bouwman et al., 2005,

[2] The terms innovation, technology and (new) media are used interchangeably as all represent a novel artifact that is to be marketed.

p.6), Diffusion research centers on the conditions, which increase or decrease the likelihood that members of a given culture will adopt a new idea, product, or practice. The main idea is that media as well as interpersonal contacts provide information and influence opinion and judgment. Studying how innovation occurs, Rogers (2003) argued that it consists of four stages: invention, diffusion (or communication) through the social system, time and consequences. The information flows through networks. The nature of networks and the roles opinion leaders play in them determine the likelihood that the innovation will be adopted. Innovation diffusion research has attempted to explain the variables that influence how and why users adopt a new information medium, such as the Internet. Opinion leaders exert influence on audience behavior via their personal contact, but additional intermediaries called change agents and gatekeepers are also included in the process of diffusion. Five adopter categories are: (1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards. These categories follow a standard deviation-curve, very little innovators adopt the innovation in the beginning (2,5%), early adopters making up for 13,5% a short time later, the early majority 34%, the late majority 34% and after some time finally the laggards make up for 16%.

Based on the work of Rogers, Arnold and Geser (2008) developed a model of the maturity life cycle of technologies to serve as a tool for collecting the views and assessments of the different stakeholders and, in order to provide a consolidated framework for the cultural heritage sector. The framework takes the different phases that a research and development (R&D) department goes through when developing a new service product into account. The diffusion of new technology traditionally begins with a pilot phase, wherein different prototypes are constructed. Innovative companies often adopt these prototypes to fill a niche in the market. When there is a clear and viable business case, larger companies create a de facto standard, after which diffusion takes place in the majority groups and then in the laggards. These phases are similar to other innovation processes (e.g., Andriessen, 1989; Bouwman et al., 2005). In addition, they also identified two chasms, which are identified as thresholds in developing ICT services within cultural organizations. The first chasm involves the transfer of prototypes to early adaptations in the market. Within the field of cultural heritage the diffusion, of research prototypes is often impeded by the fact that 1) there are few organizations that convert applied-research into sustainable service solutions, 2) the cultural heritage market is not a competitor market, and there is therefore no need to seek competitive advantage, and 3) academic researchers have no incentives to support the further development of the services they recommend. The second chasm or threshold in developing services within the field of cultural heritage is the lack of adequate technical

knowledge. Cultural organizations are mostly small or medium sized organizations that employ few technical experts; they are generally understaffed and have small budgets. A graphical representation of the framework can be viewed in Figure 2.4.

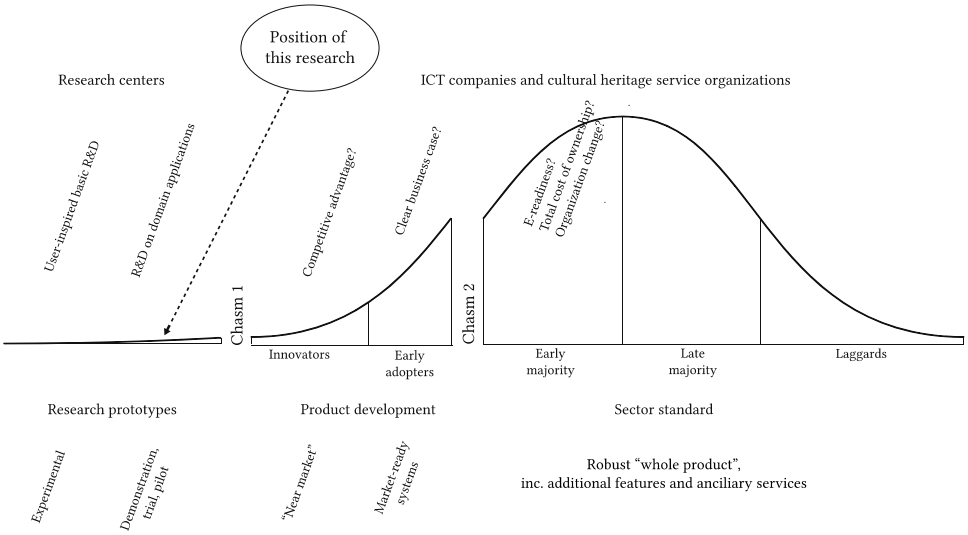
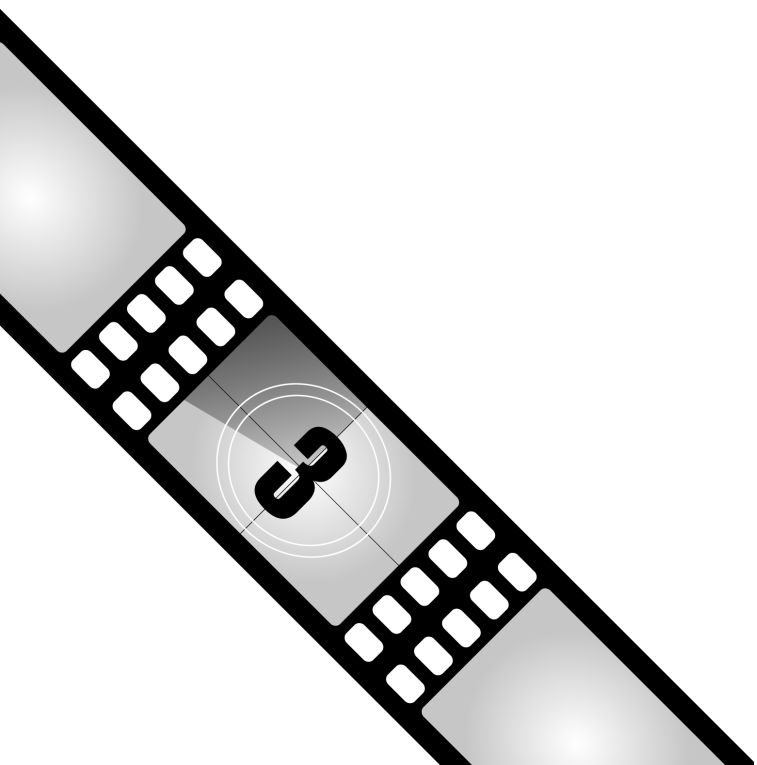


Figure 2.4. Position of this research in the technology maturity life-cycle model

The research conducted in this dissertation acts on the interplay between technology and use. Figure 2.4 positions the research presented in this dissertation by means of the innovation process of technology, which reflects this interplay. This research tries to avoid the pitfall of focusing on either design (technology) or adoption and use by studying a technology (digital audiovisual heritage service) in an early stage of development. Research positioned between the technology and its (intended) use and users comes from different disciplines such as communication science, information systems and psychology (similar to Figure 1.1).

CHAPTER 3

AUDIOVISUAL HERITAGE DOMAIN



3.1 Introduction[3]

After discussing the research methodology of this dissertation in the past chapter, a closer look at the audiovisual heritage domain in the Netherlands will be taken in this chapter. By means of a well-established business model, the organizational issues, the service issues, technology issues, and financial issues of the Dutch audiovisual domain are examined. This exercise provides an overview of the shape of this domain. Such analysis of the domain presents insights into the preconditions for provision of fruitful and viable services that can be build upon the audiovisual archives. Hence, the purpose of this chapter is to answer the first sub question lay out in the first chapter:

> *What are the internal (i.e., stakeholders, extant services, financial arrangements and technological issues) and external factors (i.e., technological advancements, market dynamics and legislation) that affect the Dutch audiovisual heritage domain?*

The type of method that is applied is that of a single descriptive case study, as the study offers an empirical enquiry in which a contemporary phenomenon is investigated within its real-life context where the boundaries between phenomenon and context are not clearly evident (Yin, 2008). For this study multiple sources of evidence are used (e.g., documents, archival records and interviews) where the unit of analysis pertains a single unit of analysis aiming to study the global nature of the phenomenon. Since this single case study describes a unique context it is considered a holistic case study (Yin, 2008). For this case study the STOF model (Bouwman et al., 2008) is adopted for analyzing purposes. This framework entails a business model that is frequently used in the field of development and implementation of IT services. The application of this framework encompasses an explorative analytical description, rather than an explanation, of the dynamics in the audiovisual cultural heritage domain.

The remainder of this chapter is structured as follows. In the following section the STOF model is outlined that encompasses theoretical propositions to guide the analysis of the audiovisual heritage domain. The next and penultimate section yields the results of the

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[3] A preliminary version of this chapter has been published in *Telematics and Informatics* (Ongena et al., 2012); some parts were included in a publication in the *Observatorio (OBS*) Journal* (Courtois et al., 2010).

Dutch audiovisual archive sector according the elements adopted from the STOF model. This chapter is closed by discussing the results and presenting the main conclusions.

3.2 Methodological approach

3.2.1 The STOF model

In general, a business model can be defined as the description of an organization or network of organizations involved in creating and capturing value from technological innovation (Chesbrough & Rosenbloom, 2002). Similarly, the business model concept in the STOF model is described as a blueprint of how a network of cooperating organizations can create and capture value from new innovative services. Bouwman et al. (2008) compared various business model definitions (e.g., Osterwalder & Pigneur, 2002; 2009) and identified four common components: 1) service component: a description of the value proposition (added value of a service offering) and the market segment at which the offering is aimed; 2) technological component: a description of the technical functionality required to realize the service offering; 3) organizational component: a description of the structure of the multi-actor value network required to create and distribute the service offering and to describe the focal firm's position within the value network; 4) financial component: a description of the way a value network intends to generate revenues from a particular service offering and of the way risks, investments and revenues are divided among the various actors in a value network. The four elements of the STOF model and their interwoven relationship are depicted in Figure 3.1.

In addition to the internal business model components, the figure also illustrates external forces that affect the formulation of the business model. The external drivers that influence the business model of a particular service consist of new technological possibilities, the changes in market demand and regulatory issues. Where the eventual service ideally leads to network value as well as customer value. In terms of applicability one can state that the model is successfully used regarding the development of business models for designing business models for mobile services (Haaker et al., 2006), for insurance intermediaries (Bouwman et al., 2005), for the description of critical design issues for IPTV (Bouwman et al., 2008) and in context-aware mobile services (De Reuver & Haaker, 2009).

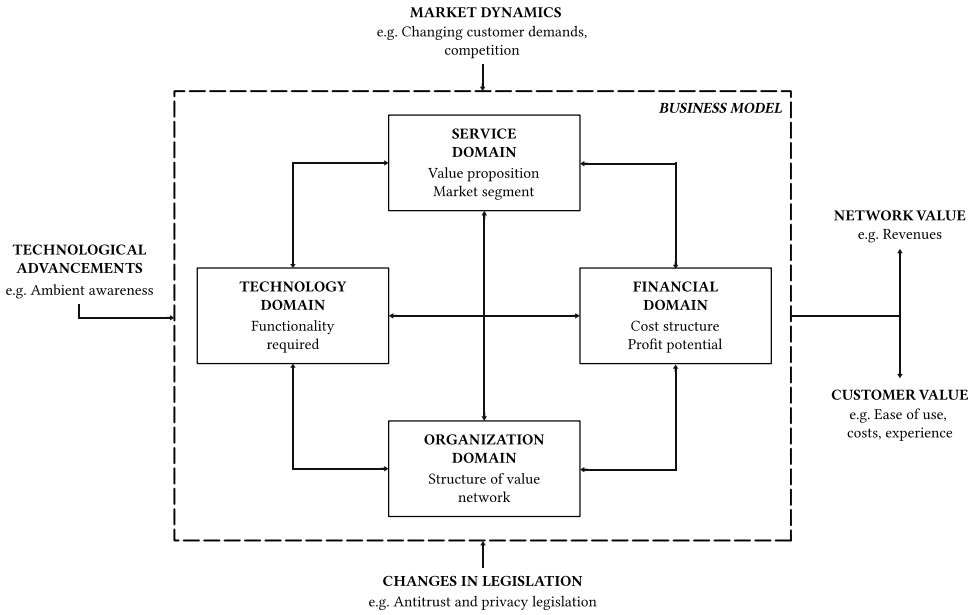


Figure 3.1. The STOF model framework (Bouwman et al., 2008)

3.2.2 Business model components

To develop insight into the way organizations can design well-thought business models, designers need to understand the design issues in business models and their interdependencies. A design issue is defined as a design variable that is perceived to be (by a practitioner and/or researcher) of eminent importance to the viability and sustainability of the business model under investigation (De Reuver & Haaker, 2009). In this section the generic design issues for audiovisual heritage services are addressed that are derived from the original authors (Bouwman et al., 2008). For each design issue the theoretical perspectives and its application in the case study are discussed.

Service design issues

The service domain revolves around the creation of customer value. The provider of a new service intends to deliver added value to the customer through newly developed propositions. Different types of value can be created for customers. For instance, one service focuses on purely functional value (i.e., increasing performance), while other services focus on experiential utilization (i.e., enjoyment). Two additional generic types of value creation are symbolic/expressive value and cost/sacrifice value (Smith & Colgate, 2007). The intended

value proposition and the customers' expected value are separated as prior research identified a gap between the value perceived by the developing and implementing organization and the customer (Parasuraman et al., 1988). Closely related to value propositions is the concept of targeting. Targeting refers to the target group of a particular service.

Organization design issues

The organization domain describes the value network that is needed to realize the particular service offering. A value network consists of actors with certain resources and capabilities, which interact and together perform value activities, to create value for customers and to realize their own strategies and goals. Peppard & Rylander (2006) provides convenient steps to analyze and describe the value network. These steps are adopted in order to analyze the ecosystem of the audiovisual cultural heritage domain. Their analysis approach aims to generate a comprehensive description how value is created in the network. The first step in the analysis defines the boundaries of the analysis that is performed. These are defined from the perspective of the network focal, which is the organization whose business model relies on the network under consideration. The second step is to identify actors that influence the value proposition(s) of the network focal towards the end-users. Third, the value each actor perceives from being a network member is formulated. Fourth, the linkages between the actors in the value network are mapped. Last step consists of an analysis of the previous steps.

Technical design issues

The technical design issues concerned with choices on two different levels. First, choices must be made about the transportation of data. Audiovisual rights-holders seek to maximize the value of their content by exploiting it sequentially across a range of platforms (or 'windows'). This is most pronounced for movies. Movies are typically premiered in cinemas, before being released a few months later on DVD, both as rentals (via video shops) and sell-through (via retail outlets). Release windows for movies follow a rather highly structured pattern across platforms. Turning to television, these windows a less clear. Due to the advent of online video services, the Internet becomes increasingly important as a new release window of television content. The latest trends also show an increase of mobile video use (Gillebaard et al., 2010). Second, middleware is considered an imperative design issue. The middleware component is primarily concerned with the different applications that can be used to view the content. An application for viewing audiovisual archive content must support the playing of video in a specific format. Many file formats exist to accomplish this

and, as stated in the beginning of this chapter, much research is done on this level to preserve audiovisual content. The focus of this design issue lies in the identification of content management systems being used and the technical functionalities of these systems (e.g., the level of personalization).

Finance design issues

The design issues that arise in the financial domain are twofold. First, the costs are a major issue. Traditionally, the costs are divided into fixed costs and variable costs, which add up to the total cost. Fixed capital expenditures for digitization include storage infrastructure, equipment, training and software licensing. Variable digitization costs include per-item scanning and rights clearance. Calculations show that film costs up to €2,000 per hour to restore, ingest and store (Wright, 2001). The production (short-term) of digital content is thus very costly. However, once the fixed costs of digitization are incurred there is a zero marginal cost of providing an additional copy (Kingma, 2000). Hence, the variable costs for the long-term decreases once content is preserved in a digital format. Second, revenues that are obtained should merit attention. Revenue models of cultural heritage projects are usually based on the project's cultural benefits. However, digital heritage collections offer new forms of economic and social benefits when digitized (Comité des Sages, 2010). Based on interviews and workshops with stakeholders in the area of cultural heritage De Niet et al. (2009) distinguished four generic revenue models for the cultural heritage sector (see Table 3.1). Earlier research has indicated that a mixture of revenue streams and channels seems to provide the best chance of success for diffusion (Chan-Olmstad & Ha, 2003).

Table 3.1. Generic revenue models in the cultural heritage sector

Type	Description
Original	Direct physical access to the collection, e.g., retail function (Lewis, 2001).
Digital original	Cultural heritage institution acts as an intermediary for third parties that want to use the collection for new services.
Digital curator	Value proposition is increased by adding contextual data (metadata) to the collection.
Digital brand	The collection provides an image and reputation. Related revenue models include advertising, friends-from-friends and crowd funding
Bundling	A mixture of the above revenue streams types (Bakos & Brynjolfsson, 1999)

3.3 A case study of the Dutch situation

3.3.1 External drivers

Technological advancements

A range of technological advances enabling audiovisual content to be made available to consumers in more convenient forms. These new technologies create opportunities for the development of new innovative services for providing access to the audiovisual archives by the general public. The key technological developments include, the maturity of Internet infrastructure and its rapid uptake, the advent of web 2.0, ubiquitous computing and virtual reality.

First, the rapid take-up of broadband Internet services over the last few years makes the distribution of audiovisual content feasible. The growth in the number of households with broadband connections has subsequently fueled the growth of Internet (Gracy, 2007). Triggered by convenience, cost reduction, ability to use broadband applications and to better perform tasks (Vermaas, 2007) the diffusion of broadband Internet emerged from its innovators to the laggards. Hence, from a demand perspective the deployment of the broadband infrastructure provoked an expansion of Internet usage. From a supplier perspective the development of broadband infrastructures, and more specifically fiber-optic connections, led to a local network to connect the different public broadcasters in the Netherlands. *De Digitale Verbinding* (The Digital Connection) aimed at a fiber optic network between the broadcast organizations in Hilversum where traditionally all public broadcasters are located. This network was completed in 2006 and enables the search and browse of material, the support of reuse of material, improved data handling, a more reliable broadcasting process and the material is ready for use for new media (e.g., the Internet).

Second, web 2.0 applications have emerged on the Internet. Web 2.0 is closely connected to interactivity. Web 2.0 creates opportunities for cultural heritage institutions as it can facilitate the interaction between users and such organizations. This new technology enables the support of adding tags, incorporation of comments and user ratings as audiovisual archives are craving for quality metadata (Hauttekeete et al., 2009). In contrast to these opportunities threats also exist regarding web 2.0 technology as YouTube, a typical web 2.0 application, is indicated more user-friendly, more reliable and has more intuitive metadata than the national audiovisual archive (McKee, 2011). The threat of substitutes (Porter, 2008) is therefore present concerning this domain of audiovisual collections. In summary, one can

state that web 2.0 creates opportunities on the one hand, but enables substitutable services that can be seen as threats on the other hand.

Third technology shaping digital cultural heritage is the omnipresence of new media through the diffusion of mobile devices. In similar vein as these new devices support daily life online activities (e.g., search information, watching video clips) it also enables the accessibility to cultural events as well as the interaction in many ways with a wealth of cultural artifacts. In combination with global positioning systems the mobile device can be used, for instance, as an information aid for archeological visits (Cutrí et al., 2008). Mobile devices thus can create opportunities for cultural institution in many ways.

Fourth, the use of immersive virtual reality applications in museums is a recent trend. For over several years of increasing development virtual reality technologies have matured. Originating from military and scientific applications realm into more multidisciplinary areas (e.g., education, art, and entertainment), although still at the early stages of practical usage (Gaitarzes et al., 2001). A specific type of virtual reality, augmented reality, can be of special interest to cultural heritage organizations. Where virtual reality focuses on the replacement of real life, augmented reality aims to include modalities of the real environment thus pertain to a mixed reality (Azuma, 1997). A number of projects are currently exploring a variety of applications in different domains including cultural heritage (Stricker et al., 2001; Choudary et al., 2009).

Market demand

A major problem with audiovisual archives is that they suffer from what has been called the long tail problem. Anderson's long tail model (2006) can be used to understand the consumption of archive content. According to his model, only a small amount of content (the head or thick tail) would be of interest to a large group of viewers, whereas more exclusive bits of the long tail would be far less popular. The most sound and efficient way to procure a multitude of viewers would be to offer free access to content from the head of the tail. However, it is precisely that type of content that is profitable; the commercial activities of private actors could be undermined and deteriorate if this material were offered for free. For example, a 1960s youth series is recognized as a cultural heritage because it reflects the ethos of an era and the shared experiences of a generation. Figure 3.2 elucidates this model; the different windows are represented by particular kinds of television programs.

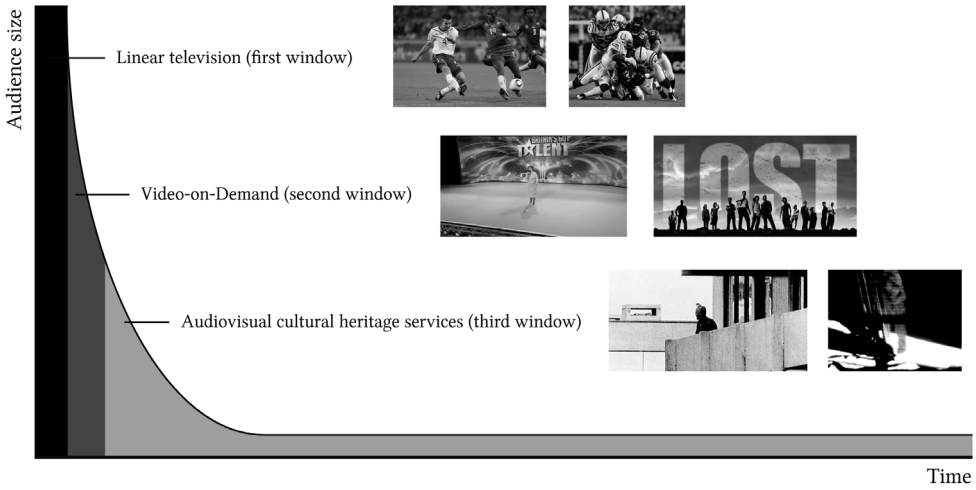


Figure 3.2. Windows of audiovisual content

The first window includes live shows, e.g., sporting events (World Cup, 2010, Super Bowl, 2010). The second window, which is often referred to as video-on-demand (VoD), is available in many forms. For instance, YouTube contains many clips of shows that have been broadcasted, i.e., the performance of Susan Boyle in Britain's Got Talent. DVDs are also included in the second window, a format in which, for example, the series Lost is highly popular. Moreover, as time passes, audiovisual content becomes part of the nation's cultural heritage, e.g., the tragedy of the Munich Games in 1972 or Apollo moon landing of 1969.

Regulation

Culture institutions heavily depend on governmental support as conservation of the audiovisual material is in need of large donations to finance the process of digitization. European legislation offers market interventions for cultural heritage organizations, aided by the state (Courtois et al., 2010). In the Netherlands, a consortium called Sound & Vision (S&V), four other non-profit organizations and a think-tank, initiated a digitization project in 2007 called Images for the Future. Aiming to digitize 30–40% of approximately 700,000 h of video, 22,510 hours of film and 2.9 m photos, it is estimated that, at the end of 2010, 55,000 hours of video will be encoded and archived (Gaarenstroom, 2009). Emphasizing the potential societal, cultural and economic mostly intangible value of the digital content legitimated governmental funding for Images of the Future. Allegedly, it can also generate positive externalities through increased knowledge creation and better-educated people (Verrips, 2006). Dotation for this project originates from a fund financed by the earnings of natural gas in the Netherlands (Fonds Economische Structuurversterking). The new installed

governmental body however decided that further acquired capital is for the exchequer. Precisely what the impact of this desiccation of funding will be for future projects remains to be seen.

3.3.2 Business model components

Organization domain

The process of preserving (digitization) and unlocking audiovisual content consists of steps designed to preserve the integrity of the content. Most archives already have analog material (Teruggi, 2004), which can be digitized; however, archives also produce new content. The first step is therefore identified as 'producing' the audiovisual digital content. This step includes the digitization of analog material as well as the formatting and editing that is needed to make sure the material meets preservation standards. The second step, which prepares the material for retrieval, is the packaging of the audiovisual media. The main activity in this step is the tagging of meta-information to the original data. This metadata is also essential for providing access to the audiovisual assets; metadata transforms the bits of video data into valuable information sources (Wactlar & Christel, 2002). These data (both the bits of video (assets) and the bits of metadata) have to be stored. Because storage is costly and time consuming, it makes up the third step in the process of bringing audiovisual content to consumers. When the content is stored, it can be aggregated and presented, which involves the assembling of different video assets into one service or product. The service or product then needs to be distributed. Finally, it is consumed in the last step of the value network process.

Now that the six steps in the process of the value network have been described, the organizations that are involved in the activities described above are identified. Broadcasting companies are often the most central actors within the supply chain of television and audiovisual preservation. The broadcasters schedule and plan programs into their timetables, after which they either begin producing a certain program, or they outsource this production to a production house. Moreover, production houses also produce programs, which they in turn sell to broadcasting companies. Several studio facilitators play a role in production as do right holders such as actors, directors, and composers. Technical facilitators, in collaboration with the broadcasters, are primarily responsible for the packaging process. In the Netherlands, however, the archiving and digitizing of the archived audiovisual material (usually from public broadcasters) is done by Sound & Vision, as was explained earlier. This institute is a central actor, and therefore the focal company, in the value network. In

addition to digitizing the archive content, this organization also adds meta-information to the video data provides storage facilities to public service broadcasters and has responsibility for the audiovisual archive of the Netherlands. Commercial broadcasters, however, organize their own storage facilities and resources. S&V is experimenting with pilot methods of delivering the archive's content to different users. To accomplish this, they aggregate the content for distribution by different organizations, such as cable companies, Internet service providers or content distributors (hardcopy). Several target groups have been defined as potential consumers of the material in the S&V archive: broadcasters (public/commercial, in and outside the Netherlands), for-profit organizations (i.e., DVDs, CDs, internet, commercial screenings), non-profit organizations (i.e., museums, film festivals), education (i.e., primary, secondary, higher) and the general public (Oomen et al., 2009).

The value network of the audiovisual archive domain in the Netherlands as described above is depicted in Figure 3.3. From the information in Figure 3.3 one can draw the conclusion that there is only one party aggregating audiovisual content, which is in contrast to the model of Arnold and Geser (2008), which indicated that ICT organizations were part of the process of diffusing and unlocking the content. However, recent activities in the development of audiovisual services, in which collaboration between S&V and several Dutch universities has intensified, seem promising.

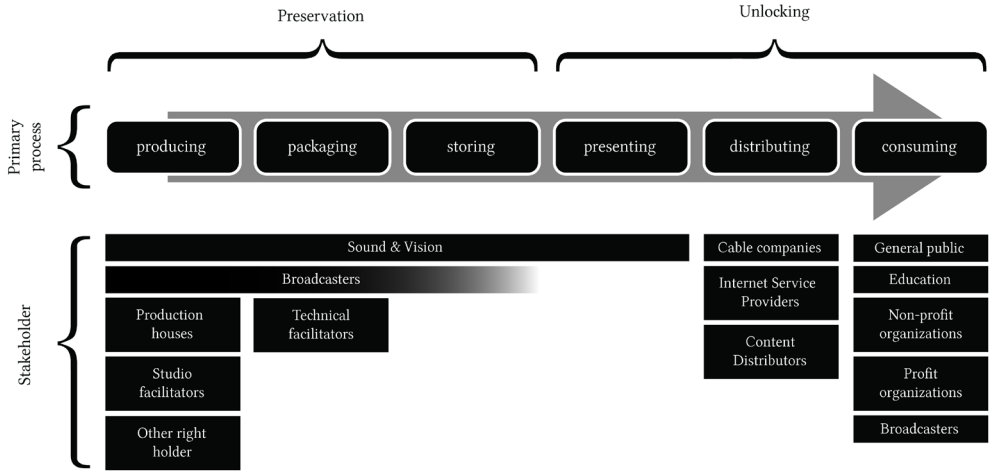


Figure 3.3. Value network of the audiovisual cultural heritage archive

Service domain

Beginning with the development of a museum in 1996, a central national audiovisual archive was born, i.e., *Beeld en Geluid* (S&V). Over the last few years, several audiovisual services have been developed. The development of these services was leveraged when a research and development department within S&V was established, and the archive began experimenting with pilot services. Table 3.2 shows the current services that are offered by S&V. The table indicates the service, the intended value proposition and the target group.

Table 3.2. Audiovisual cultural archive services in the Netherlands

Service	Intended value	Target group
Experience	On site access to an *a priori* selection of content from the audiovisual archive	General public, education
Search and order	Allows search of the database of S&V, with an on-demand service for ordering material.	General public
Dutch Footage	A thematic ordering system of audiovisual content for film editing purposes.	Professional sector (profit, non-profit, broadcasters)
Webshop	Online shop with preselected, categorized DVD content	General public
YouTube Brand Channel	Thematic online access to copyright free audiovisual content through an existing platform	General public
ED*IT	Remix tool with access to an educational database with video, film and sound clips related to Dutch cultural heritage	Education (elementary and high school)
Sound and Vision Wiki	Unlocks knowledge about the S&V collection, with a focus on films, radio and television programs that are being digitized within Images for the Future	General public
Filmotech	Offers access to Dutch films for consumers	General public
Open images	An open media platform that offers online access to audiovisual archive material to stimulate creative reuse based on the Creative Commons license model	General public
Waisda?	Video labeling game for adding descriptions to audiovisual content to enrich archival metadata	General public
Academia	Online collection dedicated to education and research in higher educational organizations.	Higher Education

In general one can state that these services are targeted on the general public provide experiential or hedonic value (e.g., the *experience* and *Webshop*) as it yields emotional and reminiscent experiences for consumers due to nostalgic feelings. Several B2C services have

also been crafted for functional or instrumental value as it enriches S&V contents (i.e., *Waisda?*, *Open images*, and *S&V Wiki*). This instrumental value however is reasoned from the organizations' perspective thus little argued from the end-users point of view. Furthermore, few services however contemplate on symbolic or expressive value. Value propositions that reflect such value relate to concepts as self-identity, self-expression, and personal meaning.

Although, overall, the service components indicated promising results when seen in conjunction with the number of services and the anticipated target groups, it remains unclear how often these services are used and whether they reach its potential audience. The main challenge in this domain is the gap between the intended value and the perceived value. Although numerous experimental services have been developed, little research is available on the user side of these services. A vital aspect of service development is determining how to efficiently and effectively involve end users in the service design and collect information on their preferences, experiences and behavior (Steen et al., 2008).

Technical domain

Regarding the transport layer design of the services few impedances exist. The *De Digitale Verbinding* consisting of a fiber optic network between the broadcasters provides the local loop connection. In addition the penetration of broadband connections in the Netherlands is rather high (Gillebaard et al., 2010) thus ensuring little threats for delivering high quality video services to end-users.

With regard to middleware and content layer one can state the following. The services use mainstream online software such as MediaWiki or YouTube. This increases their interoperability with users because browsers are adapting to these technologies, making them easily available. No additional software or hardware is therefore required to access the current audiovisual cultural heritage archive services of S&V by consumers.

Since the transport, middleware and content layer solutions have been well developed by many equipment providers and software companies the technical issues are less critical.

Finance domain

Each stakeholder performs value-adding activities in the primary process. However, every action in this process requires many hours of labor, which in turn require financial compensation. The Images for the Future project is of significant importance to S&V. This

project enables the digitization of a large amount of their audiovisual archive. The budget of Images for the Future has been appraised at €173m and is funded primarily by the Dutch Government (Ministry of Education, Culture and Science). Of this budget, €154 m originates from a fund financed by the earnings of natural gas in the Netherlands (Fonds Economische Structuurversterking). Approximately €19m has been reported to be derived from the market. When viewing the detailed breakdown of the budget, one can see that a large part of the budget of Images for the Future is allocated for S&V (69%). Table 3.3 provides a detailed monetary breakdown of the budget of S&V within this project.

Almost three-quarters of the total budget is reserved for the conservation, digitization and adding of metadata to the audiovisual content as can be seen in the above table. These activities correspond to the preservation of audiovisual content step in the value chain. One can also see that that no significant budget has been allocated to the development of services to allow access to the digitized audiovisual content despite the fact that part of the funding has been derived from the market.

Table 3.3. Financial breakdown of Images for the Future's budget for S&V

	2007	2008	2009	2010	2011	2012	2013	Total	%
Infrastructure	420	660	900	1,140	1,380	1,620	1,860	7,981	6.7%
Conservation, Digitization, Technical unlocking, Metadata	10,053	11,939	12,567	12,567	12,567	13,195	15,080	87,968	73.8%
Contextualization	2,244	2,665	2,805	2,805	2,805	2,945	3,366	19,635	16.5%
Copyright	414	492	518	518	518	544	621	3,625	3.0%
Total	13,132	15,755	16,790	17,030	17,270	18,304	20,928	119,209	100%

Hence, one can state that the financial focus has been on preservation of the audiovisual material through donations from governmental institutions. However, subsidized services are only one method of providing access, revenue models are another. Upon investigation of the payment models for the services mentioned in Table 3.2, it is found that seven of the services require their users to pay a fee. However, several of the services (i.e., *Search and order*, *Dutch Footage*, *Webshop*) are priced according to the production of the DVD, thus leaving little space to increase the return on the investment. Additionally, the educational services (i.e., *ED*IT*, *Academia*) use a licensing model wherein payments are made on a per user basis. The other services, which serve the general public, are free (i.e., *YouTube Brand Channel*, *Open images*, *Sound and Vision Wiki*, *Waisda?).* However, two comments have to

be made regarding these services. First, two of these services serve not only the general public but also have added value for the contextual data of the audiovisual content. The *S&V wiki*'s purpose is to enrich the knowledge about the S&V collection. *Waisda?* has a similar purpose; through a video labeling game, the metadata of the content in the archive can be enriched by the users. Second, a different department within S&V, namely, the R&D department, developed these services.

Applying the five possible revenue models of De Niet et al. (2009) to the services of S&V shows that all of the services allow direct physical access to the collection. This means that all of the services correspond to the 'original' type (Table 3.1). This is felicitous for educational services and for the general public.

Financially speaking, it is auspicious to see the subsidies that have been invested to preserve the national audiovisual heritage. However, this situation is a result of the high cost of digitization, which has created a lack of market interest in the digitization of audiovisual material.

3.4 Conclusion

This exploratory study on the services that are currently being developed to allow access to audiovisual archives shows the impact of design issues. Applying the components of a generic business model to the Dutch audiovisual archives provides new perspectives on these design issues. This chapter tried to answer the following research question:

> *What are the internal (i.e., stakeholders, extant services, financial arrangements and technological issues) and external factors (i.e., technological advancements, market dynamics and legislation) that affect the Dutch audiovisual heritage domain?*

The results of the case study display an imbalance between the different factors of the STOF model regarding the audiovisual cultural heritage archive domain in the Netherlands. Gaps are revealed in the development of services for audiovisual archives. The gaps or issues pertain to the technical aspects, service aspects, organizational aspects and financial aspects. Technical opportunities are numerous and although not always present in current services the research and development department of Sound & Vision is exploring these possibilities for future services. These possibilities include the use of personalization through web 2.0

technology and mobile augmented reality. In sum, one can conclude that the technical component presents few impediments and is therefore least of an issue. With regard to the service domain one can state that cultural heritage institutions associated with these archives are focused on preserving their content and are thus concerned with the back end of the value network. There is limited attention given to the presentation of the audiovisual content. Little knowledge is available about the end steps in this network and as a result, little is known about the needs of the users of this content. Current services are implemented from a technical perspective (top-down) rather than from a user perspective (bottom-up). The service domain is therefore probably the biggest question mark in this market. The organization component in terms of value network presents issues revolving around the nature of the cultural institution. Cultural organizations are non-profit organizations as is Sound & Vision in the Netherlands. Employees within these institutions are not naturally inclined towards business modeling around development of services. The culture within these organizations can therefore be seen has a hindrance in the development of viable audiovisual archive services. The financial domain shows severe bottlenecks for unlocking the content regarding intellectual property. The clearing of copyrights is one of the main tasks of Images for the Future, but engulfs much time in the primary process. Although business modeling is often strongly related to monetary issues, the audiovisual material in the cultural heritage service is mainly characterized by its cultural value, and its deployment is primarily based on this fact. Within cultural organizations, the economic value of the cultural materials is usually concealed or ignored. In line with previous comments regarding user research, users' willingness to pay, payment conditions and payment methods should be investigated to develop sustainable services for the future. Hence, it is recommended that cultural organizations begin to investigate suitable revenue models to overcome these financial interferences.

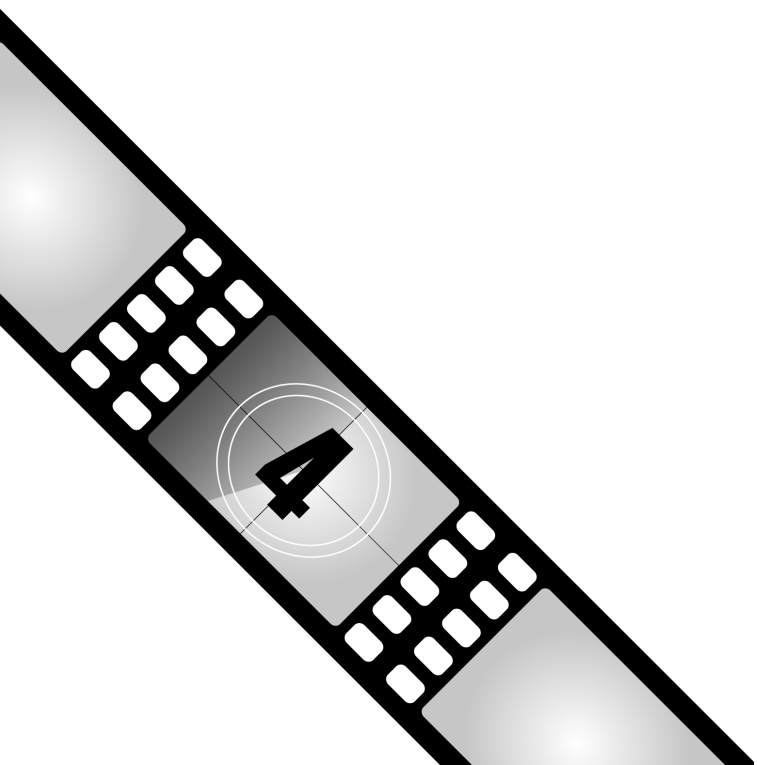
As in any case study, the results presented in this chapter should be interpreted with care, as they are based on documents and direct observations and are not meant to be applicable to large populations. The problem of single case studies, as used in this study, is its limitations in generalizability and several information-processing biases (Eisenhardt, 1989). However, considering the use of multiple sources of evidence and the fact that the adopted approach is established in literature, it is expected that the results provide useful insights.

Summarizing, three problems this chapter are distilled that lead to the next phase of the research. First and far most, the results of this exercise support the focus on the user when developing new audiovisual heritage services. Hitherto, initiatives to disclose the audiovisual

heritage archive can be characterized by innovative projects that are driven by science, and thus drive technology and application. This phenomenon is not new nor is it exclusively associated with the audiovisual heritage domain. Munro and Noori (1988) phrased this phenomenon as follows: scientific discovery triggers the sequence of events, which end in diffusion, or application of the discovery. This underlying motivation and driving force behind the innovation of a new technology can be labeled as technology-push (Schon, 1967). Technology-push implies that innovations are pushed through research and development (R&D), production and sales functions onto the market. In contrast, the need-pull proponents argue that user needs are the key drivers of adoption. It is argued that more than 70% of the innovations could be classified as need-pull, and it is suggested that organizations should pay more attention to needs for innovation than in maintaining technical competence (Meyers & Marquis, 1969). Furthermore, need-pull innovations have been found to be characterized by higher probabilities for commercial success than have technology-push innovations (Zmud, 1984). In line with the school of thought of need-pull, which this dissertation adheres to, the user needs are examined in Chapter 5. As good design science constitutes, these needs are rigorously investigated by means of existing theories. Therefore, explanatory theories are firstly discussed in Chapter 4. Second, technology aspects are not fully addressed in this dissertation. Although much design science focus on new technology in terms of patterns, algorithms or languages (Offermann et al., 2010), the results of the case study clearly indicate that current technology suffices for a possible digital audiovisual heritage service. Third, there is a need for an adequate revenue model for audiovisual heritage services. Although the examination of a revenue model is not the main purpose of this dissertation, willingness-to-pay is addressed in Chapter 8.

CHAPTER 4

THEORIES OF USER ADOPTION



4.1 Introduction

This chapter addresses the origins and birth of theories, the underlying assumptions, and definition(s). Hence, this chapter tries to answer the second sub-question of this dissertation.

> *What relevant existing technology acceptance theories can provide insight in the adoption of digital audiovisual heritage services?*

For the discussion of theories, theories on explaining and predicting media or technology user behavior are examined and discussed. Two streams of research are prevalent, namely theories that stem from the communication and media discipline, and the information systems discipline. First, the theory of planned behavior (Ajzen, 1991) is discussed, which evolved from the theory of reasoned action (Fishbein & Ajzen, 1975). Second, the oldest theory is discussed (uses and gratifications theory) which stems from 1959. The predominant psychological theory in information systems is then addressed, which is the technology acceptance model (Davis, 1986). Also, the unified theory of acceptance and use of technology is discussed (Venkatesh et al., 2003). Due to continued criticism on this theory (Ruggiero, 2000) scholars switched to a more theoretical perspective by taking a social-cognitive theory (Bandura, 1986) perspective and will subsequently be addressed by means of the new model of media attendance (LaRose & Eastin, 2004).

4.2 Theory of reasoned action / planned behavior

The fundamentals of the theory of reasoned action (TRA) emerged from the field of social psychology. Sprouted from literature revolving around Expectancy-Value Models Ajzen and Fishbein formulated the TRA around 1980 (Fishbein & Ajzen, 1975). The model addresses the discrepancy between behavior and attitude, the latter being subject to social psychologists for years. TRA comprises of three general constructs: (1) behavioral intention, (2) attitude, and (3) subjective norm. The model proposed that a person's behavior is determined by the person's intention to perform the behavior and that this intention is, in turn, a function of the person's attitude toward the behavior (Ajzen & Fishbein, 1980). One of the potential reflectors of possible behavioral outcome is intention. Intention is the cognitive representation of a person's readiness to perform an intended behavior, and it is considered to be the immediate indicator of behavior. Behavioral intention measures the relative strength of a person's likelihood to perform an anticipated behavior. It comprises motivational or attitudinal factors that capture how persons are engaging to perform the

intended behavior (Ajzen, 1991). Thus, TRA conjectures that behavioral intention is the most influential predictor of behavior.

The theory of reasoned action is concerned with rational and systematic behavior (Chang, 1998), which means that the theory assumes that individuals have control over their behavior. This assumption has been widely criticized. Sheppard et al. (1988) stress two problems with TRA. First, the prediction of behavior from intention is problematic because a variety of factors in addition to one's intentions determine whether the behavior is performed. Second, there is no provision in the model for considering either the probability of failing to perform one's behavior or the consequences of such failure in determining one's intentions. Such considerations are incorporated into the theory of planned behavior (TPB) (Ajzen, 1985; Ajzen, 1991). In comparison with the theory of reasoned action, the theory of planned behavior adds perceived behavioral control as a determinant of behavioral intention. The theory of planned behavior is therefore an extension of the theory of reasoned action. Perceived behavioral control can be conceptualized as the consumer's subjective belief about how difficult it will be for that consumer to generate the behavior in question.

The theory of reasoned action and the theory of planned behavior are both depicted in Figure 4.1.

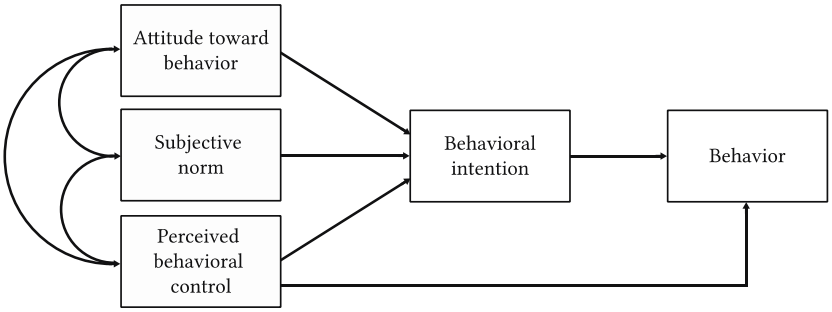


Figure 4.1. Theory of reasoned action (TRA) / planned behavior (TPB)

The theory of reasoned action and the theory of planned behavior have been applied and validated in a large number of studies in many research disciplines, for instance healthcare (e.g., O'Boyle et al., 2001), tourism (e.g., Han et al., 2010; Hsu & Huang, 2012) and traffic psychology (e.g., Chen & Chao, 2011). It also has been utilized in various user acceptance studies in the field of information systems, which is more of interest to the research that is conducted in this dissertation. In the late 80s Davis, Bagozzi and Warshaw (1989) used the

model to predict user acceptance of computer technology. Later Hebert and Benbasat (1994) used the model to understand the adoption of information technology in hospitals. It has also been applied to senior management and strategic information systems (Mykytyn & Harrison, 1993), expert systems (Liker & Sindi, 1997) and Internet banking (Liao et al., 1999; Tan & Teo, 2000; Shih & Fang, 2004). Furthermore, especially the TPB has proved to be of value in field of e-commerce, as it predicts Internet purchasing (George, 2004) and online grocery buying intention (Hansen et al., 2004) by consumers.

4.3 Uses and gratifications theory

The oldest psychological theory to explain media use is a theory of need: the U&G theory. The year 1959 is considered the official birth of the uses and gratifications theory (Bryant & Miron, 2004). In that year, Bernard Berelson claimed that communication research appeared to be dead (Berelson, 1959). Elihu Katz responded that research should move from what media do to people (persuasion) to what people do with the media (Katz, 1959). That controversy switched mass communication research from a passive-audience paradigm to an active-audience philosophy. Thus, at the core of uses and gratifications theory lies the assumption that audience members actively seek out the mass media to satisfy individual needs. It is believed that audience members actively use various media to fulfill certain needs or goals (Katz et al., 1973). Katz et al. argued that audience members choose a medium and allow themselves to be swayed, changed, and influenced – or not. Two other assumptions are that audiences also use media to fulfill expectations, and that audience members are aware of and can state their own motives for using mass communication (Infante et al., 1997).

In general, in defining U&G it is stressed that research scrutinizing uses and gratifications are 'concerned with the social and psychological origins of needs, which generate expectations of the mass media or other sources, which lead to differential patterns of media exposure (or engagement in other activities), resulting in need gratifications and other consequences, perhaps mostly unintended ones' (Katz et al., 1974, p.20). More concrete, the theory attempts to explain the uses and functions of the media for individuals, groups, and society in general. Expectations as Katz et al. (1974) stressed, received increased attention in later U&G research as this allowed scholars to link U&G to the expectancy-value perspective as used within social psychology (Fishbein & Ajzen, 1975). Although the various theories under the label expectancy-value differ somewhat in their emphases, behavior, behavioral intentions, and attitude can be seen as a function of (1) expectancy (or belief) – the perceived

probability that an object possesses a particular attribute or that a behavior will have a particular consequence; and (2) evaluation – the degree of affect, positive or negative, toward an attribute or behavioral outcome (Galloway, 1981; Palmgreen & Rayburn, 1982; Rayburn & Palmgreen, 1984; Palmgreen & Rayburn, 1985).

While earlier U&G research focused on television (Rubin, 1983; Rubin, 1981), video games (Selnow, 1984), and the video recorder (Cohen et al., 1988), the emphasis has shifted to the Internet (Papacharissi & Rubin, 2000; Stafford et al., 2004). Motivated by the Internet's rapid growth and increasing level of interactivity, researchers have applied U&G theory to the Internet to understand common motivations of the medium. Even more recently, U&G has been applied to new media, such as Twitter (Chen, 2011), online games (Wu et al., 2010), the mobile phone (Wei, 2008; Chau et al., 2012), YouTube (Hanson & Haridakis, 2008), MySpace and Facebook (Raacke & Bonds-Raacke, 2008), and Second Life (Zhou et al., 2011). Common ground of these U&G studies is that they seek to link latent motivations (the gratifications sought) with media behavior. In practice, this means that researchers attempt to discover what gratifications individuals achieve in using media. The gratifications have been classified into various primary motivations, such as interpersonal utility, passing time, information seeking, convenience, and entertainment (Papacharissi & Rubin, 2000). Later, social gratification (Stafford et al., 2004) and virtual community (Song et al., 2004) were also identified as constructs of motivation. The constructs of motivation associated with the use of traditional media and online media present theoretical and empirical parallels (Lin, 2001; Lin, 2002).

4.4 Technology acceptance model

Davis (1986) originally proposed the technology acceptance model (TAM). Originating from cognitive psychology and such theories as the TRA (Fishbein & Ajzen, 1975) and the TPB (Ajzen, 1991), Especially TRA was used to conceptualize its paradigms of modeling. TAM has proven to be a valid and adequate framework to explain users' behavior regarding to the (intended) use of IT and IT related services. The model has become the most influential and commonly employed theory for describing an individual's acceptance of information systems (Lee et al., 2003). The model has predominantly been used in prior adoption research, which led to extensions of the framework labeled TAM2 (Venkatesh & Davis, 2000) and even TAM3 (Venkatesh & Bala, 2008). Although TAM has been criticized (Benbasat & Barki, 2007), the model has been valuable in the information systems field (Goodhue, 2007) and is the most widely cited explanatory model of individuals' acceptance of specific technological

innovations (Ortega Egea et al., 2007). Furthermore, the statistical power of TAM to explain individuals' intention to use information technology is greater than or at least similar to that of competing theories. For instance, TAM proved to have a greater explained variance than the TRA (Gentry & Calantone, 2002), the TPB (Mathieson, 1991; Lin, 2007; Gentry & Calantone, 2002) and the expectation-disconfirmation theory (Premkumara & Bhattacherjee, 2008). Hence, over the years, the TAM has been proven to be a valid and adequate model to explain users' behavior regarding to the use of IT or IT related services.

According to the initial TAM, the adoption of an IT system is determined by users' intention to use the system, which in turn is determined by users' attitude towards the system. This attitude is influenced by two salient perceptions about the system: perceived ease of use and perceived usefulness of the system. It is argued that the latter factor also has a direct impact on the behavioral intention to use the system. Perceived usefulness is described as the extent to which a person believes that the use of the system enhances productivity, performance and/or effectiveness. Perceived ease of use is defined as the extent to which a person believes that using the system will be effortless. When a person gives high ratings to both utility factors, it is likely that he or she will adopt and use the system. Figure 4.2 depicts the constructs in the model and the relationships among them.

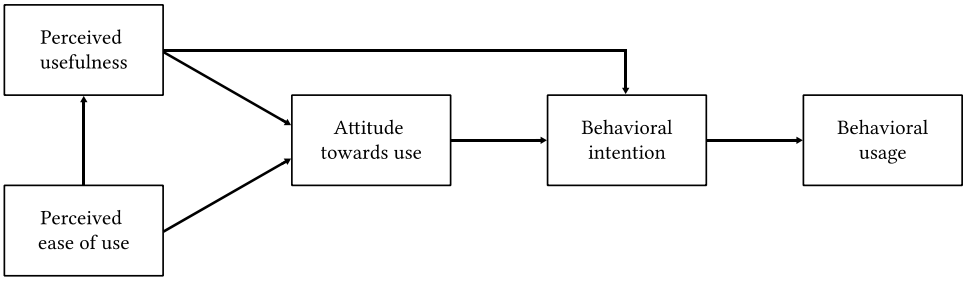


Figure 4.2. Technology acceptance model (TAM)

The technology acceptance model has been applied in a variety of domains, extending well beyond the initial scope of the computer software studied by Davis (1989). Throughout the years, a variety of information systems have been subjects of study, including information systems related to communication systems (e.g., email, (Karahanna & Limayem, 2000), office systems (e.g., groupware, (Malhotra & Galletta, 1999), specialized business systems (e.g., GDSS, (Vreede et al., 1999) and general-purpose systems (e.g., the WWW, (Lin & Lu, 2000; Gefen & Straub, 2000). These studies focus primarily on organizational contexts, such as small firms (e.g., Igbaria et al., 1997) and universities (Yi & Hwang, 2003), meaning that the

types of information systems relate primarily to their instrumental value and where compulsory. However, TAM was later applied on adoption of information systems in a residential context, concerning for instance online shopping (Gefen et al., 2003), Internet banking (Yiu et al., 2007) and HDTV (Baaren et al., 2011). Relevant to the context of this research, Yang, Hsu and Tan more recently applied the model successfully to YouTube usage (Yang et al., 2010) and Jang and Noh to IPTV (Jang & Noh, 2011). Motivated by the use of TAM, relevance and usefulness are often found as predictors for the use of electronic or digital library and archive services (Thong et al., 2002; Heinrichs et al., 2007; Tibenderana & Ogao, 2008; Miller & Khera, 2010). In these cases, TAM has elucidated the value of the respective IT artifacts examined. In sum, TAM has been utilized in various (online) contexts to examine diverse IT artifacts.

4.5 Unified theory of acceptance and use of technology

Venkatesh, Morris, Davis, and Davis (2003) integrated the above-described models of technology acceptance into the Unified Theory of Acceptance and Use of Technology (UTAUT). The theory holds that four key constructs are direct determinants of usage intention and behavior. These constructs include performance expectancy, effort expectancy, social influence and facilitating conditions. Performance expectancy is defined as the degree to which an individual believes that using the system will help him or her to attain gains in job performance and is therefore the equivalent of perceived usefulness. Effort expectancy is similar to the perceived ease of use as formulated in TAM and is defined as the degree of ease associated with the use of the system. Social influence relates to the degree to which an individual perceives that important others believe he or she should use the new system. This construct is deduced from the TRA/TPB where is what labeled as subjective norm. The last construct, facilitating conditions, is defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system. Gender, age, experience, and voluntariness of use are posited to mediate the impact of the four key constructs on usage intention and behavior (Venkatesh et al., 2003).

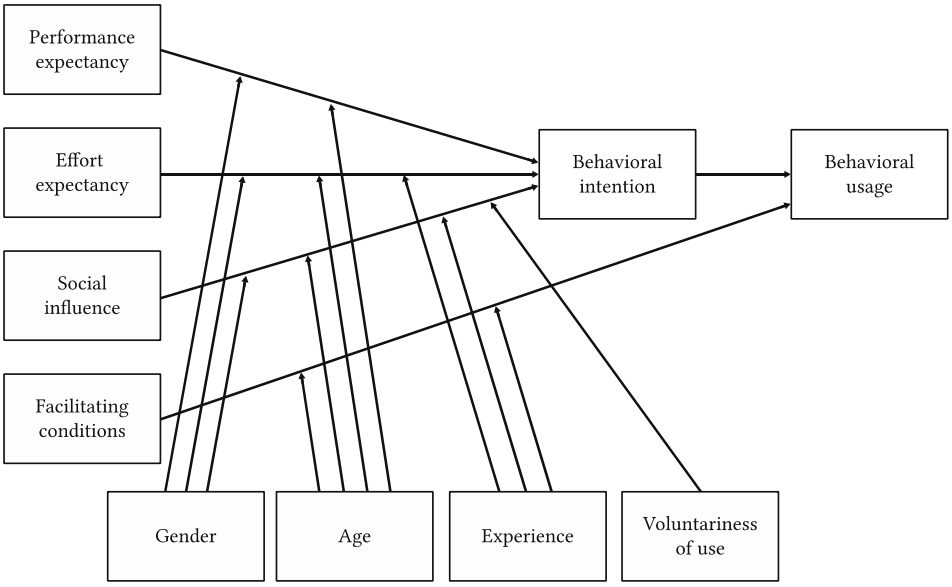


Figure 4.3. Unified theory of acceptance and use of technology (UTAUT)

Since its original publication, UTAUT has served as a baseline model and has been applied to the study of a variety of technologies in both organizational and non-organizational settings. Although less than TAM, there have been many applications and replications of the entire model or part of the model in organizational settings that have contributed to fortifying its generalizability. Examples include the use of the model to explain the adoption of mobile services (Koivumak et al., 2008; Carlsson et al., 2006), the use of health information technology (Yi et al., 2006; Chang et al., 2007; Kijsanayotina et al., 2009) and Internet banking (Zhou et al., 2010).

UTAUT was initially developed to explain employee technology acceptance and use. Recently, the model is critically examined and extended to account for the context of consumer technologies (Venkatesh et al., 2012). UTAUT is tailored to a consumer use context by the inclusion of three additional constructs and labeled UTAUT2. Firstly, hedonic motivation is integrated in the model as prior technology acceptance studies emphasized the importance of enjoyment in consumer product and/or technology use (e.g., Van der Heijden, 2004). Secondly, in consumer contexts, unlike workplace contexts, users are responsible for the costs and such costs strongly affects consumer adoption decisions (e.g., Coulter & Coulter, 2007). Price value is therefore added to the model. Thirdly, habit is incorporated as

predictor of behavioral intention since it is recognized as an important antecedent of technology acceptance in recent studies (e.g., Limayem et al., 2007).

4.6 Social-cognitive theory

Perhaps more promising than the U&G theory is the social-cognitive theory (Van Dijk et al., 2008). The gratifications sought-gratifications obtained formulation as used by researchers is indistinguishable from enactive learning (LaRose et al., 2001, p.397), which is a pivotal mechanism in the social-cognitive theory (Bandura, 1986). Enactive learning describes how humans learn from experience. In the social-cognitive view, interactions with the environment influence media exposure by continually reforming expectations about the likely outcomes of future media consumption behavior. Seemingly, this represents the same process that describes the relationship among gratifications sought, media behavior, and gratifications obtained as described in the U&G theory (Palmgreen et al., 1980). According to LaRose et al. (2001), the outcome expectation construct parsimoniously bridges the gulf between gratifications sought and gratifications obtained in uses and gratifications research.

Outcome expectations, defined as judgments of the likely consequences of behavior (Bandura, 1997), provide incentives for enacting behavior, whereas expectations of aversive outcomes provide disincentives. The expected outcomes are categorized in six basic types of incentives for media behavior: novel sensory, social, status, monetary, enjoyable activity, and self-reactive incentives (Bandura, 1986). The identification of parallels between the U&G theory and the social-cognitive theory ensures a more theoretical base for explaining media use. Where U&G research relied on constructs that were statistically derived from exploratory factor analysis, the social-cognitive approach provides a theoretical ground for determinants of media use. Expected outcomes of media use are considered to be the driving factor in the SCT approach to U&G (Van Dijk et al., 2008). These are available in the form of the incentive categories recognized in SCT (LaRose & Eastin, 2004). The expected outcomes or media functions are organized around five basic types of incentives for human behavior in. The expected outcomes found saliently resemble typologies related to other media. The outcomes show similarities with sought gratifications in U&G literature on motivational use for Internet. Table 4.1 offers an overview of extant research on U&G for the Internet or online services and the mapping on the expected outcomes as defined within the SCT approach.

Table 4.1. Expected outcomes and U&G motives

Authors	Activity outcomes	Self-reactive outcomes	Status outcomes	Novel outcomes	Social outcomes
Chen (2011) [Twitter]					Need to connect
Diddi & LaRose (2006) [Internet news]	Enter-tainment	Escapism, Pass time		Surveillance, News quizzes	
Ferguson & Perse (2000) [WWW]	Enter-tainment, Relaxation	Pass time		Social information	
Grace-Farfaglia et al. (2006) [WWW]	Enter-tainment	Escape	Self-improvement, Fame, Aesthetics	Economic gain	Social companion-ship
Kaye (1998) [WWW]	Enter-tainment,	Escape, Pass time	Web site preference	Information	Social interaction
Ko et al. (2005) [Internet]	Enter-tainment			Information, convenience	Social interaction
Leung (2003) [Internet]	Enter-tainment	Escape	Social identity	Surveillance	Affection, Social bonding
Lin (1999) [online service]	Enter-tainment	Escape		Information-Learning	Interaction
Parker & Plank (2000) [Internet]	Excitement, Relaxation	Escape		Surveillance	Social relationships, Companion-ship
Papacharissi & Rubin (2000) [Internet]	Enter-tainment	Pass time		Information seeking, Convenience	Interpersonal utility
Roy (2009) [Internet]	Relaxation		Self-development	Career opportunities, User friendly	Wide exposure, Global exchange
Song et al. (2004) [Internet]	Diversion		Aesthetic experience, Personal status	Information seeking, Monetary compensation	Virtual community, Relationship maintenance
Stafford et al. (2004) [Internet]				Content gratifications, Process gratifications	Social gratification
Wu et al. (2010) [online games]	Enjoyment		Achievement		Social interaction

Note: Terms in brackets [] refer to the artifacts studied.

The expected activity outcomes relate to the individual's desire to take part in enjoyable activities and pertains thus to enjoyment, excitement and delightfulness. This corresponds

entertainment gratifications. The expected outcomes related to self-evaluative incentives involve attempts to regulate dysphoric moods (LaRose & Eastin, 2004). These outcomes show remarkable resemblance with gratifications that are described as passing time and escapism. Expected novel sensory outcomes include the search for information, and are thus similar to information seeking gratifications. Social outcomes stem from the need for social interaction and companionship to social gratifications. Although, LaRose and Eastin (2004) also identify monetary incentives as antecedent for media attendance, it is considered irrelevant in this research. Rationales for this is that there is no economic gain involved in the audiovisual heritage archive service hypothetical as constructed in the present study.

In addition to the expectations related to the gratifications, LaRose and Eastin (2004) distinguish three other concepts: self-efficacy, deficient self-regulation and habit. Self-efficacy is the belief in one's capability to organize and execute a particular course of action (Bandura, 1997). People who perceive themselves to be highly efficacious with reference to a particular task will invest sufficient levels of effort to achieve successful outcomes, whereas those with low levels of self-efficacy will not persist. LaRose and Eastin (2004) posed that self-efficacy is directly related to media usage. Deficient self-regulation and habit are strongly interrelated. Habit represents the failure of self-monitoring, and deficient self-regulation represents a failure of the judgmental and self-reactive sub functions. Habit strength and deficient self-regulation should be related by the fact that persons with deficient self-control may also be expected to engage in habitual behavior. Habit strength is expected to influence ongoing behavior.

The established relationship between the uses and gratifications theory and the social-cognitive theory resulted in a new model of media attendance, which is depicted in Figure 4.4. In the recent years, the social-cognitive approach is adopted and tested against the Internet in a European context (Peters et al., 2006), mobile technology (Peters, 2007), music downloading (LaRose & Kim, 2007), video game usage, (Lee & LaRose, 2007) ambient technology (Ben Allouch, 2008) and digital movie piracy (Jacobs et al., 2012).

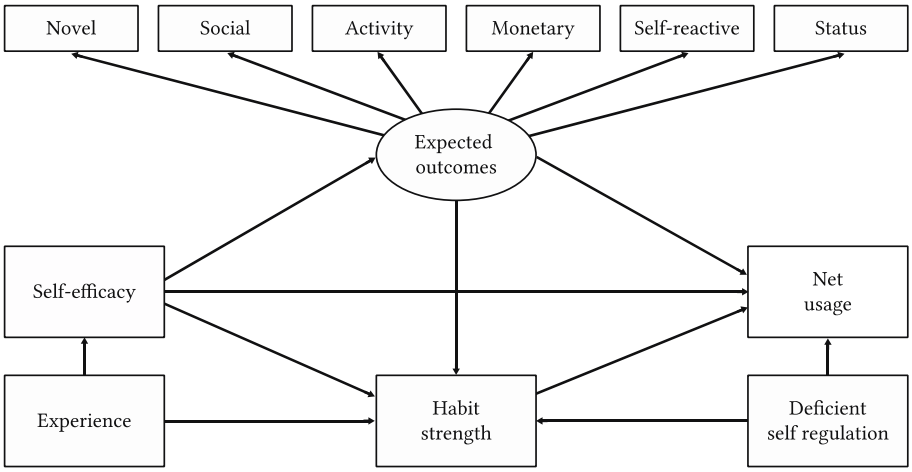


Figure 4.4. New model of media attendance (LaRose & Eastin, 2004)

4.7 Conclusion

The objective in this chapter was to gain insights in extant adoption literature. Six major theories that explain the use of media or a technology were described to gain these insights. The research question that is tried to answer, which is related to this first purpose, is the following:

> *What relevant existing technology acceptance theories can provide insight in the adoption of digital audiovisual heritage services?*

In the two previous sections various theories on explaining and predicting media and technology are detailed. Three important conclusions appear to be relevant from the consulted literature. First, the foregoing descriptions of theories appear to support separating rational and autogenetic behavior. Although rational theories assume that people behave (cognitively) rational in their decision making process decision-making is not (always) rational (Pieterson, 2009, p.94). The constructs of habit and prior experience are therefore endorsed in current theoretical perspectives on media use (e.g., LaRose & Eastin, 2004), but are also included in new technology adoption models like UTAUT2 (Venkatesh et al., 2012). Habit refers to a repeated behavioral pattern that automatically occurs outside conscious awareness (Triandis, 1977). Initial technology or media usage is mainly driven by conscious intentions. However, over time, thus when the use of the medium or technology is

routinized, past use is indicated to be a reliable predictor for future use (Kim & Malhotra, 2005). Hence, repeating behaviors ultimately lead to habits and have its influence on future usage. However, the subject of this dissertation is a not-yet-existing audiovisual heritage service. This dissertation takes a prototype approach and is therefore positioned before the phase of transferring the service (see Figure 2.4), which means that such unconscious processes that surfaces over time are less imperative to the research conducted in this dissertation, but are more relevant in a later stage of the implementation process.

Second, more and more overlap occurs between the theories attempting to explain and predict the use media and those of technology use. Although both research streams have the roots in expectancy-value theories, which can be traced back to Fishbein's dissertation (Fishbein, 1961), the proliferation of studies occurred separately. U&G theory and SCT are firmly established in the communication and media discipline, where TAM and UTAUT are developed in the discipline of information systems. However, more and more seemingly parallels exist between these theories in terms of the dichotomy of extrinsic and intrinsic motivation. Intrinsic motivation refers to the performance of an activity for no apparent reinforcement other than the process of performing the activity per se (Deci, 1975). Extrinsic motivation refers to the performance of an activity because it is perceived to be instrumental in achieving values outcomes that are distinct from the activity itself. Early research on explaining and predicting media use focused on television watching using the U&G theory. Scholars identified mainly intrinsic motivations (e.g., entertainment) for watching television. Later U&G studies also identified extrinsic motivations (e.g., interpersonal utility). In contrast, prior research on explaining and predicting technology use focused on applications in an organizational context, which means that primarily the instrumental value of technology is emphasized (e.g., usefulness). Adoption research in a household context emerged just recently (Dwivedi et al., 2008), which caused the identification of intrinsic motives (i.e., enjoyment) to use the technology. The contingency of both streams (technology and media) is caused by the shifted focus to the Internet. This new medium is characterized by an integration of telecommunications, data communications and mass communications. This process of integration enabled by a full digitalization of media and increased broadband connections (Van Dijk, 2012, p.8). Hence, impelled by a trend of convergence, theories about media use and technology use show increasing parallels.

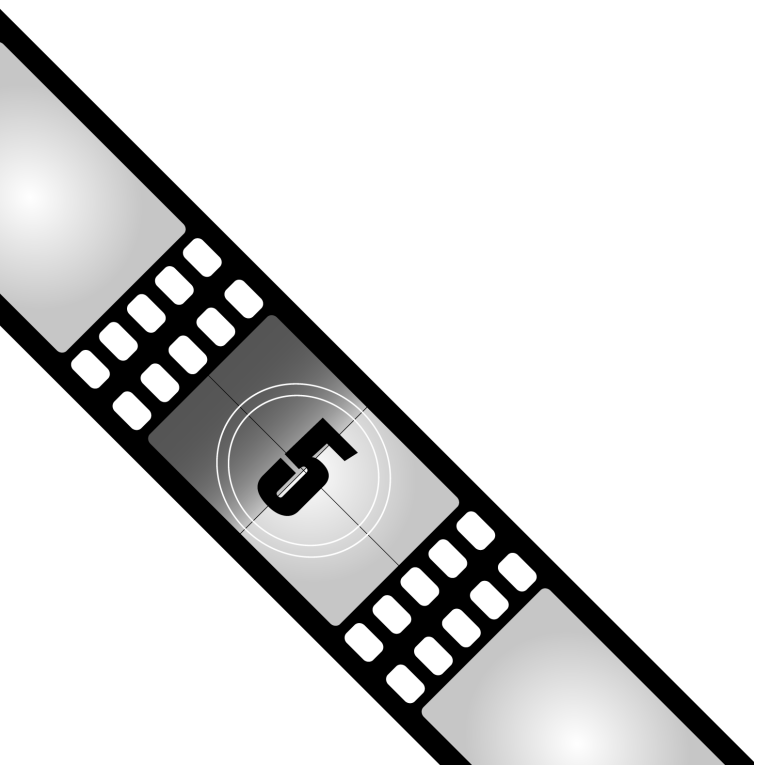
Third, an increasing amount of IT adoption studies include individual difference traits. Individual difference traits have been classified into demographic/socioeconomic and personal factors (Schaninger & Sciglimpaglia, 1981). Demographic factors have been used to

profile consumer groups to customize services and marketing with specific target-market segments. Only recently, demographic variables such as gender and age were included in adoption models as scholars identified a lack of attention to demographic variables in TAM research (Venkatesh & Morris, 2000; Morris & Venkatesh, 2000; Venkatesh et al., 2000). Subsequently, these dispositional variables are included in successive adoption models like UTAUT (Venkatesh et al., 2003). Nonetheless, UTAUT also overlooks personal, dispositional factors, in favor of perceptions of performance, effort required, and others (the only non-perceptual variables were gender, age, and experience). Zmud (1979) already showed that there was considerable interest among researchers in the effect of dispositional factors, specifically personal characteristics, on the success of IT. However, the role of personal characteristics was extracted primarily from research in non-IT contexts and was limited to management information systems. Until recently, dispositional personal factors were largely ignored in the field of information systems (McElroy et al., 2007). However, there is an increasing body of literature supporting the profound role of personal factors in the use of information systems. Personal factors that are suggested include negative affectivity (Thatcher & Perrewe, 2002), computer anxiety (Karahanna et al., 2002), playfulness (Agarwal & Karahanna, 2000) and personal innovativeness (Agarwal & Prasad, 1998).

A further exploration of user needs within the context of audiovisual heritage should determine which requirements factors play a role. Chapter 5 will describe the exploratory study that was conducted to investigate these user needs, where the above theories are used to rigorously investigate these needs. Furthermore, these theories are combined into one model that is used to evaluate the prototype that is build. The construction of this model and the use of the above theories are further described in Chapter 7.

CHAPTER 5

EMPIRICAL EXPLORATION OF CONSUMER NEEDS



5.1 Introduction

The previous chapter described scientific theories that explain and predict individual use of media or technology. These theories provide the basis for this chapter. This chapter lays the foundation for the artifact that is to be built. To acquire knowledge about the artifact this dissertation utilizes a consumer perspective instead of a theoretical perspective that was the common perspective to date in the suggestion phase in a design science research cycle (McKay et al., 2012). McKay, Marshall and Hirschheim (2012) argued that from a human-centered design artifacts could be built from knowledge accumulated in the context of their use. To articulate and suggest a design, the following question will be answered in this chapter:

> *What are consumer needs that can support the design of a digital audiovisual heritage service?*

Three studies are discussed in this chapter, which based on two datasets, in which user needs are examined. The three studies can be characterized as explorative or formative research. The objective of exploratory research is to gather preliminary information that will help define problems and provide suggestions. Hence, the studies in this chapter are used to provide suggestions for design principles for the eventual design of the artifact.

The first study of this chapter entails a vignette study. In the vignette study scenarios are used to gather data that more precisely capture human decision-making. Within the scenarios a number of service features and social influence are manipulated to see how these manipulations affect the intention to use an audiovisual heritage service. In contrast to the first study, the second study describes a study to similar audiovisual services. Two comparable services containing audiovisual material are modeled to gain insights for the audiovisual heritage service. One should however keep in mind that modeling existing solutions brings the risk that it may hinder the finding of a unique approach that is not used for the solution of other similar problems (Vaishnavi & Kuechler, 2008, p.141). The third and last study consists of a rank-ordering study. To record participant views on the importance of their ideas, participants were each asked to prioritize his/her own ideas. In a two step rank-ordering process, to reduce working memory demands, ask the participant to identify and rank order the several most important of his/her feature ideas and then separately to rank order the remaining ones.

5.2 A vignette study[4]

5.2.1 Introduction

It may be beneficial to involve prospective users in an early stage of development, as recognized in the realm of Human-Computer Interaction (Van Schaik, 1999). This study focuses on user involvement at an early stage of development. The aim of this section is to examine the determinants of the use of an audiovisual archive service. By assessing possible design issues that affect user acceptance, this examination provides guidance to the design of the prototype in the next chapter. Furthermore, with the inclusion of demographics, this study aims to provide more insights in the characteristics of prospective users.

The empirical research question tried to answer in this study is:

> *What are the influences of service feature, social influence and demographics on the adoption of an audiovisual heritage service in an early stage of development?*

This section proceeds as follows. It begins with an elaboration of the background of this study, which includes a brief literature review on user acceptance at early stages of development. Next, it also provides an explanation of the vignette method, including the features of fractional factorial survey design. Then, the rationales for the proposed determinants are detailed in the form of a research model. Also the research method comprising a procedure, sample, vignette design and measures is presented. The results are presented followed by the discussion of the results in light of prior research.

5.2.2 Background

Early user acceptance

User acceptance can be defined as 'the demonstrable willingness within a user group to employ information technology for the tasks it is designed to support' (Dillon & Morris,

[4] A preliminary version of this study has been presented as a poster at the Etmaal voor de communicatiewetenschap (Ongena *et al.*, 2011) and is accepted for publication in the journal *Behaviour & Information Technology.*

1996). User acceptance is considered a pivotal factor that determines the success or failure of new technology (Davis, 1993). Over the years, user acceptance has gained attention, resulting in a prolific body of literature. The Technology Acceptance Model (TAM) is considered the most influential and commonly employed theory to describe an individual's acceptance of technology (Lee et al., 2003). Initially, user acceptance focused on first-time usage, and acceptance was measured at the introduction of new technology. This initial acceptance is an imperative step toward the success of new technology, but long-term viability depends on continued use more than on first-time use (Bhattacherjee, 2001). Therefore, recent user acceptance research addresses the use of technology in the long term (e.g., Zhou, 2011). These studies address user acceptance a posteriori thus examines the post adoption of technology. Meaning that the (continued) use is assessed against technology that is already built. Based on the adoption phase by Rogers (2003), Karahanna et al. (1999) make a strong case for distinguishing pre-adoption and post-adoption acceptance. Assessments of user acceptance at an early stage of development (a priori) may be beneficial to the success of technology. Davis and Venkatesh (2004) argue that pre-prototype user acceptance testing may provide valuable guidance on key project decisions. The value of examining user acceptance at an early stage has been demonstrated in cases of a smart card system (Van Schaik, 1999), low-cost portable system for postural assessment (Van Schaik et al., 2002), a municipal wireless network (Jain & Manviwalla, 2006), an intelligent refrigerator (Rothensee, 2008) and an e-newspaper (Ihlström Eriksson & Svensson, 2008).

Vignette method

This research method is also known as factorial surveys (Rossi & Nock, 1982). In other research domains, factorial surveys are called scenario studies, conjoint measurement or policy capturing, but all of these methods entail similar approaches (Bouwman & Van de Wijngaert, 2002; Pieterson, 2009, p.215). The common goal of these methods is to assess the importance of various decision variables (Zedeck, 1977). In the vignette method, respondents read a scenario in which variables are manipulated, and they make decisions based upon this scenario[5]. These scenarios or vignettes consist of contrived hypothetical situations and can be defined as 'short descriptions of a person or social situation that contain precise references to what are thought to be the most important factors in the

[5] The terms scenarios and vignettes are used interchangeably due to the similarity in definition (Wason et al., 2002)

decision-making or judgment-making processes of respondents' (Alexander & Becker, 1978, p.94). A typical vignette comprises a story in which a number of dimensions (concepts) are manipulated on a number of levels (values). For instance, a vignette study including five factors on each of two levels would yield 32(2^5) scenarios. Adding a dimension with two levels doubles the number of scenarios. This point demonstrates a weakness of the vignette method: the number of scenarios grows significantly as more dimensions and levels are added.

Vignette studies have several advantages over questionnaires. First, vignettes provide situations that approximate real-life decision-making (Barnett et al., 1994) and thus provide great realism. Second, this method provides standardized stimuli to all respondents, which enhances internal validity, measurement reliability, and ease of replication (Alexander & Becker, 1978). Third, these studies overcome one of the drawbacks of survey research: the likelihood of social desirability or social correctness (Kennedy & Lawton, 1996). Finally, by focusing respondents' attention on specific characteristics of the research question, this method improves construct validity (Wason et al., 2002).

The vignette method has been employed in wide range of studies. For instance, Hsu and Kuo (2003) used a vignette design to examine how volitional control might affect the application of the Theory of Planned Behavior to research decisions related to information ethics. Jansen, Van de Wijngaert and Pieterson (2010) used the method to gain insight into the channel and source choices of entrepreneurs in a public organizational context. Recently, Caro et al. (2012) utilized the method to determine older people's views regarding residential options. Their vignettes involved dimensions such as functional status, social network characteristics, mobility barriers in current housing, features of retirement communities, and financial implications of relocation.

5.2.3 Research model

Similar to other studies, this research focuses on the intention to adopt (Agarwal & Karahanna, 2000; Chau, 1996; Gefen & Straub, 2000; Jackson et al., 1997; Chau & Lai, 2003). The traditional TAM variables of perceived usefulness and perceived ease of use are intentionally omitted because Benbasat and Barki (2007) note that these concepts are largely tautological when explaining intention to adopt. Instead, the model in this study uses three types of determinants: service features, social influence and demographic factors. Including these technological and contextual factors as alternatives in the TAM has proven

to be valuable (Baaren et al., 2011). Figure 5.1 depicts the research model as used in this study.

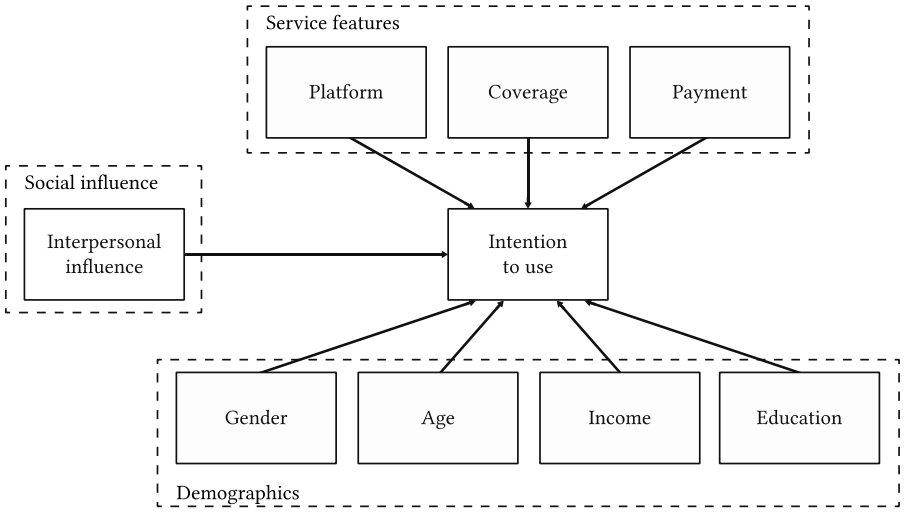


Figure 5.1. Vignette research model

Service features

In light of converging media, services are increasingly developed for multiple media, platforms and devices. However, different platforms require different implementation approaches. Moreover, traditional media (e.g., television) differ from new media (e.g., mobile technology) in interaction and portability. This concept is reflected in media richness theory (Daft & Lengel, 1986), which states that when the ambiguity and uncertainty of a task increase, people seek richer media that are able to reproduce information. Potential media for initiating unlocking of the audiovisual archive consist of television, the Internet (via PCs) and mobile devices. The latter has emerged through the rapid development of handheld computers with myriad functions in addition to the basic initial function of phoning. Furthermore, it is propelled by the development of mobile telecommunication networks facilitating Internet access (López-Nicolás et al., 2008; Zhou, 2011). Because the choice of a particular platform has major implications for the design of a service, it is included factor in the vignette design.

In addition to the type of platform, a factor related to the amount of available content is included. From a supply side, it is likely that the entire archive will not be available to

users. This is primarily due to copyright issues and content selection due to high costs. However, the non-availability of content is a possible barrier for the adoption of new technology (Baaren et al., 2011). Moreover, recent research indicates that media content is a vital component in the adoption of mobile television (Jung et al., 2009). Based on both sides (demand and supply), the role of this factor for a potential audiovisual archive service is investigated.

Finally, the prospective payment for the service is incorporated. Audiovisual archives suffer from a long-tail problem because the major part of the archive is of interest to a small number of people (Courtois et al., 2010). The viability of the service also becomes more important with declines in governmental donations. To determine users' willingness to pay, this concept is included in the research model. This construct is measured using different payment methods (i.e., free of charge, advertising, pay-per-view and monthly payments). Although research investigating the influence of different payment methods is scarce, previous studies show that users may reject, postpone or oppose payment methods (Szmigin & Foxall, 1998). Hence, it is assumed that payment plays a role in the intention to use new services.

Social influence

Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system (Rogers, 2003, p.5). There are two main types of influential channels: interpersonal channels and mass communication. Interpersonal channels involve a face-to-face influence between two or more individuals, whereas mass media channels are a means of transmitting messages involving mass media or expert opinions. Because the audiovisual archive is in its beginning stages (in contrast to other cultural heritage domains), it is believed that minimal social influence exists at a macro level. Therefore, the concept of interpersonal influence is adopted, in which norms may come from partners, friends, peers and relatives. Although communication is an imperative factor in the diffusion process, few studies have included interpersonal communication in this process (Karnowski et al., 2011). Similar to Baaren et al. (2011) a higher acceptance rate when others is expected, directly related to the user, are positive about the new service.

Demographics

Behavioral scientists have identified the importance of individual factors concerning behavioral intention. Rogers is one of the pioneers in research on individual factors, demonstrating that different categories of adopters involve different characteristics of individuals (for example, innovators are youngest in age, have the highest social class and have great financial lucidity) (Rogers, 2003). The adoption literature emphasizes the significant role of gender (Venkatesh & Morris, 2000; Venkatesh et al., 2000), age (Morris & Venkatesh, 2000) and income (Bellman et al., 1999). These dispositional variables remain unexplored in relation to audiovisual archives. To examine this uncharted field, these three variables are included in the research model. Furthermore, the education level is included because, in general, users of archives tend to be highly educated (Conway, 1986).

5.2.4 Method

Procedure and sample

The empirical data were collected during the spring of 2010 as part of a larger self-administered online questionnaire mailed to a sample of the Dutch population. This sample was selected from an earlier pool of respondents. To encourage the respondents to complete the questionnaire, they were informed that they could win a voucher for either a movie or a media shop. The URL of the survey was also sent to another sample based on a random sampling procedure provided by a panel organization. An online survey was used because this type of survey has some advantages (e.g., cost, response and lack of geographical limitations) over paper-based questionnaires.

Four dimensions were included in the study, which were manipulated on different levels. The vignette design included 48 scenarios (3x2x4x2). The inclusion of the vignettes in a larger (extensive) survey limited the possibility to postulate multiple vignettes to the respondent. The length of the entire survey exceeded 30 minutes. Hence, it was decided to present one vignette to each respondent. The vignettes were randomly assigned. The respondents were asked to read the scenarios carefully and to assume that they were the person described in the scenario. The respondents were then asked to indicate their intention to use the service.

A total of 1941 questionnaires were completed. The gender ratio indicated a fifty-fifty distribution because the sample consisted of 50.3% women and 49.7% men. Approximately

half of the respondents in the sample (52.1%) were younger than 50. Moreover, most of the respondents had an average income. Table 5.1 summarizes the attributes of the respondents. Although, the sample is somewhat skewed to older people, the sample adequately reflects the Dutch population. Since age is included as an independent variable in the model, to avoid bias, no survey weights have been applied. Moreover, the statistical package that has been used did not allow the weighing of the data. The number of respondents was large enough to provide a basis for conducting the analysis on 11 levels with dimensions specified as dummy independent variables.

Table 5.1. Characteristics of subjects (N=1941)

Items	Frequency	Percentage	Population (%)
Gender			
Male	964	49.7	49.5
Female	977	50.3	50.5
Age			
21-30	268	13.8	16.8
31-40	343	17.7	18.2
41-50	400	20.6	21.5
51-60	453	23.3	18.8
61-70	413	21.3	15.4
> 71	65	3.3	9.3
Income			
Below average	438	22.6	20.4
Average	684	35.3	42.4
Twice average	587	30.2	24.3
More than twice average	232	11.9	12.9

Vignette design and measures

As mentioned, the model consists of three groups of determinants: service features, social influence and demographical factors. The latter are part of the survey and are used as variables in the analysis. The service features and social influence are incorporated in the vignette design. For the vignette design, the framework proposed by Rossi and Anderson (1982) was adopted, who distinguish dimensions, levels, objects, judgments, and the factorial object universe. The dimensions refer to social objects or variable characterizations of these objects (e.g., gender) that can vary qualitatively or quantitatively.

Levels detail the values that a dimension may take (e.g., female). Objects are the units being judged that are described by a single level for each dimension (i.e., the vignette). A judgment is the valuation given by a respondent to an object. The factorial object universe is the set of all unique objects formed by all possible combinations of one level from each of the dimensions (i.e., the product of all of the levels). In the present study, five dimensions with levels that varied from two to four were included: device or platform (three levels), amount of content (two levels), type of payment (four levels), and social influence (two levels). The vignette structure is shown in Table 5.2. Considering these dimensions, the factorial object universe is 48.

Table 5.2. Vignette dimensions and levels

Dimensions	Levels	Description	N
Device	A. Television	'…interactive digital television channel…'	664
	B. Online	'…online video service…'	649
	C. Mobile	'…mobile video service…'	626
Content	A. Full coverage	'…all your favorite programs…'	926
	B. Partly covered	'…part of your favorite programs…'	977
Payment	A. Free	'The use of this service is free of charge'	550
	B. Advertisements	'Although the use of this service is free of charge, the programs contain advertisements.'	462
	C. Monthly	'For using this service, you have to pay a monthly fee.'	465
	D. Pay per view	'For using this service, you have to pay a fee per program.'	462
Social influence	A. Positive	'A friend has tried the service and tells you it is worth it.'	923
	B. Negative	'A friend has tried the service and tells you it is not worth it.'	1016

Dichotomous conditions to define the levels of the factors were used. These nominal levels have proved to be effective in scenario studies (Hoffman, 1960). Contextual information to each of the vignettes was added to inform the reader about the existence of the Dutch audiovisual archive; this step also concealed the manipulations and the purpose of the vignettes. An example of a vignette (object) is shown below.

"The archive of Sound and Vision contains vital television programs of public broadcasters since the introduction of television in the Netherlands. More than 700,000 hours of radio, television and films exist within the repositories, appended daily with recent broadcastings. Imagine the following situation, in which this archive is made accessible for a Dutch audience.

Suppose there is an interactive digital television channel that is available 24 hours a day. This service enables the viewing of part of your favorite programs from the audiovisual archive. The use of this service is free of charge. A friend has tried the service and tells you it is not worth it."

5.2.5 Results

To determine the effects of the dimensions included in the vignette on intention to use, a partial least squares (PLS) path model was estimated. This technique is a form of structural equation modeling (SEM), which is component-based, in contrast to the classical SEM method, which is covariance-based. Parameter estimates are obtained to minimize the residual variance of all dependent variables (Wetzels et al., 2009). This method is also more appropriate because the objective is prediction-oriented, which has a more explorative character than the testing of theory (Henseler et al., 2009; Urbach & Ahlemann, 2010). Additionally, the prediction error in PLS is smaller than in other multivariate methods. The data from the survey were analyzed with WarpPLS 3.0 software (Kock, 2012), which merits increased attention and use by scholars in the field of information systems due to its usability and functionality. Table 5.3 reports three specifications of the above model. In each model, an additional determinant was included. The first model consists of the service features. In the second, potential pervasiveness by peers, or social influence was added. In the third, demographic characteristics was added. Each of the dimension estimates is robust to specification, which suggests that the dimensions are independent from one another, as intended by the vignette design.

A number of variables in the vignette structure were associated with the intention to use the audiovisual archive service. The payment dimension had the most profound effect. Compared to a monthly payment, intention to use significantly increased when the content is freely available. Furthermore, when advertisements are implemented instead of a monthly fee, intention to use the service increased. However, implementing payment per view did not significantly enhance prospective customers' intention to use the service. Another service feature is related to the platform on which the service should run. It is

more likely that respondents will use a service that is implemented on television or on the Internet and accessible via a desktop than a service implemented on a mobile device. The presence of users' favorite programs was relevant at a 5% level. When the service entails full coverage of programs, it was more likely that the service will be used than if the service includes only part of the programs. Social influence, in terms of interpersonal communication, was an important factor in the intention to use an audiovisual archive service. In comparison with a friend who presents a negative attitude towards the service (I would not recommend the service), a positive friend significantly increased respondents' likelihood of using the service.

Table 5.3. Predictors of the intention to use of an audiovisual archive service (N=1939)

	Model 1 (β)	Model 2 (β)	Model 3 (β)
Online	0.033	0.036*	0.040**
Television	0.029	0.030	0.038*
Full coverage	0.025	0.024	0.030*
No payment	0.329***	0.332***	0.333***
Payment by advertisements	0.197***	0.195***	0.194***
Payment per viewed program	0.000	0.002	0.009
Friend is positive		0.085***	0.075***
Gender (male)			0.069**
Age			-0.067**
Education			0.066**
Income			0.096***
R^2	0.103	0.110	0.142

Note. *p < .05, **p < .01, ***p < .001

All of the demographics showed significant results. Gender had an influential effect on the intention to use an audiovisual archive service. The results showed that men tended to use these services more than women do. Age presented a negative effect on intention to use; younger people had higher intentions than older people to utilize the presented service. In contrast to age, education displayed a positive association with intention to use. Respondents with higher education had increased intentions to use the archive service. Income had a similar effect on the intention to use an audiovisual archive service; people with higher income had higher intentions to use the service in contrast to people with lower income.

5.2.6 Conclusions and discussion

The goal of this study was to gain insight into the determinants of early user acceptance. Drawing on the vignette method, this research developed an early user acceptance model for audiovisual archive services. A factorial design for the investigation of critical technological requirements, social influence and demographics was used and was shown to be valuable for identifying determinants of user acceptance at an early stage of development.

The results of the statistical analysis indicate the vital role of payment for the service. A free service was the variable that had the greatest effect in the model. Pay-per-view, monthly payment or even advertisements may be barriers to the adoption of technology. The idea of levels of payment has received little attention in adoption models, but, in light of business modeling, it is a crucial factor. Barriers such as cost should be included in future adoption models. Hence, similar to Van Schaik's (2004) conclusions, the results regarding payment also suggest that user acceptance research should consider a balance between benefits (e.g., usefulness) and barriers (e.g., costs).

In this study, a new audiovisual archive service was examined. The first main choice developers have is the choice of platform. Thus, the type of platform was considered as another service feature in the vignette. The results of the study suggest that the mobile phone is the least-preferred platform in comparison with television and desktop computers. This finding confirms the study by Xu, Ma and See-To (2008), which found that mobile video services might not be the most popular applications for the mobile Internet because not all types of video content are appropriate for a mobile media platform. This non-significant result could also be explained by the less popular of the mobile Internet, which was present at the time of study. From 2010 the acceptance of the mobile Internet increased rapidly, which is often attributed to the prevalence of Apple's iPhone (Ling & Sundsøy, 2009). Hence, it is imperative to consider the mobile phone as a potential unlocking platform for audiovisual material in the future.

Baaren et al. (2011) concluded that the amount of available content did not significantly influence users' intention to subscribe to HDTV. However, the results indicate a significant role of the amount of content because the coverage of favorite programs affects consumers' intention to use an audiovisual archive service. This finding holds, however, only when demographic characteristics were included. Hence, one can conclude that the amount of

available content affects the intention to use new technology but is not considered a pivotal factor.

As mentioned, Rogers (2003) states that personal communication influences people's attitudes towards new technology. This finding is confirmed by the results in the present study, which show that interpersonal communication affects the intention to use an audiovisual archive service. Similar to the early work of Rogers, this finding confirms recent adoption studies that incorporated social influence, as in the case of YouTube (Yang et al., 2010). However, this study is among the first to confirm interpersonal influence in an early development phase by considering early acceptance.

Demographically, innovators are often characterized as young, wealthy, and well educated (Rogers, 2003). The latter especially holds for archive users (Conway, 1986). The results in this study support these prior findings as well as recent adoption research that incorporated dispositional variables, such as the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2012). Thus, demographics must be taken into account in further adoption research. In sum, the typical audiovisual archive user can be described as a young man who is highly educated and has a high income.

This study presented an alternative model to the frequently used TAM that has been criticized the past few years (e.g., Benbasat & Barki, 2007). For this reason the constructs of *perceived usefulness* and *perceived ease of use* were omitted. However, future IT acceptance studies should benefit from these constructs as these are proven to be of value in determining behavioral intention in an early stage of development (Van Schaik, 1999; Davis & Venkatesh, 2004). An area for future research is to integrate the general approach utilized in this study with existing theoretical models (e.g., TAM). In this way, it will benefit from the reliability and validity of these models, and it supports resolving the tautological and impractical issues that are raised concerning the constructs in these models.

The findings of this study should be interpreted in light of their empirical limitations. The first limitation pertains to the gap between intention and actual behavior. This study investigates a potential service and is therefore limited to measuring behavioral intention. The literature supports a low-to-medium effect size for the relation between these constructs (Bhattacherjee & Sanford, 2009). Hence, although this study is limited to intention, it is questionable whether a new service will be used in practice once it has been

developed. Second, the use of the vignette method, as used in this study, has limitations. The number of vignettes is limited because every additional item multiplies the number of scenarios. Therefore, the number of variables is limited to the number of respondents. Moreover, the scenarios are not suitable for the incorporation of constructs with multiple items. The third limitation of this study is that comprehension of the scenarios used in this study was rather complex for the respondents. Currently, few audiovisual archive services exist, which reduces respondents' potential for accurate evaluations of their own media behavior. Fourth and finally, there is a constraint regarding the sample that may influence the generalizability of the findings. The total set of respondents is not fully representative of the Dutch population, as older adults are to some extent overrepresented. The data were collected via self-selection. Hence, the people in the dataset have an intrinsic motivation to complete the online survey. In future research, a more representative sample of the Dutch population should be used. Despite these methodological concerns, it is believed that the findings provide significant information for academics and practitioners on possible determinants of new services.

5.3 A comparison study[6]

5.3.1 Introduction

One of the major findings from the previous study was the Internet favoring television as a platform to unlock the audiovisual archive content. Online video archives are however not a new phenomenon. Many major (public) broadcasting networks initiated online video services to make full-length television programs readily available for consumers, mostly via their websites. Thus broadcasters already provide access to their broadcasted programs delivering video-on-demand (see Figure 3.2) services. Furthermore, the rise of user-generated content (UGC) gave birth to video sites aimed at sharing videos that are made by the users. The use of these online video sites has increased over the past few years. The time spent on online video sites has increased 2000% between 2003 and 2009. The number of people visiting video web sites has also enlarged 339% (The Nielsen Company, 2009).

[6] A preliminary version of this study has been accepted for publication in the journal *New Review of Hypermedia and Multimedia.*

To develop a new audiovisual service, it is beneficial to investigate comparable services. Modeling these existing solutions supports finding the best approach to solve the problem based on existing solutions for similar problems. It lets one learn from other problems and their solutions. This can provide useful insights and a useful solution approach (Vaishnavi & Kuechler, 2008, p.141). The objective of this study is thus to learn and benefit from prior online video services. Drawing upon the user gratifications from related services and the characteristics of the service, one can identify design issues that suit these needs. For audiovisual service practitioners, this research can provide significant insights into the features of such services and their relations to users' needs.

As the objective *of* this study is to give input into the development of an audiovisual heritage archive service, the objective *in* this study is model the motivations for using these video services and to examine the perceived technological characteristics. Little is known about viewers' motivations for accessing various types of online video services, and the extent to which these are different in terms of technology characteristics. Therefore, the empirical research question that is tried to answer in this study is formulated as follows:

> *What are determinants of extant online video services that can support the design of a digital audiovisual heritage service?*

The study empirically assesses two online video services, i.e., YouTube and the main online portal for public broadcast programs in the Netherlands (*Uitzending gemist*), building upon the theoretical foundations of the task–technology fit (TTF) framework (Goodhue & Thompson, 1995) to account for user evaluation of the online video sites. This framework identifies different characteristics of both technology and task, including non-routineness and information system type. These characteristics are found to jointly determine the task–technology fit that in turn influences technology use. The model use in this study is broadly consistent with the TTF framework. Here, sought gratifications (or motivations) represent the task element in TTF (e.g., the need to release tension). These motivations for using the services are examined through the uses and gratifications theory (for more details about this theory see section 4.3). The innovation characteristics of Rogers (2003) are analogous to the technology elements in TTF (e.g., service complexity). Finally, the two elements influence the utilization of the service (i.e., behavioral usage). The following section describes the theoretical background of this study; next the method of research that is used in this study in addressed. The results are discussed, and this chapter closes with a conclusion and discussion.

5.3.2 Theoretical background

Motivations

This study considers the motives found among online video users. Two studies have examined motives of YouTube users through the U&G theory. Hanson and Haridakis (2008) identified four factors through a factor analysis with 51 items. The four factors were leisure entertainment (e.g., because it is enjoyable), interpersonal expression (e.g., to participate in discussions), information seeking (e.g., to search for information), and companionship (e.g., it makes me feel less lonely). The information-seeking motivation was found to significantly affect viewing YouTube videos with traditional news content. Furthermore, the entertainment-seeking motivation contributed significantly to viewing comedy news videos. The other two identified motivation did not present significant results in relation to viewing traditional and comedy news. Another study by the same authors (Haridakis & Hanson, 2009) displayed somewhat similar results, though they identified six factors: convenient entertainment (i.e., entertainment, habit, and passing the time), interpersonal connection, (i.e., inclusion, expressive need, and time control), convenient information seeking, (i.e., because it was inexpensive and a novel way to search for information and keep up with current issues), escapism (i.e., get away from family, friends, or others; forget about school, work, or other things), co-viewing (i.e., because it is something to do and discuss with friends or family), and social interaction (i.e., to meet new people and participate in discussions). Four motives significantly affected YouTube viewing when the researchers included in them their regression analysis: convenient entertainment, convenient information seeking, co-viewing and social interaction.

Innovation characteristics

As a starting point to identify innovation characteristics, the identified innovation attributes from Rogers are adopted. Rogers (2003) identified five intrinsic characteristics of an innovation, which affect the diffusion rate of an innovation, after surveying about one thousand innovation studies. These five characteristics are clearly defined by Rogers and used by others against different information systems (e.g., Moore & Benbasat, 1991; Agarwal & Prasad, 1997; Hsu et al., 2007; Karahanna et al., 1999). They are relative advantage, compatibility, complexity, visibility and trialability. *Relative advantage* captures the extent to which a potential adopter views the innovation as offering an advantage over previous ways of performing the same task or, as Rogers defines it, 'the degree to which the innovation is perceived to be superior to current practice'. Hsu *et al.* (2007) found this

factor is influential for using MMS for potential adopters and current users. Rogers' notion of *compatibility* is formulated as 'the degree to which the innovation is perceived to be consistent with socio-cultural values, previous ideas, and/or perceived needs'. This factor significantly affects e-commerce adoption (Chen et al., 2002). *Complexity* is similar to Davis' (1989) notion of ease of use, and it encapsulates the degree to which a potential adopter views using the target service to be relatively free of effort. Systems or services that are considered easier to use and less complex have a higher likelihood of being accepted and adopted by potential users. Many studies have indicated that this factor profoundly affects usage, as in digital libraries (Hong et al., 2002). The penultimate factor is related to perceiving the innovation as visible, termed *visibility*. Its definition is formulated as 'the degree to which the innovation are visible to potential adopters'. This factor is found to affect World Wide Web use (Agarwal & Prasad, 1997). Finally, *trialability* measures the extent to which potential adopters perceive that they have an opportunity to experiment with the innovation prior to committing to its usage. This factor was imperative in adopting both the World Wide Web (Agarwal & Prasad, 1997) and a new operating system in a business environment (Karahanna et al., 1999)

Three potential factors are proposed to supplement Rogers' characteristics. First, the *reliability* and *download delay* concepts are proposed. Although earlier research did not show a significant role of this factor in adopting and implementing innovations (Tornatzky & Klein, 1982), this factor recently surfaced in usability research regarding online services. Usability and design metrics are often used as independent variables as antecedents to website success (e.g., Palmer, 2002). Metrics based on transaction processing time and rate, service failures, download delay or user response time (Barney, 2000; Messmer, 1999; Wilson, 1999), and site reliability (Berry, 1999) have been suggested. Evans and Wurster (2000) and Rose and Straub (2001) suggested that operational efficiencies on Web sites should include download delay or response time. This study proposes an overall assessment of the online service at hand. Though bandwidth and processor power has increased recently with video compression enhancements, it is plausible that streaming video content does not run smoothly in all cases. This study thus considers reliability and download delay. Second, specifically related to video, the *visual experience* factor is suggested. Implementing video related services or motion picture is accompanied by agreements on compression and picture quality. Earlier research on HDTV adoption in the Netherlands has shown that HDTV adoption was more positive from respondents who had seen HDTV images (Baaren et al., 2011). Due to the trade-off in image quality for online services, visual experience can be seen as important characteristic

5.3.3 Method

Since the study is a part of the vignette study, the sample is the same as in the vignette study. Main difference is the instrument used in this study; hence this section will elaborate on the study objects and the measures used in the study.

Study objects

An initial issue was how to select comparable online video services. Numerous online video services exist (i.e., YouTube, Metacafe, iPlayer and blip.tv). Two online video services were chosen based on four criteria. A first criterion was the availability of public broadcasting content within the service. The new online audiovisual service to be developed mostly contained programs that the public broadcasting service had broadcast. The second criterion concerned with the underlying infrastructure. The new (to be developed) service should provide access to a large database of audiovisual material, initially with 55,000 hours of video. The amount of material suggested an increased importance of the search engine for this database. Comparable services should thus be provided with a large database in the system backend. The third criterion was related to comparing both services. For the aim of the service and its characteristics, it was useful to select distinctive cases to gain helpful information from both services. Yahoo Video and YouTube were mostly equivalent. Both services provided a platform for uploading amateur videos. The features of both sites are somewhat equivalent, and analyzing both services does not provide surplus information. The last and more practical criterion was that the service must have many users. To increase the external research validation, the number of respondents who used the service must be large. Thus, this study used two services that were reaching their adoption saturation levels.

Based on these criteria, two online video services were chosen. First, YouTube was chosen. Since its start in 2005, YouTube has been the leading video platform on the Internet, with 92 billion page views each month and 490 million unique users at the moment (Elliott, 2011). Much content on YouTube is homegrown, amateur video. However, content produced by professionals is increasingly uploaded to the platform. The platform heavily depends on interaction and interpersonal communication, as users tell their friends about interesting videos they watched. YouTube exceeds two billion views a day, and approximately 24 hours of video is uploaded every minute. Furthermore, YouTube is an interesting subject for this investigation, as it is often seen as a potential threat to traditional broadcast media (Gehl, 2009). Second, this analysis used the online on-demand

service offered by public broadcasters, called *Uitzending gemist* (missed broadcasted program). This on-demand broadcast service is an online video portal implemented and maintained by the Netherlands Public Broadcasting (coordinator for all broadcasting associations). The service provides the opportunity to view programs from different broadcasting associations that are broadcast on television. Figure 5.2 shows screenshots of both services.

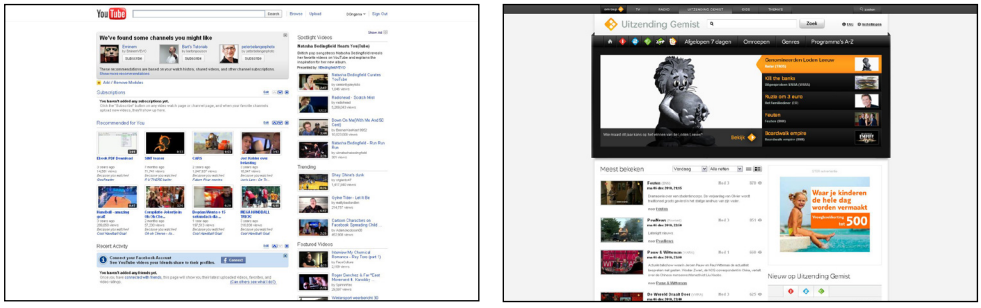


Figure 5.2. Screenshot of YouTube and *Uitzending gemist*

Measurements

To measure people's motivation to use an online video service, U&G literature was consulted to construct the measures. Respondents were asked to indicate their level of agreement with fourteen statements. These statements were based on prior research in U&G research about Internet and YouTube usage (Lin, 2002; Stafford et al., 2004; Hanson & Haridakis, 2008; Roy, 2009). These motivations include information ('to acquire general knowledge'), passing time ('to kill time'), tension release ('to take the opportunity to rest and recharge' and 'to relax and de-stress'), escape ('to escape from my everyday stress'), entertainment ('because it is exciting' and 'just for fun'), surveillance ('to keep up on what's happening in the world' and 'to keep myself informed of recent events'), social interaction ('to talk about it with friends, family and colleagues') and companionship ('because they are similar to things that happen in my life' and 'to see if other people think as I think'). A seven-point scale was used, ranging from 1 (never) to 7 (always), for each statement.

To measure the innovation characteristics of the video services, the following measures were used. Relative advantage was measured by the question about whether respondents would miss something without the online video service. This factor is thus measured relative to the service's non-existence because neither service has a predecessor. To

measure compatibility, respondents were asked to assess a service for its fit within their lifestyles. Respondents were asked to rate the degree to which a video service was difficult to use or understand, thus indicating the video service complexity. The item 'I see others regularly use it' measured the video service visibility. To measure reliability, respondents were asked whether the video service always worked. Download delay was measured by the item 'Loading of the videos is slow'. The following statement measured the last factor, visual experience: 'The image quality of is sufficient'. Similar to the motives, all items were measured on a seven-point scale, ranging from 'never' to 'always'. The factors are single-item variables.

5.3.4 Results

Online video service use

The respondents were moderate YouTube users. In the questionnaire, only 5.1% reported using YouTube 'several times a day' (M = 3.33, SD = 1.77). Almost a quarter of the respondents used *Uitzending gemist* less than one time each month (M = 2.15, SD = 1.29). The data also showed that 42.9% never used *Uitzending gemist.* YouTube usage correlated significantly with *Uitzending gemist* usage ($r = 0.30$, $p < 0.05$). Furthermore, men tended to use YouTube far more than women ($t = 6.704$, $p < 0.05$). This was not the case with *Uitzending gemist* ($t = 0.922$, $p = 0.357$).

Motivations to use online video services

The first part of the research question asked about users' motives for using the two online video services. The underlying gratifications structure was examined through an explanatory factor analysis performed using SPSS 17.0 (SPSS Inc., Chicago, Illinois). A principal component analysis with varimax rotation was used to identify the underlying gratifications. Scales for each motivation were computed as the mean of a component's high-loading items. Factor loadings were used at 0.5 and above for each item (cf., Hair et al., 2009). This analysis was performed for both services. However, the factor analysis did not aim to reveal latent Internet functions but to decrease the number of variables. The principal components analysis technique contained as much information as the initial variables (Park et al., 2002). The null hypothesis that the correlation matrix was an identity matrix was rejected using Bartlett's test for each factor analysis. The Kaiser-Meyer-Olkin (KMO) statistics presented sufficient values (all > 0.50) and significant approximate Chi-squares (all < 0.05) (cf., Hutcheson & Sofroniou, 1999). The factor analyses of the motive

statements yielded four interpretable factors: tension release needs, cognitive needs, personal integrative needs and affective needs. The labels were adapted from the seminal work by Katz, Gurevitch and Haas (1973) o on the U&G theory. Table 5.4 and Table 5.5 show the factor analysis results.

Table 5.4. Factor analysis for YouTube motives

Variable	Tension release	Cognitive	Personal integrative	Affective
To keep up on what's happening in the world		0.853		
To keep myself informed of recent events		0.868		
To gain general knowledge		0.774		
Out of curiosity				0.830
Just for fun				0.839
To talk about it with friends, family or colleagues			0.744	
Familiar to thing that happen in my life			0.774	
To see if other people think as I think			0.771	
To relax and de-stress	0.776			
To escape from my everyday stress	0.824			
To take the opportunity to rest and recharge	0.833			
To kill time	0.630			
Eigenvalues	6.118	1.563	1.100	0.703
Percentage of variance explained	23.487	22.326	18.478	14.793
Cumulative percentage	23.487	45.814	64.292	79.031

Note. Factor loadings below 0.50 are not shown.

The first factor, *tension release needs*, accounted for 23.5% of the variance after rotation for YouTube and 24.8% for *Uitzending gemist*. The tension release element was stipulated in prior research for the U&G of Internet usage. These needs are often described as passing time or escapism. It contained four items in this study derived from the a priori pastime and escape categories (Cronbach's α = .86), which are similar to *Uitzending gemist* (Cronbach's α = .89). *Cognitive needs* contained three items, all of which comprised that a priori category. This finding held for YouTube (Cronbach's α = .90) and *Uitzending gemist* (Cronbach's α = .92). It explained 22.3% of the variance for YouTube and 23.0% for *Uitzending gemist*. These needs relate to the function of the Internet as an information source, which is often juxtaposed with the entertainment function of the Internet (Morris & Ogan, 1996; Kraut et al., 1998). *Personal integrative needs* entailed three items, which

accounted for 18.5% of the variance for YouTube and 20.3% for *Uitzending gemist*. The factor included elements related to self-identity, personal meaning, self-expression and social expression for both YouTube (Cronbach's α = .86) and *Uitzending gemist* (Cronbach's α = .89). *Affective needs* contained one entertainment item (i.e., fun) and one item related to people's inquisitiveness (Cronbach's α = .79; .72). This factor was related to experiential qualities of emotions (i.e., fun) and covering these affective emotions in the entertainment experience. It explained 14.8% of the variance after rotation for YouTube and 13.5% for *Uitzending gemist*.

Table 5.5. Factor analysis for *Uitzending gemist* motives

Variable	Tension release	Cognitive	Personal integrative	Affective
To keep up on what's happening in the world		0.877		
To keep myself informed of recent events		0.885		
To gain general knowledge		0.815		
Out of curiosity				0.768
Just for fun				0.742
To talk about it with friends, family or colleagues			0.701	
Familiar to thing that happen in my life			0.836	
To see if other people think as I think			0.849	
To relax and de-stress	0.809			
To escape from my everyday stress	0.815			
To take the opportunity to rest and recharge	0.855			
To kill time	0.632			
Eigenvalues	6.606	1.540	0.932	0.716
Percentage of variance explained	24.815	22.965	20.337	13.501
Cumulative percentage	24.815	47.779	68.116	81.617

Note. Factor loadings below 0.50 are not shown.

Affective needs for YouTube (M = 4.07, SD = 1.33) and *Uitzending gemist* (M = 3.24 SD = 1.48) as well as cognitive needs (M = 3.29, SD = 1.51; M = 3.60, SD = 1.65) had the highest mean scores. Both were salient factors, whereas the tension release need (M = 3.17, SD = 1.36; M = 2.86, SD = 1.36) and personal integrative needs (M = 2.95, SD = 1.39; M = 2.69, SD = 1.40) were less salient reasons for using either YouTube or *Uitzending gemist*. These users primarily sought a convenient vehicle for information and amusement. No significant differences between male and female respondents were found in these factors. A

precondition for further analyses was a normal distribution of the sample data. A normal distribution of the sample data was indicated by skewness values. To comply with a normal distribution, these values must be between -1 and +1 (Hair et al., 2009). The distribution characteristics of the data reported adequate skewness values: the lowest was -0.37, and the highest was 0.50.

Motivations and use online video services

Two ordinary least squares regression models were used to test the association between the motivation factors and innovation characteristics for using online video services (see Table 5.6). To check for multicollinearity, the variance inflation factors (VIF) were also calculated for each β term in the regression models. The VIF indicated the variance percentage in the predictor that other predictors cannot consider. The results showed that all VIFs are under 10; the largest was 2.420, indicating that the regressions avoided the multicollinearity problem (Neter et al., 1985). A regression analysis was thus appropriate. A residual analysis was performed to determine whether the assumptions underlying regression analysis (e.g., independence, homoscedasticity, and normal error term distribution) were not violated. All assumptions were confirmed.

Online video can be considered a novel technology, as YouTube started in 2005. In the early stages of using a new technology, younger men tend to exhibit a greater tendency to seek novelty and innovativeness (Chau & Hui, 1998). Age and gender are associated with consumer technology innovativeness (Lee et al., 2010). Therefore, additional control variable, gender and age, which may also affect users' online behavior or intention to use (Venkatesh & Morris, 2000), were controlled for in the current study.

The results for current usage indicate that, for this sample, the innovation characteristics of relative advantage (β = 0.23, p < 0.001) and compatibility (β = 0.17, p < 0.001), complexity (β = 0.08, p < 0.01), download delay (β = -0.05, p < 0.05) and visual experience (β = -0.06, p < 0.01) are relevant in explaining YouTube acceptance. The latter, however, shows evidence of a strong suppression (Conger, 1974) effect, as this variable has a positive correlation with YouTube use (r = 0.31, p < 0.001). Despite this positive correlation, the variable presents a negative value in the regression model, which indicates that low image quality has a negative influence on YouTube use. The results also indicate that, among the motivations, cognitive needs (β = 0.07, p < 0.01) and affective needs (β = 0.10, p < 0.01) are obtained using YouTube. Gender (β = 0.18, p < 0.001) and age (β = -0.24, p < 0.001) also significantly

affect YouTube use. Overall, these nine variables account for 47.6% of the variance in current usage.

Table 5.6. Ordinary least squares (OLS) regression predicting frequency of use

Variable	YouTube		*Uitzending gemist*	
	β	*t*-value	β	*t*-value
Tension release need	0.04	1.62	0.10 *	2.38
Cognitive need	0.07 **	2.61	0.08 *	2.27
Personal integrative need	- 0.04	-1.25	- 0.05	-1.32
Affective need	0.10 **	3.41	0.10 *	2.49
Relative advantage	0.30 ***	11.76	0.35 ***	10.78
Complexity	0.08 **	3.24	0.04	1.13
Compatibility	0.17 ***	5.69	0.12 **	3.24
Visibility	0.00	0.17	- 0.04	-0.31
Trialability	0.01	0.27	0.04	1.09
Reliability	0.04	1.48	0.02	0.57
Download delay	- 0.05 *	-2.59	- 0.04	-1.43
Visual experience	- 0.06 **	-2.89	- 0.07 **	-2.62
Gender	0.18	9.22	0.01	0.52
Age	- 0.24 ***	-11.29	0.03	0.89
R^2 (%)	48.1		30.7	
Adjusted R^2 (%)	47.6		29.8	
F	97.184***		33.229***	
df	14, 1468		14, 1051	

Note. *p < 0.05, **p < 0.01, ***p < 0.001

Results for the likelihood of *Uitzending gemist* usage suggest that the only relevant innovation characteristics are relative advantage (β = 0.35, p < 0.001), compatibility (β = 0.12, p < 0.01) and visual experience (β = -0.07, p < 0.01). Similar to YouTube, visual experience shows evidence of a suppression effect, as this variable has a positive correlation with *Uitzending gemist* use (r = 0.18, p < 0.001). Despite this positive correlation, the variable presents a negative value in the regression model, which indicates that low image quality has a negative influence on *Uitzending gemist* use. In contrast to the prediction of YouTube use, the need to release tension significantly affects *Uitzending gemist* use (β = 0.10, p < 0.05). The need to have pleasure and fun is also indicated as factor for using *Uitzending gemist* (β = 0.10, p < 0.05). The six variables explain 29.8% of the variance in *Uitzending gemist* usage.

Comparing the two online video services

One-tailed paired *t*-tests and paired correlations were administered to compare the motives to use YouTube or *Uitzending gemist*, examining which need is related to using which video service. To investigate this question, the items per factor, as determined and described above, were averaged. Table 5.7 presents the means, standard deviations, and results of the paired mean differences tests and their correlations. All tests revealed significant results concerning mean differences. For tension release needs, personal integrative needs and affective needs differed between YouTube and *Uitzending gemist* in favor of YouTube. The cognitive needs factor also differed, but in favor of *Uitzending gemist*. YouTube thus tends to satisfy the need to escape and be entertained, and *Uitzending gemist* tends to satisfy the urge for information and news. As Table 5.7, describes, all correlation coefficients were statistically significant at the 0.001 level. These findings then suggest that when individuals are more likely to use YouTube, which is motivated by one type of need, they are also more likely to use *Uitzending gemist*, motivated by the same need.

Table 5.7. Mean differences and correlation analysis motives

Variable	YouTube		*Uitzending gemist*		Mean difference	Correlation analysis
	Mean	SD	Mean	SD		
Tension release needs	3.17	1.36	2.86	1.36	9.06***	0.70***
Cognitive needs	3.29	1.51	3.60	1.65	-5.90***	0.48***
Personal integrative needs	2.95	1.39	2.69	1.40	7.26***	0.68***
Affective needs	4.07	1.33	3.24	1.48	18.43***	0.52***

Note. *p < 0.05, **p < 0.01, ***p < 0.001

Similar to the motive comparison, the innovation characteristics were compared. Table 5.8 presents the results of the paired t-test comparisons and correlation analysis for the service characteristics of the two online video services. After comparing the mean scores for the innovation characteristics across the online services, all characteristics showed significance at a .001 level. Users of both video services attributed more relative advantage to *Uitzending gemist* than to YouTube (t = -5.36, p < 0.001). Respondents found YouTube more dispensable in their lives than *Uitzending gemist*, indicating that the latter was perceived as an essential part of their daily life. *Uitzending gemist* also fit their lifestyle better than YouTube, as the results showed a significant difference in compatibility (t = -4.10, p < 0.001). The ability to freely experiment with the video service differed moderately between *Uitzending gemist* and YouTube (t = -2.16, p < 0.05). Although the proposed factor

trialability did not affect service use, respondents significantly rated this item differently for *Uitzending gemist* and YouTube. Trialability connotes a risk-free exploration of the technology prior to committing to continued use; as more adopters feel they can experiment with a new technology and explore its ramifications for themselves personally, they are more likely to be motivated to use it during early adoption stages. Complexity encapsulates the degree to which a potential adopter views using the target system to be relatively free of effort. The results showed that the respondents considered YouTube easier to use than *Uitzending gemist* (t = -4.23, p < 0.01). YouTube thus required less effort in its utilization by individuals. The last innovation characteristic based on Rogers' work, visibility, reported a significantly higher mean (t = 22.39, p < 0.001). Respondents thus favored YouTube for its ability to be viewed with other users. Individuals indicated that they had regularly observed others use YouTube.

The three proposed additional variables also displayed significant results. Respondents found YouTube significantly more reliable than *Uitzending gemist* (t = 7.27, p < 0.01). YouTube also favored the negatively posited question about the download delay in both services. The perception of the download speed of streaming videos is significantly lower with *Uitzending gemist* than with YouTube (t = -5.63, p < 0.001). The visual image quality was, however, better with *Uitzending gemist* than with YouTube (t = -7.59, p < 0.001). *Uitzending gemist* thus delivered a better and sharper picture. All correlation coefficients were statistically significant at the 0.001 level. These findings suggested that respondents who attributed a high perceptual agreement on a particular innovation characteristic to YouTube also presented a high agreement for the same variable with *Uitzending gemist*.

Table 5.8. Mean differences and correlation analysis innovation characteristics

Variable	YouTube		*Uitzending gemist*		Mean difference	Correlation analysis
	Mean	SD	Mean	SD		
Relative advantage	3.37	1.87	3.92	1.88	-5.36**	0.34***
Compatibility	4.06	1.66	4.40	1.61	-4.10**	0.45***
Trialability	4.74	1.55	4.85	1.44	-2.16*	0.49***
Complexity	5.54	1.29	5.42	1.29	4.23**	0.42***
Visibility	4.80	1.56	3.61	1.62	22.39**	0.39***
Reliability	4.65	1.38	4.33	1.45	7.27**	0.36***
Download delay	3.74	1.43	4.05	1.50	-5.63***	0.34***
Visual experience	3.72	1.53	4.14	1.52	-7.59**	0.23***

Note. *p < 0.05, **p < 0.01, ***p < 0.001

5.3.5 Discussion

The particular group of respondents used online video services for information (cognitive need) and entertainment (affective need) purposes. These findings are consistent with prior research on YouTube use (Hanson & Haridakis, 2008; Haridakis & Hanson, 2009). This dichotomy is often attributed to online media as its two main functions (Kraut et al., 1998). Furthermore, this is similar to prior studies about watching television (Rubin, 1983; Rubin, 1981). This finding is to be expected, as much of the content (or all content, for *Uitzending gemist*) on the online video services includes televised material. This is especially true for the relation between tension release motives and watching videos on *Uitzending gemist*. Where YouTube is not used to release everyday stress, *Uitzending gemist* is. Because tension release is particularly found in television studies, it is not surprising that this factor significantly affects *Uitzending gemist* use.

The distinctly social aspect to YouTube, as found by Haridakis and Hanson (2009) was not found in this study. The results show that neither YouTube nor *Uitzending gemist* are used to satisfy personal integrative needs. A possible explanation for this result lies in the item construction of this social component. Social interaction and co-viewing, as identified by Haridakis and Hanson (2009) were not found as distinctive factors. This could be attributed to the number of items used in the survey. Future studies should include more items to provide a valid and reliable number of components.

This study is the first to examine perceptual innovation characteristics in relation to online videos. The findings display different predictors for YouTube and *Uitzending gemist* about their innovation characteristics. Compatibility and visual experience significantly affect *Uitzending gemist* use. Similarly, these two factors influence YouTube use. This confirms the prior findings by Chen, Gillenson and Sherrell (2002), who found that compatibility is an imperative factor in e-commerce. However, the download delay and complexity of YouTube also affect its usage. The significant influence of complexity on YouTube use is not surprising, as the effect of ease of use is found in previous YouTube research and included in the technology acceptance model (Yang et al., 2010).

The comparison analysis between the two services revealed significant differences. Affective (entertainment), personal integrative and tension release motives are favored for YouTube, whereas cognitive motives (information seeking) present higher values for *Uitzending gemist*. Relative advantage, compatibility, and visual experience are attributed

to *Uitzending gemist*, whereas YouTube is considered reliable, easy to use, visible, and has little download delay. These findings indicate that the Internet has diverse functions and different sites on the web are used for different purposes. Further research should not only focus on YouTube, but it should also include other websites to provide reliable recommendations.

As with every study, the findings of this study should be interpreted in light of their empirical limitations. First, it should be noted that the innovation characteristics in this study are measured by single-item factors. This reduces the reliability and validity of these factors. The measures used were part of a larger survey. It would therefore become impracticable for respondents, as it would heavily affect the length of the survey. Second, the labels given to the motivations were based on prior studies in the context of television use. Although similar gratifications were found in relation to the Internet, it is possible that future studies find different motivations for the use of online video services. Further research is needed to determine the gratifications that are related to online video services. Third and final, generalizations must be made with caution. The total set of respondents is not fully representative of the Dutch population, as older adults are to some extent overrepresented. The data were collected via self-selection. Hence, the people in the dataset have an intrinsic motivation to complete the online survey. Despite these methodological concerns, it is believed that the findings provide significant information for academics and practitioners.

5.3.6 Implications and conclusions

This study set out to explore comparable services to audiovisual heritage services and how one can benefit from these services in terms of usage motivations and perceived innovation characteristics. This study generated several insights into online video site usage. In general, relative advantage and compatibility are important factors when developing online video services. Service needs have instrumental value to the user, which seems evident, but it is often lacking in practice. In the Netherlands, audiovisual heritage services often initiate from a technology perspective and are pushed rather than pulled (Ongena et al., 2012). Audiovisual archives should therefore include prospective users in their development to increase the eventual usefulness of the service, as already recognized in human-computer interaction (Van Schaik, 1999). Furthermore, audiovisual heritage should be compatible with users' lifestyles. This characteristic can be achieved by trying to understand the systems' users. Traditionally, archive users are more likely to be well educated with higher

household incomes (Conway, 1986). They include most early adopters of archives. For audiovisual archives to reach their desired popularity levels, audiovisual archives must strive to attract those late adopters and laggards.

YouTube appeals to the respondents' entertainment needs, and its features reflect a reliable, effortless and straightforward online service. To a great extent, the same applies for the need to release tension. Escaping daily stress and relaxing goes hand-in-hand with an uncomplicated and easy-to-use video service. When implementing an audiovisual service for entertainment purposes, developers should thus consider reliability, download speed, and the ease of use. The last can be achieved by usability evaluations. Because such evaluations are essential for determining whether a site successfully meets its users' needs (Cunliffe et al., 2001), it is imperative to execute these usability assessments. Usability evaluations should be a pivotal point in developing audiovisual heritage services.

Compared to YouTube, *Uitzending gemist* satisfies the need for information and knowledge. Considering the features favored for this online service, it is important to consider the importance of video quality and searchability in this service. To keep up with recent events or increase one's general knowledge, video quality is a vital factor. A technology similar to HDTV is thus a valuable asset when developing an online video service to appeal to users' information needs, as is the complexity variable about search result quality. *Uitzending gemist* users indicated that they found what they were seeking. The search engine is thus important when developing a service that appeals to a user's information need.

Based on U&G and IDT, this study examined factors that affect use of online video sites and investigated potential differences among these factors. By surveying 1,939 Dutch citizens, similar services to provide suggestions for the service to be developed were investigated. This study provided practical implications for audiovisual heritage archives.

5.4 A rank-ordering study

5.4.1 Introduction

Whereas the first study in this chapter entailed an examination of factors affecting the intention to use an audiovisual archive and the second study focused on existing solutions, this (smaller) study concentrates on an more in-depth analysis of user requirements. One of

the major limitations of the vignette survey was that the amount variables that can be taken into account is small. To gain more knowledge about the possible design of an audiovisual heritage service a requirement analysis is conducted.

The empirical research question that is tried to answer in this study is the following:

> *What are the most important user requirements regarding an audiovisual heritage service?*

Researchers have struggled since the dawn of information systems to investigate how to meet the user needs serving a particular information system. Striving doing so, requirements elicitation emerged as a discipline (Tuunanen, 2003). Requirements elicitation can be described as the practice of obtaining the requirements of a system from users, customers and other stakeholders (Sommerville & Sawyer, 1997). Literature argues the acquisition of requirements information or knowledge has a major impact on the final product quality (Valusek & Fryback, 1987). A variety of methods or techniques exist to acquire information aiming at its elicitation. Elicitation methods include observation techniques (e.g., prototyping), unstructured elicitation techniques (e.g., brainstorming), mapping techniques (e.g., cognitive mapping) formal analysis techniques (e.g., repertory grid) and structured elicitation techniques (e.g., card sort) (Byrd et al., 1992). The effectiveness differs per technique, however there is no agreement among experts on how best to elicit information or knowledge (Davis et al., 2006). Moreover, these traditional techniques are mostly applied within organization reach and therefore not serving sufficient requirement determination for information systems aiming at a wide audience (Tuunanen, 2003).

In this study a two-step priority rank-ordering elicitation method is used. This method, with respect to information processing, avoids excess demands on working and long-term memory for participants as it reduced the number of concepts considered at a time (Tuunanen et al., 2011). This method supports the evaluation of the user needs and roundups the suggestion phase in this dissertation.

5.4.2 Method

Procedure and sample

Target participants for the study included lead users. To identify different groups of users and to be able to define the distinguishing features between them a cluster analysis was conducted on the sample data used in the previous studies. As a basis for the analysis, the variables concerning the amount of usage of online and mobile video were used (YouTube and *Uitzending gemist*). The nonhierarchical clustering K-means algorithm (McRae, 1971) was used as a clustering method, which is less sensitive to outliers and more suitable for handling larger sets of data than the hierarchical clustering. In the K-means cluster analysis method, the amount of final clusters is decided beforehand, and the goal was to divide the respondents into different groups of lead users and laggards. Cluster solutions for three, four, five and six clusters were compared in selecting the best cluster solution with these two criteria: how well each variable clustered the sample and varied between the clusters; and how interpretable the cluster solution was. The four-cluster solution was accepted. It had four comparable-sized clusters.

People that infrequently use audiovisual media via both the fixed and mobile Internet form the first profile. This group, comprising 28.7% of the sample, is labeled as *mass conservative*. This cluster can be sketched by an absence of audiovisual media use via the mobile device and a very low frequency of audiovisual media use by computer. The second cluster consists of a *progressive mass* of audiovisual users. This group of people watches short fragments on the Internet on a regular basis. They also make occasional use of services such as *Uitzending gemist*. This group does not frequently make use of mobile video services. Besides this mass groups two interesting niche groups are identified. The first of these are the *heavy users*, which is thus the third cluster. These users are characterized by a frequent use of audiovisual media. In contrast to the conservative mass, heavy users are watching significantly more on demand audiovisual media. They watch it via both mobile and fixed infrastructure. The second niche group, the fourth and last cluster, consists of *mobile users*. This cluster shows a mixed picture. When taking a closer look at the results a pattern arises. This group appears to make moderate use of audiovisual video services via the fixed connection. However, although to a lesser extent than the group of heavy users, it appears that this group significantly uses mobile video service. These mobile video users are therefore the culmination of this profile. The difference

between the clusters was statistically analysis at a 0.05 level. The cluster size of the four clusters, and the gender and age distribution appear in Table 5.9.

Table 5.9. Cluster size, gender and age distribution among clusters

	Conservative mass	Progressive mass	Heavy users	Mobile users
Cluster size	28.7%	35.7%	11.8%	23.8%
Gender				
Male	52%	64%	71%	66%
Female	48%	36%	29%	34%
Age (SD)	43.8 (13.2)	39.1 (11.8)	37.2 (12.1)	38.4 (13.5)

The objective was to recruit at least twenty participants, the minimum necessary to make the study results meaningful (Peffers et al., 2003; Tuunanen et al., 2006). The participants were mainly derived from the second (progressive mass) and third (heavy users) clusters as these groups contain mainly innovators but also some of the early majority. As this dissertation tries to address the needs of the general public, this group is critical to the eventual use of the audiovisual heritage service.

Design and measures

The ranking method can be categorized as a structured elicitation technique. Ranking as it is used in this study can furthermore be characterized as a practical application of the card sorting technique in combination with a structured interview. Card sort is executed by sorting a vast amount of cards marked with specific elements a frequent amount of time. Every time each aggregated deck of cards is labeled according to its underlying concept (Gammack, 1987). Structured interview consist of positing open, closed, probing and leading questions to potential users, which is considered the most general elicitation method (Byrd et al., 1992).

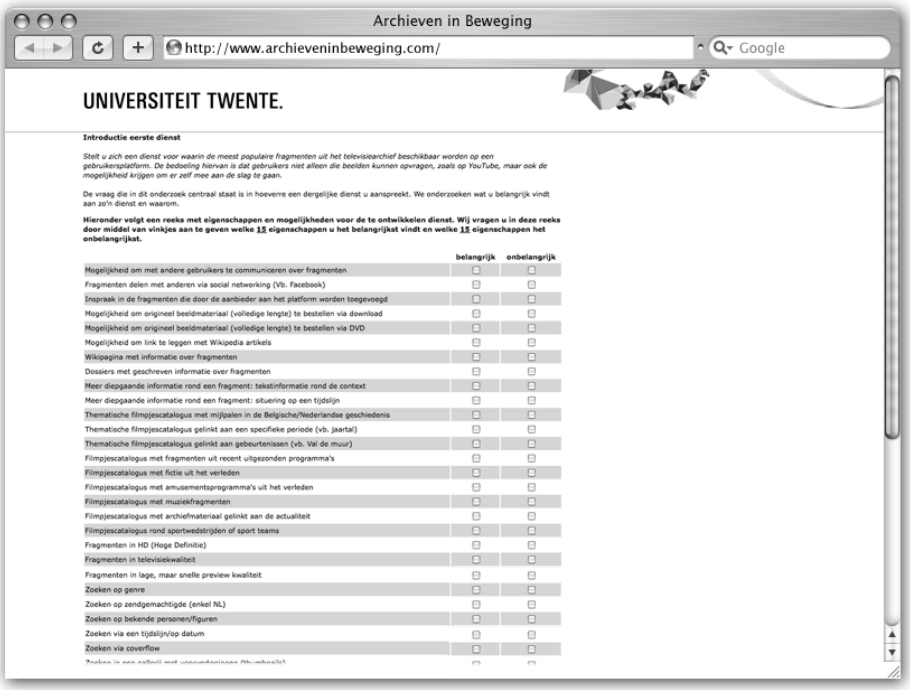


Figure 5.3. Screen were respondents indicate (un)important features (Dutch)

Measurement of the ranking aspects was online-based and respondents were given login information. After an introductory screen, respondents were presented with a general description of the new service concept. Moreover, the Dutch situation and current status regarding audiovisual cultural heritage were explained. First question that was posited to the respondent concerned the medium preference for the development of such service, thus which platform the respondent favor. Predefined categories were determined in order to structure the potential list of candidate features, which consists of categories related to the content (i.e., content preferences, context, recommendations and extraction) and interaction (i.e., user-to-user, user-to-document and user-to-system). Based on these categories a long list of features was determined. Respondents were asked to indicate the importance of features by selecting 15 important and 15 unimportant features (see Figure 5.3). Lastly, respondents were asked to determine their 15 important features in a top-5 rank.

5.4.3 *Results*

This section reports the results of the study. The features are rank ordered according to type of content, contextualization of content, recommendation of content, extraction of content, user-to-user interaction, user-to-document interaction and user-to-system, for further analysis. Moreover, not all the scores for the features on all categories of features are presented and only shown the extremes.

Content

To analyze the full set of features related to the content, a ranking is made. The rank is based on the frequency per item. This gives a first indication of the importance / unimportance of certain features. Next, the prioritization of the features by the users was used as a weighting factor. An item that is set as number 1 thus counts more significantly towards the ranking. Table 5.10 presents the top-10 content features.

Table 5.10. Content features and category based on ranking

Rank	Category	Item
1	Extraction	Download video fragments from the archives
2	Content type	Catalogue with fragments related to current affairs
3	Content type	Thematic content that is linked to major events (e.g., the fall of the Berlin wall)
4	Content type	Catalogue with fragments of music
5	Extraction	Possibility to download original full-length content
6	Content type	Fragments in high-definition (HD)
7	Recommendation	Keeping track of user history
8	Contextualization	File with written information about the content
9	Content type	Catalogue with entertainment programs from the past
10	Content type	Catalogue with recently broadcasted programs

As for the preferred type of content, the results show that thematic content that is linked to current issues is often indicated as an important feature. The topicality is of content is thus imperative to prospective users. One respondent supports this with the example of the earthquake on Haiti. The respondent stressed that it would be useful to combine fragments of this catastrophic incident to acquire all information about the issue. The illustration of this example indicates that major events are considered imperative to include in the service that is also demonstrated by the feature to provide content thematically (ranked third).

Respondents also find music important. There are five respondents who indicate to would like to view broadcasted concerts and performances again. This also includes classical and significant concerts in history. As an example, respondents refer to the last on stage performance of Pavarotti with Nessun Dorma at the Olympic Games of Turin 2006. The ranked list displays other types of content that are important to the respondents. The results display a meaningful role for programs related to entertainment. Respondents express enthusiasm for comedy, satire and cabaret such as one-man shows by the late Toon Hermans (Dutch comedian). But people also want to look back game shows and reminisce. Although the respondents tend to reminisce, they also show interest in the present. The respondents indicate to include recently broadcasted programs in the service. For instance, one respondent would like to view last years *Ik hou van Holland* [I love Holland] show, which is a Dutch game show aired on Saturday night.

A small set of features relates to the contextualization of content. This includes features that add in depth information to the content. This information can be derived from internal sources, for instance acquired from the vast amount of metadata added by audiovisual heritage archives, or from external source like Wikipedia. Overall, this type of features is considered less important in relation to the type of content, which is demonstrated by the fact that only one contextualization feature showed up in the top-10 list. However, respondents indicate that additional in-depth textual information about the context of the watched fragment is important to them. This information can pertain to background information of the actors, broadcasting date or other contextual information.

Similar to the contextualization of content, content recommendations is also represented by one item in the top-1o list. Respondents are keen on keeping track of their own viewing history. Although not shown in Table 5.11, respondents also indicate to appreciate recommendations based on the latest content additions. Recommendation by archivists or based on similar users are however not interesting as several respondents address the unimportance of these features in the results.

The last category entails the extraction of audiovisual content. Respondents were provided with features related to receiving hard copies of fragments or full-length material, and with downloading of the content. Downloading of fragments is ranked number one in this category, moreover the downloading is overall the preferred feature of an audiovisual heritage service. Most of the respondents ranked this feature as the number one of their individual top-5 list. Ordering of hardcopies (i.e., DVD) is thus not preferred.

Interaction

Similar to the features related to content, the interaction features are ranked according frequency and weighted by the individual prioritization. The system must provide interaction feature to sift through the archive. To gain more information about the attributes people want to search on, searching criteria were asked in terms of user-to-system features. However, a possible service is not limited to a mere passive consultation of the material. It would also give rise to interaction with others, which may already use the service or in the future perhaps will do. Besides the interaction between users, participants were provided with the opportunity to indicate features that interact with the content presented. This is comes down to generating metadata in the form of reviews, comments, favorites and keywords. Table 5.11 provides a summary of the top-10 listed items.

Table 5.11. Interaction features and category based on ranking

Rank	Category	Item
1	User-to-system	Search via search engine
2	User-to-system	Search by genre
3	User-to-system	Search for celebrities
4	User-to-system	Search by categories or themes
5	User-to-system	Search by thumbnails
6	User-to-document	Make a list of favorite fragments
7	User-to-system	Search by broadcaster
8	User-to-user	Possibility to communicate about fragments with other users
9	User-to-user	Share fragments via social media (e.g., Facebook)
10	User-to-system	Search by timeline or date

Features categorized as user-system items dominate the top-10 list. People like to search content via a regular search engine but would also appreciate the additional in-depth search possibilities such as searching by genre, celebrities, themes, thumbnails, broadcaster and dates. As for celebrities, respondents refer to artists, members of the royal family and politicians. Searching by recent introduced ways like tag clouds or Cover Flow[7] is less appreciated. With regard to user-to-document items, respondents clearly indicate to be unwilling to comment on fragments or review fragments (rating). The only interesting

[7] Cover Flow is an animated, three dimensional graphical user interface integrated within Apple products. By using the on-screen scrollbar users are provided with visually flipping through snapshots of documents, website bookmarks, album artwork, or photographs.

feature in this category is the possibility to build up a list of favorite fragments. User-to-user features are unpopular as most of them are indicated as unimportant. However, a small amount of respondents indicate that they find importance in sharing the audiovisual content across social media or between other users.

5.4.4 Conclusions and discussion

In this exploratory research, the focus was on audiovisual heritage service features. It tried to examine how features on two core categories; i.e., content (i.e., content preferences, context, recommendations and extraction) and interaction (i.e., user-to-user, user-to-document and user-to-system), were perceived, judged and scored by the respondents. This study can be seen as a preliminary step in the quest to seek answers in the area of requirements elicitation for wide-audience end-users in a domestic context. This examination shows that, although not fully optimized yet, a ranking technique is valuable to gain both quantitative as well as qualitative information on user requirements. Hence, a scientific domain of contributive results by this study is in the field of requirements elicitation of wide-audience end-users as introduced by Tuunanen (2003), who stated that there is a need for elicitation methods/techniques for wide-audience end-users and research needs to be done in this area.

The results clearly suggest an online consultation platform with the possibility to download content. Searching content in the consultation service seems mainly to present in a free search or a search query by genre or person. Regarding additional features one can identify four extensions. First, the type of content and the provision of access it within the service. Respondents are interested in content focused on (major) news items, music and amusements programs. Second, the degree of personalization can be an important asset. In today's Internet era, this is an increasingly important issue. Websites like Amazon.com implement successful recommendation systems to optimize customers' service. As the respondents indicate, also with an audiovisual heritage service the possibility to make a list of favorite fragments or to keep track of user history is imperative. Thirdly, people see little added value in a remix module on top of the basic service. The question is whether this should be so is also included, or that this is a bridge too far for many users. Such additional functionality would only be interesting for the so-called heavy users. Fourth and final, respondents see a significant role for the extraction of the material, more specifically downloading the material.

The results must however be interpreted with care. The use of lead users result in a non-representative sample, i.e., the sample does not represent the Dutch population or even audiovisual heritage users. The lead user concept is intended to identify members of a population who are more likely to be able to participate effectively in data collection, particularly when the subject of the data collection involves innovative products or technology. Lead user samples have been used effectively to anticipate the preferences of mass audiences. There cannot be any certainty, however, that the mass audience's preferences will eventually mimic those of the lead users for any particular set of ideas, preferences, or product features. Indeed it seems likely that some portion of the population of audiovisual heritage service users may never be interested in some of the ideas expressed by the participants. If this study were attempting to sketch an unbiased image of the preferences of the population, this would be worrisome. For the purpose of designing new systems and products, however, this is not a problem. No system will be attractive to all members of a population and one that is attractive to a substantial portion may create much value.

5.5 Conclusion

This chapter tried to acquire more information about the users needs by means of three exploratory studies to ensure that the prototype delivers a service that match these user needs. The research question that is tried to answer in this chapter has been the following:

> *What are consumer needs that can support the design of a digital audiovisual heritage service?*

The three studies that tried answered this question provided implications for the design of an audiovisual heritage service. A clear result from the vignette study is the preference for the online platform of an audiovisual heritage service. This already motivated the assessment study by comparing two online video services (YouTube and *Uitzending gemist*). This however has also major practical design implications. Traditionally, programs are broadcasted on television. With the introduction of advanced decoders that enables video-on-demand, it is a congruent step to develop a service via the television platform. However, in terms of richness one can state that the Internet is able to deliver more features, thus cues, to the user. Therefore, the choice is made to develop a prototype that is accessible through the Internet.

The results are yet indecisive about the expected value an audiovisual heritage service must deliver. Marketing literature distinguishes on utilitarian and hedonic products (Holbrook & Hirschman, 1982). This dichotomy is later is used to classify information systems (Van der Heijden, 2004). It is believed that a utilitarian information system pertains to the instrumental value and thus its perceived usefulness, whereas a hedonic information system is associated with enjoyment of the activity itself. The results of the comparison study between YouTube and *Uitzending gemist* shows that online services can differ in appealing to certain needs. Based on this, one can debate on the need that an audiovisual heritage service would address. The ranking study clearly shows the dichotomy of instrumental value versus enjoyment. On the one hand respondents indicate to find content related to news important, which pertains to the utility of an information system. On the other hand respondents are also keen on entertainment and comedy, which are associated with the enjoyment factor. The service must therefore support both values. To support the instrumental value of the service a search engine that is able to search by genre, celebrities and categories is implemented. Furthermore, the service provides additional information such as genre, year of broadcasting, and episode. To support the hedonic value, an audiovisual heritage service should contain fiction and entertainment programs. Furthermore, as acquired from the comparison study clips are provided on preview quality to decrease download delay. The latter is found to be a significant determinant in the use of an online video service. This is in line with the service as provided by YouTube. Since, YouTube pertains more to the affective and tension release needs it is expected these proposed features will leverage the enjoyment factor to use the audiovisual heritage service. Summarizing, implementing such features to support the instrumental and hedonic value of the system enhances the relative advantage, as this is an imperative antecedent to use an online video service.

An important design principle the prototype must comply with is the complexity of the service. The ease of use determines the use of an information system to a great extend. In the comparison study already presented an imperative role for the adoption and use of an online video service. In order to adhere to the principle to design an effortless service, the design principle by Siau et al. (2007) is adopted. They laid the following design principle for web-based information systems that is related to the usability of the system: organize contents in the way users are familiar. This principle is based on the work of Norman (1998) to usability. To decrease information overloading and its frequent use the service is likely to be used when is relates to the design and layout similar to that of YouTube. Respondents indicate that YouTube is easy to use and see others frequently use the service.

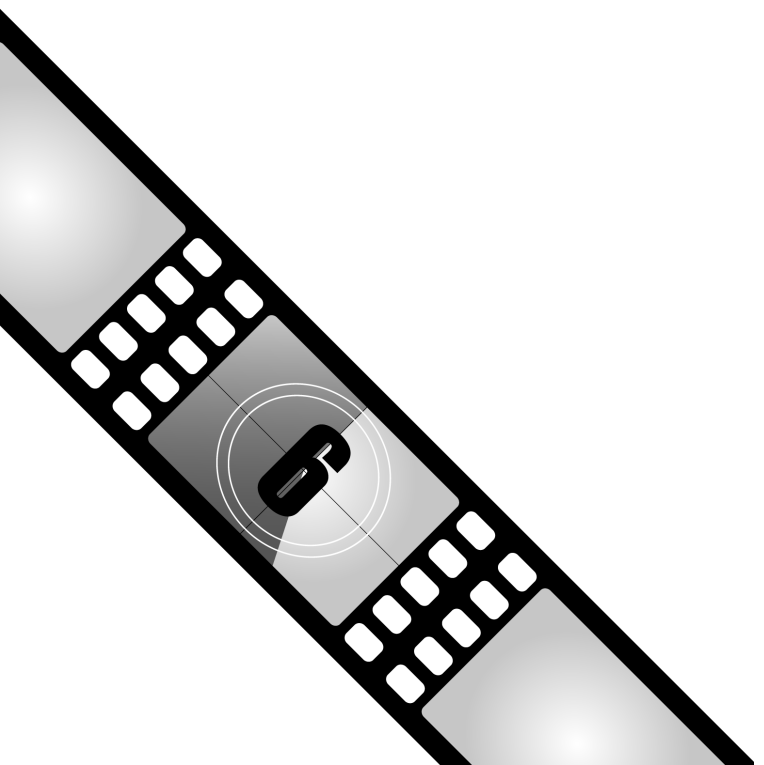
Hence, it is suggested that a design similar to YouTube will increase the usage of an online audiovisual heritage service.

For the prototype design, two additional features are suggested. First, based on the vignette results one can state that social influence has a profound effect on the use of an audiovisual heritage service. As this is a cumbersome factor to influence as a designer, one is able to support this factor by including sharing possibilities. To make it easier to share content or experiences with the service users are able to influence prospective users triggering the use of the audiovisual heritage service. Sharing the content on social media and via email is therefore implemented. Second, personalization is included in the service. Although personalization is considered of a great strategic significance to online vendors to manage customer retention (Winer, 2001), the respondents in the ranking study displayed results indicating the unimportance of this tailoring. However, the respondents do indicate that the construction of a favorite list is important to them. This feature is subsequently implemented.

Lastly the extraction of content is an imperative factor that is requisite to attention. Respondents indicate that downloading of audiovisual heritage content is imperative to them. Since this is intertwined with the payment of the content the choice is made not to implement this feature directly in the prototype. Instead, a further examination is proposed to assess the willingness-to-pay for content and the appropriateness of possible revenue models. On the subject of willingness-to-pay will be further elaborated in Chapter 8. The eventual prototype that includes the above design considerations is detailed in Chapter 6

CHAPTER 6

THE PROTOTYPE DESIGN



6.1 Introduction

In Chapter 5 the user needs are explored through three quantitative studies. Purpose of that chapter was to gain insights in the design of the prototype of an audiovisual heritage archive service and come up with a suggestion. This chapter describes the integration of the lessons learned from the exploratory study by means of the development of a prototype and thus answers the following research question:

> *What are the technical and user design components of a digital audiovisual heritage instantiation?*

The primary goal of any prototype development exercise and evaluation is that of addressing a particular user need that is not currently addressed and therefore improving users' overall experience of using an application or system (Köbler et al., 2011). Within design science research prototypes are often referred to as instantiations (e.g., Hevner et al., 2004; Gregor & Jones, 2007) and represent the physical level of the artifact. Prototypes are considered valuable in enhancing artifact knowledge (Müller & Thoring, 2011) In the following chapter, a design description of the audiovisual heritage archive service including a technical description of the prototype system and its features is provided.

6.2 Design rationales

The design rationales for the various features and functions of the prototype are mainly derived from the user studies as described in Chapter 5. Although most of the design science research papers are explorative of nature, they provide useful insights in possible design principles. Hence, design principles are also adopted from previous design science studies. Furthermore, these principles are based on the designer's creativity as creativity and design go hand in hand (Hevner & Chatterjee, 2010, p.155).

The design principles pertain primarily to the field of interaction design. The overall aim of good interaction design is to support people in their everyday lives (Winograd & Flores, 1986). Although there are some overarching principles for good interaction concerning usability and the quality of user experience (Sharp et al., 2007) they are difficult to operationalize for specific situations such as the design of an audiovisual heritage archive as what constitutes good design in one specific situation might be very different from another one. Existing studies primarily focused on studying technologies used by a single group of

people. In contrast, this dissertations focuses on a broader perspective by introducing a platform for two-sided markets. Two-sided markets, also called two-sided networks, are defined as economic networks having two distinct user groups that provide each other with network benefits (Armstrong & and Wright, 2007; Gallaugher & Wang, 2002). The platform provides infrastructure and rules that facilitate the two groups' transactions and can take many guises (Eisenmann et al., 2006). In the case of the present study, the rights holders of the content influence the consumer network. The latter pertains mostly to the broadcasters, which have the intellectual property rights of the audiovisual material. The study thus aims at unlocking the audiovisual content by formulating a two-sided platform.

6.2.1 Consumer side

For the web-based context, the four components as suggested by Nambisan and others are adopted. The authors studied customers' interaction experiences in the context of online product forums and proposed an analytical framework suggesting that virtual co-creation systems have to consider four experience dimensions – pragmatic, hedonic, usability, and sociability – in order to serve user needs (Nambisan & Baron, 2007; Nambisan & Nambisan, 2008; Nambisan & Nambisan, 2008). These four items reflect similar findings from the exploration to user needs (see Chapter 5). These are supplemented by trust (Williams et al., 2008) as part of service design dimensions. Furthermore, media recognition should be supported. The mixture and focus on the different design principles depends on the function of a digital audiovisual heritage service. For instance, an online game would more rely on a hedonic experience instead of a pragmatic experience. The suggested design in this dissertation includes the design principles equally. The six design principles are detailed below.

The first aspect, the pragmatic experience, relates to the customer's experience in realizing product-related informational goals in a virtual customer environment. Archives and digital libraries are primarily used to seek information (Wilson, 1997). Thus, relevance and usefulness are often found to be predictors of the use of electronic or digital library and archive services (Hong et al., 2002; Heinrichs et al., 2007; Tibenderana & Ogao, 2008; Miller & Khera, 2010). Based on this utilitarian need, the following design principle is posited.

Design principle 1: *An audiovisual archive should support a pragmatic experience.*

In addition to the instrumental value of an audiovisual archive service, such a service can pertain to the entertainment needs of the users. This intrinsic motivation is often found in

association with hedonic information systems (Van der Heijden, 2004). Therefore, enjoyment could increase the popularity of a service based on an audiovisual archive. Thus, audiovisual archive services must be configured in a way to satisfy hedonic needs (Van der Heijden, 2004; Sun & Zhang, 2006), which prompts the second design principle.

Design principle 2: *An audiovisual archive service should provide a hedonic experience.*

Customers choose a product with more features even at the expense of usability. However, once they have used a product, their preference changes, that is, ease of use matters substantially more than utility (Thompson et al., 2005). However, ease of use takes precedence over usefulness in hedonic systems (Van der Heijden, 2004). Additionally, new web-based services are often equipped with Web 2.0 features. For example, the so-called interaction-enabled features result in more engaging webpage displays (Harrison & Barthel, 2009). Therefore, Web 2.0 is found easy to use (Dwivedi et al., 2011), which is even more so the case considering the "unlocking" initiatives for consumers. Consumers should not require high technical skills required when using the service. Thus, the overriding goal should be simplicity (Williams et al., 2008), which prompts the following design principle.

Design principle 3: *An audiovisual archive service should express simplicity.*

The next design principle also pertains to Web 2.0 characteristics. The term "Web 2.0" is collectively used for web applications that facilitate collective knowledge production, social networking and user-to-user information exchange (Adams, 2010), i.e., the sociability experience. Thus, the Internet is increasingly used as an interpersonal utility (Luo et al., 2011; Papacharissi & Rubin, 2000). Therefore, the fourth design principle is formulated as follows.

Design principle 4: *An audiovisual archive service should support a sociability experience.*

In addition to the defined overriding goal of simplicity, Williams, Chatterjee and Rossi formulate a second goal in a consumer context: trust (Williams et al., 2008). The trustworthiness, or credibility, of the website can enhance its use and be defined most simply as 'believability' (Tseng & Fogg, 1999). Believability is considered to be a key concept in business (Kracher et al., 2005). Although there is a large body of literature regarding trust and credibility, the design principle used in this dissertation primarily pertains to reputed credibility. Reputed credibility is based on source labels. For example, sources labeled 'Doctor' or 'Professor' are perceived to be credible by virtue of the label. Similar credibility

can be attributed to sound and vision. Based on this idea, the penultimate design principle is formulated as follows.

Design principle 5: *An audiovisual archive service should express credibility.*

The final design principle pertains to the recognition of the service. Åkesson, Kautz and Eriksson (2010) found that e-newspapers should be designed to provide a familiar news-reading experience. That is, the patterns of interaction, layout, structure, order and aesthetics characteristic of news media, where feasible for the e-newspaper, should be used. Similarly, Siau, Chen and Tan (2007) stipulate that web-based information systems should organize content in a way that users are familiar with. Consequently, it was imperative to design the prototype in such a manner that it would be recognizable to prospective users. Thus, the final design principle is postulated as follows:

Design principle 6: *A web-based audiovisual heritage service should provide media recognition support.*

6.2.2 Business side

A difference between services and digital services is the concept of ownership. In a digital environment, this is linked to intellectual property rights (IPR). Especially in the case of audiovisual archives, IPR plays an important role. Access activities are governed and constrained by the legal entitlements of copyright holders (Edmondson, 2004). Ownership management is therefore considered critical in the successful unlocking of the content towards consumers. Therefore the following design principle from the provider side is laid down:

Design principle 1: *A web-based audiovisual heritage service should support ownership management.*

In order to develop viable services, revenue streams towards the provider are necessary. The different approaches to capture revenue include different methods of pricing (i.e. advertising *vs.* pay-per-view) and different sources of revenues (Williams et al., 2008). Digital services also allow the exploitation of the content for different user groups. For instance, audiovisual content can be priced according the demographical characteristics of the users. For broadcasters, it is important that the provider side of the platform includes information, which adheres to their need to implement pricing strategies. Therefore the next design principle is postulated:

Design principle 2: *A web-based audiovisual heritage service should support pricing strategy.*

6.3 Conceptual design

To provide a technical description of the prototype, the language and graphical notation of the unified modeling language (UML) is used. UML defines a standard language and graphical representation for creating models of business and technical systems (Fowler, 2003). The current UML specification provides standardization of 14 types of diagrams divided into two categories. Seven diagram types represent structural information (structure diagrams), and the other seven represent general types of behavior (behavior diagrams) (Booch et al., 2005). For the purpose this research, the two most important and most frequently used diagrams are used to provide the technical description of the prototype. First, the use case model, which is a behavioral model, is discussed. A use case model describes the functionality provided by a system in terms of actors, their goals represented as use cases, and any dependencies among those use cases. Second, the technical architecture is discussed by means of a class diagram. A class diagram describes the structure of a system by showing the system's classes, their attributes, and the relationships among the classes.

6.3.1 Use case model

Subsequently from previous chapter, two actors are involved with the two sides of the prototype: stakeholders on the business side of the platform that consist of content providers, and consumers. The use-case model presented in Figure 6.1 details the use-cases of each of these actors with the demonstrator.

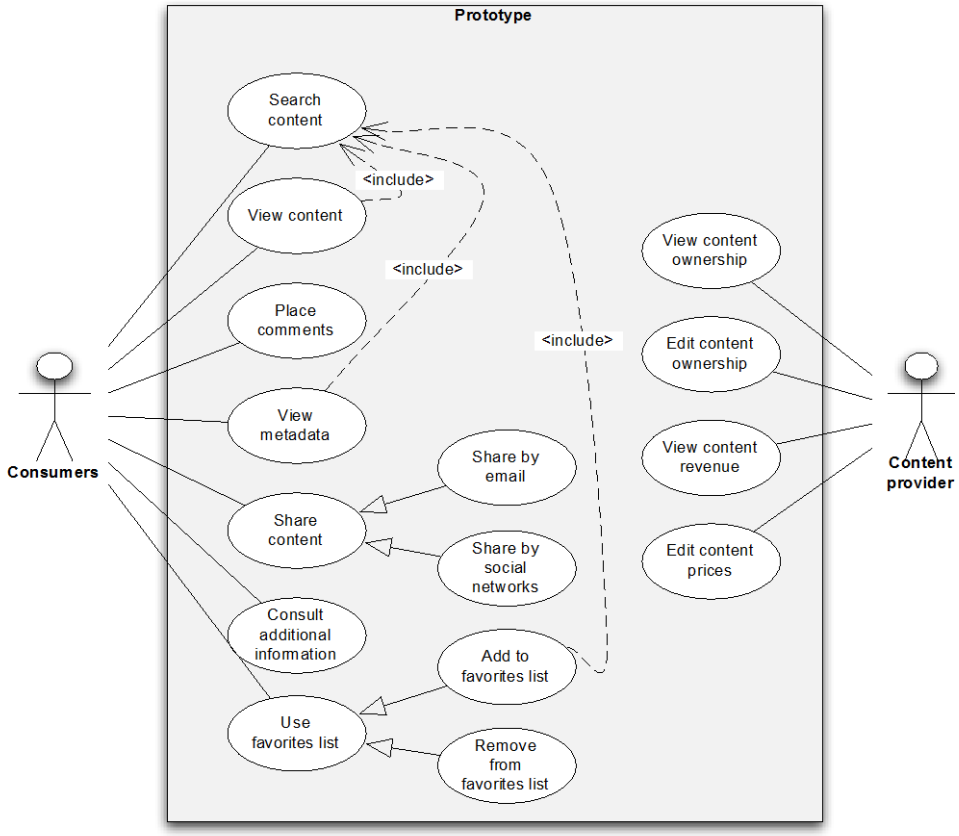


Figure 6.1. Use case model

Consumers should be able to search and view audiovisual heritage material. This was the mode important interaction feature as indicated by the rank-ordering study (see 5.4). In the same study respondents indicated that sharing content is imperative to them. The service should be able to social interact by means of content sharing among social networks and email. Hence, sharing of content must be supported. Furthermore, to enhance the social experience, comments can be given with every content item that is provided. This content yields a vast amount of metadata, which is selectively provided to users. Lastly, users are should be able to manage their favorite programs. A shortcut to adding content items to the favorite list is provided after searching content.

As reflect by the design principles and the fact that this research takes a consumer perspective, the business side of the prototype is considerably smaller. To date it primarily entails the management of ownership; content providers should be able to view and edit this

ownership. Furthermore, they should be able to view revenue of individual content items and should be able to adjust prices of content items.

6.3.2 Technical architecture

This section elaborates on the technical architecture that is chosen for the prototype. First the architectural structure is motivated and in addition to that goes into detail on the elements in that architecture.

The prototype is built according to the Model-view-controller (MVC) architecture for object-oriented software (Lethbridge & Laganiere, 2004). MVC is a software architecture that separates the representation of information from the user's interaction with it. The model consists of application data and business rules, and the controller mediates input, converting it to commands for the model or view. A view can be any output representation of data. Multiple views of the same data are possible. In sum, this architecture allows distinguishing on graphical interface, logic and data issues. It is chosen for its simplicity in use and understanding. Figure 6.2 provides an overview of the MVC architecture of the prototype.

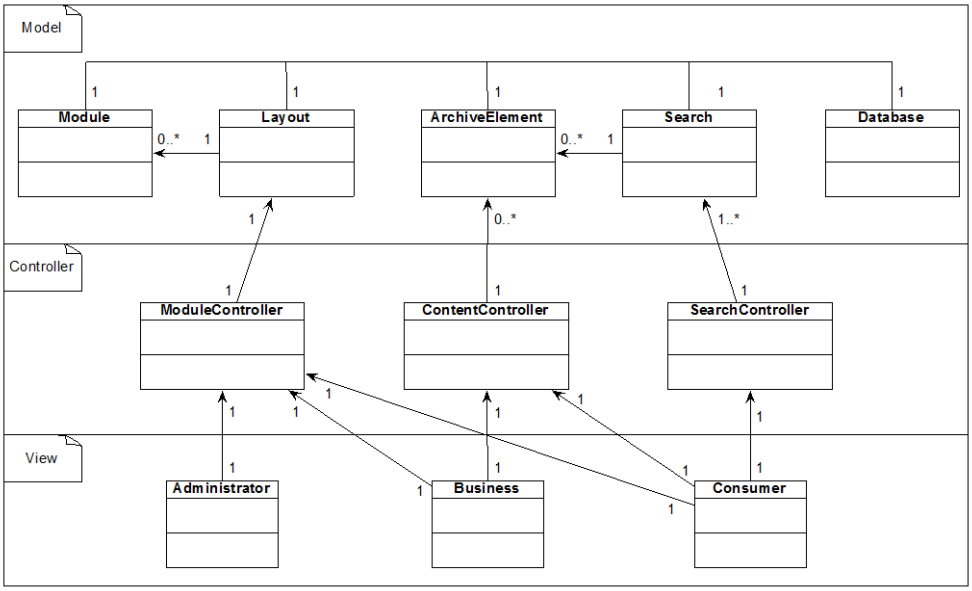


Figure 6.2. General model-view-controller architecture of the prototype

The View layer contains three classes, consumer, business and admin. These three classes act through graphical user interfaces as gateways to the three groups of actors that are

identified: consumers, content providers (e.g., broadcasters) and administrators. The latter is not included in the use case model (Figure 6.1), but mainly controls the user management of the service. The classes in the View layer are only able to communicate with the classes in the Controller layer. Asynchronous calls are chosen in the demonstrator to provide the users the experience of working in an application rather than on a website. This technique allows refreshing parts of the interface in contrast to refreshing the whole page.

The Controller layer contains three classes: ModuleController, ContentController and SearchController. Classes in this layer are in charge over a subset of classes that are in the Model layer, by translating actions that flow in from the View layer into operations on the Model classes of the demonstrator. Results from preformed tasks can be fed back to a View class, which presents the result to the user of the demonstrator. In other words, the Controller layer is the 'glue' between the Model and the View layers.

The Model layer contains five classes: Module, Layout, ArchiveElement, Search and Database. Classes in this layer are representations of the data, which is stored in a relational database. Each class in this layer communicates with the database through the Database class, which is able to perform all logical SQL operations on the database and thus acts as a gateway between program and the data.

6.4 User interface design

In this section the user interface is stressed. Figure 6.3 provides a screenshot of the main page of the prototype. Below the different elements in this screenshot are discussed by means of the design principles mentioned in 6.2.1.

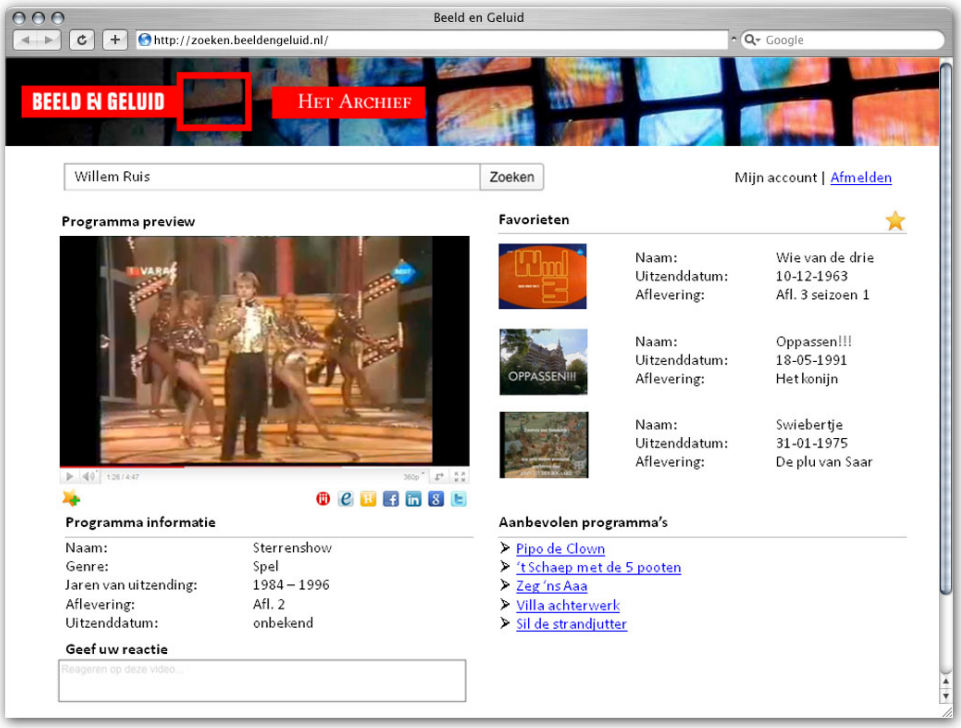


Figure 6.3. Screenshot of the audiovisual heritage service prototype (Dutch)

These design principles were translated into design components. The design components describe the technical interpretation of the design principles that are derived from a conceptual level. To construct an artifact, these design principles are formulated on the physical level to provide the artifact with form and function. This translation is discussed principle by principle. First, pragmatism is addressed by providing information regarding the audiovisual content. The informational content includes features such as accurate, complete and relevant information (Zhang & Von Dran, 2002). Moreover, features that relate to personalization support the pragmatic experience. This approach attempts to select additional relevant links for the user, thus modifying the navigation space by reducing or improving the paths to related Web pages (Nah et al., 2005). By including recommendations based on the viewed content, pragmatism with respect to searching for and locating content is supported. Second, enjoyment is provided using multimedia and attractive images and by making the service fun to explore. This approach requires a skillful visual design of the online service, which is considered to be the most important design feature of websites in the entertainment domain (Zhang et al., 2001). To enhance the service's simplicity and ease of

use, the visual elements are easy to understand and intuitive with respect to the information that they represent. Moreover, the layout of the service adopts in many ways the layout of similar services, such as YouTube, because YouTube is considered easy to use (Yang et al., 2010). To increase the sociability experience, social media features are incorporated that support user-to-user exchange. Social media have garnered increasing attention in recent years. With the advent of features for the incorporation of social media into websites, the exchange of content became easier. Thus, to enhance the sociability experience of the audiovisual archive service, social media buttons are implemented in the service to support content sharing among users. To increase the service's credibility, it is imperative that the identification of site's owners and designers is clear (Zhang & Von Dran, 2002). Moreover, the visual design of a website increases trust (Cyr, 2008). Therefore, to increase the website's credibility, the website owner must be clearly identified. Media recognition is achieved by matching the layout with existing online video services, primarily YouTube because YouTube is a frequently used service, as described in the comparison study (see 5.3), and used for similar reasons. Furthermore, YouTube has become the standard of what individuals expect audiovisual archives to be (Prelinger, 2009).

6.5 Conclusion

This chapter tried to find an answer for the fourth research question of this dissertation. This question is:

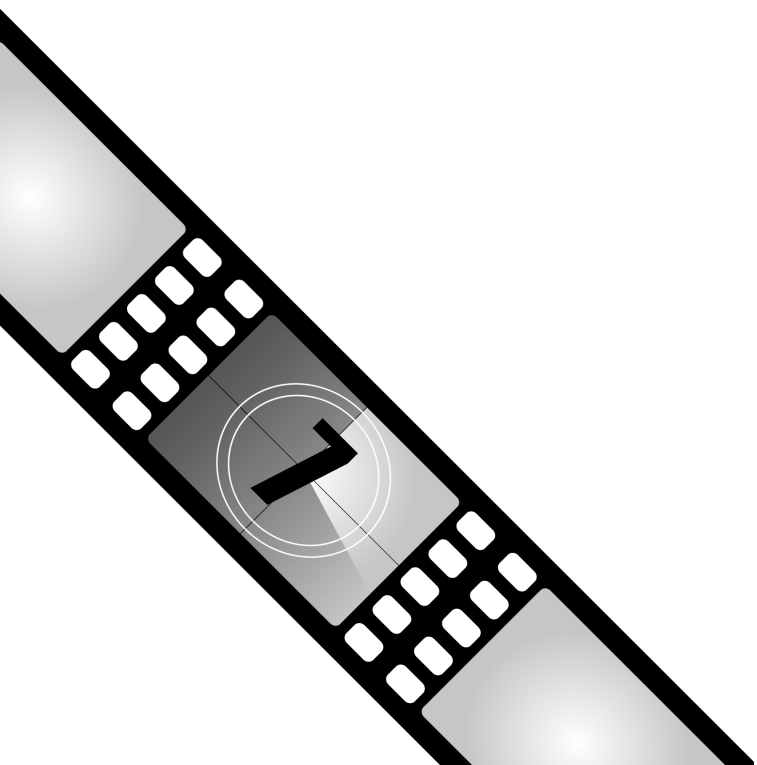
> *What are the technical and user design components of a digital audiovisual heritage instantiation?*

Based on the exploration of consumer needs (Chapter 5) a prototype is developed and discussed in this chapter. This prototype entails an online consultation platform that allows users to search and explore the audiovisual heritage archive of Sound & Vision in the Netherlands. The design rationales of the consumer and the business side are laid down (section 6.2) and translated into a technical architecture and a user design (i.e., interface). The prototype allows consumers to preview content, view metadata, and is provided with recommended material. Furthermore, users can comment on content items. A prototype as described in this chapter is often referred to as an instantiation in the literature of design science research (Hevner et al., 2004; Gregor & Jones, 2007). The purpose of this prototype artifact is mainly to get feedback from potential users. The communication between different communities (potential user and designers) can be supported by so-called *boundary objects*

(Star & Griesemer, 1989). Boundary objects are 'both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites' (Star & Griesemer, 1989). The artifact as described in this chapter can be used as boundary objects, because on the one hand they allow relevant stakeholders to experience the design and to give feedback (Carlile, 2002; Subrahmanian et al., 2003). On the other hand they hide unnecessary design complexity. The prototype will be evaluated in Chapter 8, but first a framework is constructed (Chapter 7) that serves as a basis for the evaluation.

CHAPTER 7

A MODEL OF AUDIOVISUAL HERITAGE ADOPTION



7.1 Introduction

Where the previous two chapters entailed the suggestion phase and development phase of the audiovisual heritage service, this chapter takes focuses on the development of a model that explains consumer adoption of the audiovisual heritage service. This chapter develops an audiovisual heritage adoption model based on the prior discussed theories (Chapter 4). This chapter thus answers the following sub-question:

> *What determinants could affect the adoption of digital audiovisual heritage services?*

Chapter 4 described relevant theories from disciplines related to the context of audiovisual heritage. However, what are factors that affect the intention to use an audiovisual heritage service? This dissertation proposes different factors that serve as behavioral determinants in the intention to use an online audiovisual heritage service. The proposed model combines a media view (literature and theories from the field of media and communication) with a technology view (literature and theories from the field of information systems). The core assumption of this model is that people are active and goal oriented. Hence, audience members actively seek out the audiovisual heritage service to satisfy individual needs. Furthermore; it is imperative to stress two principles that are related to the location of the prototype in diffusion process. First, the basis of the needs relate to individual expectancies. Since this dissertation considers a not-yet-existing online service, experience has not been formed. These expectancies are formed a priori to the use of the service. Therefore, they are more pure than the expectancies formulated for instance in the new model of media attendance (LaRose & Eastin, 2004). That model is tested against the Internet. Respondents that were used in testing the model already used the Internet for a number of years. The expectancies in that model are thus created a posteriori the use of the subject at hand. Hence, the motives to use the service all consist of expectancies. Second, the focal dependent variable is the intention to use the digital audiovisual heritage service in contrast to many adoption studies that utilized actual usage. The research model, as proposed in this study, applies behavioral intention to use as an indicator of user acceptance. Studying behavioral intention as an indicator of user acceptance is in line with previous studies using the TAM (Agarwal & Karahanna, 2000; Chau, 1996; Chau & Lai, 2003; Gefen & Straub, 2000; Jackson et al., 1997). Moreover, the intention to use a particular technology strongly affects its actual usage (Venkatesh et al., 2003).

In similar grain as the conclusion in Chapter 4, extrinsic and intrinsic expectancies (or motives) are discussed in the context of audiovisual heritage adoption. This dichotomy is adopted to guide the discussion of the included constructs. Furthermore, individual differences are addressed in terms of personal characteristics and demographic factors. The entire model is depicted in Figure 7.1. The next section describes the relationships of this model in fourfold. First extrinsic motivation and its determinants are addressed. Then, the intrinsic motivation and its antecedents are discussed. Next, potential personal characteristics are addressed that is followed by the relationships of demographics in the model. Each section describes relationships with other constructs and the associations are concretely stressed by means of hypotheses.

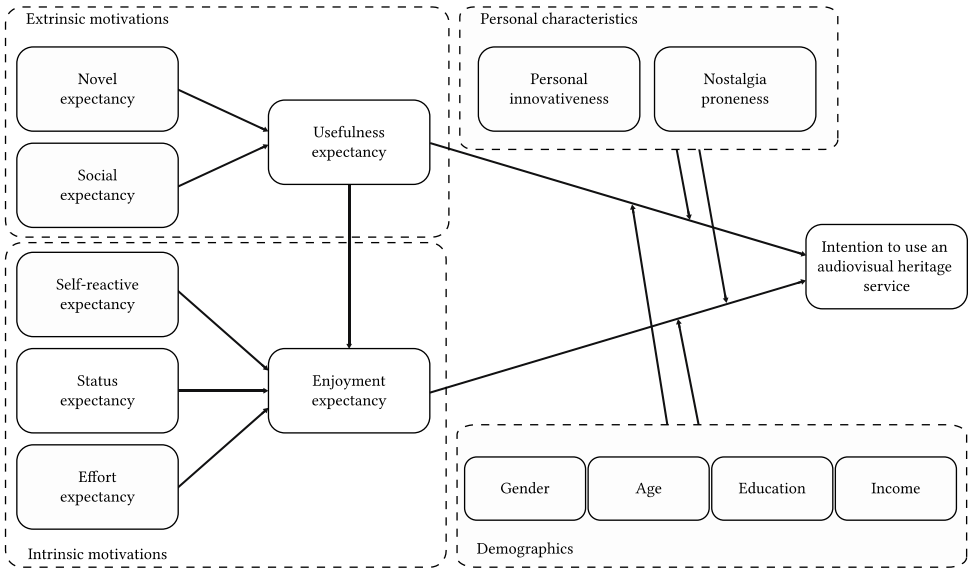


Figure 7.1. Multidisciplinary model of factors that explain the intention to use digital audiovisual heritage services

7.2 Extrinsic motivations

Extrinsic motivation is defined as the degree to which an individual believes that using the system will help to attain gains in his/her performance of daily activities. An extrinsically motivated user is driven by the expectation of some reward or benefit external to the interaction with a system (Van der Heijden, 2004). The purpose of using an information

system by that user is mainly based on the expected utilitarian outcomes. This construct occurs in the TAM as perceived usefulness. Similarly, UTAUT addresses the importance of the usefulness of a system. The users' performance expectancy or perceived usefulness of the system affects, to a large extent, the intention to use an information system. This relation is found against different types of information systems and in various contexts. Particular of interest to this study are the studies in the context of digital libraries and online video services (primarily YouTube). Thong, Hong and Tam (2002) showed strong support for the appropriateness of using TAM to understand individuals' acceptance of digital libraries, which they indicate as a new generation of information retrieval systems. Perceived usefulness was observed to have significant impact on intention to use the digital library by students. Thus, when students perceive the digital library as useful to their studies, they are more likely to use the system. The findings of Heinrich et al. (2007) also displayed a profound effect of perceived usefulness on the intention to use an academic library by undergraduate and graduate students. Replications of similar TAM studies in the context of digital libraries in other countries supported and thus strengthen the relation between the perceived usefulness and the intention to use a digital library (Miller & Khera, 2010; Tibenderana & Ogao, 2008). Hence, one can conclude that digital libraries and thus archives are often used for utilitarian purposes. Similarly, the association between usefulness and intention to use is found in the context of YouTube. Yang et al. (2010) found that usefulness is a predictor of the users' attitude towards sharing video clips, which in his turn affects the intention to share videos. Hiramatsu et al. (2009) also found positive correlations between the usefulness of online video services and the intention to use them. As many TAM studies these results are based on a sample of students. Considering these prior findings it is likely that also an audiovisual heritage service is used for its usefulness or expected enhancement of the individuals' performance. Hence, the following hypothesis is therefore postulated:

H1. Usefulness expectancy has a positive influence on behavioral intention to use an audiovisual heritage archive service.

From the adoption literature, two extrinsic motivations can be derived that affect the service's usefulness, novel expectancy and social expectancy.

7.2.1 Novel expectancy

Novel expectancy is defined as the degree to which an individual believes that using the system will help him/her to find information. Studies in the research community revolving

around archives, libraries and museums often stipulate the user's information need to use a (digital) library. This need lies at the roots of information-seeking behavior (Wilson, 1981). Basically, individuals use digital libraries when they find the systems useful to their information needs. This need is a subjective experience that occurs only in the mind of the person in need and is recorded on a numerous of occasions (Wilson, 1997). However, as Wilson (1994) indicates in his literature review, information science does not have a monopoly on research in the field of information-seeking behavior. Scholars that utilized the U&G theory also found this information seeking need as an imperative motive to use the Internet (Papacharissi & Rubin, 2000). The results thus suggest an instrumental use of the medium. Furthermore, Hanson and Haridakis (2009) found that a convenient information motive affects the viewing of YouTube clips by users. Also the SCT addresses this information need in terms of novel sensory. Although an audiovisual heritage service comprises of earlier broadcasted material, the service includes content that is new to some individuals. Especially younger generations that are provided with earlier news broadcasts could have expectancies considering the novelty of content. The following hypothesis is therefore formulated:

H2. Novel expectancy has a positive influence on usefulness expectancy regarding an audiovisual heritage archive service.

7.2.2 Social expectancy

Social expectancy relates to the degree to which an individual believes that the system will be used to interact with others. This social aspect of media or technology is often found in U&G studies, where it is reflected by motives such as social integrative needs (Katz et al., 1973), interpersonal utility (Papacharissi & Rubin, 2000) or social gratifications (Stafford et al., 2004). Especially in the context of YouTube social aspects significantly affects the use of this service (Haridakis & Hanson, 2009). Similarly, McClung and Johnson (2010) found that social aspects associated with podcasts, meaning podcast users tend to talk to friends and other fans about the podcasts they download, are the main motive for using podcasts. In their case, the social aspect of media appears to be a predictor of podcast use of these shows. One can expect that in case of audiovisual heritage people like to talk about the content of the media in social settings and therefore acts as a predictive motive to use such an audiovisual heritage service. Considering this social aspect, the following hypothesis is posited:

H3. Social expectancy has a positive influence on usefulness expectancy regarding an audiovisual heritage archive service.

So, in sum, three extrinsic motivations are derived from explanatory theories. Usefulness expectancy is posited as the main extrinsic motivation. The two factors novel expectancy and social expectancy enhance the perceived instrumental value of the audiovisual heritage service. They thus influence the intention to use the service indirectly through usefulness expectancy. Hence, the following relationships between the extrinsic motivations are proposed:

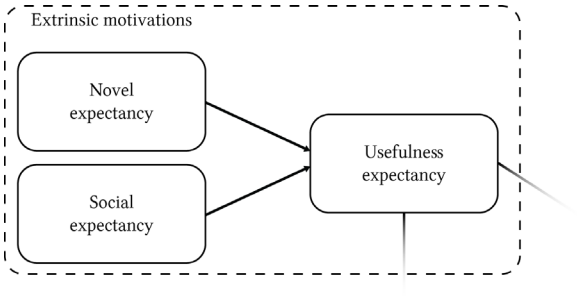


Figure 7.2. Interrelationship between extrinsic motivations in the research model

7.3 Intrinsic motivations

Besides the possible functional value of an audiovisual heritage service, where the value lies in productive use, it is very likely that such a service will be used for hedonic reasons. The value of a hedonic system is a function of the degree to which the user experiences fun when using the system. To have a pleasurable experience, individuals often seek sensations on multiple sensory channels (Holbrook & Hirschman, 1982). Systems pertaining to this hedonic character are more likely to be influenced by intrinsic than extrinsic motivations (Van der Heijden, 2004). Intrinsic motivation is defined as the extent to which the activity of using the computer is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated (Deci, 1971). The notion that the feeling of joy, elation, pleasure or depression, disgust, displeasure and hate associated by an individual with a particular act affects behavior has been supported throughout the literature on behavior (Triandis, 1971). Over the last years there is a significant amount of studies that found a relation between the perceived enjoyment and the intention to use the Internet (Teo, 2001; Van der Heijden, 2003). In the consumer context, this hedonic motivation has also been

found to be an important determinant of technology acceptance and use (Childers et al., 2001; Brown & Venkatesh, 2005; Venkatesh et al., 2012). The audiovisual heritage service as built in this research is specifically aimed at the general public (i.e., consumers). It is therefore very likely that the service's enjoyment will increase its usage. The intrinsic motivation (i.e., enjoyment) is therefore added as a predictor of consumers' behavioral intention to use an audiovisual heritage service and the following hypothesis is thus formulated:

H4. Enjoyment expectancy has a positive influence on behavioral intention to use an audiovisual heritage archive service.

From the literature three intrinsic expectations are derived that would enhance the service's enjoyment: self-reactive expectancy, status expectancy and effort expectancy.

7.3.1 Self-reactive expectancy

Self-reactive expectancy is defined as the degree users believe they will use the system to relax or escape from daily activities. This incentive is found a major component of a gratification factor in several U&G studies (LaRose et al., 2001). This motive is often labeled as escapism (Kaye, 1998) or to pass time (Papacharissi & Rubin, 2000) and is frequently found when examining motives for Internet use and watching television. Similarly, it could be expected that an audiovisual heritage service is used to relief some stress or to pass time when bored. To flee from daily activities can thus be a motive to use the service. Therefore the following hypothesis is formulated:

H5. Self-reactive expectancy has a positive influence enjoyment expectancy regarding an audiovisual heritage archive service.

7.3.2 Status expectancy

Status expectancy is defined as the degree users believe they will use the system to enhance their image. In other words, to seem 'cool'. Although this variable has never been a major component of Internet gratification factors, they were minor components of those used by Compeau et al. (1999) and Charney and Greenberg (2001). López-Nicolás et al. (2008) also found this variable to be a significant predictor in the attitude towards the acceptance of advanced mobile services. This could also be true for audiovisual heritage services. To

examine the relation of this coolness motive and the use to of such a service the following hypothesis is postulated:

H6. Status expectancy has a positive influence on enjoyment expectancy regarding an audiovisual heritage archive service.

7.3.3 Effort expectancy

The effort expectancy is defined as the extent to which users believe that the use of the application is free of effort, thus is easy to use. This variable is juxtaposed as perceived ease of use to the perceived usefulness in the TAM. It is believed that systems that have a high level of usability are likely to be used more often. The relation between ease of use and the use of digital libraries are also often found (Thong et al., 2002). An online audiovisual heritage archive service must be easy to learn and use in order to prevent non-adoption. It is therefore hypothesized that there is a direct relationship between perceived ease of use and behavioral intention (Mathieson, 1991; Venkatesh, 2000; Sun & Zhang, 2006):

H7. Effort expectancy has a positive influence on enjoyment expectancy regarding an audiovisual heritage archive service.

7.3.4 Usefulness expectancy

Different people have different orientations of motivation—intrinsic or extrinsic—as well as different levels of motivation. However, the relationship between extrinsic and intrinsic motivators is also interconnected. Ryan and Deci (2000) agreed that interpersonal events and structures (e.g., rewards, communication, and feedback) could enhance intrinsic motivation because exterior environments made people feel competent or satisfied. There is a significant embodiment of literature that partly supports the interrelation between by empirical findings. Perceived ease of use (intrinsic) is found a predictor of perceived usefulness (extrinsic) on numerous occasions and is thus strongly supported (Lee et al., 2003). Also the relation between perceived enjoyment (intrinsic) and usefulness (extrinsic) is showed in several empirical studies (Sun & Zhang, 2006; Yi & Hwang, 2003). A recent study by Yoo, Han and Huang (2012) is one of only a few efforts that re-categorized UTAUT sub-constructs into intrinsic and extrinsic motivation. Their findings adequately support the assumption of classic motivational studies about the relation between extrinsic and intrinsic motivations. They found a mediating effect of intrinsic motivation on extrinsic motivation that suggests

the critical role of extrinsic motivators for the development of intrinsic motivation. This finding prompts a more integrative view on the relationship between intrinsic and extrinsic motivations than just two separated classes. Since it is clear that the both classes are associated, one can expect that, in case of an audiovisual heritage service, cognitive responses (extrinsic motivations) influences affective responses (intrinsic motivations). Therefore the following hypothesis is formulated:

H8. Usefulness expectancy has a positive influence on enjoyment expectancy.

Within the cluster of intrinsic motivations similar relationships that are proposed within the cluster of extrinsic motivations are proposed. Four intrinsic motivations are derived from literature, where enjoyment expectancy is considered the pivotal factor. The factors self-reactive, status and effort expectancy are considered to indirectly influence the intention to use the digital audiovisual heritage service through the enjoyment expectancy. Furthermore, it is proposed that usefulness expectancy affect the enjoyment expectancy. The figure below depicts the interrelationship between the intrinsic motivations:

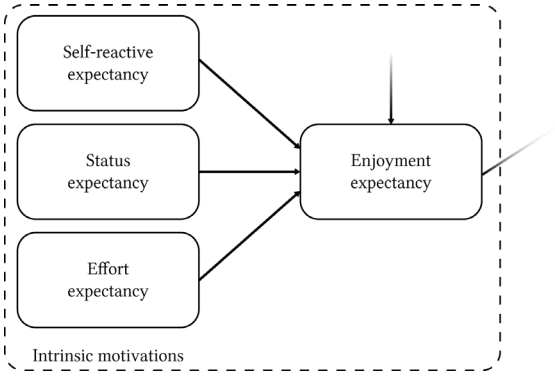


Figure 7.3. Interrelationship between intrinsic motivations in the research model

7.4 Personal characteristics

Previous research has suggested that personal characteristics play an important role in technology adoption processes (Karahanna et al., 2002). The research in this dissertation focuses on personal innovativeness and nostalgia proneness, as it is believed that these are particularly relevant in an audiovisual heritage context. The domain of audiovisual heritage services is rather an uncharted area by consumers, especially on the web. It is therefore imperative to examine the role of personal innovativeness, as prior research also stressed

that new technology is at first utilized by a minority of innovators (Rogers, 2003). Furthermore, audiovisual heritage relates to years that have gone by. Hence, nostalgic feelings can influence the use of such a service. Since the participant's level of nostalgia is not explicitly taken into account by other acceptance studies, it is instructive to know if and how these personal characteristics influence the acceptance and use of the audiovisual heritage system. Recognizing the contingent nature of certain key relationships in adoption theories of behavior, personal characteristics might intervene in the hypothesized relationships of perceptions and behavioral intentions as suggested by Liska (1984). Hence, the two variables are included as moderators.

7.4.1 Personal innovativeness

The concept of personal innovativeness influencing individuals' behavior regarding innovations has been widely used in diffusion research (Rogers, 2003). The construct is conceptualized to characterize individuals, with people who adopt innovations at an early stage deemed early adopters and thus innovative. The construct is used to segment users based on the time of adoption (Rogers, 2003). A major limitation of this measurement is the fact that it uses an ex post descriptor of usage behavior (Agarwal & Prasad, 1998). Subsequent personal innovativeness studies focused on measuring the construct directly (Goldsmith & Hofacker, 1991). To date, Agarwal and Prasad (1998) developed the most comprehensive and practical operationalization to measure personal innovativeness. They established a standard that measure individuals' cognitive interpretations of information technology and labeled it Personal Innovativeness in Information Technology (PIIT). PIIT is defined as the willingness of an individual to try out any new information technology. The basic idea is that individuals possessing high levels of personal innovativeness towards technology are expected to develop more positive attitudes towards new technologies (Lewis et al., 2004) and therefore have a greater intention to use them. Agarwal and Prasad added this individual difference variable as a new construct to Davis' original TAM model and hypothesized that individuals with higher levels of PIIT are expected to develop more positive perceptions about the innovation in terms of advantage, ease of use, compatibility, and have more positive intentions toward use of a new information system. Initially, PIIT was found to be an indirect, and thus a moderate or mediate, determinant of use of new technology (Agarwal & Prasad, 1998). More recently, PIIT has been re-conceptualized as a direct determinant of behavioral intention (Yi et al., 2006). The concept of PIIT is used particularly in the context of mobile services (Mao et al., 2005; Hung et al., 2003; Yang, 2005; Lu et al., 2005). Because audiovisual heritage archive services are currently in experimental

phases, and their introduction to the market is still in its infancy, it is assumed that the early adopters, who have an innovative attitude towards technology, are more likely than others to intend to adopt new technologies. Similar to Agarwal and Prasad (1998) this research proposes that PIIT serves as a key moderator for the consequences of perceptions. In general terms, a moderator is a qualitative (e.g., gender) or quantitative (e.g., age) variable that affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable (Baron & Kenny, 1986). This implies that individuals with same level of perceptions (intrinsic and extrinsic motivations) will have higher intention to use the audiovisual heritage service when they are more willing to experiment or take risks. Based on this consideration the following hypotheses are postulated:

H9. Personal innovativeness will moderate the effect of usefulness expectancy on behavioral intention to use an audiovisual heritage archive service, such that the effect will be stronger for people with high level of personal innovativeness.

H10. Personal innovativeness will moderate the effect of enjoyment expectancy on behavioral intention to use an audiovisual heritage archive service, such that the effect will be stronger for people with high level of personal innovativeness.

7.4.2 Nostalgia proneness

Nostalgia, a topic that has been researched for many years, has been associated with homesickness and seen as a mentally repressive compulsive disorder (Fodor, 1950). It was only in the latter part of the 20th century that nostalgia acquired a separate conceptual status (Wildschut et al., 2006). Over the past decade, interest has grown regarding nostalgia and consumption experiences. Founded in psychology literature, nostalgia is currently defined as more than simply a memory. Rather, the memory embodies a sentimental desire for an idealized past that no longer exists (Davis, 1979). Essentially, nostalgia reflects a positive emotional experience and enhances this self-positivity; it is generally defined as 'a positively toned evocation of a lived past' (Davis, 1979). These emotions are induced by negative experiences of the present or negative perceptions of the individual's life situation (Goulding, 2001) and change with the time in the individual's life (Baker & Kennedy, 1994).

An expanding body of literature addresses the concept of nostalgia. Studies found that consumers' yearning for and inclinations about the past — i.e., nostalgic feelings — affect consumers' preferences (Schindler & Holbrook, 2003) and intentions to purchase nostalgic products (Routledge et al., 2008). For instance consumers form lifelong attachments to the styles of popular music that they encountered in their late teens and early twenties (Holbrook & Schindler, 1989). Consumers also show enduring preferences for movie stars and films that they experienced in their youth (Holbrook & Schindler, 1994; 1996). Recently, studies found significant correlations among nostalgic proneness, charitable giving (Merchant et al., 2011) and consumer brand attitude (Muehling & Pascal, 2011). However, although the knowledge base regarding nostalgia has broadened, empirical research on the subject is confined to the fields of advertising and consumer psychology (Holak & Havlena, 1998; Schindler & Holbrook, 2003). Therefore, the concept of nostalgia is considered in relation to the audiovisual heritage archive as cultural institutions seek to induce nostalgia through selectively retaining aesthetic, scientific, and historical cultural artifacts (Belk, 1988). In similar grain as personal innovativeness, it is expected that nostalgia act as a moderator between usefulness expectancy, enjoyment expectancy and the intention to use. Based on these considerations the following hypotheses are formulated:

H11. Nostalgia proneness will moderate the effect of usefulness expectancy on behavioral intention to use an audiovisual heritage archive service, such that the effect will be stronger for people with high level of nostalgia proneness.

H12. Nostalgia proneness will moderate the effect of enjoyment expectancy on behavioral intention to use an audiovisual heritage archive service, such that the effect will be stronger for people with high level of nostalgia proneness.

Summarizing, two personal characteristics are included in the model. The factors personal innovativeness and nostalgia proneness are considered to affect the relation between usefulness and enjoyment expectancy and intention to use the digital audiovisual heritage service. The figure below depicts the relationships of personal characteristics in the model:

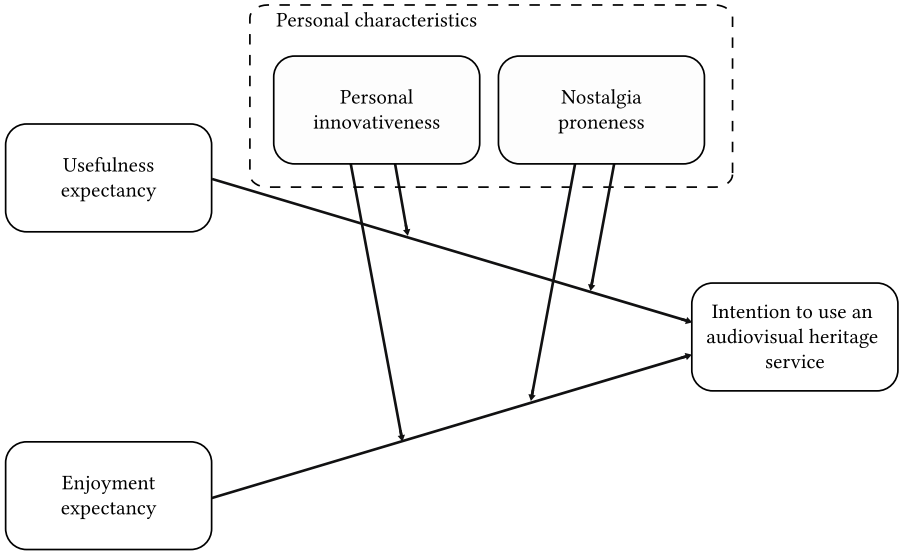


Figure 7.4. Associations of personal characteristics in the research model

7.5 Demographics

Rogers (2003) demonstrated in his seminal work that early adopters of an innovation had higher socioeconomic status, were younger and than later adopters. Also studies in the area of marketing have confirmed the importance of demographic variables in studying adoption (Assael, 1981). From a theoretical point of view, there is reason to expect that the relationship between perceptions (intrinsic and extrinsic) and intention will be moderated by demographics.

7.5.1 Gender

In the context of the Internet, studies have generally shown that users are predominantly males and that men took to the Internet faster than women (Teo & Lim, 2000). More specifically, men tend to download and purchase more often on the Internet then women (Teo, 2001). The inclusion of gender in the UTAUT model as moderator between performance expectancy and behavioral intention stems from studies that indicated that men tend to be highly task-oriented (Minton & Schneider, 1980). Therefore, performance expectancies are salient to men (Venkatesh et al., 2003). Additionally, Venkatesh et al. (2012) argued that, based on the relation between consumer technology innovativeness and gender

(Lee et al., 2010), gender moderates the association of the hedonic motivation and the behavioral intention of use a consumer-oriented information system. Based on these prior findings, one can expect a moderating role of gender in the context of an audiovisual heritage service on the relation between motivations (extrinsic and intrinsic) and behavioral intention. The following hypothesis is therefore postulated:

H13. Gender will moderate the relation between usefulness expectancy and behavioral intention to use an audiovisual heritage archive service, such that the effect will be stronger for men.

H14. Gender will moderate the relation between enjoyment expectancy and behavioral intention to use an audiovisual heritage archive service, such that the effect will be stronger for men.

7.5.2 Age

In addition to gender, age is suggested as moderator between the motivational factors and intention to use an audiovisual heritage service. The general opinion is that younger generations are especially considered skilled users of the Internet. The explanation is twofold. First, seniors have more trouble learning Internet skills due to decreased working memory and reaction times. Second, the younger generations have had exposure to the Internet throughout their entire life (Van Deursen et al., 2011). Age differences have been shown to exist in technology adoption contexts (Morris & Venkatesh, 2000). Based on this prior work on age-related issues one can expect a similar moderating role of age as found in UTAUT. Therefore the following hypotheses are defined:

H15. Age will moderate the relation between usefulness expectancy and behavioral intention to use an audiovisual heritage archive service, such that the effect will be stronger for younger people.

H16. Age will moderate the relation between enjoyment expectancy and behavioral intention to use an audiovisual heritage archive service, such that the effect will be stronger for younger people.

7.5.3 Income and education

Scholars argued that higher incomes and education levels may be capable of developing sophisticated and probably accurate estimates of what to expect from a service (Keaveney & Parthasarathy, 2001). Rationale considering income lies in the fact that users with a higher income can afford to buy products online for instance. In gaining more experience, they are able to assess their behavior more accurately. Education can also play a significant role. For instance, Van Dijk et al. (2007) showed that people that frequently use e-services are higher educated. A possible explanation can be that higher education levels provide users with greater digital skills. Van Deursen et al. (2011) clearly shows that the level of education is related to the level of digital skills a person possesses. One can expect that a higher level of digital skills will lead to a more efficient and effective use of an Internet application. Consequently, higher educated will accomplish their tasks more easily and will have higher enjoyment of this task. Considering the audiovisual heritage service it is expected that the education level of a prospective user will moderate the relation between extrinsic and intrinsic motivations. The following hypotheses are thus formulated:

H17. Income and education will moderate the relation between usefulness expectancy and behavioral intention to use an audiovisual heritage archive service, such that the effect will be stronger for higher educated people.

H18. Income and education will moderate the relation between enjoyment expectancy and behavioral intention to use an audiovisual heritage archive service, such that the effect will be stronger for higher educated people.

In sum, four demographical characteristics are included in the model (i.e. gender, age, education and income). In similar grain as the personal characteristics they are considered to affect the relation between usefulness and enjoyment expectancy and intention to use the digital audiovisual heritage service. The figure below depicts the relationships of personal characteristics in the model:

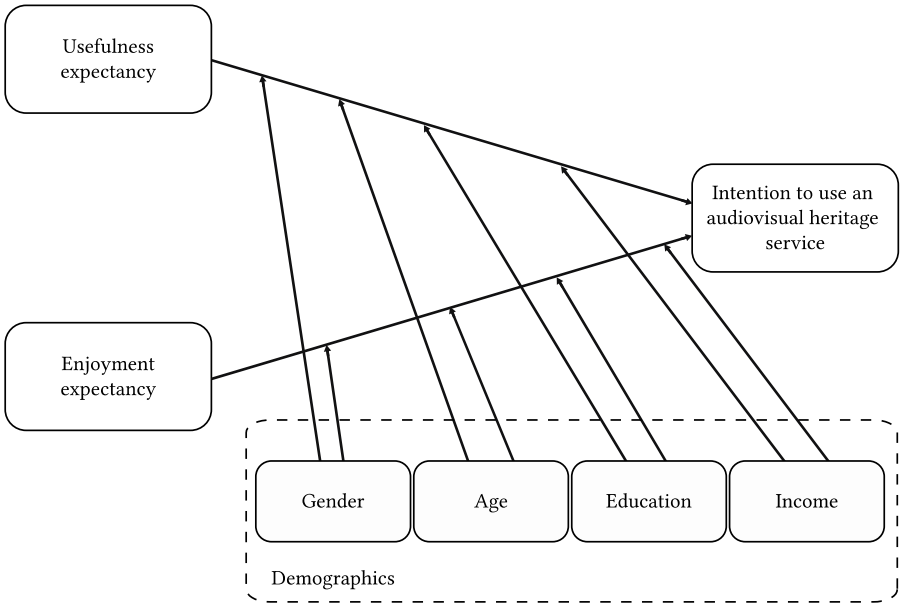


Figure 7.5. Associations of demographics in the research model

7.6 Conclusion

Based on the literature an integrative model that could explain the use of an audiovisual is constructed. This model includes antecedents from the different theories that were consulted to answer the previous research question. The penultimate research question related to the construction of this model is postulated as follows:

> *What determinants could affect the adoption of digital audiovisual heritage services?*

In this chapter a preliminary theory is laid down that attempts to integrate prior theoretical insights. Extrinsic and intrinsic motivations are derived from literature, which potential influence the intention to use the audiovisual heritage service. In addition, two types of individual differences are included in the model. These consist of two personal characteristics (i.e., personal innovativeness and nostalgia proneness) and demographics (i.e., gender, age, education and income). The relationships between the different factors are

modeled in the framework as shown Figure 7.6. Through a perceptual study the associations in the model will be tested. This will be the focal point of Chapter 8.

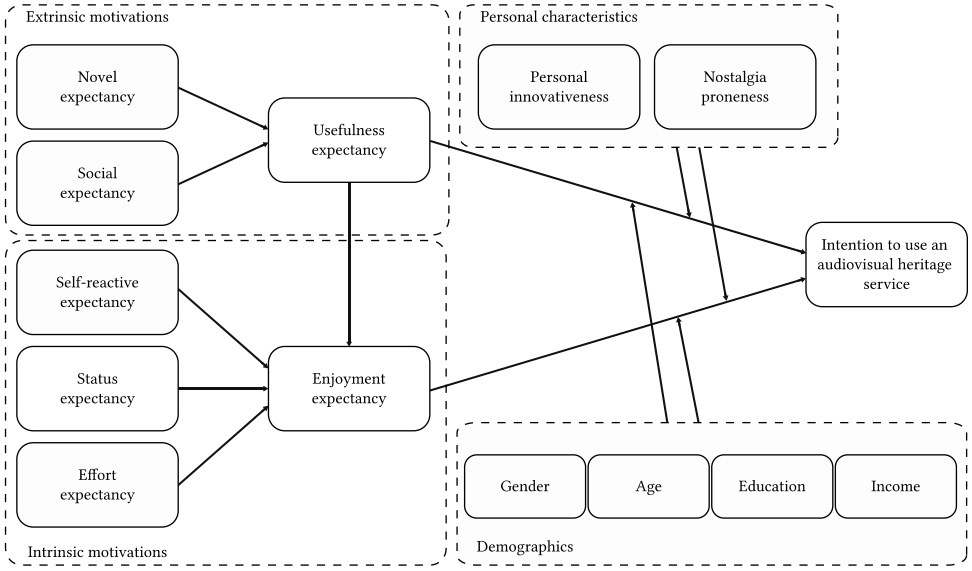
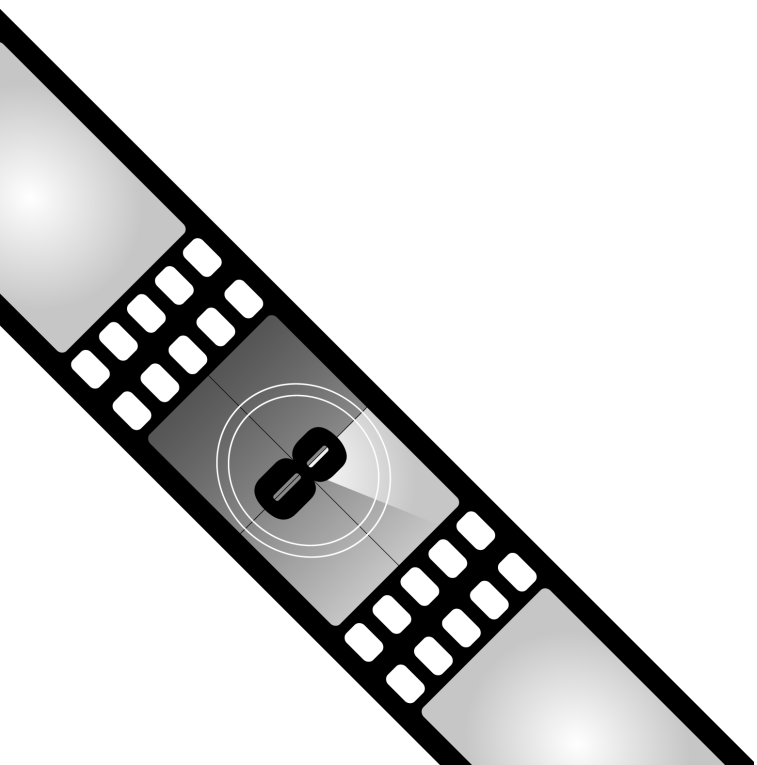


Figure 7.6. Multidisciplinary model of factors that explain the intention to use digital audiovisual heritage services

CHAPTER 8

ANTICIPATED ADOPTION AND WILLINGNESS TO PAY



8.1 Introduction[8]

Chapter 7 presented the preliminary adoption theory on audiovisual heritage service use. Theory argues that audiovisual heritage service use is potentially influenced via two main elements. One element entails the extrinsic motivations to use the service, where the other is based on intrinsic motivation. Hence, enjoyment is juxtaposed to the usefulness of the service. The question is however to what extent these formulated hypotheses hold in reality. The focus of this chapter is to test the associations postulated in the theory. Hereby the final research question of the study is focused on:

> *What is the anticipated adoption and willingness-to-pay potential of the digital audiovisual heritage service instantiation in the Netherlands?*

The theory posits adoption as a focal point. Many 'grand' adoption theories such as the technology acceptance model can be classified as theories for explaining and predicting and are represented by means of words and diagrams (Gregor, 2006). Other types of theories include analysis (says what it is), explanation (says what is, how, why, when, and where), prediction (says what is and what will be) and design and action (says how to do something). The model proposed in this research falls in the explaining and prediction category as it tries to say what is, how, why, when, where, and what will be. Hence, the model provides predictions and has both testable propositions and causal explanations. The main objective of this study is thus to assess the hypotheses as described in Chapter 6. This study provides more insights in the reasons people have to use such a service, which not only explains the use of an audiovisual heritage service, but also predicts future usage. The results of this study entail the evaluation of the prototype but also further the development of new audiovisual heritage services.

The second objective of this study is to assess the willingness to pay for an audiovisual heritage service. With the advent and increasing popularity of online services, companies are seeking ways to make money out of these services. The Internet is undergoing a major paradigm shift as online commercial models are emerging (Weis, 2010). In several online industries, companies are experimenting and expanding their business models in order to market successful online services to retain their business' survival in the harsh reality. Hence, charging for online content is therefore becoming more accepted as several firms

[8] A preliminary version of this chapter has been submitted as two studies to two journals.. The study submitted to Information Research is already published.

struggle to find a viable business model (Lopes & Galetta, 2006). For a long time, the Internet consists of free services relying on the revenue streams by advertisements. Online advertising remains the primary revenue source for, by example, newspapers to cover website expenses (Ihlström & Palmer, 2002). Although research showed that advertisements are considered informative and enjoyable (Schlosser & Kanfer, 1999) and others show the abomination of consumers towards advertising (Dewan et al., 2003), advertising and media share a symbiotic relationship for several years in the sense that advertising revenue sponsors media content, and the content that makes the consumption of advertising acceptable to consumers (Prasad et al., 2003). The complete reliance on advertisements, however, is argued to be insufficient for the business' sustainability (Dewan et al., 2003). Companies therefore seek for alternative revenue generation to meet the bottom-line needs, such as subscriptions to fee-based services (Whang et al., 2005). For instance, the newspaper industry already demonstrated the success of subscription-based arrangements as a significant source of revenue (e.g., The *Wall Street Journal*, Steinbock, 2000). However, Chyi and Sylvie (2001) presented rather resistive figures of the adoption of commercial business models by the online news industry. They indicated that only 3% of the sites were subscription-based. Hitherto, there are no initiatives to build advertisement-based, subscription-based or pay-per-use-based services for audiovisual heritage archive access. To investigate the possibilities at a microeconomic level, these payment methods are examined.

The chapter is further divided in three parts. Section 8.2 describes the methodology of the study conducted in this chapter. This includes the procedure, measures, subjects and data analyses. Next, the results are discussed which entails the instrument validation (reliability and validity of the measures used), the testing of the hypotheses, and the results on willingness to pay (section 8.3.3). Lastly, this chapter closes with the conclusions that can be drawn upon this study (section 8.4).

8.2 Method

The aim of this study is to assess the intention to use and willingness to pay for the proposed basic service (the prototype as described in Chapter 6) and four potential expansion scenarios. A quasi-experiment was set up, which entailed a single condition five-staged within-subjects design, and was run through an online questionnaire. This section details the procedure that is followed (section 8.2.1), the measures that are used (0), the characteristics of the sample (section 8.2.3), and how the data is analyzed (8.2.4).

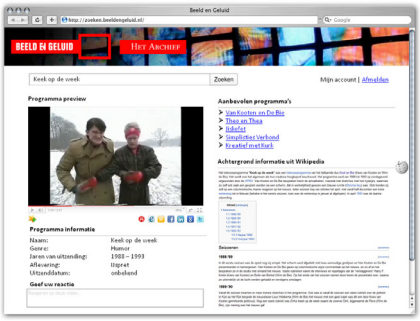
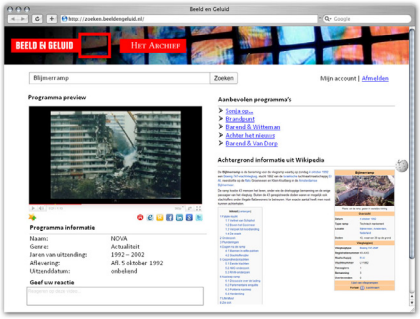
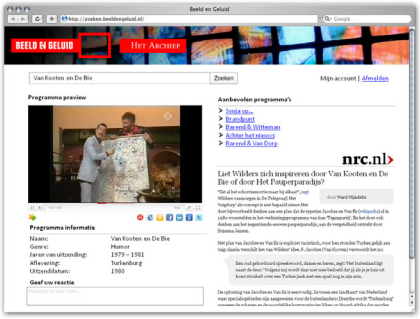
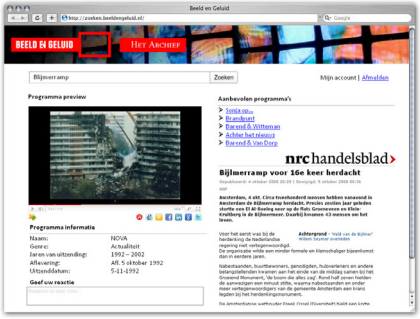
8.2.1 Procedure

A professional organization was hired to collect the data using an online panel. Respondents aged 18 and older could fill out the questionnaire between May 2, 2011 and May 6, 2011. To increase the item response to answers, all questions were mandatory. Out of the total 228 respondents, 205 were used, with 23 being excluded due to incomplete questionnaires. Initially, the basic service was presented, which the respondents were asked to indicate their expectations and intention to use this service (these measures are displayed in Table 8.3). Subsequently, four expansion conditions were presented involving a combination of additional material (fiction or related to current events), and contextualized by editorial material (in this case the relevant newspaper articles) or encyclopedic material (Wikipedia). Finally, the background of the respondents was asked. Both the basic service as the extensions were familiarized by a short introductory text and a screenshot. Table 8.1 displays the extensions on the basic service. The latter is discussed in Chapter 6.

8.2.2 Measurement development

This study designed the survey instrument using validated multi-item scales from prior research as a means of assessing the theoretical constructs of an extended TAM model and by using TAM scales of PU and performance expectancy for extrinsic motivation, PEOU for effort expectancy, and behavioral intention to use the audiovisual heritage archive service from Davis (1989) and Davis, Bagozzi & Warshaw (Davis et al., 1989). The other antecedents of behavioral intention are derived from the social-cognitive theory (SCT) approach on uses & gratifications theory (U&G). More detailed information on these theories can be read in Chapter 4. One of the differences between traditional U&G research and the SCT approach is that theoretical assumptions about the nature of the expected outcomes are available. Instead of utilizing exploratory factor analysis of the gratification items, the present study established the expected a priori. These outcomes were derived from SCT literature (LaRose & Eastin, 2004) and collected from prior U&G studies (e.g., Papacharissi & Rubin, 2000), and were rephrased as outcome expectation.

Table 8.1. Screenshots and explanations of extensions on the basic service

Screenshot (Dutch)	Explanation
	Imagine the basic service as described, is expanded with a wide selection of programs from the archives related to **entertainment and fiction programs** (e.g. crime series) of the last 60 years. In addition, the service provided by more context **information from Wikipedia**.
	Imagine the basic service as described, is expanded with a wide selection of programs from the archives related to **current affairs**. In addition, the service provided by more **context information from Wikipedia**.
	Imagine the basic service as described, is expanded with a wide selection of programs from the archives related to **entertainment and fiction programs** (e.g. crime series) of the last 60 years. In addition, the service provided by more **context information from newspapers and other media**.
	Imagine the basic service as described, is expanded with a wide selection of programs from the archives related to **current affair**s. In addition, the service provided by more context **information from newspapers and other media**.

To develop the concept of nostalgia proneness (NP) the items from Zimbardo & Boyd (1999) are used. Their Time Perspective Inventory (TPI) consists of 56 items measuring attitudes toward the past, present, and future. Because this study is interested in attitudes towards the past that reflect the nostalgia proneness, a subset of 8 items that had good face validity in terms of capturing the sentiment of nostalgia proneness (Routledge et al., 2008) are selected and administered. To measure the personal innovativeness (PI) items from prior research (De Marez & Verleye, 2004) are adopted, which are successfully used by others (Bouwman et al., 2007; De Reuver et al., 2011) and altered them to fit the context of this study. All of the scales were slightly modified to suit the context of the audiovisual heritage archive service. The list of final survey items is presented in Table 8.3 and Table 8.3.

Willingness to pay concerning pay per use was assessed by a single question: *'If you would use this service, how much would you spend on a maximum per program/item?'*, followed by six response options: (a) nothing, (b) €0.5, (c) €1, (d) €1.5, (e) €2, (f) €2.5 and (g) over €2.5 (followed by a question to specify how much). Willingness to pay per use is thus measured by a direct valuation question. Willingness to pay regarding advertisements, subscription and third party information was asked on a seven-point scale on its suitability.

Table 8.2. List of items by construct

Construct	Item	Description
Usefulness expectancy	UE1	Use of the audiovisual heritage archive service enhances the quality of my life or work.
	UE2	Use of the audiovisual heritage archive service increases the productivity of my life or work.
	UE3	Use of the audiovisual heritage archive service can help me in my life or work.
	UE4	Use of the audiovisual heritage archive service increases the effectiveness of my life or work.
Novel expectancy	NE1	I will use the audiovisual heritage archive service to broaden my knowledge.
	NE2	I will use the audiovisual heritage archive service to understand events that happen.
	NE3	I will use the audiovisual heritage archive service to learn.
Social expectancy	SOE1	I will use the audiovisual heritage archive service to talk about it with friends or family.
	SOE2	I will use the audiovisual heritage archive service to share with others.

Table 8.3. List of items by construct (continued)

Construct	Item	Description
Enjoyment expectancy	EE1	I will use the audiovisual heritage archive service to relax.
	EE2	I will use the audiovisual heritage archive service to have a good time.
	EE3	I will use the audiovisual heritage archive service because it is fun
Self-reactive expectancy	SRE1	I will use the audiovisual heritage archive service to evade my responsibilities.
	SRE2	I will use the audiovisual heritage archive service to postpone tasks.
	SRE3	I will use the audiovisual heritage archive service to flee from daily activities.
Status expectancy	STE1	I will use the audiovisual heritage archive service because it is trendy.
	STE2	I will use the audiovisual heritage archive service to shape my personal identity.
	STE3	I will use the audiovisual heritage archive service to impress others.
Effort expectancy	EF1	It is easy to find the appropriate clips in the audiovisual heritage archive service.
	EF2	It is easy to learn how use the audiovisual heritage archive service.
	EF3	It is easy to use the audiovisual heritage archive service in general.
	EF4	It is easy to use the audiovisual heritage archive service how I would like it.
Personal innovativeness	PI1	I always want the latest technology.
	PI2	I am one of the first to try out new services.
	PI3	I am one of the first to use new technologies.
Nostalgia proneness	NP1	I often think of what I should have done differently in my life.
	NP2	I think about the good things that I have missed out on in my life
	NP3	I think about the bad things that have happened to me in the past.
Behavioral intention	BI1	I would use the audiovisual heritage archive service.
	BI2	I would frequently use the audiovisual heritage archive service in the future
	BI3	I would recommend others to use the audiovisual heritage archive service.

8.2.3 Sample characteristics

In the sample, the ratio of men to women was approximately equal (47.8% vs. 52.2%), which does not significantly deviate from the population ($\chi^2 = 0.13$, $p > 0.05$). Approximately 25% were under the age of 35, and 56.1% had a full-time or part-time job. Both variables indicated no significant differences compared to population statistics ($\chi^2 = 4.75$, $p > 0.05$; $\chi^2 = 4.59$, $p > 0.05$). Hence, although it is argued that professional online respondents are less likely to be employed full-time (Stafford & Gonier, 2007), the sample show no significant

differences concerning the respondent's occupation. With regard to the educational level of the respondents, the descriptive figures show the majority of the sample is higher educated. Although this is the case, the chi-square shows that the educational level does not significantly differ from the population (χ^2 = 7.20, p > 0.10). Approximately 66% of the respondents were married, and 26.3% had children with their current spouse, which also shows no significant difference as compared to the population (χ^2 = 9.35, p > 0.10). Table 8.4 provides the complete set of descriptive statistics in the respondents' demographic profile. Based on these figures the sample is considered representative for the Dutch Internet population (CBS, 2011).

Table 8.4. Descriptive statistics of sample characteristics (N=205)

Items	Frequency	Percentage	χ^2
Gender			0.13**
Male	98	47.8%	
Female	107	52.2%	
Age			4.75**
18 - 25	25	12.2%	
26 - 35	26	12.7%	
36 - 45	31	15.1%	
46 - 55	43	21.0%	
> 56	80	39.0%	
Education			7.20*
Lower	42	20.5%	
Middle	76	37.1%	
Higher	87	42.4%	
Occupation			4.59**
Full-time / part-time job	115	56.1%	
No work (householder / pension / entitlement)	74	36.1%	
Student	16	7.8%	
Household			9.35*
Single without children	57	27.8%	
Single with children	13	6.3%	
Married or cohabiting without children	81	39.5%	
Married or cohabiting with children	54	26.3%	

Notes: * p > 0.10, ** p > 0.05

8.2.4 Data analyses

The proposed model is evaluated using structural equation modeling (SEM). SEM is a powerful second-generation multivariate technique for analyzing causal models. In contrast to first-generation techniques, (e.g., factor analysis, discriminant analysis, or regression analysis), provides researcher with two imperative advantages. First, SEM allows considering associations among multiple independent and dependent constructs. SEM answers a set of interrelated research questions in a single, systematic, and comprehensive analysis (Gefen et al., 2000), thus allows a path analysis. Second, a structural equation model allows the researcher to include latent variables. Latent variables are defined as hypothetical constructs invented by a scientist for the purpose of understanding a research area (Bentler, 1980, p.420). The primary characteristic of such a latent variable is that it is unobservable and measurable indicators operationalize the theoretical construct. Consequently, the use of latent variables has the potential to model theoretical constructs that are hard or impossible to measure directly (Urbach & Ahlemann, 2010).

In general, two types of SEM techniques are distinguished: covariance based (CB-SEM), and partial least squares (PLS) (Gefen et al., 2000; Urbach & Ahlemann, 2010; Hair et al., 2011). These approaches differ in their analyses' objectives, their underlying statistical assumptions and have their own (dis)advantages. The philosophical distinction between CB-SEM and PLS is straightforward. If the research objective is theory testing and confirmation, then the appropriate method is CB-SEM. If the research objective is however prediction and theory development, then the appropriate method is PLS (Hair et al., 2011). Based on the rule of thumbs for selecting the PLS or CB-SEM approach provided by scholars (Gefen et al., 2000; Wetzels et al., 2009; Urbach & Ahlemann, 2010; Hair et al., 2011; Henseler et al., 2009) the model in this research is tested by the PLS technique. Rationale for this is fourfold. First, the research presented in this dissertation is exploratory and aims to identify key 'driver' constructs. PLS is considered better suited since the goal of CB-SEM is theory testing, theory confirmation, or comparison of alternative theories. Second, the phenomenon to be investigated is relatively new and measurement models need to be newly developed, Third, PLS is considered more appropriate as the model in this research is complex (many constructs and many indicators). Fourth, the sample size used in this research is relatively low, which makes PLS more suitable.

8.3 Results

The structural equation model-results consists of different sub-models. The inner model, which is often referred to as the structural model, entails the relationships between the constructs, which are derived from theoretical considerations. The independent latent variables or constructs are also referred to as exogenous variables and the dependent latent variables as endogenous variables. However, before painting the inner model, the outer model (measurement model) has to be defined. In total, the measurement model in this research consists of eight latent constructs detailed by 31 items. The constructs include Novel expectancy (NE), Social expectancy (SOE), Self-reactive expectancy (SRE), Status expectancy (STE), Effort expectancy (EF), Personal innovativeness (PI), Nostalgia proneness (NP), Usefulness expectancy (UE), Enjoyment expectancy (EE), and Behavioral intention (BI). Consequently, the results discuss the instrument validation by means of assessing the measurement model. Next, the structural model is described.

8.3.1 Instrument validation

Before heading to the model validation it is imperative is to assess possible common method bias. Although method biases in the information systems domain are not as serious as those found in other disciplines (Malhotra et al., 2006), the possibility of common method bias (CMB) is one of the potential problems with single-respondent data (Premkumara & Bhattacherjee, 2008). This is the case as both the dependent and focal explanatory variables are perceptual measures derived from the same respondent (Podsakoff et al., 2003). To test for the possibility of CMB, a Harman's single-factor test is conducted. The test comprises an investigation whether a substantial amount of common method variance is present in the data sample. This is shown by either a single factor that emerges from the factor analysis or one general factor accounts for the majority of the covariance in the independent and dependent variables (Podsakoff & Organ, 1986). The ten factors together accounted for 82% of the total variance; the first (largest) factor did not account for a majority of the variance (37%). Thus, no general factor is apparent. It is therefore assumed that common method variance is not of great concern and thus is unlikely to confound the interpretations of results.

Reliability

Reliability is examined through the assessment of internal consistency reliability measures. Traditionally, Cronbach's alpha is used for this. A high alpha value assumes that the scores

of all items with one construct have the same range and meaning (Cronbach, 1951). It is desirable that the values should exceed 0.70 for exploratory research. Values above 0.80 or 0.90 are desirable for measures that are used in an advanced stage of research (Nunnally & Bernstein, 1994). As shown in Table 8.5, all Cronbach's alphas for the measures used in this research exceed the recommended value of 0.70. This provides a first indication that the measures used are reliable.

An alternative measure to Cronbach's alpha is the composite reliability (CR) (Werts et al., 1974). Cronbach's alpha assumes that all indicators are equally reliable. It therefore tends to underestimate the internal consistency reliability of latent variables. The composite reliability measure takes into account that indicators have different loadings (Henseler et al., 2009). Composite reliability is therefore recommended since it overcomes this deficiency of the Cronbach's alpha (Chin, 1998). Similar to the Cronbach's alpha, the composite reliability should exceed the value of 0.70. (Bagozzi & Yi, 1988; Nunnally & Bernstein, 1994; Hair et al., 2009). The calculated composite reliabilities of the latent variables in this research all comply with this recommended minimum value (see Table 8.5).

Validity

To examine the validity of the measurement model convergent and discriminant validity are assessed. Convergent validity involves the degree to which individual items reflecting a construct converge in comparison to items measuring different constructs. A commonly applied criterion of convergent validity is the average variance extracted (AVE) proposed by Fornell and Larcker (1981). An AVE value of at least 0.50 indicates that a construct is on average able to explain more than half of the variance of its indicators and, thus, demonstrates sufficient convergent validity. As shown in Table 8.5, each construct satisfies the recommended levels of average variation extracted. Therefore, convergent validity is shown.

Table 8.5. Descriptive statistics, internal consistency reliabilities and AVE

Latent variables	M	SD	Cronbach's alpha	CR	AVE
Novel expectancy (NE)	4.28	1.66	0.933	0.957	0.881
Social expectancy (SOE)	3.54	1.66	0.907	0.956	0.915
Self-reactive expectancy (SRE)	2.19	1.50	0.902	0.939	0.837
Status expectancy (STE)	2.54	1.56	0.844	0.906	0.763
Effort expectancy (EF)	4.20	1.39	0.945	0.960	0.858
Personal innovativeness (PI)	3.23	1.64	0.947	0.966	0.904
Nostalgia proneness (NP)	4.86	1.44	0.789	0.877	0.705
Usefulness expectancy (UE)	2.81	1.46	0.947	0.962	0.864
Enjoyment expectancy (EE)	4.61	1.74	0.960	0.974	0.926
Behavioral intention (BI)	4.71	1.47	0.952	0.969	0.912

Discriminant validity concerns the degree to which the measures of different constructs differ from one another. Whereas convergent validity tests whether a particular item measures the construct it is supposed to measure, discriminant validity tests whether the items do not unintentionally measure something else (Urbach & Ahlemann, 2010). To assess the discriminant validity two criteria need to be met. First, the indicators should load more strongly on their corresponding construct than on other constructs in the model. By obtaining the cross-loadings, where each latent variable are correlated with all the other items, convergent validity is assessed. If each indicator's loading is higher for its designated construct than for any of the other constructs, and each of the constructs loads highest with its assigned items, it can be inferred that the different constructs' indicators are not interchangeable (Chin, 1998). The indicators used for the latent variables in this research load more strongly on their corresponding constructs than on other constructs (see Table 8.6 and Table 8.7), which means that the first criterion is met.

Table 8.6. Loadings and cross-loadings for the measurement model

Item	NE	SRE	SOE	STE	EF	PI	NP	UE	EE	BI
NE1	**0.853**	-0.093	-0.105	-0.191	-0.026	-0.028	-0.004	-0.085	0.155	0.100
NE2	**0.900**	0.169	0.082	-0.028	-0.022	0.001	-0.020	0.019	-0.064	-0.030
NE3	**0.867**	-0.083	0.018	0.218	0.049	0.026	0.025	0.064	-0.087	-0.067
SRE1	-0.062	**0.944**	-0.108	0.020	0.017	0.029	0.019	0.038	-0.021	0.076
SRE2	0.052	**0.930**	0.074	0.022	0.042	-0.097	-0.007	-0.034	-0.030	-0.014
SRE3	0.010	**0.943**	0.035	-0.041	-0.059	0.067	-0.012	-0.005	0.050	-0.062

Table 8.7. Loadings and cross-loadings for the measurement model (continued)

Item	NE	SRE	SOE	STE	EF	PI	NP	UE	EE	BI
SOE1	0.008	-0.003	**0.957**	0.002	0.076	-0.019	-0.005	-0.023	-0.085	-0.065
SOE2	-0.008	0.003	**0.957**	-0.002	-0.076	0.019	0.005	0.023	0.085	0.065
STE1	0.101	-0.021	-0.005	**0.926**	-0.076	0.008	-0.038	-0.011	-0.123	0.066
STE2	0.070	-0.040	-0.016	**0.955**	-0.003	0.014	0.043	0.008	0.030	-0.085
STE3	-0.186	0.067	0.023	**0.862**	0.085	-0.024	-0.006	0.003	0.099	0.024
EF1	0.070	0.008	-0.074	-0.098	**0.922**	-0.038	0.007	0.068	0.001	-0.062
EF2	-0.008	0.070	-0.028	0.054	**0.928**	0.042	-0.016	-0.102	-0.031	0.016
EF3	0.019	-0.050	0.083	0.014	**0.938**	0.035	0.035	-0.024	-0.005	0.020
EF4	-0.082	-0.028	0.017	0.030	**0.917**	-0.041	-0.026	0.059	0.036	0.026
PI1	-0.002	-0.023	-0.060	-0.050	0.071	**0.930**	-0.031	0.032	-0.012	-0.005
PI2	-0.010	-0.027	0.025	0.028	-0.008	**0.964**	-0.019	-0.013	0.036	0.003
PI3	0.012	0.050	0.033	0.021	-0.061	**0.958**	0.049	-0.019	-0.024	0.001
NP1	-0.033	-0.161	-0.135	0.112	-0.051	0.119	**0.860**	0.002	0.123	0.103
NP2	-0.055	0.110	0.013	0.064	-0.017	-0.118	**0.870**	-0.052	-0.066	0.112
NP3	0.097	0.054	0.134	-0.194	0.075	0.001	**0.785**	0.055	-0.062	-0.237
UE1	-0.081	0.068	-0.043	0.054	-0.023	-0.040	-0.031	**0.899**	0.010	0.118
UE2	0.168	-0.083	0.029	-0.092	0.017	0.034	-0.022	**0.938**	0.025	-0.094
UE3	-0.136	0.082	0.021	0.056	0.019	-0.033	0.048	**0.923**	-0.062	0.026
UE4	0.042	-0.062	-0.008	-0.014	-0.013	0.036	0.004	**0.957**	0.026	-0.044
EE1	-0.035	0.062	-0.067	0.017	0.037	-0.003	0.042	0.004	**0.953**	-0.026
EE2	0.023	-0.019	0.037	0.005	-0.050	0.029	0.009	0.018	**0.969**	-0.005
EE3	0.011	-0.042	0.029	-0.022	0.014	-0.026	-0.050	-0.022	**0.964**	0.031
BI1	0.020	-0.040	0.035	-0.038	0.076	-0.015	0.009	-0.012	-0.009	**0.954**
BI2	-0.007	0.016	-0.007	-0.013	-0.052	0.028	0.036	0.031	0.013	**0.961**
BI3	-0.013	0.024	-0.028	0.051	-0.024	-0.013	-0.045	-0.020	-0.004	**0.951**

The second criterion requires a latent variable to share more variance with its assigned indicators than with any other latent variables (Fornell & Larcker, 1981). Table 8.8 reports correlations between the constructs, with the diagonal elements reporting the square roots of the AVE, which were all found to be higher than the correlations between constructs. This pattern indicates that more variance is shared between a variable and its measurement items than with another variable represented by a separate set of measurement items, and is therefore indicative of discriminant validity.

Table 8.8. Correlation matrix and the square root of AVE for each latent variable

	NE	SRE	SOE	STE	EF	PI	NP	UE	EE	BI
NE	*0.939*									
SRE	0.610	*0.957*								
SOE	0.084	0.303	*0.915*							
STE	0.365	0.511	0.631	*0.873*						
EF	0.488	0.464	0.047	0.218	*0.926*					
PI	0.326	0.331	0.092	0.192	0.351	*0.951*				
NP	-0.243	-0.219	-0.196	-0.310	-0.174	-0.311	*0.840*			
UE	0.513	0.489	0.378	0.484	0.426	0.291	-0.387	*0.930*		
EE	0.616	0.621	0.027	0.216	0.585	0.294	-0.099	0.410	*0.962*	
BI	0.490	0.458	-0.022	0.266	0.494	0.207	0.041	0.338	0.603	*0.955*

Overall, the results of both reliability and validity measures provide strong empirical support for the reliability and validity of the scales of the measurement model, which indicates that the findings of the following structural model analysis are based on measures with desirable psychometric properties.

8.3.2 Hypotheses testing

To assess the model fit, the PLS software provides three model fit indices. The model fit indices provided include average path coefficient (APC), average R^2 (ARS), and average variance inflation factor (AVIF). Model fit refers to the ability of a model to reproduce the data. A good-fitting model is one that is reasonably consistent with the data and thus does not require re-specification. A good-fitting measurement model is also required before interpreting the associations in the structural model. Kock (2012) suggests the *p*-values for both the APC and ARS should be lower than 0.05. This indicates that the relationships within the model are significant at the 0.05 level. He also recommends that the AVIF be lower than 5, which denotes an acceptable level of multicollinearity in the model. Using the PLS regression algorithm and bootstrapping as a resampling method for the analysis, the three fit indices present sufficient results as displayed in Table 8.9.

Next essential criterion for the assessment of the PLS structural equation model is each endogenous latent variable's coefficient of determination (R^2). R^2 measures the relationship of a latent variable's explained variance to its total variance. The values should be sufficiently high for the model to have a minimum level of explanatory power. Values of approximately 0.670 are considered substantial, where values around 0.333 are considered

average, and values of 0.190 and lower considered weak. (Chin, 1998). The R^2 value of 0.394 (see Table 8.10) indicates that the model explained a fair amount of variance in audiovisual heritage service intention. In addition, the model accounts for 43 percent of the variance for enjoyment expectancy and 33 percent for usefulness expectancy.

Table 8.9. Model fit indices

	Recommended criteria	Obtained value
Average path coefficient (APC)	< 0.05	0.156
Average R-squared (ARS)	< 0.05	0.284
Average variance inflation factor (AVIF)	< 5.00	1.493

Table 8.10 displays the path coefficients of model. The first column in this table presents the independent variables that assumedly affect the dependent variables (first row). The table shows some interesting results. In the first place the figures present that the expected enjoyment is more important than the expected usefulness. It shows that people that have the intention to use the digital audiovisual heritage service are in first instance guided by their expected enjoyment, the coefficient is positive (β = 0.472, p < 0.001), meaning that expected enjoyment will lead to more use of the service. This expected enjoyment is in his turn primarily determined by the effort that the user is expected to invest in terms of usability (β = 0.579, p < 0.001) and the expected usefulness (β = 0.147, p < 0.05). The two factors that were assumed to affect the expected usefulness display also significant results. Both novel expectancy (β = 0.341, p < 0.001) and social expectancy (β = 0.293, p < 0.001) are positively associated with the expected usefulness of the audiovisual heritage service. Regarding the moderators, the results only show some mild effects on the expected usefulness. The usefulness expectancy is positively moderated by a person's educational level (β = 0.157, p < 0.10). This means that higher educated people whom expect instrumental value have a higher intention to use the audiovisual heritage service. Also the personal factors indicate to influence usefulness expectancy. First, personal innovativeness displays a negative effect in combination with usefulness expectancy on behavioral intention (β = -0.190, p < 0.10). Second, nostalgia proneness also shows a negative effect in combination with usefulness expectancy on the intention to use the digital audiovisual heritage service (β = -0.179, p < 0.10). Hence, a high usefulness expectancy of the service combined with low personal factors (i.e. personal innovativeness and nostalgia proneness) will lead to an increasing intention to use the online service.

There are however also none significant results. First, status and self-reactive expectancy do no influence the expected enjoyment of the digital service. This is remarkable, since

both factors are considered, similar to enjoyment, intrinsic motivations that fuel the use of a particular service. Second, the moderating variables do not seem to affect the relation between expected enjoyment and behavioral intention. Both demographics and personal factors do not strengthen the association between the two constructs, but diminish it.

A number of hypotheses were formulated on the influence of different factors on intention to use the audiovisual heritage service. The first hypothesis (H1) is that usefulness expectancy has a positive influence on behavioral intention to use an audiovisual heritage archive service. Based on the data, this hypothesis is rejected. In contrast, novel and expectancy has a positive influence on usefulness expectancy regarding an audiovisual heritage archive service (H2 & H3) and are therefore supported.

Table 8.10. Path coefficients and R^2 values

	Usefulness expectancy	Enjoyment expectancy	Behavioral intention
Novel expectancy	0.341***		
Social expectancy	0.293***		
Self-reactive expectancy		-0.068	
Status expectancy		-0.017	
Effort expectancy		0.579***	
Usefulness expectancy		0.147**	0.060
Enjoyment expectancy			0.472***
UE x Gender			0.129
UE x Age			0.051
UE x Education			0.157*
UE x Income			0.079
UE x PI			-0.190*
UE x NP			-0.179*
EE x Gender			0.171
EE x Age			0.012
EE x Education			-0.001
EE x Income			0.039
EE x PI			-0.097
EE x NP			0.011
R^2	0.330	0.428	0.394

Notes: * $p > 0.10$, ** $p > 0.05$, *** $p > 0.001$

Five hypotheses were formulated around intrinsic motivations. The first posited that enjoyment expectancy has a positive influence on behavioral intention to use an

audiovisual heritage archive service (H4). The results clearly indicate that this is the case. Hence, this hypothesis is supported. Enjoyment in his turn is not significantly influence by self-reactive and status expectancy (H5 & H5) and the hypotheses regarding these two factors are thus rejected. Effort expectancy does show a positive influence on enjoyment expectancy, which means that H6 is supported. Furthermore, the results show that usefulness expectancy has a positive influence on enjoyment expectancy and thus is H7 supported.

Next, four hypotheses were formulated about the influence of personal characteristics, in particular personal innovativeness and nostalgia proneness. Both factors significantly influence the relation between usefulness expectancy and behavioral intention. However, the direction is different than expected. They both negatively affect the relation and thus are the related hypotheses (H10 & H12) rejected. The moderating variables personal innovativeness and nostalgia proneness do not confirm the hypotheses that they moderate the relation between enjoyment expectancy and behavioral intention. Hence, both (H9 & H11) are rejected.

The final hypotheses are related to the demographics of individuals. None of the demographical factors indicated to significantly influence the relation between both usefulness expectancy and enjoyment expectancy and the intention to use the audiovisual service with one exception. Education affects the relation between usefulness expectancy and behavioral intention in such a way that higher educated people that perceive instrumental value of the service have a higher intention to use the digital audiovisual heritage service. H17 is therefore partly supported, since income does not have this effect. The other hypotheses regarding demographics (H13, H14, H15, H16 and H18) are however rejected.

8.3.3 Willingness to pay

Overall, the respondents indicate to be reluctant about paying for program views. The majority (76.6%) does not want to pay per program. Approximately 12.2% is willing to spend €0.5, and 8.8% is willing to sacrifice €1.0 per program. The last 2.5% is willing to spent €1.5 or €2.5. Furthermore, the expansions did not indicate change this picture, as both the type of content ($F(1, 204) = 0.361$, $p = 0.549$) and type of additional contextual information ($F(1, 204) = 0.123$, $p = 0.726$) do not have a significant effect on the willingness to pay. The marginal means histogram in Figure 8.1 reflects a rather sobering picture. There

appears to be no substantial variation in the willingness to pay, which persists to be under twenty eurocents.

Related to the so-called pay-per-view as the above payment method can be labeled, respondents were asked about their preferences regarding the possible consumption of the content offered by the service. Respondents indicate to favor streaming of high quality (HD) content (M = 4.70, SD = 1.62) against downloading of the content to their own hard disk (M = 4.56, SD = 1.59) and ordering of the content as hardcopy (M = 4.15, SD = 1.62).

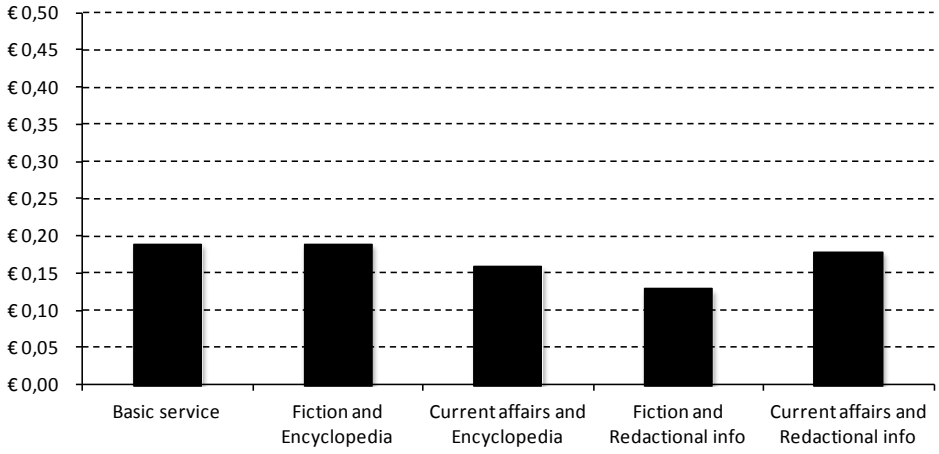


Figure 8.1. Marginal means histogram of willingness to pay

Three alternative payment methods were asked. Payment by a subscription is somewhat more accepted, as 31.1% is willing to spend a small fee per month. Advertisements are acceptable for 48.8% of the respondents. Approximately 21.5% indicate to accept information from third parties. Although the figures are somewhat more promising n general when comparing to the pay-per-view variant, similarly to latter the variation between the expansions are minimal as can be seen in Figure 8.2.

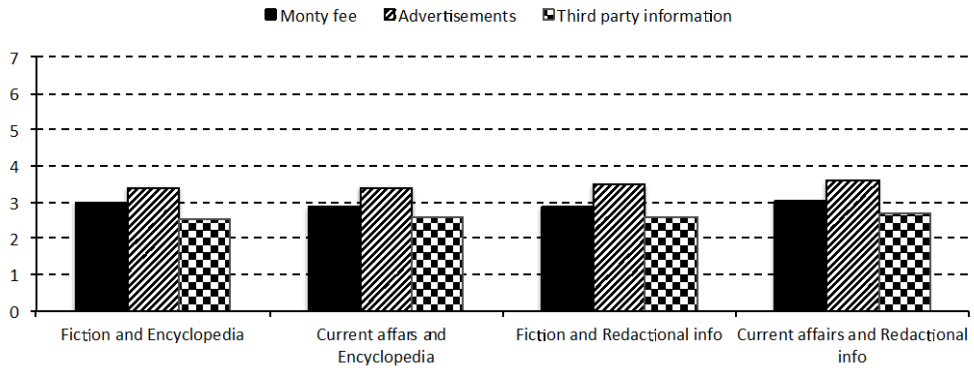


Figure 8.2. Suitability of alternative payment methods

8.4 Conclusion

This chapter tried to find an answer for the final research question of this dissertation, which is formulated as follows:

> *What is the anticipated adoption and willingness-to-pay potential of the digital audiovisual heritage service instantiation in the Netherlands?*

A study that was conducted to answer this question is described in this chapter. One of the main findings is that the intention to use the audiovisual heritage service is primarily affected by the expected pleasant feelings enhanced by the service. Respondents that have high intrinsic motivation in terms of enjoyment will use the service in the future. This enjoyment is mainly triggered by the 'ease of use' of the service. The amount of effort yielded by the user is a pivotal factor in its enjoyment. A digital audiovisual heritage service has thus to be effortless in order to be used by potential users. Furthermore, the results show that only people with higher education and perceptual usefulness of the service have an intention to use the service. This is in line with Rogers (2003), who proclaimed that higher educated people tend to adopt innovative services earlier, then their lower educated counterpart. However, personal innovativeness indicates to have a negative influence. One can thus state that the interest in such novel heritage services does not only lie within the innovators, but also appeals to the early adopters/majority. The results even indicate, by the negative value, that the service should aim at the latter in contrast to many new services that are at first are targeted at innovators.

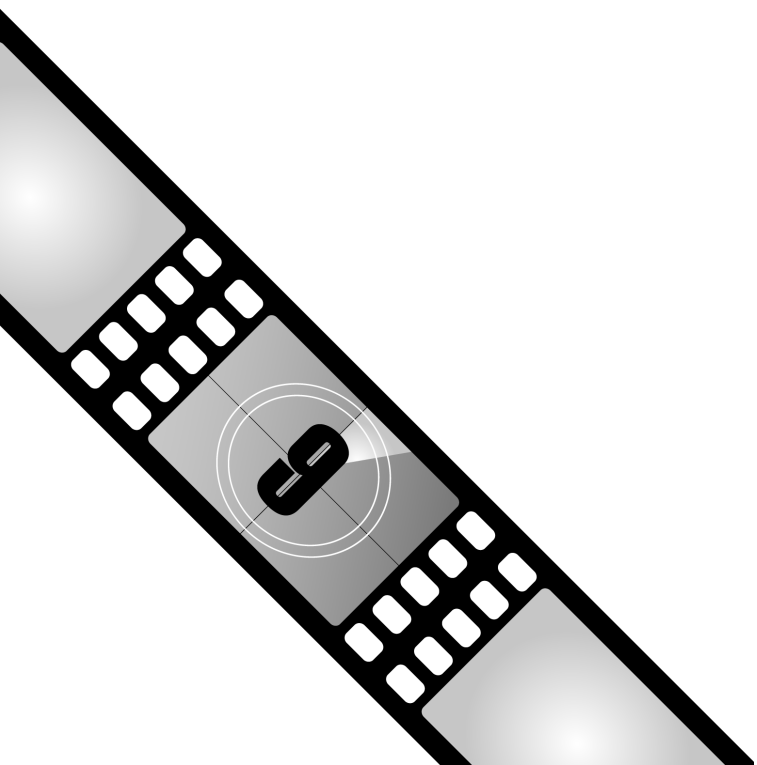
The second purpose of this study was to explore the willingness to pay for audiovisual heritage archives services by consumers. In general the results present reluctance to the willingness to pay for audiovisual heritage archive services. Respondents indicate that advertisements are the preferable payment method. The inclusion of additional information or content does not change this rather misanthropic picture. It seems unlikely that the trend of pay-per-use or subscriptions will translate to a significant source of revenues anytime soon for the prototyped audiovisual heritage service, as is argued for Internet companies in general (Whang et al., 2005).

Although this study is the most wide-ranging so far it has a number of limitations. First, the fact that the service that is investigated in this study did not yet exist caused inadequate answering by respondents with limited ability to empathize. Second, in this study an online panel is utilized. Although it is argued that online research respondents are not very typical of the general population (Stafford & Gonier, 2007), external validity is demonstrated by key demographical factors. Third, the construct of nostalgia proneness had a low number of retaining items compared to the initial construct, which consisted of eight items. Further research should emphasize a valid and reliable measurement scale in relation to technology acceptance theories. Fourth, a longitudinal investigation of the factors that determine consumers' adoption of audiovisual heritage archive services in a domestic context would be useful after such a service is introduced. This study was only able to investigate the individuals' intention to use the service and could not evaluate actual usage. Research on the development of audiovisual heritage archives has so far yielded little knowledge about the actual uses of the content, similarly to image digital libraries (Conway, 2009). Fifth, further research should emphasize on the users audiovisual archives to identify most immediate beneficiaries of archives (Conway, 1986). Although user groups are identified (Oomen et al., 2009), a further refined of the characteristics of these users is needed to develop services that suit the particular user needs. To enhance the understanding of user acceptance of audiovisual heritage archive services, future research can also include additional variables. Furthermore, it should be noted that this study measures the variance in self-reported use and thus not actual use as is the case of most adoption studies (Legris et al., 2003; Chuttur, 2009). Moreover, these self-reported measures are perceptions of the respondents. Jacobson (2011) showed in her research that there could be a gap between the perceptions of users and the eventual actual use. In sum, the results should be considered in light of these limitations.

Further implications of the empirical work for the entire research, practical and theoretical recommendations and a further discussion of limitations of the study shall be discussed in the final chapter of this dissertation.

CHAPTER 9

DISCUSSION AND CONCLUSIONS



9.1 Introduction

What constitutes a viable digital service that provides access to audiovisual heritage archives for the general public? The investigation presented in this dissertation originated from this question. The primary goal of this exploratory study was twofold: first, to enhance design knowledge regarding digital audiovisual heritage services and second, to enhance knowledge regarding consumer behavior with respect to the adoption and use of digital audiovisual heritage services. Six research questions were formulated to structure and guide the exploratory process leading to a possible viable audiovisual heritage service. On the exploratory road to developing an initial design solution for audiovisual archives, the design science approach was adopted, which was augmented by explanatory theories from behavioral science. Figure 9.1 displays the intertwining of both paradigms and the related sub-questions.

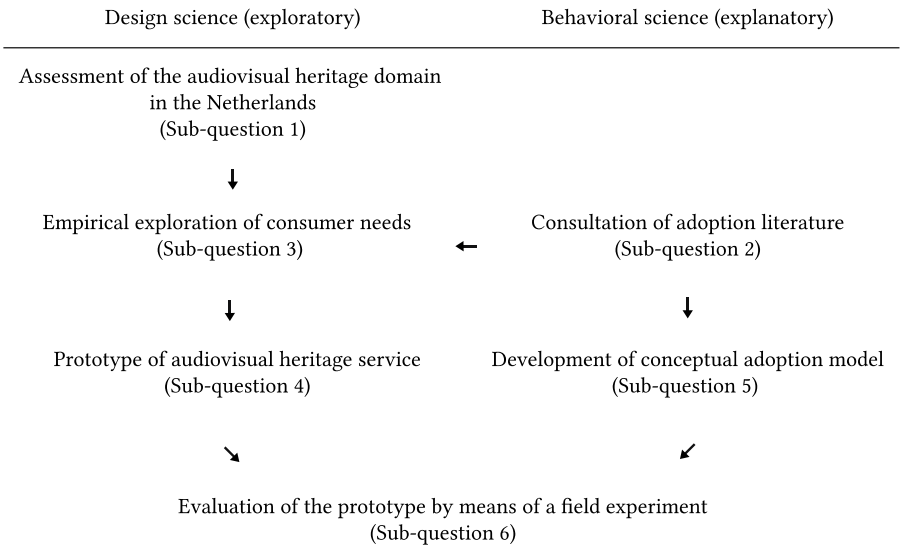


Figure 9.1. Research activities and related sub-questions

The next two sections describe the main findings of the research by answering the research questions and thus summarize the previous chapters. The discussion of the findings is separated into two paradigms: behavioral science (consumer adoption) and design science (design of service). The latter entails an initial description of a design theory of digital audiovisual heritage services. The subsequent section reflects on the theoretical implications

of the dissertation's findings. This section is followed by a reflection on the practical aspects and implications of the research. The penultimate section describes several limitations of the project and prospects for future research. This chapter and the dissertation conclude with some final remarks.

9.2 Consumer adoption of digital audiovisual heritage services

The line of behavioral science examined the assessment of consumer adoption of digital audiovisual heritage services. Explanatory theories were thus investigated (Chapter 4) and incorporated in one adoption model (Chapter 7) and eventually tested (Chapter 8). The answers on the related research questions and thus the conclusions are discussed below.

The second research question is discussed in Chapter 4, which focuses on relevant existing technology acceptance theories that can provide insight into audiovisual heritage adoption. This chapter discusses the adoption theories that emerged from the field of communication and media (e.g., uses and gratifications) as well as information systems (e.g., the technology acceptance model). The described theories appear to support the separation of rational and autogenetic (habit or experience) behavior, the latter being only recently endorsed. Furthermore, the theories display more overlap when they evolve over the years. Whereas communication and media theories originally included primarily intrinsic motivations, they increasingly also include extrinsic motivations. Similarly, information system theories primarily included extrinsic motivations but are starting to include intrinsic motivations because they are increasingly used in a consumer context. Finally, a trend of including personal characteristics in adoption models is identified. Traits such as personal innovativeness are being incorporated to a larger extent in adoption models. Generally, none of the original models suffice to evaluate the prototype digital audiovisual heritage service described in this dissertation. Nevertheless, the adoption theories provide relevant insights and are combined into a multidisciplinary adoption model for audiovisual heritage services in Chapter 7.

Chapter 7 presents a preliminary theory that attempts to integrate the insights from the adoption theories described in Chapter 4. This chapter was guided by the following question: What determinants could affect the adoption of digital audiovisual heritage services? The core assumption of the multidisciplinary model developed here is that individuals are active and goal-oriented. Thus, audience members actively seek an audiovisual heritage service that satisfies individual needs. The basis of these needs relates to individual expectations

because this dissertation considers a not-yet-existing online service. Therefore, the motives to use the service consist of expectations. Furthermore, in contrast to many adoption studies that utilize actual use, the focal dependent variable is the intention to use the digital audiovisual heritage service. Extrinsic and intrinsic determinants are derived from the literature, which potentially influences the intention to use the audiovisual heritage service. In addition, two types of individual difference are included in the model. These consist of two personal characteristics (i.e., personal innovativeness and nostalgia proneness) and demographics (i.e., gender, age, education and income). The developed model is presented below:

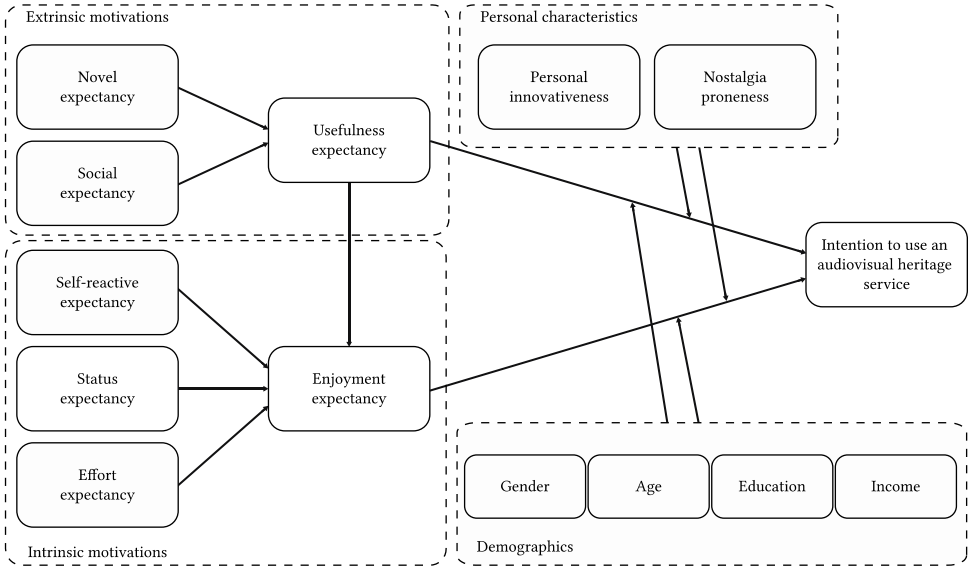


Figure 9.2. Multidisciplinary model of factors that explain the intention to use digital audiovisual heritage services

Chapter 8 attempts to answer the following final research question: What is the anticipated adoption and willingness-to-pay potential of the digital audiovisual heritage service of the proposed service in the Netherlands? This chapter describes the results of a quantitative empirical study on Dutch potential consumers regarding their expectations and intentions to use digital audiovisual heritage services. The study tested the propositions using the multidisciplinary model. To assess a structural equation model, the perceptions of the Dutch participants were collected using an online survey. The primary conclusion of this study is that the intention to use the proposed digital audiovisual heritage service is determined by

the enjoyment that individuals expect to receive from using the service. This hedonic experience is primarily driven by the effort that users must expend to use the service. Although the expected usefulness does not affect the intention to use, the expected instrumental value is affected by the expected novelty of the service and the perceptual social expectancy. Additionally, the results indicate that demographics and personal characteristics play a minor role in the intention to use the proposed audiovisual heritage service. Because nostalgia proneness and personal innovativeness negatively affect the intention to use, non-nostalgic individuals and non-innovators are more likely to use the service. A plausible explanation for this atypical result is that the audiovisual heritage service pertains not only to nostalgic feelings but also creates value for individuals in the present. Furthermore, although the service is a novel application, not only the interest of innovators can be explained by the service's affinity to comparable services, such as YouTube, which has transcended the stage of a service that only interests innovators. In addition, the willingness to pay was assessed. Generally, the results demonstrate a reluctance to pay for audiovisual heritage archive services. Respondents indicate that advertisements are the preferable business model. Thus, it seems unlikely that pay-per-use or subscriptions will become a significant source of revenue for the proposed audiovisual heritage service in the near future.

The process of starting to use a new medium, such as digital audiovisual heritage services, is not straightforward, as is often assumed by theories. The results indicate that the expectation of an enjoyable activity plays a vital role in the intention to use a new audiovisual heritage service. The self-reactive outcomes demonstrate a non-significant relation with the expected enjoyment. Therefore, in contrast with television (Rubin, 1983), escapism, for instance, does not enhance the enjoyment of a digital video archive. Because linear television was considered to be an alternative to fleeing daily activities, time-honored audiovisual material is not considered to be a means to postpone tasks because primary activities precede the use of such services. Moreover, the enjoyment of the audiovisual heritage service is not increased by expected status, which is often attributed to innovative technologies, such as the mobile telephone (Wei, 2008). Additionally, the results indicate a non-significant role for the instrumental value of an audiovisual heritage service. Thus, one can conclude that although an archive can provide useful information, potential users would not use the system for that purpose. In sum, regarding the premises with respect to usefulness, personal innovativeness and nostalgia, the data demonstrate unexpected results.

9.3 The design of digital audiovisual heritage services

The line of design science explored the creation of a viable digital audiovisual heritage service. The environment of audiovisual heritage was examined (Chapter 3) after which the consumer needs were explored (Chapter 5) and they were incorporated in an instantiation of an audiovisual heritage service (Chapter 6). The answers on the related research questions and thus the conclusions are discussed below.

Chapter 3 addresses the first research question and describes the internal (i.e., stakeholders, extant services, financial and technological issues) and external factors (i.e., technological advancements, market dynamics and legislation) that affect the Dutch audiovisual heritage domain. Using a case study, the Dutch circumstances were examined and described. Three conclusions were drawn based on the results of the case study. First, existing digital audiovisual heritage services are 'pushed' to the consumers, which means that innovations are introduced to the market through research and development, production and sales. Second, current technology suffices for a potential viable digital audiovisual heritage service that provides access to the archive. Third, the results of the case study indicate a need for an adequate revenue model for audiovisual heritage services.

The third research question asked which consumer needs can support the design of a digital audiovisual heritage service. Chapter 5 describes three studies that attempted to answer this question. The results of the first study, which entails a vignette study, clearly indicate that the Internet is favored as a platform for providing access to audiovisual material. In addition, the vignettes demonstrated that social influence is a required antecedent in the intention to use a potential audiovisual heritage service. From the results of the comparison of YouTube with *Uitzending gemist*, one can conclude that in general online video services cannot be generalized in terms of antecedents. The results indicate that the antecedents for the use of a video service differ between the two video services. Furthermore, there is a link between the needs that the service addresses and the characteristics of the service. YouTube appeals to the entertainment needs of the respondents, and its features reflect a reliable, effortless and straightforward online service. To a significant extent, the same applies with respect to the need to release tension. Escaping daily stress and relaxation are closely associated with an uncomplicated and easy-to-use video service. Innovation characteristics, such as reliability, download speed, and ease of use, are important. In contrast, *Uitzending gemist* satisfies the need for information and knowledge. Regarding the features favored for this online service, it is important to consider the importance of the video quality and searchability provided in

this service. The third and final study in this chapter detailed the requirements. In this preliminary ranking study, the focus was on audiovisual heritage service features. The study sought to examine how the features of two core categories – content (i.e., content preferences, context, recommendations and extraction) and interaction (i.e., user-to-user, user-to-document and user-to-system) – were perceived, judged and scored by the respondents. The results clearly suggest the preference for an online consultation platform with the capability to download content. Searching content in the consultation service seems primarily to be preferred in the form of a free search or a search query by genre or person. Regarding additional features, one can identify four extensions. First, the content type and the provision of access it within the service. Respondents are interested in content focused on (major) news items, music and amusement programs. Second, the degree of personalization can be an important asset. In today's Internet era, the degree of personalization is an increasingly important issue. Websites, such as Amazon.com, successfully implement recommendation systems to optimize customer service. As the respondents indicated, the possibility to create a list of favorite fragments or to track user history is also imperative for an audiovisual heritage service. Third, individuals perceive little added value in a remix module in addition to the basic service. The question whether this should be so is also discussed or whether this extra service is 'a bridge too far' for many users. Such additional functionality would only be attractive for so-called heavy users. Fourth and finally, the respondents perceived a significant role for the extraction of the material, more specifically, downloading the material.

Chapter 6 attempts to answer the following research question: What are the technical and user design components of the digital audiovisual heritage service prototype described in this research? First, six design principles for the consumer side of the digital audiovisual heritage service, which are based on Chapter 5 and additional literature, are established. For the web-based context, the four components suggested by Nambisan and others are used. The authors studied customer interaction experiences in the context of online product forums and proposed an analytical framework that suggests that virtual co-creation systems must consider four experience dimensions – pragmatism, hedonism, usability, and sociability – to serve user needs (Nambisan & Baron, 2007; Nambisan & Nambisan, 2008). These dimensions are supplemented by trust (Williams et al., 2008) as part of the service design dimension. The mixture and focus of the different design principles depend on the function of the digital audiovisual heritage service. For instance, an online game would rely more on a hedonic than a pragmatic experience. The design suggested in this dissertation includes the design principles equally. The six design principles are detailed below.

The first aspect, the pragmatic experience, relates to the customer's experience in realizing product-related informational goals in a virtual customer environment. Archives and digital libraries are primarily used to seek information (Wilson, 1997). Thus, relevance and usefulness are often found to be predictors of the use of electronic or digital library and archive services (Hong et al., 2002; Heinrichs et al., 2007; Tibenderana & Ogao, 2008; Miller & Khera, 2010). Based on this utilitarian need, the following design principle is posited.

Design principle 3: *An audiovisual archive should support a pragmatic experience.*

In addition to the instrumental value of an audiovisual archive service, such a service can pertain to the entertainment needs of the users. This intrinsic motivation is often found in association with hedonic information systems (Van der Heijden, 2004). Therefore, enjoyment could increase the popularity of a service based on an audiovisual archive. Thus, audiovisual archive services must be configured in a way to satisfy hedonic needs (Van der Heijden, 2004; Sun & Zhang, 2006), which prompts the second design principle.

Design principle 4: *An audiovisual archive service should provide a hedonic experience.*

Customers choose a product with more features even at the expense of usability. However, once they have used a product, their preference changes, that is, ease of use matters substantially more than utility (Thompson et al., 2005). However, ease of use takes precedence over usefulness in hedonic systems (Van der Heijden, 2004). Additionally, new web-based services are often equipped with Web 2.0 features. For example, the so-called interaction-enabled features result in more engaging webpage displays (Harrison & Barthel, 2009). Therefore, Web 2.0 is found easy to use (Dwivedi et al., 2011), which is even more so the case considering the "unlocking" initiatives for consumers. Consumers should not require high technical skills required when using the service. Thus, the overriding goal should be simplicity (Williams et al., 2008), which prompts the following design principle.

Design principle 5: *An audiovisual archive service should express simplicity.*

The next design principle also pertains to Web 2.0 characteristics. The term "Web 2.0" is collectively used for web applications that facilitate collective knowledge production, social networking and user-to-user information exchange (Adams, 2010), i.e., the sociability experience. Thus, the Internet is increasingly used as an interpersonal utility (Luo et al., 2011; Papacharissi & Rubin, 2000). Therefore, the fourth design principle is formulated as follows.

Design principle 6: *An audiovisual archive service should support a sociability experience.*

In addition to the defined overriding goal of simplicity, Williams, Chatterjee and Rossi formulate a second goal in a consumer context: trust (Williams et al., 2008). The trustworthiness, or credibility, of the website can enhance its use and be defined most simply as 'believability' (Tseng & Fogg, 1999). Believability is considered to be a key concept in business (Kracher et al., 2005). Although there is a large body of literature regarding trust and credibility, the design principle used in this dissertation primarily pertains to reputed credibility. Reputed credibility is based on source labels. For example, sources labeled 'Doctor' or 'Professor' are perceived to be credible by virtue of the label. Similar credibility can be attributed to sound and vision. Based on this idea, the penultimate design principle is formulated as follows.

Design principle 7: *An audiovisual archive service should express credibility.*

The final design principle pertains to the recognition of the service. Åkesson, Kautz and Eriksson (2010) found that e-newspapers should be designed to provide a familiar news-reading experience. That is, the patterns of interaction, layout, structure, order and aesthetics characteristic of news media, where feasible for the e-newspaper, should be used. Similarly, Siau, Chen and Tan (2007) stipulate that web-based information systems should organize content in a way that users are familiar with. Consequently, it was imperative to design the prototype in such a manner that it would be recognizable to prospective users. Thus, the final design principle is postulated as follows:

Design principle 8: *A web-based audiovisual heritage service should provide media recognition support.*

These design principles were translated into design components. The design components describe the technical interpretation of the design principles that are derived from a conceptual level. To construct an artifact, these design principles are formulated on the physical level to provide the artifact with form and function. This translation is discussed principle by principle. First, pragmatism is addressed by providing information regarding the audiovisual content. The informational content includes features such as accurate, complete and relevant information (Zhang & Von Dran, 2002). Moreover, features that relate to personalization support the pragmatic experience. This approach attempts to select additional relevant links for the user, thus modifying the navigation space by reducing or improving the paths to related Web pages (Nah et al., 2005). By including recommendations

based on the viewed content, pragmatism with respect to searching for and locating content is supported. Second, enjoyment is provided using multimedia and attractive images and by making the service fun to explore. This approach requires a skillful visual design of the online service, which is considered to be the most important design feature of websites in the entertainment domain (Zhang et al., 2001). To enhance the service's simplicity and ease of use, the visual elements are easy to understand and intuitive with respect to the information that they represent. Moreover, the layout of the service adopts in many ways the layout of similar services, such as YouTube, because YouTube is considered easy to use (Yang et al., 2010). To increase the sociability experience, social media features are incorporated that support user-to-user exchange. Social media have garnered increasing attention in recent years. With the advent of features for the incorporation of social media into websites, the exchange of content became easier. Thus, to enhance the sociability experience of the audiovisual archive service, social media buttons are implemented in the service to support content sharing among users. To increase the service's credibility, it is imperative that the identification of site's owners and designers is clear (Zhang & Von Dran, 2002). Moreover, the visual design of a website increases trust (Cyr, 2008). Therefore, to increase the website's credibility, the website owner must be clearly identified. Media recognition is achieved by matching the layout with existing online video services, primarily YouTube because YouTube is a frequently used service, as described in the comparison study (see 5.3), and used for similar reasons. Furthermore, YouTube has become the standard of what individuals expect audiovisual archives to be (Prelinger, 2009).

These design components are translated into an expository example, that is, a conceptual design and a user interface design. The latter is more important because this dissertation adopts a consumer perspective. The figure below shows the interface design of the digital audiovisual heritage service.

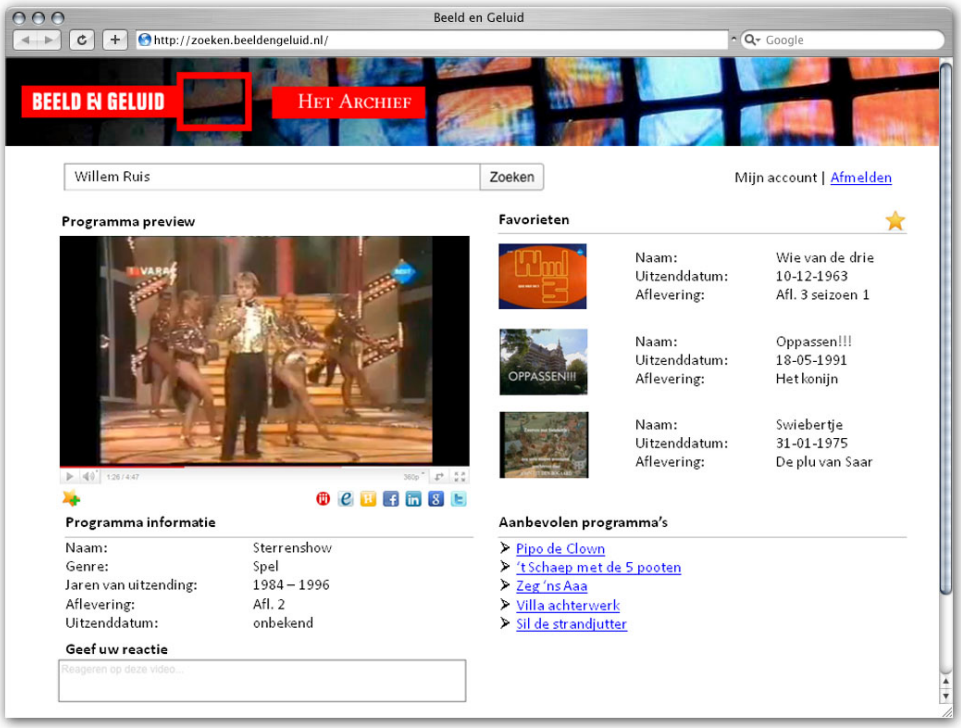


Figure 9.3. Screenshot of the audiovisual heritage service prototype (Dutch)

9.3.1 Toward a design theory

The primary purpose of this dissertation was to generate design knowledge regarding a digital audiovisual heritage service. Such design knowledge can assume several forms. A formal form of design knowledge is design theory. Previously, there was no consensus whether design research should theorize (Hevner et al., 2004; Kuechler & Vaishnavi, 2008; Venable, 2006) (March & Smith, 1995). The design science paradigm initially emphasized activities focused on the artifact rather than the problem of what a special design-type theory might look like (Gregor & Jones, 2007). However, with the aim of accumulating knowledge to guide practitioners (Venable, 2006) and originating in design science ideas, the term "design theory" was coined (Markus et al., 2002). This study adopts the components of the design theory proposed by Gregor and Jones (2007), which expands the work of Walls et al. (1992) and Dubin (1978), because this design theory is considered to be the most comprehensive (Alturki et al., 2011). The results of design science research proposed by March and Smith (1995) (i.e. constructs, models and methods) are included in the framework

of this design theory (Gregor & Jones, 2007). Following the discussion of design theory by Gregor and Jones (2007), in this dissertation, a mid-range design theory of digital audiovisual heritage services is proposed. Here, the term 'mid-range' refers to the generalization of the theory. A mid-range theory entails a theory that is moderately abstract, has limited scope, and can easily produce testable hypotheses.

The first component of a design theory is the purpose and scope. This component describes the aim of the artifact, and the artifact's boundaries are stressed (Dubin, 1978). Thus, this component answers the question 'what is the system for?' (Gregor & Jones, 2007). Walls et al. refer to this component as the meta-requirements (Walls et al., 1992). From a critical realist perspective, this element pertains to the identification of problem situations and desired outcomes (Carlsson et al., 2011; Carlsson, 2010). New knowledge should be created to solve a class of problems (Hevner & Chatterjee, 2010) rather than to provide a solution to a single, situated problem. Thus, the design theory should have generalizable characteristics and be applicable in different settings from the specific setting in which it is tested (Lee & Baskerville, 2003). Second, the constructs describe the representations of the entities of interest in the theory. These constructs are the most basic level in any theory and could be physical phenomena or abstract theoretical terms. Third, the principles of form and function formulate the abstract template, or architecture, that describes an artifact, either a product or method or intervention. Fourth, artifact mutability describes the changes in the state of the artifact anticipated in the theory, that is, the degree of artifact change that is encompassed by the theory. Fifth, the testable propositions describe truth statements regarding the design theory. Sixth and finally, because this study examines the outcome of this design science practice, justificatory knowledge is derived from existing literature. Table 9.1 summarizes the preceding discussions and locates them in the design theory framework suggested by Gregor and Jones (2007).

Table 9.1. Summary of the design theory for digital audiovisual heritage services

Type	Description
Purpose and scope	The purpose is to construct a viable digital audiovisual heritage service for the general public.
Constructs	Pragmatic experience, hedonic experience, simplicity / usability, sociability, trust / credibility
Principles of form and function	• The service supports searching via keywords and browsing and provides relevant, complete and up-to-date metadata on the content items. Link personalization supports the searching and browsing of content. • The service uses multimedia and attractive images and is fun to explore. • The content is logically organized, and the service is intuitive. • The service uses Web 2.0 features to share content among social network sites. • The service owner is clearly identified by a prominent logo.
Artifact mutability	Malleability is ensured when the service is constructed according to the model, view and controller (MVC) architecture for object-oriented software. Using this architecture facilitates distinguishing between graphical interface, logic and data issues.
Testable propositions	If applied, the design theory ensures that the service provides a pragmatic and hedonic experience, is simple and easy to use, supports sociability, and is credible.
Justificatory knowledge	Customer experience (Nambisan & Nambisan, 2008); Design of emerging digital services (Williams et al., 2008).

9.4 Theoretical reflection and implications

This section reflects on the theoretical contributions of the research as conducted in this dissertation.

9.4.1 Reflection on adoption theories

In this dissertation, a model of audiovisual heritage adoption is developed and tested. In the development of this model, theories from different scientific backgrounds are considered. The model is constructed using insights from the theory of reasoned action / planned behavior (TRA/TPB), the technology acceptance model (TAM), uses and gratifications theory (U&G), the unified theory of acceptance and use of technology (UTAUT) and the social cognitive theory (SCT). The theories used all reflect a rich history of research. Although in general the theories originate from social-psychological theories, they emerged in different disciplines. U&G was founded in mass media research, whereas TAM is dominated by the

field of information systems (Lee et al., 2003). The types of constructs employed in TAM and UTAUT research have primarily been technology- and organizational-centric perceptions, and little research has been performed at the individual level (Venkatesh, 2006). TAM and UTAUT research contrasts with the U&G approach, which primarily focuses on individual motives and therefore omits the perceived media or technology characteristics. TAM has been applied to numerous information systems in extension of its initial scope: the workplace. However, this extension does not guarantee that the generalizability of TAM's theoretical scope can be extended to theoretically explain circumstances and events not specifically included in the phenomena that TAM is intended to explain (i.e., media use behavior). Whereas the individual theoretical models possess their own distinct advantages (Lin, 2007), this dissertation integrates different models to construct an initial model that explains the use of an audiovisual heritage service. The adoption of such an integrative approach is impelled by the recent trend of technological convergence. Garnering increased academic attention; the concept of converging information and communication technologies pertains to the process of technological change through digitalization. However, few attempts have been made to integrate different theoretical perspectives. This research has attempted to provide one of the most comprehensive models of audiovisual heritage service adoption to date. Multiple factors from different theories were included, and the influence of the factors on the intention to use a prototype digital audiovisual heritage service was tested in a quantitative study. Although this dissertation does not claim to present a definitive theory of audiovisual heritage service adoption, it is hoped that the research will further the development of audiovisual heritage service adoption models or new media adoption models in general. In sum, an important theoretical contribution is the integration of several adoption models and the test of the integrated model against a converged medium or system. This section will further reflect on and evaluate the usefulness, interpretability and faithfulness of the models and their parsimony and ease of application, which are qualitative criteria adopted from Myung, Pitt and Kim (2005) and Mathieson (1991). The final paragraph concludes with a reflection on the integration of the models.

After evaluating the usefulness of the models, one can state that the U&G constructs consist of expectations customized to the context in which the research was conducted. These expectations are derived from the perceptions of individuals toward the medium. Because these expectations are focused on the content within that medium, the motivational factors, such as entertainment, escapism and information, are the typical factors identified within U&G studies. Because TAM was developed in an organizational context, it initially lacks such expected outcomes. That is, it solely addresses the artifact's usefulness and ease of use.

More recently, because of the use of TAM in a domestic context with respect to new media, such as the Internet, scholars have juxtaposed enjoyment with usefulness. Studies have found that the use of hedonically motivated technology is more likely to be predicted by intrinsic motivations (Van der Heijden, 2004). However, the focus of TAM has been criticized as tautological, trivial, too narrow, and of little help to management practitioners because it does not address which features shape an individual's impression of usefulness and ease of use (Benbasat & Barki, 2007; Bouwman et al., 2005). Therefore, it is understandable that researchers have argued that the information systems discipline is in a state of theoretical confusion because there is no commonly accepted adoption model and because the original TAM has outlived its usefulness (Benbasat & Barki, 2007).

The model's interpretability and faithfulness are related and in the following are simultaneously discussed for the models used. Interpretability confines a sensible and understandable model by means that the components of the model must be linked to theoretical constructs. The model's faithfulness encompasses the model's ability to capture the underlying phenomenon of interest. This faithfulness originates in the theoretical principles embodied in the model rather than in the choices made in the model's computational instantiation (Myung et al., 2005). The technology acceptance model originates in psychological theories, such as the theory of reasoned action (Ajzen & Fishbein, 1980). These theories thus constitute the model's underlying theoretical principles. Although TAM has become a powerful theory in terms of significant empirical results (Venkatesh & Davis, 2000) and has been replicated, refined and elaborated, certain theoretical concerns remain. For instance, TAM does not provide a mechanism for the inclusion of other salient beliefs because its dominance makes it difficult to incorporate other predictors (Benbasat & Barki, 2007). Certain researchers have heeded these critiques by proposing alternative approaches (e.g., Baaren et al., 2011). Thus, a tradition of improving TAM has been interrupted by the demonstration that TAM is limited in its understanding of the prediction of technology adoption as it is less faithful. The expectations that affect the usefulness and enjoyment factor of the model used in this dissertation originate in the link of U&G with the social cognitive theory (LaRose & Eastin, 2004) as used within social psychology (e.g., Fishbein & Ajzen, 1975). The most common method within the U&G tradition to cluster gratifications is to transform an extensive list of potential sought-for gratifications into several gratification factors or motives using an exploratory factor analysis. Thus, the gratifications are derived from empirical U&G studies rather than theoretically constructed. However, because of the seminal work of LaRose et al., U&G has received more theoretical grounding based on SCT. Due to the connection between U&G and SCT, it possesses the

ability to capture the underlying phenomenon of interest, which makes it faithful. Furthermore, the constructs are linked to theoretical principles, which makes it interpretable.

In terms of its parsimony and ease of application, a model ideally has minimal procedural costs. Davis (1989) developed standard measurements for the constructs in TAM. These instruments have been demonstrated to be reliable and viable in a wide range of studies in different contexts. Moreover, as a parsimonious model, TAM allows a smaller sample size (Luo et al., 2011). Although SCT's application to media use is promising, major research efforts are required to develop standard measurements and validate the model with respect to other technologies. In sum, regarding cost and research effort, TAM is well suited to predicting the attitude and intention to use a new system because it provides a quick and inexpensive approach with which to investigate behavioral intention.

Accounting for the (dis)advantages of the different models, this dissertation successfully integrated the different models into one comprehensive model. Future research may include a search for additional or mediating factors that affect the intention to use technology in the context of audiovisual heritage services. Although these factors may provide additional insights into the intention to use, there is no guarantee that the explanatory or predictive power of any model would be improved. Further theory expansion through model integration may be performed to provide an avenue for identifying additional or mediating factors or developing theoretical frameworks with the potential to advance our understanding of technology acceptance in particular with respect to digital audiovisual heritage services.

9.4.2 Reflection on the design science approach

The boundaries and outlines of design science continuously undergo definition and refinement, particularly considering that the information systems discipline only recently reclaimed its intellectual roots as a science of the artificial. This dissertation adopted the design science research method (Kuechler et al., 2008), specifically, a prototyping method, to develop an IT artifact. This method guided the development of the digital audiovisual heritage service in this dissertation because the method yields a research process based on the activities of design. This section reflects on the design science paradigm and the learning experience of how design science research is used as a method in this dissertation.

An initial observation with respect to the design science paradigm is the lack of user involvement in the design process. This dissertation has presented detailed discussions of the

inclusion of potential users in the design process, e.g., the research questions in the introduction (1.5), the description of the design science process (2.5), and the main conclusion of the case study described in Chapter 3 (3.4). The primary objective in this study was the development of a digital audiovisual heritage service that serves user needs. The development process designed in this dissertation included the advice of potential users to increase the service's viability. The advantages of involving prospective users in an early stage of development have been previously recognized in the field of human-computer interaction (Van Schaik, 1999). Within design science research, a culture exists based on trying to achieve perfect software, which relies heavily on the creativity of the designer. However, the results of this dissertation clearly favor the inclusion of potential users in the design science research process, as argued by other scholars (e.g., Hovorka & Germonprez, 2011).

A second observation pertains to the context of the establishment of the paradigm. As with many theories in the information systems discipline, the design science paradigm is defined against the background of organizational contexts. However, because the rapid development of digital technology continues to make computers and computing an everyday experience, design science research faces new challenges. Yoo (2010) has argued that the information systems community must expand its intellectual boundaries by embracing experiential computing as an emerging field of inquiry to fill this increasing intellectual void. This dissertation is among the first to employ the ideas of design science research in a consumer or residential context. Similar to the research presented in this dissertation, there is a need for exemplary studies that investigate the nature and consequences of the digital mediation of everyday experience to validate and refine the design science approach in a consumer context. Two recommendations are imperative for refining the approach to services aimed at residential users. First, the incorporation of business models would improve the viability of potential artifacts and could therefore be a meaningful addition. Such assessment is particularly relevant for (innovative) consumer technologies or services. Second, in relation to the previous comment, the inclusion of an exit strategy is important. Design science research is aimed at constructing artifacts. However, the construction of an artifact is not always the best solution. During the construction process, it can become clear that the artifact already exists, is not viable as a business model, or is not useful to users. Thus, one could argue that such development should cease. Therefore, future research should focus on the formulation of a comprehensive and complete design science method for a consumer context.

A third observation involves the dissemination of knowledge. Design science within the information systems discipline can be viewed as bridge-building with other disciplines (Purao et al., 2008). The research presented in this dissertation integrated theories and findings from other disciplines (see 1.7). Thus, this dissertation embraced the idea of interdisciplinary research as a means to transcend traditional academic boundaries. Although design science potentially includes interdisciplinary research, few attempts have been made to reach out to allied disciplines. In terms of output, scientific articles that use the design science approach are primarily published by the six leading journals in the information systems discipline, according to the Association for Information Systems (AIS), with the notable exceptions of Hrastinski, Keller and Carlsson (2010), and Helms, Giovacchini, Teigland and Kohler (2010). Although returning the research outcomes to multiple home disciplines and communicating to these audiences could be a significant challenge (Purao et al., 2008), overcoming this challenge would support the establishment of the design perspective as an interdisciplinary science.

9.4.3 Reflection on the integration of DS and BS

Gregor (2006) has argued that the theory of design, and the theory of explanation and prediction are interwoven. Assuming a broader contingency perspective on the relation between design science (DS) and behavioral science (BS), one can state that both paradigms are thoroughly intertwined. This dissertation used theories of explanation and prediction to construct an adoption model for the evaluation of the artifact and a design perspective to construct a prototype. Thus, the paradigms have a symbiotic relationship, as is common with research and practice (Borgman, 1999).

Generally, artifacts provide utility for behavioral science research (Hevner & Chatterjee, 2010, p.11). Previous behavioral science research aims at explaining and predicting existing technology. In a world in which new media continually emerge, the absence of investigations regarding non-existing technology or services is surprising. This dissertation demonstrated that constructing an artifact to test a particular model could be a useful means to obtain theoretical insights. Thus, scholars in the field of behavioral science should embrace design science research to develop and refine theoretical models for non-existing technology. Furthermore, more attention must be paid to the implications of their research for the design of technology. Understanding human behavior is invaluable for organizations that strive to improve technology to suit user needs. Therefore, with this dissertation as an example, behavioral scientists are urged to draw attention to the design of technology.

However, design science researchers pay little attention to human behavior. Knowledge of individuals and information technology capabilities can inform the design and development of new technology. Design science researchers locate the artifact on the axial of their research. However, prospective users eventually use such an artifact, and a continual interaction exists between the artifact and the user. Thus, it is imperative to learn from previous behavioral research to construct viable artifacts that suit user needs.

9.5 Practical reflection and implications

In addition to the theoretical consequences of convergence, practical consequences of technological convergence exist. Since the 1990s, the domains of information technology (e.g., the Internet) and media (e.g., television) have converged (Dwyer, 2010; Jenkins, 2006; Lin, 1999), which has resulted in the Internet's vital role in the distribution of audiovisual content (Noam, 2009). More concretely, previously, television could only be viewed on a television set, and texts could only be edited on a computer. Today, individuals can watch television on a laptop computer and use the Internet to download movies to their television sets. Therefore, convergence in media research has been presented as three intersecting circles of media industries (the broadcasting and motion picture industry, the print and publishing industry, and the computer industry) that have united as a single entity (Fidler, 1997). Over the years, media convergence has come to denote everything from organizational structures and new high-technological inventions to mergers between media companies (Appelgren, 2004). Thus, convergence is viewed as one of the driving forces of the development of new information infrastructures and services (Herzhoff, 2009), as is the audiovisual heritage service studied in this dissertation. This convergence is the primary reason to locate audiovisual heritage services under the new media umbrella (see 1.4). In addition to their theoretical consequences and implications, the findings of this dissertation have implications for organization affected by this convergence. In particular, the implications for practitioners within archive institutions that include audiovisual heritage content are discussed.

9.5.1 Implications for audiovisual heritage archives

The results have implications for various organizations that manage audiovisual heritage material. The affected organizations include broadcasting archives (national, regional and local), audiovisual museums, national audiovisual archives, studio archives of (large)

production houses, and archives, libraries and museums in general. Below, the implications for these organizations are discussed.

Given the significant role of perceived enjoyment in relation to the non-significant role of perceived usefulness, a different perspective on audiovisual heritage archives is required to enhance the accessibility and broaden the use of the archives. Previously, archives and libraries emphasized their instrumental value. However, whereas audiovisual content primarily addresses hedonistic needs. The results suggest that the study of services that explicitly appeal to these hedonic needs, such as online games or video-on-demand via television, would be more useful than focusing on search engines that support the quest for information.

In addition, the results indicate that perceived ease of use is a factor in the adoption of audiovisual heritage archive services. Therefore, from a managerial perspective, it is important to convince users that an audiovisual heritage archive service is clear, adequate and comprehensible and thus easy to use. This aim can be easily achieved using the many available *de facto* standards. With respect to audiovisual archives, YouTube has become the standard of what users expect: comprehensiveness, interactivity (the capacity to embed videos from the collection or to upload one's own), instantaneous accessibility and enabled social networking (the capacity to link individuals to their uploads and favorite videos, send material to others and maintain friendships) (Noordegraaf, 2010; Prelinger, 2007). Complying with these standards would decrease the effort a potential user must expend to use the digital service.

In this regard, the relationship between personal innovativeness and behavioral intention is interesting. The alleged potential of audiovisual heritage is reflected by the non-significance of the relation between personal innovativeness and behavioral intention. Although audiovisual heritage services remain in an experimental stage, their use is not limited to innovators, which is uncommon with many other innovations. The results indicate that early and late majorities (Rogers, 2003) are interested in online audiovisual heritage services. Thus, the target audience of the audiovisual heritage service is broad with respect to the diffusion of these services. Such information is important to marketing managers.

The practical implications of this thesis apply beyond audiovisual heritage services as these are located under the new media umbrella. New media are expected to affect many aspects of our future everyday life. Evidence indicates that new media and, in particular, the

Internet create traditional and new forms of social capital at the individual and collective levels (Katz & Rice, 2002). Thus, designers and users will shape our future everyday life.

9.5.2 Implications for policy makers

Governmental funding for restoration, preservation and digitization originated in the (imminent) decay of film and audiovisual archives and the lack of access to archives by different groups. Through restoration, preservation and digitization, video, film and photographs collections can be partially preserved for future generations. Subsequently, the plans for restoration, conservation and preservation were linked to an ambitious plan for digitization, which should provide access to the collections to a wider audience if new services could be developed.

Although most objectives of the Images for the Future (for more information see Chapter 3) project regarding restoration, preservation and digitization were achieved, the development of new services has proceeded slowly (Leurdijk et al., 2010). The preconditions for future funding in the domain of audiovisual heritage should entail or at least address the provision of access to the archives because providing access legitimates the creation of audiovisual heritage archives and significantly increases their societal impact. Moreover, one should not think lightly about providing access to the audiovisual archives for the general public. Many complex antecedents underlie the use of digital audiovisual archive services that aim to unlock the archives to the consumer market as the causal model developed in this dissertation showed. Hence, policy makers should give deep thought about the goals of the service and the expectancies consumers can have before building a digital audiovisual heritage service.

In particular, attention should be paid to the viability of new services. That is, a sound business model is required. Although current audiovisual heritage services do not meet expectations, when market conditions change or the willingness to pay of users increases, new business models and related income sources may arise. To enhance the motivation to find new income sources, when governmental funds are granted, appropriate incentives are an indispensible precondition. Such incentives are crucial if audiovisual heritage services are to survive as businesses in the cultural heritage domain of the future. However, this commercial approach toward public service values in the digital domain indicates a further need for policy to ensure that socially and culturally valued broadcasting content remains universally, equally and freely available to the citizen-consumer.

9.5.3 Implications for other countries

The research presented in this dissertation is also intended to encourage thinking on the endorsement of the audiovisual heritage and providing access to the audiovisual archives. Although other countries are not addressed here, they can benefit from the results of this research as audiovisual heritage gains increasing international attention. That is, the Netherlands can serve as an example for other countries. Many steps have been taken in the Netherlands, which are yet to be taken in other countries. The research findings provide clues with which to determine the factors that are likely to influence the adoption of digital audiovisual heritage services. However, there may be differences in culture, legislation, regulations and market mechanisms that influence consumer adoption. Nevertheless, it is likely that in every country, the potential consumers of digital audiovisual heritage services will have expectations and willingness to pay. In certain countries, the willingness to pay may be greater than in others. However, the adoption of digital audiovisual heritage services remains a matter of being willing and able to adopt. Furthermore, the results provide insights into the design of digital audiovisual heritage services. Here, too, one must bear in mind that the culture, legislation, regulations and funding of other countries differ from those of the Netherlands.

9.6 Limitations and future research

After the discussion of the limitations of the case study in Chapter 3, of the survey, the vignette and the ranking methods in Chapter 5, and the survey method in Chapter 8, the dissertation is now reflected on in its entirety. Additionally, several avenues for further research are presented.

First, a number of issues can be discussed that are related to the continuing development process. The development of the audiovisual heritage services is an ongoing process based on user feedback and new learning and will extend beyond the scope of a single project, such as this dissertation. Hevner (2007) indicates that artifacts must be rigorously and thoroughly tested before they are released, which requires multiple iterations of the design cycle in design science research. The primary part of this dissertation is design science research, focusing on construction and evaluation. However, the research does not cease after it is evaluated. Similar to other research projects, because of its necessarily restricted scope, this dissertation has limitations, leaves unaddressed problems, and has uncovered new questions during the research process. The problem investigated in this dissertation is complex, as

indicated in this chapter. A single project, such as this dissertation, cannot lead directly to a 'killer application', that is, an application that is highly successful and engenders a high revenue stream. Additionally, this dissertation does not present a final explanatory adoption theory. However, the research presented here can be regarded as a stepping stone to further research on the development of viable audiovisual heritage services. Future research is required to incrementally refine the solution and create a more complete and generalized theory of audiovisual heritage adoption.

Second, two remarks must be made regarding the antecedents of the adoption model and the position of this dissertation in the diffusion process. The research presented here is consciously positioned in the early stage of the diffusion process because digital audiovisual heritage services remain in an early stage of development and use. Although often neglected by studies that (re)formulate adoption models, there are indications that the antecedents of technology adoption evolve over time. They are different during the early stages of the use of a new technology that has been designed for the consumer market compared with later stages, when users have gained experience with the technology concerned (Peters, 2007). A consequence of this important consideration is that the antecedents of adoption in adoption models and theories might be different. Two remarks illustrate this possibility. The first pertains to including habit as an antecedent for the use of audiovisual heritage. The initial use of a technology or media, such as the digital audiovisual heritage service discussed in this dissertation, is primarily driven by conscious intentions. However, over time, when the use of the medium or technology is routinized, past use has been demonstrated to be a reliable predictor of future use (Kim & Malhotra, 2005). The second remark pertains to the changing pattern of the determinant of ease of use or effort expectancy, as these phenomena are denoted in this dissertation. Davis and Venkatesh (2004) found that the perceived ease of use evolves over time. When data on users before and after hands-on experience were compared, the results differed over time. Therefore, to provide a more comprehensive adoption model for audiovisual heritage services that is also valid for these services in a mature stage of development, future research should attend to the ideas expressed in both of these remarks.

Third, in this dissertation, only a consultation platform is prototyped. In addition to the consultation platform, a game based on the broadcast archive was proposed. A game is an easy means to captivate and engage individuals because of its competitive elements. However, experts have been doubtful regarding the viability of a casual game. Moreover, as with every project, there were certain practical constraints (time and money), which resulted

in the decision not to prototype the game. A valuable direction for research is to construct and evaluate a game based on audiovisual heritage content.

Finally, the ongoing debate on how technology and demand interact must be addressed. Based on the Dutch audiovisual heritage case study, this dissertation followed the demand-pull tradition (see 3.4). Critics of demand-pull stress that the definition of 'demand' in empirical studies had been inconsistent and generally too broad to be useful (Mowery & Rosenberg, 1979; Chidamber & Kon, 1994). Furthermore, demand explains incremental technological change far better than it explains discontinuous change. Thus, demand fails to account for the most important innovations (Mowery & Rosenberg, 1979; Walsh, 1984). The introduction of the iPhone is most likely one of latest illustrative innovations that caused unexpected behavioral change. In addition, critics have expressed their skepticism regarding how effectively one can identify 'unrevealed needs' from a nearly infinite set of possible human needs (Simon, 1959). The research presented in this dissertation sought to overcome this criticism by rigorously examining the needs using multiple studies and subsequently adopted a multi-method approach. Although this approach should decrease the gap between the expected value and the delivered value (Zeithaml et al., 1990), uncertainty remains regarding the fruition and viability of audiovisual heritage services when marketed. Thus, the demand-pull school of thought does not provide the ultimate design solution. Therefore, future research should provide a more detailed understanding of how technology and demand interact in the field of audiovisual heritage.

9.7 Concluding thoughts

Many audiovisual heritage archives are on the verge of giving consumers access to their archives to gain the fruits of their labor and legitimate their raison d'être. Although much governmental funding has been invested in providing access to audiovisual archives, no other studies have empirically examined the intention to use audiovisual heritage services or the willingness to pay for such content. For audiovisual archives, this focus was novel. Therefore, this research can be viewed as a stepping stone toward the development of a more complete understanding of the dynamics of assigning value to audiovisual heritage archive content by consumers. The results of this research indicate that the intention to use audiovisual heritage services during the early stage of development is generally low. Furthermore, the findings demonstrate that intrinsic motivations affect this intention more than extrinsic motivations. Additionally, the willingness to pay is low. More abstractly, these findings result in a more important conclusion: audiovisual archive professionals are

largely unaware of consumer behavior and the antecedents that affect this behavior, which raises the following question: how can audiovisual archives built viable digital services if their designers and managers lack fundamental knowledge on consumer behavior?

Only through further research and by maintaining a consumer perspective can the true meaning of audiovisual heritage content for consumers be understood. Further research can provide an avenue for identifying and developing viable digital audiovisual heritage services. Hopefully, this dissertation encourages academics to investigate this uncharted field of study as much research remains to be performed in the coming years.

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SAMENVATTING (DUTCH SUMMARY)

De televisie is inmiddels ruim 60 jaar in de Nederlandse huishoudens aanwezig. Het is daarom een logisch gevolg dat televisieprogramma's in toenemende mate gezien worden als onderdeel van het cultureel erfgoed. Verscheidene landen hebben daarom audiovisuele erfgoed archieven opgericht die de verantwoordelijkheid hebben gekregen om televisie-uitzendingen te bewaren en bewaken voor het nageslacht. Plannen worden of zijn gemaakt om het analoge materiaal om te zetten in een digitaal format, veelal door overheden gesubsidieerd. Analoge dragers (magneetbanden) hebben de neiging te krimpen en te verzuren in de loop der tijd waardoor de banden onherstelbaar worden aangetast. Dragers van digitaal format (polyester dragers) kennen deze verzuring niet waardoor het materiaal honderden jaren meegaat. Belangrijke drijfveer hierbij is dat de kosten voor het digitaal opslaan van grote hoeveelheden videomateriaal de laatste jaren sterk gedaald zijn. Een groot bijkomend voordeel van deze digitalisering is dat het archiefinstellingen in de gelegenheid stelt om het materiaal op nieuwe manieren te ontsluiten naar het brede publiek toe. Deze ontsluiting staat vaak centraal bij de toekenning van digitaliseringprojecten door overheden. Ondanks het vermeende potentieel van de ontsluiting van het audiovisueel materiaal lijken de huidige ontwikkelde digitale diensten weinig gebruikt te worden door consumenten. Daarbij moet wel worden aangetekend dat toegang geven tot het audiovisueel archief aan een breed publiek nog in de kinderschoenen staat. Het is de ontwikkeling van een digitale dienst dat geënt is op de ontsluiting van audiovisuele archieven naar consumenten dat centraal staat in deze disseratatie. **Hoofdstuk 1** verdiept de hier kort geschetste achtergrond en werpt de centrale vraag van deze dissertatie op:

> *Wat omvat een levensvatbare digitale dienst die toegang biedt tot audiovisuele erfgoed archieven tot het brede publiek?*

Om antwoord te geven op deze vraag staat de eindgebruiker centraal. De primaire doelstelling is het bouwen en evalueren van een digitale audiovisuele erfgoeddienst. Deze doelstelling kan worden onderverdeeld in twee onderzoeksdoelen. Ten eerste beoogt dit onderzoek een bijdrage te leveren aan de ontwerpkennis over digitale audiovisuele erfgoeddiensten. Ten tweede is het doel van dit onderzoek om de theoretische discussie over het gedrag van consumenten ten aanzien van de acceptatie en het gebruik van digitale audiovisuele erfgoeddiensten verder te helpen.

Het ontwerp- en onderzoeksproces staat centraal in **hoofdstuk 2**. Hierbij wordt onderscheidt gemaakt tussen de ontwikkeling van de dienst en het onderzoek naar consumentengedrag. Vijf stappen liggen ten grondslag aan dit proces. Ten eerste is, ter bewustwording van het probleem, een analyse van de Nederlandse situatie gemaakt. Ten tweede is er een literatuurstudie naar acceptatiemodellen gedaan tezamen met een analyse of wensen en behoeften van gebruikers om tot een suggestie van ontwerp te komen. Ten derde is een prototype van een digitale audiovisuele erfgoeddienst ontwikkeld en is een (theoretisch) model ontwikkeld dat het gebruik van digitale audiovisuele erfgoeddiensten kan verklaren. Ten vierde zijn alle resultaten geconfronteerd met de ontwerppraktijk in een empirische studie om het model te toetsen. Als laatste worden de bevindingen geanalyseerd, samengevat en gerapporteerd.

In Nederland heeft Beeld en Geluid in 1996 de verantwoordelijkheid gekregen om audiovisueel erfgoed te bewaken en bewaren voor de toekomstige generatie. **Hoofdstuk 3** beschrijft een kijkje op het audiovisuele erfgoed domein in Nederland. Uit deze analyse volgen drie conclusies. Ten eerste dat de meeste initiatieven om het audiovisuele archief te ontsluiten worden gekarakteriseerd als innovatieve projecten met een wetenschappelijke drijfveer en daarmee technologie gedreven. Dit in tegenstelling tot gebruikersgedreven innovaties. Daarnaast blijkt de huidige technologie (ook aan de gebruikerskant) voldoende voor de implementatie van een digitale audiovisuele erfgoeddienst. Dit betekend dus dat de randvoorwaarden zijn voldaan. Als laatste is er een noodzaak tot een adequaat verdienmodel voor audiovisuele erfgoed diensten geïdentificeerd.

Hoofdstuk 4 bestaat uit een analyse van theoretische inzichten uit de wetenschappelijke literatuur vanuit de onderzoeksdisciplines *communication* en *information systems* over de acceptatie van technologie of media en de motieven die hier ten grondslag aan liggen. Dit hoofdstuk bespreekt vijf modellen of theorieën die de afgelopen decennia aan verandering onderhevig zijn geweest. Vanuit de ontwikkeling van deze modellen over de jaren zijn drie generieke trends geïdentificeerd. Ten eerste is er een tendens om naast bewuste motieven ook gewoonte mee te nemen als motivatie tot gebruik van technologie. De meeste acceptatie theorieën gaan uit van een actieve gebruiker die zijn/haar beweegredenen rationeel kan afwegen om tot een bewuste keuze te komen. Onbewuste keuzes op basis van eerdere ervaringen is een motief die steeds vaker zijn intrede doet. Dit gedrag op basis van gewoonte wordt veroorzaakt door frequent gebruik van de technologie die dan een sterke voorspeller is van toekomstig gebruik. Ten tweede is er in toenemende mate overlap tussen de theorieën die onafhankelijk van elkaar zijn doorontwikkeld de afgelopen jaren in de twee

onderzoeksdisciplines. Waar de modellen in *information systems* vaak uitgaan van extrinsieke motieven (bijv. het nut van een technologie) voor het gebruik van een technologie gaan modellen in *communication* vaak uit intrinsieke motieven (bijv. het plezier dat wordt beleefd aan het gebruik van een technologie). Doordat in beide disciplines het Internet steeds vaker als onderzoeksobject centraal staat, laten nieuw ontwikkelde modellen een toename zien van de integratie van zowel extrinsieke alsmede intrinsieke motivaties. Het Internet laat zich namelijk kenmerken door een sterke mate van convergentie waardoor gebruikers verschillende motieven ontwikkelen voor het gebruik van dit medium. Als derde en laatste bevatten de modellen steeds vaker de toevoeging van persoonlijke factoren. Persoonlijke karakteristieken zoals leeftijd en geslacht hebben reeds hun weg gevonden in de literatuur. Echter, alhoewel aangetoond en succesvol beargumenteerd vindt de inclusie van persoonlijke factoren zoals computerangst en persoonlijke innovativiteit in de acceptatiemodellen (nog) niet plaats. Geen van de besproken modellen voldoet om het prototype te evalueren dat wordt ontwikkeld in deze dissertatie, omdat dit een geïntegreerde aanpak van intrinsieke, extrinsieke en persoonlijke factoren vereist.

Dit promotieonderzoek is gestart vanuit de notie dat een digitale audiovisuele erfgoeddienst aan dient te sluiten bij de wensen en behoeften van de gebruikers. Om dit te bewerkstelligen zijn een drietal verkennende studies opgezet en beschreven in **hoofdstuk 5**. Deze bestaan uit een vignette studie waarbij verschillende scenario's aan de respondent worden voorgelegd, een vergelijking tussen motieven voor gebruik van YouTube en Uitzending gemist, en een ordeningstaak om de belangrijkste eigenschappen van een mogelijke dienst te identificeren. Hierbij vielen een aantal zaken op. Het Internet (naast televisie en mobiel) wordt duidelijk geprefereerd door consumenten als platform om een audiovisueel archief op te ontsluiten. De toegevoegde waarde van een digitale audiovisuele erfgoeddienst is tweeledig. De dienst moet zowel nuttig (bijv. opzoeken van nieuwsfeiten) als amuserend (bijv. het bekijken van fictie) zijn. Om de instrumentele waarde van de dienst te ondersteunen is een zoekmachine die in staat is om te zoeken op genre, bekende Nederlanders en programmacategorieën nodig. Bovendien dient die extra informatie aan zoals genre, jaar van de uitzending en de eventuele episode aan te bieden. Om de dienst ook plezierig in gebruik te maken dienen fictie en amusementsprogramma's te worden toegevoegd. Daarnaast dient ook de kwaliteit van de video's niet te hoog te zijn, om zo de tijd om een video te downloaden te verkorten. De gebruikersvriendelijkheid speelt ook een belangrijke rol. Om dit te verhogen wordt de inhoud organiseert op de manier die bekend is bij gebruikers. De layout van de dienst zal daarom lijken op die van YouTube, omdat veel consumenten daar al bekend mee zijn. Een stukje personalisatie is een andere eigenschap van de dienst. De gebruikers krijgen de

mogelijkheid om hun favorieten video's op te slaan. Ook het delen van content wordt mogelijk gemaakt. Uit de vignette studie blijkt sociale invloed een belangrijke voorspeller te zijn voor het gebruik van een audiovisuele erfgoeddienst. Om dit te ondersteunen wordt het delen van content via social media onderdeel van de dienst. Als laatste is de extractie van materiaal een punt van aandacht. Respondenten gaven aan videomateriaal te willen downloaden naar de eigen computer. Omdat dit sterk gerelateerd is aan een eventueel verdienmodel heeft dit geen plaats gekregen binnen het prototype, maar wordt in de evaluatie van het prototype meegenomen. **Hoofdstuk 6** beschrijft vervolgens het prototype, waarbij het conceptuele design (use case model en de technische architectuur) en de user interface design wordt gepresenteerd.

Vanuit de literatuur is een model ontwikkeld dat het gebruik van een digitale audiovisuele archiefdienst kan verklaren. Het model bestaat uit drie extrinsieke motieven (nut van de dienst, in hoeverre ze verwachten nieuwe dingen te leren, en in hoeverre ze verwachten om met anderen over de dienst te praten) die consumenten kunnen hebben voor de intentie tot het gebruik van digitale audiovisuele erfgoeddiensten. Daarnaast zijn er vier intrinsieke motieven (het plezier dat ze verwachten te ervaren, de mate waarin de dienst gebruikt wordt als vluchtgedrag, in hoeverre gebruik hun status zal verhogen, en in hoeverre ze inspanning moeten leveren om de dienst te gebruiken) die consumenten kunnen hebben voor de intentie tot het gebruik van digitale audiovisuele erfgoeddiensten. Ook bevat het model twee persoonlijke kenmerken (persoonlijke innovativiteit en geneigdheid tot nostalgie) en demografische gegevens (geslacht, leeftijd, opleiding en inkomen). **Hoofdstuk 7** bevat de hypothesen die hierbij zijn geformuleerd.

In een kwantitatieve studie (n=205), welke gerapporteerd is in **hoofdstuk 8,** is het model getoetst. Eén van de belangrijkste bevindingen is dat de intentie om een digitale audiovisuele erfgoeddienst te gebruiken voornamelijk wordt beïnvloedt door de verwachte plezierige ervaring van de dienst. Respondenten die een hoge intrinsieke motivatie hebben in termen van plezier en vermaak zullen eerder geneigd zijn de dienst te gebruiken in de toekomst. Dit wordt voornamelijk veroorzaakt door het gebruiksgemak van de dienst. De hoeveelheid inspanning die men moet leveren is een cruciale factor. Bovendien laten de resultaten zien dat voornamelijk mensen met een hogere opleiding die het nut van de dienst inzien een hogere intentie hebben om de dienst te gebruiken. Persoonlijke innovativiteit laat echter een negatieve invloed zien. De zogenoemde 'innovators' zijn dus niet de eerste die een dergelijke dienst zouden willen gebruiken. Naast de toetsing van het model is in deze studie ook de betalingsbereidheid bekeken van consumenten. In het algemeen laten de resultaten zien dat

de bereidheid om te betalen voor audiovisueel erfgoeddiensten erg laag ligt. Respondenten geven aan dat advertenties de voorkeur hebben. Het lijkt erg onwaarschijnlijk dat pay-per-use of eventuele abonnementsvormen zal leiden tot een belangrijke bron van inkomsten.

Ter afsluiting van deze dissertatie passeren in **hoofdstuk 9** de meest in het oog springende bevindingen over de acceptatie door de consument en het ontwerp van de dienst de revue. Het ontwerp wordt tevens geformaliseerd in een ontwerptheorie. Ook wordt er gereflecteerd op de gebruikte theorieën, worden de praktische implicaties voor audiovisuele archieven, beleidsmakers en andere landen besproken, en worden de beperkingen van het onderzoek behandeld. Ten slotte wordt er gepleit voor verder onderzoek voor het identificeren en ontwikkelen van levensvatbare audiovisuele erfgoeddiensten in de toekomst. Hopelijk stimuleert deze dissertatie academici en professionals om dit onontgonnen vakgebied te exploreren aangezien er nog veel onderzoek nodig is aankomende jaren.

LIST OF PUBLICATIONS

Internationally refereed publications related to this dissertation

Ongena, G., Van de Wijngaert, L.A.L., Van Dijk, J.A.G.M., & Huizer, E. (submitted). Understanding the intention to use an audiovisual heritage archive service: A model comparison approach.

Ongena, G., Van de Wijngaert, L.A.L., & Huizer, E. (in press). Exploring determinants of early user acceptance for an audio-visual heritage archive service using the vignette method. Accepted for publication in *Behaviour & Information Technology*. ***Impact factor: 1.011***

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CURRICULUM VITAE

Guido Ongena was born on the March 2, 1983 in Woerden, the Netherlands. He spent the majority of his childhood in the neighboring village Kamerik. At high school he obtained his MAVO, HAVO and VWO diploma. Within the period 2002-2008 Guido obtained gradually his bachelor in Information Science and his master Business Informatics at the Utrecht University. During this educational period he was actively involved as student assistant. Guido worked from 2008 onwards on his PhD research at the Department of Media, Communication and Organization at the University of Twente in Enschede. This project was funded by ICTRegie and is entitled 'Moving archives: The disclosure of digital collections with audio and video from a user perspective'. The project focused on the preservation, but mostly on the disclosure, of the digital cultural heritage at the Flemish and Dutch broadcasting companies resulting in the dissertation as lies before you.

During his academic employment Guido lectured for bachelor students, and supervised bachelor, pre-master and master theses. More specifically, together with his esteemed colleague dr. Thea van der Geest he taught the course User-Centered Design (UCD). During this course students were assigned to develop an innovative artifact that supports (visually, cognitive) impaired people during daily activities. A pivotal point in this course is the involvement of end users in an early stage of development. Furthermore, he acted as reviewer for several international journals and conferences, including the *European Conference on Information Systems* (ECIS), *International Conference on Mobile Business* (ICMB), *Hawaii International Conference on System Sciences* (HICSS), and the *Tijdschrift voor de communicatiewetenschap* (Dutch).

In addition to his academic work, Guido worked since 2006 as researcher / consultant for Dialogic *innovation & interaction*. In that role he contributed to various projects in the field of broadband, network analysis, user research and research in the educational field. From 1 January 2013, he started working for the Dr. Leo Kannerhuis foundation. This organization aims at developing, providing and transmitting optimal, specialized treatment for people with disorders in the autism spectrum (ASD). He momentarily works as a project manager on the research and development department where he develops innovative ICT solutions (eHealth) for people with ASD.

The attention to preserve moving images has risen rapidly over the years as its cultural value is increasingly underlined and the analogue carriers are decaying. Many countries have therefore already established audiovisual heritage archives to preserve television and film recordings for future generations. New media (e.g. Internet) can provide solutions to unlock these archives. But what constitutes a viable digital service that provides access to audiovisual heritage archives for the general public? This research focuses on this question by developing a digital audiovisual heritage service from a consumer perspective.

The first goal of this research is to enhance design knowledge about digital audiovisual heritage services. The second goal of this research is to enhance theoretical knowledge about consumer behavior regarding the adoption and usage of digital audiovisual heritage services. By reaching these goals this research is set out to provide managers of audiovisual heritage archives with design knowledge and knowledge about consumers' behavior that may help them in the development of services that are aimed at disclosing their archives for the general public.

Guido (1983) has a background in information science. He obtained his master's degree in Business Informatics at Utrecht University. He conducted his PhD research at the department of Media, Communication and Organization at the University of Twente, the Netherlands. During his PhD trajectory he worked as a researcher and consultant on network analyses, user research and advisement with broadband at Dialogic innovation & interaction. Research conducted by Guido is used by several Dutch Ministries, provinces and other public and private organizations. Currently, he works as a projectmanager on several ICT developing projects that focus on people diagnosed with Autism spectrum disorders (ASD) at the Dr. Leo Kannerhuis.

UNIVERSITEIT TWENTE.