

Designing online audiovisual heritage services: an empirical study of two comparable online video services

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The purpose of this study is to seek input for a new online audiovisual heritage service. In doing so, we assess comparable online video services to gain insights into the motivations and perceptual innovation characteristics of the video services. The research is based on data from a Dutch survey held among 1,939 online video service users. The results show that online video service held overlapping antecedents but does show differences in motivations and in perceived innovation characteristics. Hence, in general, one can state that in comparison, online video services comply with different needs and have differences in perceived innovation characteristics. This implies that one can design online video services for different needs. In addition to scientific implications, the outcomes also provide guidance for practitioners in implementing new online video services.

Keywords: Online video services; Audiovisual heritage services; Innovation characteristics; Uses & gratifications

1. Introduction

The Internet has become a part of our daily lives. As the proliferation of broadband connections has continued over several years (Vermaas 2007), the scope of Internet functions broadened from basic functions such as searching for information to multimedia interactional web sites. In addition to earlier text-based informational web sites, the Internet provides today's users with a platform containing many services, including banking, sharing photos', and viewing videos. The latter is the main subject of this study.

Online video use has increased over the past few years. The time spent on online video sites has increased 2,000% between 2003 and 2009. The number of people visiting video web sites has also increased 339% (The Nielsen Company 2009). Since its start in 2005, YouTube has been the leading video

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platform on the Internet with 92 billion page views each month and 490 million unique users at the moment (Elliott 2011). Other services also enable free access to television and video content. Major (public) broadcasting networks have initiated online video services to make full-length television programs readily available for consumers, mostly through their web sites. This online video material is accessible at any time and any place, as the videos can be watched on both computers and mobile phones. However, little is known about viewers' motivations for accessing various types of online video services and the extent to which these differ in their technology characteristics. This study aims to model the motivations for using these video services and examine the perceived technological characteristics. This study utilizes the uses and gratifications framework to identify the extent to which motivations predict and differ among online video services. Furthermore, we draw upon the innovation diffusion theory (IDT) to investigate the power of predicting technology characteristics and differences among online video services.

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 and Thompson 1995) to account for user evaluation of the online video sites. This framework identifies different characteristics of both technology and task, including nonroutineness and information system type. These characteristics are found to jointly determine the task–technology fit that in turn influences technology use. The model used 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. 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 rationale of this study; next, the theoretical groundings are outlined. The method section describes the survey approach used in this study. The results are discussed, and this paper closes with a conclusion and a discussion.

2. Rationale for this study

Before describing the theoretical foundations of this study, we elaborate the reasons for performing this research. As the aim *in* this study is to compare video services, and the objective *of* this study is to obtain input for developing new audiovisual heritage services.

Since the development of radio and television, audiovisual content has been seen as a vital component of a nation's historical cultural heritage (Oomen *et al.* 2009) in addition to its printed documents and other historical artifacts (Auffret and Bachimont 1999). International television is increasingly

recording historically significant moments, including the Apollo moon landing, the assassination of John F. Kennedy, the fall of the Berlin Wall, and the 9/11 terrorist attacks on the Twin Towers. These iconic scenes are also increasing within a national context. In the Netherlands, Big Brother and the glorification of the Dutch soccer team after winning the European cup in 1988 are now seen as landmarks in national television. The value of audiovisual heritage is progressively being acknowledged as an important asset of a country's cultural heritage. This awareness forces governmental and cultural institutions to plan for conserving and preserving this material. Public broadcast archives are primarily digitalized for preservation reasons (Ongena *et al.* 2012). However, questions about new services upon these archives arise when executing digitization projects. Several experimental unlocking projects are pioneering the service side of the audiovisual archives in the Netherlands, including unlocking via a branded YouTube channel updated weekly with historic news items and a game engaging consumers and enriching metadata.

To develop a new audiovisual service, it is beneficial to investigate initially similar services. Modeling these existing solutions advocates 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 and 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. Hereby, we formulate the general research question that this study tries to answer:

RQ: What are the determinants of extant online video services that can advocate the design of a digital audiovisual heritage service?

3. Theoretical foundation

3.1. Uses and gratifications

At the core of the uses and gratifications (U&G) theory is the assumption that audience members actively seek out mass media to satisfy individual needs. 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 additional assumptions are that audiences use the media to fulfill their expectations and that audience members are aware of and can state their own motives for using mass communication (Infante *et al.* 1997). Definitions of U&G generally stress that research scrutinizing U&G is “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). The theory attempts to explain the media uses and functions for individuals, groups, and society in general.

While earlier U&G research focused on television (Rubin 1981, Rubin 1983), video games (Selnow 1984), and the video recorder (Cohen *et al.* 1988), the emphasis has shifted to the Internet (Papacharissi and Rubin 2000, Stafford *et al.* 2004). Motivated by the Internet’s rapid growth and increasing interactivity level, researchers have applied the U&G theory to the Internet to understand common motivations for the medium. U&G has been applied to new media, including Twitter (Chen 2011), online games (Wu *et al.* 2010), the mobile phone (Wei 2008, Chau *et al.* 2012), MySpace and Facebook (Raacke and Bonds-Raacke 2008), and Second Life (Zhou *et al.* 2011). These U&G studies all seek to link latent motivations (the gratifications sought) with media behavior. In practice, researchers attempt to discover what gratifications individuals achieve in using media. The gratifications have been classified into various primary motivations, including interpersonal utility, passing time, information seeking, convenience, and entertainment (Papacharissi and Rubin 2000). Social gratification (Stafford *et al.* 2004) and virtual community (Song *et al.* 2004) were also identified as constructs of motivation.

This study also considers the motives found among online video users. Two studies have examined the 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 and 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), coviewing (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, coviewing, and social interaction.

3.2. Innovation characteristics

Rogers (2003), who is considered the ‘godfather’ of scientific research into the diffusion of innovations or technology,¹ (Bouwman *et al.* 2005, p. 6) developed a general framework labeled the IDT. Diffusion research centers on the conditions that increase or decrease the likelihood that members of a given culture will adopt a new idea, product, or practice.

As a starting point to identify innovation characteristics, we adopt the identified innovation attributes from Rogers. 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 and Benbasat 1991, Agarwal and Prasad 1997, Karahanna *et al.* 1999, Hsu *et al.* 2007) 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 sociocultural 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 innovations are visible to potential adopters.” This factor is found to affect World Wide Web use (Agarwal and 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 and 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 and 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 web site

¹The terms innovation, technology, and (new) media are used interchangeably as all represent a novel artifact that is to be marketed.

success (e.g. Palmer 2002). Metrics based on transaction processing time and rate, service failures, download delay or user response time (Messmer 1999, Wilson 1999, Barney 2000), 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 speed. 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.

4. Method

4.1. Sample and data gathering

The empirical data were collected during the spring of 2010, using a self-administered online questionnaire, which was mailed out to a sample of the Dutch population. These people were selected from an earlier respondent pool. To encourage the respondents to complete the questionnaire, we informed them that they could win a voucher for either a movie or a media shop. In addition, the survey URL was sent to another sample, based on a random sampling procedure provided by an external panel organization. This panel contained a sample of the Dutch population over the age of 18 whose mother tongue was Dutch. 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. Although, the sample is somewhat skewed to older people, the sample adequately reflects the Dutch population when compared to the figures collected by Statistics Netherlands (CBS 2012). The data were based on responses from 1,939 respondents.

4.2. 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. The 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. Similar 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 additional 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 1 shows screenshots of both services.

4.3. 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 and 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

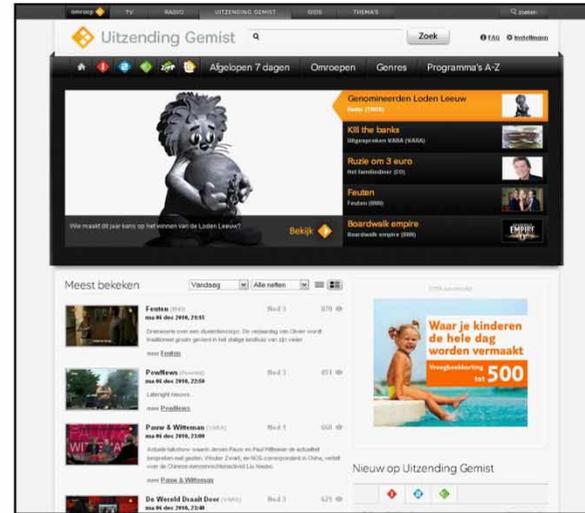


Figure 1. Screenshot of YouTube and *Uitzending gemist*.

(“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 7-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 nonexistence 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 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. Results

5.1. 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 (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) (Hutcheson and 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 *et al.* (1973) on the U&G theory. Tables 1 and 2 show the factor analysis results.

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.

Table 1. 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	
Similar to things 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			
<i>Eigenvalues</i>	6.118	1.563	1.100	0.703
<i>Percentage of variance explained</i>	23.487	22.326	18.478	14.793
<i>Cumulative percentage</i>	23.487	45.814	64.292	79.031

Note: Factor loadings below 0.50 are not shown.

Table 2. 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	
Similar to things 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			
<i>Eigenvalues</i>	6.606	1.540	0.932	0.716
<i>Percentage of variance explained</i>	24.815	22.965	20.337	13.501
<i>Cumulative percentage</i>	24.815	47.779	68.116	81.617

Note: Factor loadings below 0.50 are not shown.

It contained four items in our study derived from the a priori pastime and escape categories (Cronbach's $\alpha = 0.86$), which are similar to *Uitzending gemist* (Cronbach's $\alpha = 0.89$). *Cognitive needs* contained three items, all of which comprised a priori category. This finding held for YouTube (Cronbach's $\alpha = 0.90$) and *Uitzending gemist* (Cronbach's $\alpha = 0.92$). 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 and 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 $\alpha = 0.86$) and *Uitzending gemist* (Cronbach's $\alpha = 0.89$). *Affective needs* contained one entertainment item (i.e. fun) and one item related to people's inquisitiveness (Cronbach's $\alpha = 0.79$; 0.72). 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*.

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 .

5.2. Motivations and use online video services

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 ($r = 0.30$, $p < 0.05$).

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 3). 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

Table 3. Ordinary least squares (OLS) regression predicting frequency of use.

Variable	YouTube		Uitzending gemist	
	β	<i>t</i> -value	β	<i>t</i> -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	
<i>F</i>	97.184***		33.229***	
<i>Df</i>	14, 1468		14, 1051	

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

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 and Hui 1998). Age and gender are associated with consumer technology innovativeness (Lee *et al.* 2010). Additional control variables, e.g. gender and age, which may also affect users' online behavior or intention to use (Venkatesh and Morris 2000), were controlled in the current study.

The results for current usage indicate that, for this sample, the innovation characteristics of relative advantage ($\beta = 0.23$, $p < 0.001$) and compatibility ($\beta = 0.17$, $p < 0.001$), complexity ($\beta = 0.08$, $p < 0.01$), download delay ($\beta = -0.05$, $p < 0.05$), and visual experience ($\beta = -0.06$, $p < 0.01$) 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 ($\beta = 0.07, p < 0.01$) and affective needs ($\beta = 0.10, p < 0.01$) are obtained using YouTube. Gender ($\beta = 0.18, p < 0.001$) and age ($\beta = -0.24, p < 0.001$) also significantly affect YouTube use. Overall, these nine variables account for 47.6% of the variance in current usage.

Results for the likelihood of *Uitzending gemist* usage suggest that the only relevant innovation characteristics are relative advantage ($\beta = 0.35, p < 0.001$), compatibility ($\beta = 0.12, p < 0.01$), and visual experience ($\beta = -0.07, p < 0.01$). 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 ($\beta = 0.10, p < 0.05$). The need to have pleasure and fun is also indicated as factor for using *Uitzending gemist* ($\beta = 0.10, p < 0.05$). The six variables explain 29.8% of the variance in *Uitzending gemist* usage.

5.3. 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 4 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 4 describes, all correlation coefficients were statistically significant at the 0.001 level. These findings then suggest when individuals are more likely to use YouTube, which is motivated by one type of need, and they are also more likely to use *Uitzending gemist*, motivated by the same need.

Table 4. Mean differences and correlation analysis motives.

Variable	YouTube		<i>Uitzending gemist</i>		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***

*** $p < 0.001$.

Table 5. Mean differences and correlation analysis innovation characteristics.

Variable	YouTube		<i>Uitzending gemist</i>		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***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Similar to the motive comparison, the innovation characteristics were compared. Table 5 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 0.001 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*.

6. 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 and Haridakis 2008, Haridakis and 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 1981, Rubin 1983). 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. Our 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 coviewing, 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.

To the best of our knowledge, this study is the first to examine perceptual innovation characteristics in relation to online videos. Our 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 *et al.* (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 web sites to provide reliable recommendations.

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. The use of multi-item factors 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, we believe that our findings provide significant information for academics and practitioners.

7. Implications and conclusion

This study set out to explore comparable services to audiovisual heritage services and how we can benefit from these services in terms of usage motivations and perceived innovation characteristics. Our 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 are initiated 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, we investigated similar services to provide suggestions for the service to be developed. This study provided practical implications for audiovisual heritage archives.

References

- R. Agarwal and J. Prasad, "The role of innovation characteristics and perceived voluntariness in the acceptance of information technologies", *Decision Sciences*, 28(3), pp. 557–582, 1997.
- G. Auffret and B. Bachimont, "Audiovisual cultural heritage: From TV and radio archiving to hypermedia publishing", in *Proceedings of the Third European Conference and Research and Advanced Technology for Digital Libraries*, S. Abiteboul and A. Vercoustre (Eds), London, UK: Springer-Verlag, pp. 58–75, 1999.
- E. Baaren, L.A.L. Van de Wijngaert and E. Huizer, "Understanding technology adoption through individual and context characteristics: The case of HDTV", *Journal of Broadcasting & Electronic Media*, 55(1), pp. 72–89, 2011.
- D. Barney, "e-Comm intelligence report", *Network World*, 17(9), pp. 56–57, 2000.
- J. Berry, "The world according to e-Biz metrics", *Internet week*, pp. 38, 1999.
- H. Bouwman, B. Van Den Hooff, L.A.L. Van de Wijngaert and J.A.G.M. Van Dijk, *Information and Communication Technology in Organizations: Adoption, Implementation, Use and Effects*, London, UK: Sage, 2005.
- CBS., 2012. Bevolking; kerncijfers. The Hague, The Netherlands. Retrieved from: [http://statline.cbs.nl/StatWeb/publication/?VW=T&DM=SLNL&PA=37296ned&D1=a&D2=0,10,20,30,40,50,\(1-1\)-l&HD=121211-1500&HDR=G1&STB=T](http://statline.cbs.nl/StatWeb/publication/?VW=T&DM=SLNL&PA=37296ned&D1=a&D2=0,10,20,30,40,50,(1-1)-l&HD=121211-1500&HDR=G1&STB=T).
- A.Y.K. Chau, D.H.-L. Goh and C.S. Lee, "Mobile content contribution and retrieval: An exploratory study using the uses and gratifications paradigm", *Information Processing & Management*, 48(1), pp. 13–22, 2012.
- P.Y.K. Chau and K.L. Hui, "Identifying early adopters of new IT products: A case of Windows 95", *Information & Management*, 33(5), pp. 225–230, 1998.

- G.M. Chen, "Tweet this: A uses and gratifications perspective on how active Twitter use gratifies a need to connect with others", *Computers in Human Behavior*, 27(2), pp. 755–762, 2011.
- L. Chen, M.L. Gillenson and D.L. Sherrell, "Enticing online consumers: An extended technology acceptance perspective", *Information & Management*, 39(8), pp. 705–719, 2002.
- A.A. Cohen, M.R. Levy and K. Golden, "Children's uses and gratifications of home VCRs", *Communication Research*, 15(6), pp. 772–780, 1988.
- A.J. Conger, "A revised definition for suppressor variables: A guide to their identification and interpretation", *Educational and Psychological Measurement*, 34(1), pp. 35–46, 1974.
- P. Conway, "Facts and frameworks: An approach to studying the users of archives", *The American Archivist*, 49(4), pp. 393–407, 1986.
- D. Cunliffe, E. Kritou and D. Tudhope, "Usability evaluation for museum web sites", *Museum Management and Curatorship*, 19(3), pp. 229–252, 2001.
- F.D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology", *MIS Quarterly*, 13(3), pp. 319–340, 1989.
- A.-M. Elliott, 2011. 10 Fascinating YouTube Facts That May Surprise You. Available online at: <http://mashable.com/2011/02/19/youtube-facts/> (accessed 5 December 2011).
- P. Evans and T. Wurster, *Blown to bits*, Boston, MA: Harvard Business School Press, 2000.
- R. Gehl, "YouTube as archive who will curate this digital Wunderkammer?", *International Journal of Cultural Studies*, 12(1), pp. 43–60, 2009.
- D.L. Goodhue and R.L. Thompson, "Task–technology fit and individual performance", *MIS Quarterly*, 19(2), pp. 213–236, 1995.
- J.F. Hair, C.W. Black, J.B. Babin, R.E. Anderson and L.R. Tatham, *Multivariate data analysis* (7th ed), Englewood Cliffs, NJ: Prentice Hall, 2009.
- G. Hanson and P. Haridakis, "YouTube users watching and sharing the news: A uses and gratifications approach", *Journal of Electronic Publishing*, 11(3), 2008. Available online at: <http://quod.lib.umich.edu/jjep/3336451.0011.305?rgn=main;view=fulltext>
- P. Haridakis and G. Hanson, "Social interaction and co-viewing with YouTube: blending mass communication reception and social connection", *Journal of Broadcasting & Electronic Media*, 53(2), pp. 317–335, 2009.
- W. Hong, J.Y.L. Thong, W. Wong and K. Tam, "Determinants of user acceptance of digital libraries: An empirical examination of individual differences and system characteristics", *Journal of Management Information Systems*, 18(3), pp. 97–124, 2002.
- C.-L. Hsu, H.-P. Lu and H.-H. Hsi, "Adoption of the mobile Internet: An empirical study of multimedia message service (MMS)", *Omega*, 35(6), pp. 715–726, 2007.
- G. Hutcheson and N. Sofroniou, *The multivariate social scientist*, London: Sage, 1999.
- D.A. Infante, A.S. Rancer and D.F. Womack, *Building communication theory* (3rd ed), Prospect Heights, IL: Waveland Press, 1997.
- E. Karahanna, D.W. Straub and N.L. Chervany, "Information technology adoption across time: A cross-sectional comparison of pre-adoption and post-adoption beliefs", *MIS Quarterly*, 23(2), pp. 183–213, 1999.
- E. Katz, J.G. Blumler and M. Gurevitch, "Utilization of mass communication by the individual", in *The Uses of Mass Communication*, J. Blumler and E. Katz (Eds), Beverly Hills, CA: Sage, pp. 19–34, 1974.
- E. Katz, M. Gurevitch and H. Haas, "On the use of the mass media for important things", *American Sociological Review*, 38(2), pp. 164–181, 1973.
- R. Kraut, M. Patterson, V. Lundmark, S. Kiesler, T. Mukophadhyay and W. Scherlis, "Internet paradox: A social technology that reduces social involvement and psychological well-being?", *The American Psychologist*, 53(9), pp. 1017–1031, 1998.
- H. Lee, H.J. Cho, W. Xu and A. Fairhurst, "The influence of consumer traits and demographics on intention to use retail self-service checkouts", *Marketing Intelligence & Planning*, 28(1), pp. 46–58, 2010.
- C.A. Lin, "Perceived gratifications of online media service use among potential users", *Telematics and Informatics*, 19(1), pp. 3–19, 2002.
- E. Messmer, "Internet holiday shopping stresses online toy stores", *Network World*, 16(49), p. 6, 1999.
- G.C. Moore and I. Benbasat, "Development of an instrument to measure the perceptions of adopting an information technology innovation", *Information Systems Research*, 2(3), pp. 192–222, 1991.
- M. Morris and C. Ogan, "The Internet as mass medium", *Journal of Communication*, 46(1), pp. 39–50, 1996.
- J. Neter, W. Wasserman and M.H. Kutner, *Applied linear statistical models*, Homewood, IL: Irwin, 1985.

- G. Ongena, E. Huizer and L. van de Wijngaert, "Threats and opportunities for new audiovisual cultural heritage archive services: The Dutch case", *Telematics and Informatics*, 29(2), pp. 156–165, 2012.
- J. Oomen, H. Verwayen, N. Timmermans and L. Heijmans, "Images for the future: Unlocking value of audiovisual heritage", in *Museums and the Web 2009: Proceedings*, J. Trant and D. Bearman (Eds), Indianapolis, IN: Archives & Museum Informatics, 2009. Available online at: <http://www.museumsandtheweb.com/mw2009/papers/oomen/oomen.html>
- J.W. Palmer, "Web site usability, design, and performance metrics", *Information Systems Research*, 13(2), pp. 151–167, 2002.
- Z. Papacharissi and A.M. Rubin, "Predictors of Internet use", *Journal of Broadcasting & Electronic Media*, 44(2), pp. 175–196, 2000.
- H. Park, R. Dailey and D. Lemus, "The use of exploratory factor analysis and principal components analysis in communication research", *Human Communication Research*, 28(4), pp. 562–577, 2002.
- J. Raacke and J. Bonds-Raacke, "MySpace and Facebook: Applying the uses and gratifications theory to exploring friend-networking sites", *Cyberpsychology, Behavior*, 11(2), pp. 169–174, 2008.
- E.M. Rogers, *Diffusion of innovations* (5th ed), New York: Free Press, 2003.
- G. Rose and D.W. Straub, "The effect of download time on consumer attitude toward the e-service retailer", *e-Service Journal*, 1(1), pp. 55–76, 2001.
- S. Roy, "Internet uses and gratifications: A survey in the Indian context", *Computers in Human Behavior*, 25(4), pp. 878–886, 2009.
- A.M. Rubin, "An examination of television viewing motives", *Communication Research*, 8(2), pp. 141–165, 1981.
- A.M. Rubin, "Television uses and gratifications: The interactions of viewing patterns and motivations", *Journal of Broadcasting*, 27(1), pp. 37–51, 1983.
- G.W. Selnow, "Playing videogames: The electronic friend", *Journal of Communication*, 34(2), pp. 148–156, 1984.
- I. Song, R. LaRose, M.S. Eastin and C. Lin, "Internet gratifications and Internet addiction: On the uses and abuses of new media", *CyberPsychology & Behavior*, 7(4), pp. 384–394, 2004.
- T.F. Stafford, M.R. Stafford and L. Schkade, "Determining uses and gratifications for the Internet", *Decision Sciences*, 35(2), pp. 259–288, 2004.
- The Nielsen Company., 2009. Online engagement deepens as social media and video sites reshape the Internet. Available online at: http://blog.nielsen.com/nielsenwire/wp-content/uploads/2009/04/nielsen-online-global_pr.pdf (accessed 6 December 2011).
- L.G. Tornatzky and R.J. Klein, "Innovation characteristics and innovation adoption-implementation: A meta-analysis of findings", *IEEE Transactions on Engineering Management*, 29(1), pp. 28–45, 1982.
- V.K. Vaishnavi and W. Kuechler, *Design Science Research Methods and Patterns: Innovating Information and Communication Technology*, Boca Raton, FL: Auerbach Publications, 2008.
- P. Van Schaik, "Involving users in the specification of functionality using scenarios and model-based evaluation", *Behaviour & Information Technology*, 18(6), pp. 455–466, 1999.
- V. Venkatesh and M.G. Morris, "Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior", *MIS Quarterly*, 24(1), pp. 115–139, 2000.
- K. Vermaas, *Fast Diffusion and Broadening Use: A Research on Residential Adoption and Usage of Broadband Internet in the Netherlands Between 2001 and 2005*, Utrecht, The Netherlands: SIKS, 2007.
- R. Wei, "Motivations for using the mobile phone for mass communications and entertainment", *Telematics and Informatics*, 25(1), pp. 36–46, 2008.
- T. Wilson, "Service keeps tabs on partner sites", *InternetWeek*, pp. 780, 1999.
- J.-H. Wu, S.-C. Wang and H.-H. Tsai, "Falling in love with online games: The uses and gratifications perspective", *Computers in Human Behavior*, 26(6), pp. 1862–1871, 2010.
- C. Yang, Y.C. Hsu and S. Tan, "Predicting the Determinants of Users' Intentions for Using YouTube to Share Video: Moderating Gender Effects", *Cyberpsychology, Behavior, and Social Networking*, 13(2), pp. 141–152, 2010.
- Z. Zhou, X.-L. Jin, D.R. Vogel and Y. Fang, "Individual motivations and demographic differences in social virtual world uses: An exploratory investigation in second life", *International Journal of Information Management*, 31(3), pp. 261–271, 2011.