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ABSTRACT

ADOPTION, USE AND IMPACTS OF AN INTERACTIVE DIGITAL TECHNOLOGY: A STUDY OF DIGITAL CABLE

By

Myung-Hyun Kang

One of the most important innovations in communication technology in the last decade is digitalization. The trend toward digitalization is no exception in the area of cable telecommunications. Since the late 1990s, cable companies have been offering an upgraded digital distribution system featuring interactivity. The present study addresses the adoption process of digital cable, use patterns of the multifaceted elements of the service, and its impacts on subscribers' viewing behaviors. For this purpose, data were obtained from a telephone survey of 365 digital cable subscribers in a medium-sized midwestern community.

The first purpose of this study was to explore characteristics of digital cable subscribers by examining adoptive innovativeness and its relations to demographics, perceptions, motivations, and premium channel subscribership. Results indicated that demographic factors were important in predicting how early the current analog subscribers upgrade to digital cable. In particular, income was found to be the strongest predictor in digital cable adoption.

The second purpose was to examine the use patterns of the interactive programming guide (IPG), the most unique application of digital cable, which will eventually be an essential tool for navigating the plethora of television channels in the future. Results showed that perceived guide utility and premium channel subscribership were positively related to IPG use while age and perceived guide complexity were negatively related to the use of IPG.

The final objective of this study was to explore impacts of digital cable on subscribers' amount of television viewing, satisfaction with the service, diversification of program types, channel repertoire, and consumption of competing media. The study found strong evidence that digital cable has influenced users' viewing behaviors. Results revealed that digital cable features, especially IPG, enabled users to watch television more, increase satisfaction with digital cable, enrich use of program types, and have larger channel repertoires. It was also found that "near-video-on-demand" provided by digital cable could be competitive with video rentals.

The major findings of the study suggest that: 1) the IPG could be considered as a "revolutionary device" or "discontinuous innovation" in the hierarchy of cable technologies; 2) the IPG has the potential to be a *TV portal* for expanded television programming choices and t (television) - commerce.

To My Parents

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INTRODUCTION

Research Background

One of the most important innovations in communication technology in the last decade is digitalization. On April 3, 1997, for example, the Federal Communication Commission (FCC) adopted digital transition schedule of the over-the-air television, which required the affiliates of the big four networks in the top 10 markets (30% of TV households) to build their digital facilities by May 1999 and for all remaining licensees to complete their digital transition by 2006 (FCC, 1997). As of April 2000, 126 stations in 48 markets were transmitting over-the-air digital signals, reaching 62% of U.S. television households (McConnell, 2000). The satellite TV industry, which is mainly composed of DirecTV and EchoStar Communications, also provides digital services. Not only do both providers offer two HDTV channels, but they also offer several interactive digital services (Rosenthal, 2000). DirecTV's digital service called "Ultimate TV" allows users to watch two shows at once. It also provides digital video recording of live programs with instant playback, rewinding and fast forward, with 30 hours of program storage. EchoStar offers a similar digital service which brings additional information to regular programming such as pop-up weather forecasts and local news (Albiniak, 2000).

The trend toward digitalization seems to be no exception in the area of cable telecommunications. Since the late 1990s, cable companies have been offering an

upgraded digital distribution system, namely, digital cable. Using digital compression technology that squeezes more channel capacities into broadband cable, digital cable provides relatively advanced attributes compared to the current analog service.

First, digital cable provides more specialized channels not available in existing analog services, such as *Discovery Kids*, *Discovery Science, ESPN Classic* and *ESPNews* (Higgins, 1997).

Second, the new cable service is able to provide the multiplexed[1] premium movie channels that allows premium channel subscribers to access a set of convenient and different schedules (Colman, 1997). For instance, if existing HBO subscribers upgrade to the new digital cable service, they can receive additional multiplex HBO channels (i.e., HBO1, HBO2, HBO3, etc.). At any given time there is a choice of several titles, which is anticipated to reduce pay channel churn (Haring, 1997).

Third, digital cable also offers more Pay-Per-View (PPV) titles and start times than ever before. With the more frequent start times, viewers are able to watch movies at their convenience. Because movie titles in digital cable are almost always available at any time viewers want to order, this service can be referred to as "near video-on-demand" (Baldwin, McVoy, & Steinfield, 1996; Haring, 1997).

Finally, the most salient characteristic of digital cable may be interactivity. Digital cable incorporates more advanced interactive capability to navigate through channels with a sophisticated program guide system - it consists of an interactive programming guide and universal remote control. The interactive guide allows audiences to manage their viewing schedules more effectively with a variety of guide functions. For instance,

[1] Multiplexes refer to additional channels tied to a premium mother channel. Only subscribers to the mother channel can access these multiplexes.

if a viewer uses a "Reminder Function" not to miss a program, the interactive guide reminds of when the program begins, from 1 to 15 minutes before the program starts (Colman, 1998). This is an obvious example of the interactive capability that digital cable has.

Because of these innovative features, the penetration rate of digital cable in the U.S. has been increasing since the first launch in late 1996 (McAdams, 1999; Higgins, 2000a). As the end of 1999, there were roughly 4.9 million digital cable subscribers, which is about 8% of the U.S. cable households. Media analysts estimate that the number will reach 42 millions by the end of 2006 (Paul Kagan Associate, Inc., 1999).

AT&T Broadband & Internet Services (AT&T BIS, formerly TCI) is the pioneer of digital cable. The company started the country's first full-fledged digital cable offering in October 1996. Adding 80,000 to 100,000 new digital cable subscribers per month, the AT&T BIS had sold more than 1.8 million digital cable subscribers nationwide by 1999 (Higgins, 2000b). The company estimated that roughly 70% of its existing analog subscribers will buy digital cable within the next three to five years (Menezes, 1999).

Other cable operators such as AOL Time Warner, Cox and Comcast are in various stages of digital deployment. AOL Time Warner Cable started the new service in May of 1999 in Austin, Texas, and signed up more than 0.6 million subscribers by the end of the year (McAdams, 1999). The digital package offered by the company gives customers access to 37 PPV channels, multiplexed premium channels, 40 channels of digital audio and the interactive programming guide (Hogan, 1999).

Always a leader in selling new products, Cox has been aggressive in its digital rollout. Since the first launch of 1997, the MSO has signed up over 0.4 million digital subscribers paying between $8 and $13, offering several different themed tiers including sports and information (McAdams, 1999). A relatively early player in digital, on the other hand, Comcast is taking a different marketing approach. While others used digital to load up on addition basic channels, the MSO has taken a more-movies approach such as extra pay multiplex and PPV channels to digital. Comcast had over 0.5 million subscribers by 1999 (McAdams, 1999).

Traditionally a technology laggard, Charter had just 155,000 digital subscribers out of 4.6 million digital-ready homes. Most operators of Charter rely on movie channel multiplex rather than the basic approach to programming (McAdams, 1999).

Insight Communications Co. began rolling out its digital product which is called "Insight Digital Gateway," in April of 1999. The company reported results were beyond its original expectations. Digital cable subscribers of Insight have been increased to over 0.1 million. One of the interesting features of Insight digital service is an opening menu screen. When digital subscribers turn on their TV sets, they're greeted with a "welcome screen" which includes such options as "Program Guide," "LocalSource," "On Demand TV," and "Digital Music" (Forkan, 1999).

Table 1 summarizes the current situation of digital cable deployment as of the end of 1999.

Table 1

An Overview of Digital Cable Deployment (As of the end of 1999)

Cable Operators	Basic (analog) Subscribers	Digital-Ready Homes	Digital Subscribers	Digital Penetration[2]
Insight	1,435,000	750,000	109,000	14.5 %
Comcast	5,719,800	4,636,500	515,000	11.1 %
Service Electric	294,000	100,000	10,500	10.5 %
AT&T[1]	16,400,000	19,482,000	1,856,000	10.0 %
Adelphia	4,990,092	2,300,000	233,949	10.0 %
Cox	6,100,000	5,200,000	450,000	8.7 %
GS Comm.	119,219	102,475	8,559	8.3 %
Northland	260,615	6,684	495	7.4 %
Susquehanna	188,543	101,400	7,185	7.1 %
AOL Time Warner	12,700,000	12,513,000	613,000	4.9 %
Midcontinent	215,371	234,594	9,085	3.9 %
Charter	6,138,000	4,675,000	155,000	3.3 %
Mediacom	747,000	168,000	5,300	3.2 %
Classic Cable	413,000	174,000	5,000	2.9 %

Note:
- 1) Numbers adjusted for the recent acquisition of MediaOne
- 2) Percentage of digital subscribers of digital-ready homes.
- *Source: Broadcasting & Cable, May 1, 2000, pp. 25 – 50.*

Most cable operator are optimistic about the future of the new cable service, believing that digital cable will become the most important revenue source in the near future (McAdams, 1999). In the current situation where growth in basic cable subscribers has been less than 2% over the past few years and competitive pressures such as direct-broadcast satellite (DBS) continue to increase, digital cable is recognized as an effective means for cable companies to generate revenues and to keep premium customers from migrating to DBS. As a financial benefit, digital cable has increased cash flow for several operators (Higgins, 2000a). Some analysts in the cable industry estimate that digital subscribers might be profitable with about 20% penetration in each system (Colman, 1998).

Aside from the economic impacts on cable operators, digital cable is also important in that it has potential to alter audiences' existing viewing patterns. According to a recent research conducted by Cox Communications, new digital subscribers watched about 10% more television and rented fewer videos than before (Katz & Peers, 1998). Another recent study by CTAM (Cable Television Administrative & Marketing Society) also indicated that subscribers' TV viewing behavior was significantly affected by digital cable. The study, which polled about 1,500 digital cable subscribers from systems across the country, showed that 69% of the respondents watched television more, 47% watched more premium channels, and 45% rented fewer videotapes (Higgins, 1999).

Digital Cable as an Interactive Technology

The new and advanced features of digital cable, especially interactivity, enable digital cable to be perceived as a technical *innovation* in cable television entertainment. An innovation is conceptually defined as "an idea, practice, or object perceived to be *new* by an individual or other unit of adoption, such as a household or an organization" (Rogers & Shoemaker, 1971, p. 19, emphasis added). However, not all innovations have the same degree of "newness." Robertson (1967, 1971) posited three categories of innovation: 1) continuous; 2) dynamically continuous; and 3) discontinuous innovations.

A continuous innovation involves the introduction of a modified product, and hence requires *little disruption* in consumer's behavioral patterns. Compared to continuous innovation, a dynamically continuous innovation requires *some disruption* in behavioral patterns, but does not alter them substantially. A discontinuous innovation is a

new product that requires a dedicated user skill. It may require users to alter consumption patterns *dramatically* or to establish *new* behavioral patterns.

Applying Robertson's framework on the television medium, Krugman (1985) developed a theoretical model conceptualizing a hierarchy of cable television. He positioned basic cable service on continuous, pay cable on dynamically continuous, and interactive services (e.g., VCRs or Home Computers) on discontinuous consumption media, on the basis of potential influences on viewing behaviors of subscribers.

According to Krugman, since basic cable has specialized programs, monthly fee system, and better reception of signals, it may require different viewing rules compared to standard over-the-air broadcast, and hence it should fall into the continuous category. Furthermore, he designated pay cable as dynamically continuous technology because it offers more pay movies and attractions, which need to consider viewing changes with regard to programming and fee fares. Although Krugman's classification is somewhat arbitrary, as he argued, "there is enough evidence to acknowledge that variation [of viewing patterns] does indeed exist" (p. 24).

On the other hand, in the model, Krugman considered the (two-way) interactivity to be the most fundamental criterion in distinguishing discontinuous media from the dynamically continuous. He exemplified VCRs or computer games as discontinuous innovative media because they possess some interactive features never before found in the cable media.

Of course, digital cable did not exist when the model was made in 1985. If the existence of digital cable can be considered in structuring the model, however, it could be

argued that it falls into the discontinuous innovation category. That is not only because digital cable has relatively high interactivity with viewers, but also because other inherent features of digital cable are anticipated to dramatically alter audiences' viewing patterns (i.e., increasing amount of television viewing, increasing use of PPV, and programming).

As a result, the interactive attributes of digital cable as well as anticipated changes of user' viewing patterns suggest a need to reconceptualize Krugman's model. In academic circles, in fact, scholars have regarded the interactive nature of new media as their most distinctive quality (e.g., Rogers, 1986; Salvaggio & Bryant, 1989). In assessing the dimensions of audience uses of new media, Heeter (1989) argued that interactivity would present a key basis for differentiation with regard to conventional media. In this regard, Salvaggio and Bryant (1989) suggest that the interactive nature of the new media requires the studies of new media to approach with different perspectives. Given that digital cable is thought to be capable of allowing people to change their viewing environment through the interactivity, it indeed differs from an analog service. Table 2 represents a new hierarchical category of cable medium adapted from Krugman's model, considering the presence of digital cable.

Table 2. Cable Medium's Hierarchical Category

Type of Innovation	Cable Medium	Features
Continuous	Basic Cable	Better Reception/ Program Variety
Dynamically continuous	Pay Cable	Special Movies
Discontinuous	Digital Cable	Interactivity/ Multiplexed Movie Channels/ Digital PPV

Purposes of Study

Although digital cable is still in its infancy, it has great potential to be another revenue stream for cable operators. Moreover, in comparison with the existing analog cable service, digital cable with interactivity has overly innovative attributes to alter subscribers' viewing behaviors. The significant role of digital cable in the cable industry as well as its new position in the cable hierarchy warrant additional research.

Nevertheless, this area of research has received little attention to date except for some early studies. In a pioneering study about interactive cable service, for example, Lin and Jeffres (1998) explored audience intentions to adopt multimedia cable technology service that could provide several hundred voice, data, and video channels via an interactive coaxial cable system. They found that interest in adoption of such a multimedia cable service was related to marital status, higher income, and higher education level. However, the study profiled potential adopters of the interactive cable service, not actual adopters, by identifying their intention to adopt the future service. A recent study by Kang (1999) actually addressed an adoption issue of a new cable technology service: digital cable. By comparing digital cable subscribers and non-subscribers (analog-only), the study found that digital cable subscribers are those who watch television heavily, subscribe to premium channels, and perceive themselves as well as their cable operator as technically progressive. The study also indicated that one's perceptual variables are more important than demographic variables in predicting digital cable subscribership.

Despite these early studies, there has been very little research concerning use issues of digital cable. Now that the new cable technology is here, it seems particularly timely to assess consumers' dispositions toward the technology. Although there are no general rules, numerous studies suggest that the best time to account for a new technology's influence may be at an early stage which can be defined as about 10 percent market penetration (Robertson & Kennedy, 1968). This is because the new technology's novelty might have disappeared as it reached the flat part of its diffusion curve. In their panel studies, for instance, Sparkes and Kang (1986) found a leveling effect that shows demographic differences among cable subscribers diminish over time.

At present, less than 10% of U.S. cable subscribers have digital cable. Further, as penetration gets higher and the cost of digital boxes gets lower, cable companies may switch out of the current analog distribution system to fully digital cable and adoption is then forced. In cases in which the digital cable's penetration becomes nearly universal, and in some cases involuntary, theoretical insight regarding adoption patterns of the new technology and its influences may be more limited.

At the current stage of digital cable, where there is a need to expedite the adoption rate, the essential issues may involve how people use digital cable, how well the subscribers are satisfied with the new service, and how digital subscription is related to the use of other media. Therefore, the ultimate goal of this study is to examine digital cable's adoption process and uses in the household setting. More specifically, the study investigates the adoption of digital cable in the home, patterns of use of the multifaceted

elements of the service, and its impacts on users' viewing behaviors within the following sets of research areas.

First, the current study will identify characteristics of existing digital cable subscribers by exploring the differences between the earlier subscribers and later subscribers. To explore how to expedite the current adoption rate, it may be necessary to identify and understand who subscribes to digital cable earlier or later, as well as the reasons for the difference of adoption behavior. Also, the study will examine some additional important factors that were suggested by the previous Kang's (1999) study to better understand and predict the digital adoption.

Second, the present study will explore how digital cable is used in the home. In particular, the study will focus on how the adopters use several features of the interactive programming guide because interactivity is the most unique feature of digital cable. What aspects of the interactive guide are used? And, by whom? Are there any problems in usage of the interactive functions? The answers for these questions may have implications for building consumer education programs in cable systems.

Finally, the study will examine the impacts of digital cable uses. What are the impacts of digital cable on subscribers' viewing behaviors? How does the new cable technology affect the way in which people use television and other competing media?

In sum, this study addresses a series of adoption processes of digital cable in the household setting by examining: 1) the independent factors shaping digital cable's adoption and use; 2) the uses of the service; and 3) their impacts on users' viewing behaviors which are conceptualized as dependent variables.

The study is organized as follows. In the next chapter, the relevant literature on factors influencing adoption and use of new communication technology is reviewed. From this, in Chapter Three, a conceptual model and hypotheses are developed. Next, in Chapter Four, the methodology for testing the hypotheses is described. Chapter Five reports results of the tests. Finally, Chapter Six interprets and discusses the results of the study and offers suggestions for future research.

Chapter II

LITERATURE REVIEW

Factors Influencing Adoption and Use of New Communication Technology

How individuals adopt and use new communication technologies can be influenced by a number of factors which may come into play in the context of digital cable adoption. Literature reviews provide some independent factors that are associated with adoption and usage of a new communication technology. These factors include: 1) demographics, 2) perceptions, 3) prior experience, 4) motivations, and 5) length of subscribership.

Demographics

The current study is based on the assumption that digital cable is an innovative technology in the area of cable telecommunications. Under this assumption, the study uses diffusion theory as a theoretical framework.

Diffusion theory provides a systematic explanation on how new innovative technologies are communicated, evaluated, adopted and reevaluated by consumers (Williams, Strover & Grant, 1994). As a demand side approach, the theory focuses on communication channels, stages of decision making, criteria for decisions, characteristics of early adopters, likely impacts of the adoption, and the complexity of what is being adopted. It may thus offer clues for the explanation and prediction of a new technology adoption behavior.

According to diffusion theory (Rogers, 1983, 1995), people's adoption behavior is a function of their socioeconomic status, media use patterns, and uses of other technologies.

In their meta-research on the adoption of personal computers and cable technologies, Dutton, Rogers and Jun (1987) asserted that social status is a factor central to explanation of the adoption and use of those communication technologies. In addition, the adopters' profiles have appeared to be consistent with those indicated by research on the adoption of a wide range of new technologies from VCR (Reagan, 1987; Scherer, 1989), personal computer (Danko & MacLachlan, 1983; Dickerson & Gentry, 1983), videotex (Ettema, 1984, 1989), DBS (Bruce, 1996), HDTV (Dupagne, 1999), and to the Internet (Atkin, Jeffres, & Neuendorf, 1998), in that the adopters tend to be younger, wealthier, and better educated. In the adoption process of personal computers, for example, Lin (1998a) found that the adopters are younger, more educated, and more upscale than likely adopters or non-adopters.

Similarly, other computer technology adopters such as videotext users are also prone to be upscale (Ettema, 1984), younger and better educated (Garramone, Harris, & Anderson, 1986), which is confirmed by other cable related research (e.g., Krugman, 1985; Dutton et al., 1987).

Perceptions of Innovation Attributes

There has been a recent movement in diffusion research toward an innovation-centered perspective: an attempt to analyze an adopter's perceptions about innovation attributes rather than the characteristics of the adopter. Studies by Bolton (1983), Carlin

(1998), Dickerson and Gentry (1983), Ostlund (1974), and Weir (1998) successfully demonstrate the importance of consumers' perceptions of innovation attributes as predictors of adoption probability and adoptive innovativeness.

Reviewing the diffusion literature, Rogers and Shoemaker (1971) suggested that there are five dominant innovation attributes by which an innovation is perceived by an adopter: relative advantage (perceived utility), complexity (ease of use), compatibility, trialability, and observability, each of which is explained as follows.

Relative advantage refers to the degree to which an innovation is perceived as superior to the ideas it supercedes. Rogers and Shoemaker (1971) noted that people's perceptions of how the adoption of an innovation would benefit them are important considerations in adoption decisions. According to Rogers (1995), the greater the perceived utilities provided by an innovation or technology, the greater the probability of adoption. LaRose and Atkin (1991) confirmed this notion by providing some evidence that pay-per-view use intention was most strongly associated with its perceived benefits such as no commercials and convenient access. They further argued that "demographic and media variables in general are not very powerful predictors of cable subscription. Rather, the perceived benefits of service...seem to be much more important" (Atkin & LaRose, 1994, p. 105).

Complexity refers to the degree to which an innovation is perceived as difficult to understand and use. Traditionally, innovations have been perceived as confusing and hard to understand how to work. For this reason, the perceived complexity has been

considered as a deterrent to the diffusion of an innovation (Vallee, 1982). For example, in comparing the adoption process of two electronic bulletin boards, James, Wotring, and Forrest (1995) indicated that since Prodigy might be perceived easier to use with flashy graphics, it would be used more often by consumers than its competitor, CompuServe. In their meta-analysis of innovation attributes, Tornatzky and Klein (1982, p. 15) concluded that "all but one of the seven studies found a negative relationship between the complexity of an innovation and its adoption" (p. 36).

Compatibility is defined as the degree to which an innovation is perceived to be consistent with existing values, habits, and past experiences of the potential adopter. Past work on information services adoption addressed the compatibility between innovations and the existing values, past experiences and needs of potential users. In regard to compatibility with one's existing values about technology usage, studies reveal that adopters are usually more comfortable with new related technologies (Rogers, 1986).

Trialability is defined as the degree to which an innovation is perceived to be available for trial on a limited basis. The possibilities of trial for an innovation without full commitment are also influential to its adoption (Bolton, 1983; Sparkes & Kang, 1986).

Observability refers to the degree to which results of an innovation are visible and easily communicated to others. The existence of observable characteristics of an innovation may be important in the adoption process as well (Sparkes & Kang, 1986).

In an analysis of these innovation attributes examined in diffus ion, (1983) indicated that perceived utility, compatibility, trialability, and o innovation are positively related, but the complexity is negatively relat innovativeness.

Motivations for New Technology Use

Aside from diffusion theorists, other researchers (Atkin, Jeffres & Neuendorf, 1998; Jeffres & Atkin, 1996; Leung & Wei, 1999; Lin, 1994; Perse & Dunn, 1998; Rubin & Bantz, 1987a) have applied a uses and gratifications approach to the study of new technology use, indicating that peoples' selection of and uses for communication technologies depend on their personal needs (motivations).

The uses and gratifications approach to the mass media argues that individuals have *needs* to use a certain technology which will prompt adoption and actual use of it (Blumer, 1979; Katz, Blumer & Gurevitch, 1974; Palmgreen, Rosengreen, & Wenner, 1985). According to Katz et al. (1974), the ultimate objective of the uses and gratifications is to explain the motivations for media usage and their links to specific media behaviors. Hence, the uses and gratifications approach is mainly concerned with, "1) the social and psychological origins of 2) needs, which generate 3) expectations of 4) the mass media or other sources, which lead to 5) differential patterns of media exposure (or engagement in other activities), resulting in 6) need gratifications and 7) other consequences, perhaps mostly unintended ones" (Katz et al., 1974, p. 20).

To better explain the relationship between audience motivation and consumption, the uses and gratifications perspective rests on the several basic assumptions (Rosengren, 1974; Rubin & Windahl, 1986; Rubin, 1994; Rubin & Bantz, 1989). First, people are goal-directed, purposive, and motivated in their communication behaviors. Second, people take the initiative in selecting and using communication media to gratify their needs. Instead of being used by the media, people purposefully select certain media and media content for consumption in order to satisfy their needs (Katz, Gurevitch & Hass, 1973). Third, people are influenced by a host of social and psychological factors when seeking to communicate and selecting among communication alternatives. Fourth, media compete with other communication alternatives for selection, attention, and use. Finally, people are able to articulate their reasons for using media.

The meaning underlying the assumptions indicates that people are aware of their needs and can accurately report them (Katz, Blumer, & Gurevitch, 1974). These reported needs are, in turn, assumed to influence use of the media (Kippax & Murray, 1980). As a result, the uses and gratifications perspective views audience members as *active* rather than passive receivers of the media messages. In an extension of such an active audience concept, Blumler's (1979) view of audience activity is more concrete. Acknowledging that the concept of active audience is not uniform and simple, he identified a range of meanings for the term as utility (i.e., media have uses for people), intentionality (i.e., media consumption is directed by prior motivation), and selectivity (i.e., media behavior reflects prior interests and preferences).

The active audience concept of the uses and gratifications approach may be particularly applicable for the study of new communication technologies, because new communications technologies provide audiences: 1) more (and complex) choices; 2) new opportunities for altering communication messages; 3) the ability to reallocate time; and 4) the capability to interact with media (Williams et al., 1994), and each of which demand audience active participation (Perse, 1990; Perse & Dunn, 1998; Rubin, 1994).

Empirical research on new technologies rooted in the uses and gratifications has supported such theoretical supposition that audience motivations are linked with media behaviors (Albarran & Dimmick, 1993; Lin, 1998b). For instance, Rubin and Bantz (1987) reported that motives of VCR users such as time shifting were associated with the extent and the ways in which the VCRs were used. VCR users also were active and intentional in their behavior, selecting what content to tape or rent and when to watch it (Rubin & Bantz, 1987). Moreover, a study on an electronic political bulletin board (Garramone, Harris & Anderson, 1986) indicated that the audience needs for surveillance, personal identity and diversity all equally contributed to the adoption and use of the new technology.

Working under the uses and gratifications umbrella, on the other hand, some researchers (Rubin, 1983, 1984; Rubin & Perse, 1987b) have addressed the assumption of audience activity by identifying two main types of orientations towards media use: 1) "instrumental use"; and 2) "ritualistic use." Rubin (1984) has positioned ritualistic use as a more or less habitual use of a medium in search of companionship or a way to pass time, whereas instrumental use is purposeful use to gratify information needs.

Specifically, the former focuses more on the medium *per se*, rather than on particular content, while the latter reflects selective and goal-oriented exposure to specific content (Rubin, 1984).

Accordingly, these two orientations require different levels of activity by media consumers (Rubin & Perse, 1987b). More active and selective audience involvement is required for the instrumental media use. Ritualistic use, though, requires passive and nonselective participation. In the realm of television viewing, Perse (1990) found that the instrumental viewing motive was linked to greater program selection, intentionality, and elaboration (i.e., higher involvement), whereas the ritualistic motive was correlated with engaging in distractions while viewing (i.e., lower involvement).

With regard to use of new media, the dichotomy of the media use categories provides unique implications in that the new media usually require the audience to be more active. Under the current media environment of greater program options that multi-channel cable television and remote-control devices, audiences may be actively selective in their viewing. Such active viewing was supported by the frequency with which many cable users change channels during viewing sessions (Heeter & Baldwin, 1988; Heeter & Greenberg, 1985). To use Rubin's terms, digital cable examined here may facilitate even more instrumental viewing because it also demands more active participation in its uses.

Prior Experience

Diffusion studies point to the importance of previous experience with technology in the adoption process. In a study of the diffusion of the home computer, Dickerson and Gentry (1983) found that early adopters were more likely to have used other technologies.

This is especially true for media that fall within the same technology cluster (Atkin & LaRose; 1994; Ettema, 1984, 1989; Jeffres & Atkin, 1996; LaRose & Atkin, 1992). For instance, Ettema (1984, 1989) found that new technologies are most likely to be used if they are functionally similar to existing ones, as experience with technology encourages adoption of cable (Dutton et al., 1987; Reagan, 1987) and computer media (Lin, 1998a). Hirschman (1980) further argued that such prior experience may lead to a greater propensity to detect and adopt superior new products within the class.

Confirming this notion, many other studies have provided additional evidence that prior experience within the same technology class is an important predictor of adoption of telecommunication technologies (Atkin, 1993; Reagan, Pinkleton, Chen, & Aaronson, 1995).

Length of Subscribership

The length of subscribership (or ownership), a length of time that an individual has used a medium on a regular basis, may encourage use of the medium (Dutton et al, 1987; Rogers, 1983). The logic underlying this is how much a new technology is used should depend on the amount of time that is necessary for a user to comprehend it as a familiar concept (Dickerson & Gentry, 1983). The familiarity with a new technology that

can be obtained through the length of its ownership may greatly reduce the mental efforts required to use it.

Several studies have suggested that the uses of new media increase over time. For example, longitudinal studies of videotext have found a gradual increase in uses of several relevant applications over time (Rice & Paisley, 1982). The influence of the length of technology presence on its use is explained by other studies on VCRs. Although Greenberg and Lin (1989) found no significant difference in VCR use between two groups of VCR owners – new VCR owners (ownership 2 years or less) and old owners (ownership more than 2 years), Lindstrom (1989) reported that earlier VCR adopters used it more often than did later adopters. Consistent with this finding, Klopfenstein and Seanson (1987) also observed that VCR use was greater in the households in which the VCR had been adopted earlier.

The evidence of these studies sufficiently supports the proposition that use of a technology may increase over time as the adopter gains familiarity with the technology.

Usage of Digital Cable

The usage of a new medium may evolve in a natural progression from the limited use of few applications to a heavier use of many applications of the medium. Hence, two main conceptualizations for media usage can be considered as: 1) the amount of time devoted to use (light use vs. heavy use); and 2) the type of use.

By the amount of usage time, for example, Rafaeli (1986) reported the patterns of an electronic bulletin board use by the amount of time devoted to using it, citing that nearly three-fourths mentioned using the board more than once a week.

Additionally, new media usage is illustrated by examining which attributes of the new media are utilized. In general, most studies identify a variety of applications of a new medium, and then examine how much time is devoted to use of each of the applications, and for what uses. In their meta-research on personal computers, Dutton et al. (1987) studied the use patterns of personal computer applications. They found some evidence that the use of work-related applications like word-processing appears to be growing, but entertainment use such as computer games appears to be declining proportionately.

Applied to the type of application, the usage of digital cable can be identified by the four dimensions: 1) specialized channels, 2) multiplexed channels, 3) digital PPV channels, and 4) interactive programming guide (IPG). As distinctive applications compared to the existing analog service, these dimensions of digital cable usage are briefly explained as follows.

Specialized Channels

The first dimension of digital cable usage is "specialized channels" which are above and beyond what is available on the current analog lineups. The additional basic channels are said to be the most interested application in digital cable by users. In a pilot

study, Kang (1999) found that the most popular reason for subscribing to digital cable was to watch the specialized basic channels.

Multiplexed Channels

The second dimension of digital cable use is "multiplexed premium channels." In this context, multiplexes mean additional channels tied to a premium mother channel (e. g., HBO – HBO1, HBO 2, and HBO 3; Showtime - Showtime1, Showtime 2, and Showtime 3, etc.). With the multiplexed premium channels, the subscribers may be able to access movies at their convenient time.

Digital Pay-Per-View (PPV) Channels

The third dimension of digital cable usage is "digital PPV channels" which permit a near-video-on-demand, an approximation of full video-on-demand. In digital cable where several channels are devoted to PPV, viewers do not have to wait long time for their chosen movie to begin.

If 12 channels are used for PPV, three movie titles of two-hour duration or less could be available, always on the half-hour (Baldwin, McVoy, & Steinfield, 1996). In digital cable, for example, one movie could be provided on channel 801 at 10:00 p.m., on channel 802 at 10:30 p.m., on channel 803 at 11:00 p.m., and on channel 804 at 11:30 p.m. By 12:00, that movie finishes on channel 801 and is played again.

Since the movie is available on a 24-hour basis across the four channels at 30-minute intervals, this application of digital cable is referred to as "near-video-on-demand" (Baldwin et al., 1996). As digital bandwidth compression makes more channels

available, the near-video-on-demand could be closer to full video-on-demand, where a program is always available at any time the viewers want to order.

Interactive Programming Guide (IPG)

Interactive programming guide, the fourth dimension of digital cable usage, could be considered the most distinctive feature in digital cable. Interactivity is a desired quality of communication systems under the assumption that increased interactivity leads to more effective communication and more satisfaction to participants in communication process (Rogers, 1986). In comparison with the analog cable service, the programming guide of digital cable is more capable of supporting interactive communications.

Interactivity refers to "the degree to which the new communication systems are capable of talking back to the user, almost like an individual participating in a conversation" (Dutton et al., 1987, p. 135). In digital cable, the programming guide provides a variety of interactive capabilities such as "Search Function" which allows viewers to search for programs by entering the first four letters of the programs, or "Reminder" which reminds the viewers automatically before the show begins. As a result, the interactive nature of the programming guide allows people to choose the program intentionally and selectively, providing them a great degree of control in programming.

Among all the dimensions of digital cable, the interactive programming guide (IPG) is regarded to be relatively newer because it has unique interactive functions unavailable on existing analog service. However, other functions (specialized channels,

multiplexed channels, and PPV channels) are considered to be less new because they are an extension of the existing service in terms of added channel options.

Impacts of Digital Cable Use

The use of a new medium have appeared to affect an adopter's preexisting media behaviors (e.g., Becker, Dunwoody, & Rafaeli, 1983; Weimann, 1996). Perhaps, people who adopt and use a new medium may create more favorable attitudes toward it over time. With the increased use of the new medium, they may also increase or decrease the uses of other media. For example, the uses of VCRs and cable television were found to affect one's uses of other media including television (Cohen & Cohen, 1987; Grotta & Newsom, 1982; Levy, 1980, 1981, 1983, 1987; Sparkes, 1983; Walker, 1988).

In a similar vein, the introduction of digital cable may influence adopters' media use patterns in several aspects from the amount of television viewing, the types of programs watched, and to the consumption of other media. A body of literature review suggest that the potential impacts of digital cable uses on users' viewing behaviors include: 1) amount of television viewing; 2) satisfaction; 3) diversification of program types; 4) channel repertoire; and 5) consumption of competing media.

Amount of TV Viewing

The effect of introduction of new video media on the amount of television viewing time may theoretically involve at least three possibilities.

First, it is likely that the new media use will have little or no effect on the time consumption of television. This scenario was supported by Agostino's (1980) and Sparkes' (1983) study which did not find any evidence of cable's impact on time spent with television.

Second, it is also possible to assume that new media adoption will lead to time reduction of television viewing. In an early study of respondents interviewed before and after they subscribed to cable, Jeffres (1978) reported a substantial decrease in use of television after the introduction.

Finally, one can also assume that the use of new media stimulates the consumption of television viewing. Harvey and Rothe (1986) discovered that, after acquiring a VCR, audiences increased their time spent with television. Consistent with this finding, Lin (1990) found that VCRs encouraged an even larger percentage of audiences to increase time with television at home. Such findings have been confirmed by a series of cable studies (Becker et al, 1983; Rothe, Harvey, & Michael, 1983; Webster, 1983; Weimann, 1996) in that cable subscription leads lead to more television viewing.

Although all these possibilities could be considered as likely, taken as a whole, literature on cable suggests the amount of television viewing time is increased as a result of introducing cable television in the home. In the meta-analysis on cable use, Dutton et al. (1987, p. 186) supported this notion, remarking that "the use of cable has been associated with increased viewing."

Satisfaction

User satisfaction refers to the extent which users believe a technology available to them meets their expectations about the technology. Oliver (1980) defined user satisfaction as the sum of a user's positive and negative reactions to product use. Thus, user satisfaction is regarded as a perceptual, subjective outcome variable of technology use.

Previous studies of media use showed that heavier users of the media were more satisfied. For example, Hiltz (1980) studied how satisfied users of an electronic information system were after they had used the technology. Results of the study showed that the amount of use was positively related to higher level of satisfaction. Perse and Ferguson (1993) examined the impact of use of newer television technologies (e.g., cable television, VCR, and remote control devices) on satisfaction with television viewing. In the study, they found that television satisfaction was positively related to the television exposure (Perse & Ferguson, 1993).

Diversification

In the new media environment, people are no longer limited by the mainstream offerings of the traditional broadcasters and can watch anything they want (Bulck, 1999). Indeed, newer technologies such as cable television and the VCR have the potential to "replace the homogeneity of the old media" (Ferguson, 1992, p. 83) by increasing a certain independence from the traditional television networks. As a result, they allow people to be more selective in choosing television programs.

Perse, Ferguson, and McLeod (1994) suggest that the use of new technology like VCRs will automatically lead to more selectivity, and thus will lead to a diversification of the viewer's television program types, relying on the technological determinism that what is possible by new technology might automatically be used in such a way by its adopters.

This view was empirically supported by Bulck's (1999) study. In the study exploring whether VCR use lead to diversification of the viewing genre, the researcher observed that respondents who used the VCR more often also appeared to watch more diverse program types. That is, use of the VCR leaded to a diversification of the television-viewing genre.

However, there are some contradictory findings which indicate that increased options do not necessarily lead to the diversification of program types. In his study of cable viewing, for example, Youn (1994) reported that multi-channel cable viewers watched more of the same types, reinforcing their program type preferences.

Channel Repertoire

In a multi-channel environment, viewers do not necessarily watch every channel available to them. Reporting that cable subscribers regularly watch far fewer channels than the total number available, Heeter and Greenberg (1988) introduced the concept of "channel repertoire" which is conceptually defined as "the set of channels watched regularly by an individual or household" (p. 16). This repertoire usually consists of ten or fewer channels (Heeter, 1985; Heeter & Greenberg, 1988; Ferguson & Perse, 1993; Ferguson, 1992; Lotchte & Warren, 1989).

Channel repertoire can be used as an outcome variable of media use. Heeter (1985, 1988) suggested that different levels of audience activity result in different impacts on channel repertoire, depending on the extent to which the audience engages in active selection behaviors. She argued that viewers' active selection behaviors in program decision-making such as elaborated search would increase the channel repertoire. According to Heeter (1985, 1988), because the elaborated search pattern scans all or most channels, more involvement is required in the channel selection process than the restricted pattern which searches a limited number of channels. The elaborated search may make viewers aware of more different channels, and, in turn, leads to greater channel repertoire.

There is some evidence that channel changing, which may involve a guide use or remote control devices (RCD) usage, increases channel repertoire (Greenberg, Heeter, D'Alessio, & Sipes, 1988; Brown, 1989; Ferguson, 1992). Heeter (1988) found that those who change more channels are likely to watch more different channels. A similar result was observed by Ferguson and Perse's (1993) study in which channel repertoire was found to be positively related to level of channel changing.

In a similar vein, use of a programming guide or remote control devices (RCDs) has appeared to have a positive impact on viewers' channel repertoire. Brown (1989) found that viewers with RCDs have somewhat higher channel repertoire than those without RCDs. Consistent with this finding, Ferguson (1992) also showed that respondents using RCDs have higher channel repertoires than those not using RCDs. The implication of these findings is that active viewing behavior such as programming guide use would trigger an increase in the viewer's channel repertoire.

Consumption of Competing Media

In general, the introduction of a new medium tends to cause a restructuring of the way in which people consume established media (e. g., Henke & Donohue, 1989). If the use of one particular medium is increased, then uses of other competing media providing similar or comparable functions will, in turn, be displaced. The arrival of new cable television channels, for example, has partially displaced viewership of traditional television viewing (Becker et al., 1983; Grotta & Newsom, 1982).

Henke and Dononue (1989) found that a greater level of VCR use was negatively associated with movie-going, which was confirmed by a later research (Lin, 1993). Moreover, Harvey and Rothe (1986) reported a decrease in movie-going among VCR owners after adoption of the medium. LaRose and Atkin (1991) examined the relationship among the movie distribution modalities (e. g., VCRs, pay cable, pay-per-view). In the study, they observed evidence of the substitution effect that if a person favors one distribution modality, he/she might reduce the use of other competing media.

Other industry data have confirmed the substitution phenomenon of one distribution outlet for another. Parsons and Frieden (1998) reported that beginning in the early 1990s, for example, the introduction of VCRs and home video rentals reduced gross revenues in premium cable services.

In this regard, one can expect that the uses of new movie distribution systems of digital cable (e.g., multiplexed premium channels) may compete with other modalities like "video rentals" or "movie-going," reducing the consumption of those competing media.

Chapter III

RESEARCH QUESTIONS AND HYPOTHESES

Research Framework

The reviewed literature presented in the previous chapter suggests a research framework on how a new technology such as digital cable is adopted and used, as well as its impacts on users. As seen in Figure 1, the framework consists of four major categories of variables 1) the independent factors and approach factors shaping patterns of adoption and use, the intervening variables of 2) adoption and 3) uses, and 4) their impacts as outcome variables.

The conceptual framework, first, addresses determining factors that influence adoption and use of a new technology. The factors such as social status of the adopters are assumed to influence the adoption and use patterns of digital cable. Uses of digital cable are constructed in three use patterns of expanded channels (Specialized Channels, Multiplexed Channels, Digital PPV Channels) and use of a new guide system (Interactive Program Guide). In the use patterns, the guide use thus should be separated from other uses of expanded channels. The use patterns are, in turn, expected to affect users' viewing behaviors, but there might be recursive relationships between the impacts and use patterns. It should be noted here that the conceptual framework is not a path model to test, but a brief summary to better understand the construction of the research questions and hypotheses. The current study, therefore, is not intended to test a causal model.

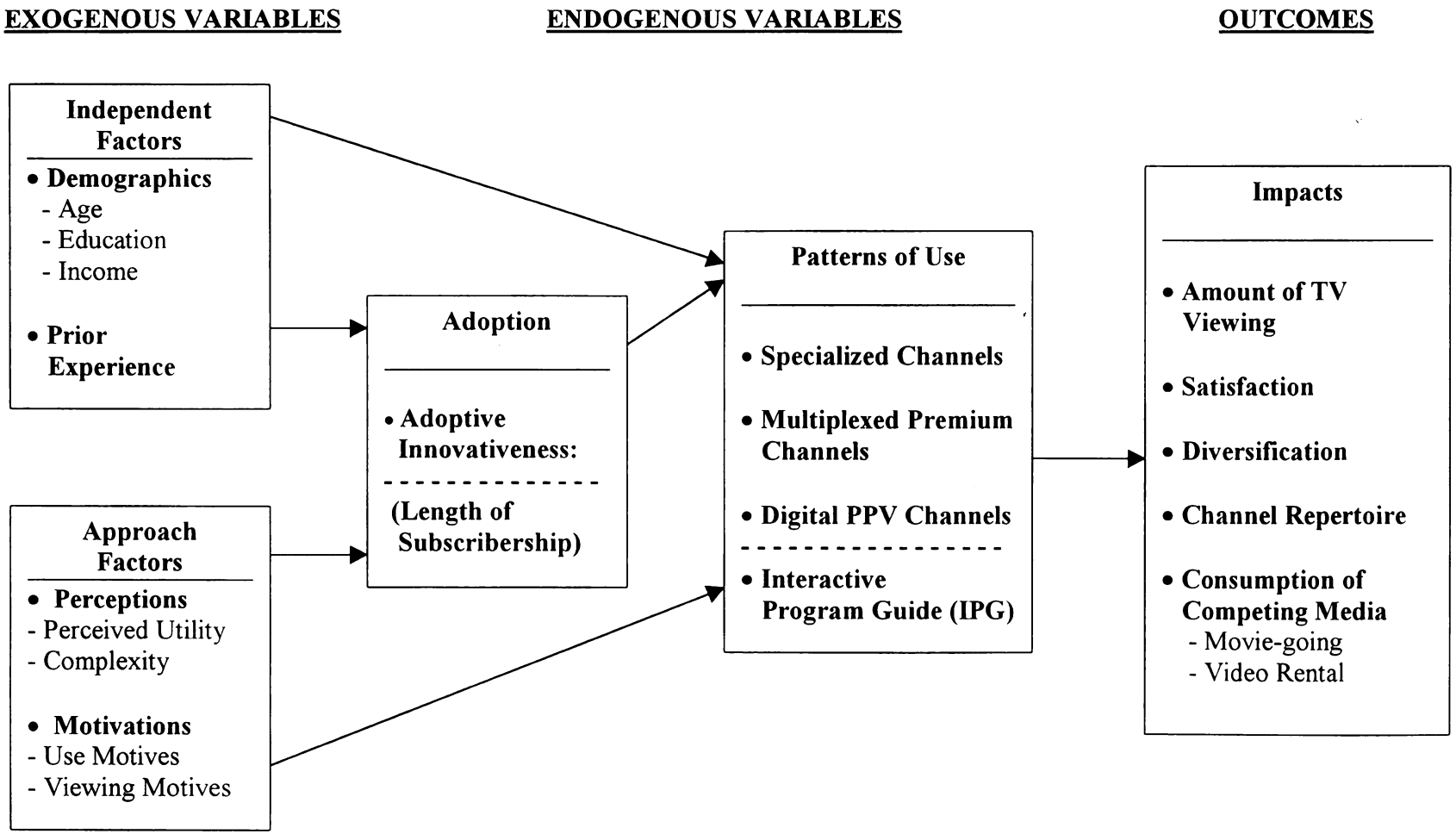

Figure 1. A Research Framework of the Adoption, Use and Impacts of Digital Cable

Research Questions and Hypotheses

Relationships between Independent Factors and Adoption

In diffusion process of a new technology, time is an important dimension (Midgley & Dowling, 1978; Rogers, 1995). Time in diffusion process generally is explained by an adopter's degree of innovativeness which is defined as "the degree to which an individual or other unit of adoption is *relatively earlier* in adopting new ideas than other members of a system" (Rogers, 1995, p. 22, emphasis added). Put another way, the speed of diffusion could be dependent on one's adoptive innovativeness – that is, the relative earliness/lateness with which an innovation is adopted when compared with other members of a social system.

The concept of adoptive innovativeness is thus measured by the relative time of adoption (See, e.g., Midgley & Dowling, 1978). A number of diffusion studies have shown that the characteristics of earlier adopters of a new technology are vastly different than those considered to be later adopters or non-adopters due to the degree of their adoptive innovativeness (e. g., Lin, 1998a; Kang, 2000).

Demographics. A great deal of diffusion research has been focused on demographic variables in order to identify earlier adopters of an innovation (Robertson, 1968, 1971; Rogers, 1983, 1995). Rogers (1995) postulates that earlier adopters of new communication technology would be younger, better educated, and of higher income than later adopters.

In the context of cable subscription, demographic data confirm the earlier adopter profiles postulated by the diffusion theory In general, initial subscribers to cable

television tended to be younger, upscale and better educated than later subscribers or non-subscribers (Baldwin & Mcvoy, 1988; Ducey, Krugman & Eckrich, 1983; Greenberg, Heeter, D'Alessio & Sipes, 1988; Krugman, 1985; Krugman & Eckrich, 1982; LaRose & Atkin, 1988a; Reagan, Ducey & Bernstein, 1985; Rothe, Harvey & Michael, 1983; Webster, 1983). From this, the following hypotheses will be addressed:

> H1a: Age will be negatively related to the level of adoptive innovativeness in adopting digital cable. The younger the people are, the sooner they will adopt the digital cable.
>
> H1b: Education will be positively related to the level of adoptive innovativeness in adopting digital cable.
>
> H1c: Income will be positively related to the level of adoptive innovativeness in adopting digital cable.

Perceptions of innovation attributes. Diffusion researchers have also tried to identify perceived characteristics of an innovation and to evaluate the extent to which its perceived attributes affect adoption of the innovation. As discussed in the previous chapter, there are five dominant attributes of innovations; perceived utility, complexity, compatibility, trialability, and observability. Of them, the most relevant characteristics and most commonly used in the study of communication technology are "perceived utility" and "complexity" (See, Davis, Bagoxxi & Warshaw, 1989; Lin, 1996, 1998a).

Several reviews of adoption literature have indicated that the two perceptional variables have superior discriminatory and predictive power in the identification of an initial adopter or non-adopter (LaRose & Atkin, 1991: Lin, 1998a). From this, it is expected:

H2a: The level of perceived utility for digital cable will be positively related to the level of adoptive innovativeness in adopting digital cable.

H2b: The level of perceived complexity for digital cable will be negatively related to the level of adoptive innovativeness in adopting digital cable.

Motivation. The classical uses and gratifications perspective presumes that individuals' media selection is motivated by the expectation to fulfill their needs to use (Katz, et al., 1974). The underlying indication of this perspective is that how soon a person adopts a new medium can be dependent on the degree of the person's internal needs and gratification-seeking motives. The more one may have the motives to use a technology, the sooner he/she would adopt it. This premise is confirmed by Leung and Wei's (1999) study on the pager. In the study, it was found that how soon people adopt the pager was significantly associated with user's motive for fashion.

RQ1: What motives are related to earlier adoption of digital cable?

Prior experience. Rogers (1962) proposed that the more compatible an innovation is with the consumer's background, the more likely it is to be adopted. Consistent with this proposition, Zaltman and Stiff (1973) argued that early adopters of an innovation are heavy users of products similar to the behavior replaced by the innovation. The implication of the finding is that, once familiar with other technical products, the decision to adopt a new, even more complex technology, should be easier and more likely.

Taylor (1977) concluded that "new product development clearly should be conducted among heavy users of the product class" (p. 106). In that regard, it is assumed that persons who have already used some premium channels and pay per view channels

are more likely to buy the new cable service than others because they are heavier users in the class of the cable technology. It might be reasonable, then, to expect that the premium subscribers with relatively heavier cable usage as well as higher loyalty toward cable television would be among the relatively earlier subscribers of another new cable service, digital cable. From this, the following hypothesis will be addressed:

> H3: The subscribership to premium channels will be positively related to the level of adoptive innovativeness in adopting digital cable.

Relationships between Independent Factors and Usage

Adoption and use are not synonymous (Steinfield, Dutton & Kovaric, 1989). Adoption of an innovation does not necessary lead to the successful adaptation and incorporation of the innovation in the home setting (Rogers & Shomaker, 1971; Yin, Heald, Vogel, Fleischauer, & Vladeck, 1976). Depending on adopters' different purposes or perceived utility, abandonment, a variety of usage patterns ranging from non-use or rejection to heavy use of the innovation can occur at any point in the process of integrating an innovation into their daily life. Thus, it might be useful to focus on the more immediate issues of how people actually use the new and evolving technology, digital cable, rather than simply the presence or absence of the technology.

Demographics. Social-economic characteristics influence actual use of an innovation. In particular, age and education are considered as the most important predictors of new technology use. More education is likely to mean that highly educated people could better understand the new functions provided by an innovation. In their

meta-analysis on the patterns of cable use, Dutton et al. (1987, p. 183) suggested that education should differentiate patterns of use for the cable medium because more educated individuals may be "more active, selective, and instrumental in their use of media." Younger people also could be less timid in using an innovation (Mundorf & Westin, 1996).

By implication, it might be logical to assume that younger and highly educated people are more likely to use digital cable's new functions. Since the functions of the interactive programming guide (IPG) are conceived as the newest, only hypotheses regarding the use will be proposed.

H4a: Age will be negatively related to the use of IPG.

H4b: Education will be positively related to the use of IPG.

Perceptions of innovation attributes. People's perceptions about a particular new medium can also be a useful device in the understanding of the actual use of the new medium. Specifically, people may be more likely to use the new technology if it is perceived as beneficiary (Carlin, 1998; Ostlund, 1974; Perse & Dunn, 1998; Rogers, 1995; Weir, 1998), and to be easier to use (Rogers, 1995; Svenning & Ruchinskas, 1988; Tornatzky and Klein, 1982; Trevino & Webster, 1992).

From the user's perspective, on the other hand, the ways to use specialized basic channels, multiplexed premium channels, and PPV channels may be almost the same as those of the existing analog service. In digital cable, however, the use of the interactive guide may be perceived differently by the users. It may be perceived as more complicated compared to the use of current electronic (one-way) programming guide (EPG). Since the

perception issue is particularly related to the use of interactive programming guide, only hypothesis will be posited for the guide use.

H5a: The level of "perceived IPG utility" will be positively related to the use of IPG.

H5b: The level of "perceived IPG complexity" will be negatively related to the use of IPG.

Motivation. The relationship between user need or motivation and actual media use has been extensively investigated by the uses and gratifications studies. James et al. (1995) reported that the electronic bulletin board uses are strongly associated with users' informational/learning and socialization needs. Dutton et al. (1987) further asserted the validity of this application by documenting the empirical evidence which proves the needs reported for using a certain medium are indeed associated with how it is actually used. Lin (1994) confirmed this assertion, discovering that consumers' surveillance needs contributed to the uses of videotext services. These findings gathered from the literature herein imply that each motivation for digital cable should be linked to their relevant uses of it.

RQ2: Are the subscription motives for digital cable actually related to their relevant uses?

As discussed earlier, some researchers in uses and gratifications paradigm (e.g., Rubin, 1983, 1984; Rubin & Perse, 1987a) have suggested that television use motives can be separated into those in which the viewer makes an active choice to seek television content (instrumental) and those in which the audience views out of passive orientation to television content (ritualistic). Unlike ritualistic audiences, viewers with instrumental

motives may actively find programs to fill their particular needs from an enormous range of television contents (Perse, 1990). Since instrumental use of television is more active, it should be linked to greater awareness of the contents that are watched. For this reason, "an instrumental use of television is reflected in more use of program guides" to get more information about the program contents and to plan viewing (Ferguson & Perse, 1993, p. 35).

Conceptually, use of the interactive programming guide in digital cable is regarded as part of the active audience paradigm because the technology demands more active participation while viewing. The programming guide may facilitate viewers planning as a decision making tool, encouraging them to watch what they want actively.

The selective exposure and greater planning of instrumental use suggest that viewing for instrumental reasons should lead to greater use of the IPG.

H6: The instrumental viewing motive will be positively related to the use of IPG.

Prior experience. Perspectives of diffusion and functional similarity (Ettema, 1989) suggest that the adoption of one medium is likely to stimulate the use of related media (Atkin & LaRose, 1994). In the context of cable, the existing pay channel subscribers have more experience with cable set-top box, which may help them become more familiar with the new digital box. In addition, several interactive attributes of the programming guide may be judged as more familiar by the users who have more experience of similar interactive technologies such as e-mail or web. From this, the following hypotheses will be addressed:

H7a: The subscribership to premium channels will be positively related to the use of IPG.

H7b: The interactive use of e-mail will be positively related to the use of IPG.

H7c: The interactive use of web will be positively related to the use of IPG.

Length of subscribership. New technology use may increase with length of subscribership (ownership) if adopters become more familiar with, or reinvent, the technology's applications (Klopfenstein, Spears, & Ferguson, 1991; Rogers, 1983; Von Hippel, 1986).

Klopfenstein et al. (1991) found that the longer the VCR is in the home, the more likely people are to use it. In a telephone survey of VCR owners, the researchers reported that the length of VCR ownership was related to higher level of VCR use behaviors such as recording television shows, recording a program while watching a different program, recording while sleeping, and recording a program while not at home. These general findings are fairly consistent in the literature. Klopfenstein and Swanson (1987) found that VCR use was greater in the households where the VCR had been adopted earlier, which was supported by the finding that people who use the VCR longer, also record programs form television more often (Bulck, 1999).

Similarly, the use of cable television has also been affected by length of its presence. Henke, Donohue, Cook, and Cheung (1984) found that the use of cable news channels such as CNN was greater among those who have had cable for a longer period of time (over 6 months) than among newer subscribers (less than 6 months). Implications of these findings are that, the longer digital cable has been subscribed to in the home, the more it is used.

H8a: The length of digital cable subscribership will be positively related to the use of "specialized channels."

H8b: The length of digital cable subscribership will be positively related to the use of "multiplexed channels."

H8c: The length of digital cable subscribership will be positively related to the use of "PPV channels."

H8d: The length of digital cable subscribership will be positively related to the use of "IPG."

Usage

As mentioned earlier, digital cable's programming guide with interactivity is the most innovative feature which doesn't exist in analog distribution. For this reason, the guide related studies have been focused mainly on the electronic programming guide (one-way) or printed guide (e.g., Heeter, 1988). In this regard, some researchers argued that uses of "a more effective guide" and their influences on program viewing should be explored in the future research (Heeter & Greenberg, 1988, p. 49).

Given the guide's interactivity might play a key role in interactive television (e.g., Web-TV, t-commerce) in the future, it is important to examine the use patterns of the IPG. Which features are best used? Who uses each function of the IPG the most? What factors are related to the use? More specifically, in order to encourage video medium's interactive uses, it might be worthwhile to understand how the independent factors mentioned influence the use of specific IPG features.

RQ3: Which factors are related to the use of specific IPG features? That is, what factors can explain the use of each function of IPG?

Impacts of Digital Cable Use

Amount of TV viewing. Many studies of cable have focused on how its launch affects the amount of television viewing. Even though there are some contradictory results (e.g., Jeffres, 1978), most firmly established from the previous studies is the finding that subscription to cable is associated with increased time spent watching television (Becker et al, 1983; Rothe & Harvey & Michael, 1983; Weimann, 1996; Webster, 1983). In an early study of cable's impact, Becker et al. (1983) found a real increase in the amount of television viewing after the introduction of cable television.

Similar impacts of cable introduction were reported in other countries from Netherlands (Olderann & Jankowski, 1989), Germany (Noelle-Neumann & Schulz, 1989), and to Israel (Weimann, 1996).

The impact of cable on television viewing is also found in the upgrading activity of cable users. In a panel study exploring the effects of cable upgrading and downgrading, Umphrey (1991) found that upgraders watched more television after making a change in service, and downgraders watched less. These summative findings imply that if more options of channels are given, the possibilities of increased viewing time are also higher. Because digital cable provides more channel options, it is reasonable to expect that greater use of those channels would increase the time devoted to watch television.

Interestingly, a recent study on digital cable discovered that the television viewing time of digital cable users was significantly higher than that of non-digital subscribers (Kang, 1999). In the study, however, it couldn't be determined whether heavy viewers of television subscribe to the service or if subscription to digital cable increases viewing

time because it was a cross-sectional, not a longitudinal study. If there is evidence of associations between the use of digital cable's expanded channels and viewing time, it may be indirect evidence that digital cable increases the viewing time.

H9a: The use of "specialized channels" will be positively related to the amount of TV viewing.

H9b: The use of "multiplexed channels" will be positively related to the amount of TV viewing.

H9c: The use of "PPV channels" will be positively related to the amount of TV viewing.

H9d: The use of "IPG" will be positively related to the amount of TV viewing.

Satisfaction. Media satisfaction has been related to media consumption (Perse & Ferguson, 1993; LaRose & Atkin, 1988b; Jacobs, 1995, 1996). As the use of a medium increases, so does a user's satisfaction with it. Burgoon and Burgoon (1980) found that those who spend more time reading the newspaper tended to be more satisfied with the medium. Lin (1990) revealed that heavier use of a VCR had a significant, positive association with greater viewing satisfaction.

In a cable study, Atkin and LaRose (1988b) argued that continued cable subscription is contingent upon how well the subscriber expectations about the service are satisfied. Similarly, in a study examining the determinants of cable subscriber satisfaction, Jacobs (1996) found that overall satisfaction with cable service was negatively related to subscriber complaining behavior. From these studies, one can assume that those who feel their initial expectations of digital cable are met, may be more likely to use digital cable, which in turn leads to more satisfaction with it.

H10a: The use of "specialized channels" will be positively related to overall satisfaction with digital cable.

H10b: The use of "multiplexed channels" will be positively related to overall satisfaction with digital cable.

H10c: The use of "PPV channels" will be positively related to overall satisfaction with digital cable.

H10d: The use of "IPG" will be positively related to overall satisfaction with digital cable.

Diversification. With regard to effect of cable television on an audience's viewing genre, results of studies have been inconsistent in that some of them observed increased spread of viewing type, whereas others found concentrated viewing patterns. For example, Weimann (1996) found that cable viewers enriched their television diet in terms of increased viewing in various television program types after subscribing to cable television.

Perse et al. (1994) also noted that cable could allow viewers an increased variety range of programming. The authors argued that because cable television offers viewers more of the specialized channels, they should have higher possibilities theoretically to contact more different and diverse types of programs. Contrastingly, Youn (1994) reported that cable users were likely to watch more of the same types that are closer to their program type preferences, suggesting that the increase in program choice options of cable don't facilitate viewing diversification.

In addition to expanded channel options, the use of program guides or remote control devices (RCD) is associated with the spread of audiences' viewing diet. Cable

subscribers who are more likely use the program guides, tend to watch more different channels (Heeter & Baldwin, 1988), and the use of RCDs also increases exposure to a wider range of television programs (Ainslie, 1988; Perse et al., 1994). Digital cable provides more specialized channels and an interactive programming guide which may help users sample diverse types of channels. The use of these attributes may affect an audience's viewing type of program.

Despite some contradictory results, it may be more logical to theoretically expect that the use of "specialized channels" and "IPG" would lead to diversification of the viewing type.

> H11a: The use of "specialized channels" will be positively related to the level of diversification. The use of specialized channels will lead to watching more different types of programs.
>
> H11b: The use of "IPG" will be positively related to the level of diversification.

Channel repertoire. Besides more exposures to specialized digital channels, use of the program guide as an active selection behavior may increase viewers' channel repertoire because the guide allows viewers to find out about channels with which they would be otherwise unknown.

Heeter (1985) found that guide use was significantly associated with channel familiarity, which in turn was strongly correlated with channel repertoire. A similar finding was found in a further analysis in which a printed guide use appeared to be a significant predictor of channel repertoire (Greenberg et al., 1988). Acknowledging the programming guide's impact on channel repertoire, Lochte and Warren (1989, p. 94) also

argued that "future studies of channel repertoire should include investigation of the use of program guides."

Given these findings and notions, viewers who use the IPG more often would be more likely to be aware of certain channels and, in turn, they likely watch more different channels regularly. Hence it is expected that:

> H12a: The use of "specialized channels" will be positively related to the number of channel repertoire among the specialized channels.
>
> H12b: The use of IPG will be positively related to the number of channel repertoire among the specialized channels.

Consumption of competing media. According to the media substitution hypothesis, heavy consumption of a medium may infringe upon the consumption of other competing media.

Childers and Krugman (1987) examined factors leading to choices among three movie distribution modalities: VCRs, pay cable, and pay-per-view. Their study suggested that these distribution systems are likely to compete for consumer dollars and audience viewing time. The results of the study provided evidence of the substitution possibility of one modality for another, indicating that VCR users regarded pay-per-view as a more convenient service and easier to consume, relative to VCR rental.

Actually, a number of studies have documented such media substitution effects (Lin, 1993; Harvey & Rothe, 1986; Henke & Donohue, 1989; Leung & Wei, 1999). Kaplan (1978) examined the impacts of multi-channel cable television on the utilization of other media. He found that cable subscribers reported less movie-going with a corresponding increase in use of equivalent cable. Exploring the relationship among the

movie modalities, LaRose and Atkin (1991) reported that pay-per-view use was associated with negative attitudes toward other competing media such as movie-going and pay cable channels.

By implication, one can assume that both the multiplexed channels and the PPV channels of digital cable should compete with "home video rentals" or "movie-going," which is what Baldwin et al. (1996) anticipated.

H13a: The use of "multiplexed channels" will be negatively related to the frequency of movie-going.

H13b: The use of "multiplexed channels" will be negatively related to the use of video rentals.

H13c: The use of "PPV channels" will be negatively related to the frequency of movie-going.

H13d: The use of "PPV channels" will be negatively related to the use of video rentals.

Chapter IV

RESEARCH METHOD

This chapter describes data collection and analysis procedures used to test the hypotheses and answer the research questions outlined in the previous chapter. To collect data for the purposes of this study, a telephone survey was conducted among digital cable users.

Sampling

The sample for this study was selected from digital cable subscribers of AT&T Broadband & Internet Services (AT&T BIS) in East Lansing - Meridian Township, Michigan. The cable company has provided the digital cable service since early 1998, approximately 3 years prior to the study. In this market, digital service penetration (digital subscribers/ total cable subscribers) was about 20 percent at the time when the study was conducted (November, 2000).

Besides the basic analog channels, the cable system offered at that time a variety of digital services available only to its digital subscribers. Specifically, the company carried 23 specialized basic channels, 19 multiplexed premium channels, and 9 digital PPV channels, and offered the interactive programming guide to the digital subscribers. Table 3 contains a complete listing of available digital services.

Table 3. Digital Cable Services Provided by the Cable Company

Digital Service	Channels / Menus
Specialized Basic Channels (23)	Noggin, Discovery Kids Channel, Sci Fi, Game Show Network, BBC America, Bravo, Discovery Home & Leisure, Discovery Health, The History Channel, Discovery Civilization Channel, Discovery Science Channel, Discovery Wings, Fox Sports World, ESPN News, ESPN Classic Sports, Outdoor Life, The Golf Channel, Speed Vision, VH1 Country, VH1 Classic Rock, Turner Classic Movies, Romance Classics, Independent Film Channel
Multiplexed Premium Channels (19)	Encore East, Encore Love East, Encore Mystery East, Encore Western East, Encore True Stories & Drama, Encore Action East, Starz! East, Starz! Theater East, HBO Plus, HBO Signature, HBO Family East, Cinemax East, MoreMAX East, Showtime East, Showtime 2 East, Showtime 3 East, Showtime Extreme East, The Movie Channel East, The Movie Channel 2 East
PPV Channels (9)	Interactive Demand 6 PPV Channels, Hot Network, Spice, Playboy
Interactive Programming Guide (IPG)	Information Button, Time menu, Channel Menu, Movie Program Menu, Sports Program Menu, Search Function, Reminder

The list of computer-generated random phone numbers for digital subscribers was obtained from the cable company. In addition to the phone numbers, the list included some additional information: 1) the subscription date to digital cable; and 2) each household's frequency of PPV uses in the last three months. Based on the list, a telephone survey was conducted.

Survey Administration

Telephone interviews were conducted during the evening hours (6:00 p.m. – 9:00 p.m.) over a two week period (November 7 to November 17, 2000) at the Technology Lab of the Communication Arts & Sciences building at Michigan State University. All calls were made on Tuesday through Friday to control the different TV viewing levels between weekdays and weekends. Reports of "yesterday" viewing activities thus refer to weekdays in this study.

The survey instrument was administered by trained and paid undergraduate students who were enrolled in a research course. Before the main survey was conducted, the survey instrument was pilot tested with a sample group, and phrasing and item ordering were revised. For example, questions regarding the usage of email and the web seemed to be unclear to respondents. They asked whether the questions included the uses for business purposes. The questions were revised to clarify, and confined to the uses for personal purposes only. The final version of the survey instrument is presented in Appendix B.

The instrument was administered only to persons 18 years old or over. As an incentive to increase response rate, a free pay-per-view movie coupon was offered to interviewees who completed the survey. The telephone interviews were performed at a central location monitored by a supervisor. All phone numbers with "no answer," "busy signal," or "answering machine" were called back for at least 20 times.

Out of 708 phone numbers tried, there were 96 ineligible numbers (business, non-working number, non-digital number, disconnects, faxes, etc.), 70 unreachable numbers (no answer/busy/answering machine), 173 refusals/terminations, and 369 completions.

Eliminating ineligible numbers, the response rate was 60.3%. A response rate of above 60% is considered adequate for analysis (Babbie, 1990).[2] Out of 369 total cases, four invalid responses were excluded from statistical data analysis. The final sample size was thus 365.

Sample Profile

Of the 365 respondents in the sample, males were 51.2 % (N=187) and females were 48.8 % (N= 178). The mean age of the sample was 32.8 with a standard deviation of 12.1.

Almost all respondents (N=340, 93.2%) attended at least some college, with a mode of "some college education." As for income, 24.4% (N=89) of the respondents reported their annual household income as "$30,000 – less than $60,000," followed by "less than $10,000" (20.5%, N=75), "$10,000 – less than $30,000" (16.2 %, N=59), "$60,000 – less than $90,000" (16.2%, N=59), and "$90,000 – less than $120,000" and "$120,000 or more" (8.2%, N=30 each). Most (73.2%, N=267) have lived for more than 3 years at the community surveyed. Because the survey was conducted in a college town, nearly thirty percent of the sample was full-time students (29.3%, N=107). The general characteristics of the sample are displayed in Table 4.

[2] According to rules of thumb, a response rate of at least 50 percent is generally considered adequate for analysis (Babbie, 1990).

Table 4

Characteristics of the Sample

Attribute	Percent	N	Mean	S. D.
Gender				
Male	51.2 %	187		
Female	48.8 %	178		
			32.8	12.1
Age				
Education				
No high school	.0 %	0		
Some high school	.0 %	0		
High school	6.8 %	25		
Some college	42.2 %	154		
College	26.8 %	98		
Beyond college	24.1 %	88		
Income				
Less than $10,000	20.5 %	75		
$10,000-less than $30,000	16.2 %	59		
$30,000-less than $60,000	24.4 %	89		
$60,000-less than $90,000	16.2 %	59		
$90,000-less than $120,000	8.2 %	30		
$120,000 or more	8.2 %	30		
Missing	6.3 %	23		
Length of Stay				
3 or more than 3 years	73.2 %	267		
Less than 3 years	26.8 %	98		

Measurement of Key Variables

The survey instrument included questionnaire items that operationalized the following key variables: independent factors, digital cable usage, and five sets of outcome variables. Operational definitions and response categories of all variables are described below.

Demographics

In order to acquire the demographic variables, respondents were asked their age, levels of income, and education. A ratio scale was used for age (years), while ordinal scales were used for income and education. Specifically, income was coded "1" for "less than $ 10,000" through "6" to represent "$120,000 or more." Education was categorized "1" for "no high school education" through "6" to indicate a "post-college graduate education."

Perceived Attributes

There were two perceptual variables which were measured in this study: perceived utility and complexity (ease of use). In addition, each of these perception variables has two dimensions: perception for overall digital cable and perception for IPG use.

Perceived utility for overall digital cable was measured by asking respondents to rate on a ten-point semantic differential (i.e., useful vs. useless, efficient vs. inefficient, and convenient vs. inconvenient) with the following three questions.

a) On a scale of 1 to 10 where 1 means "not useful at all," and 10 means "very useful," how would you rate your general feelings about digital cable?

b) On a scale of 1 to 10 where 1 means "not efficient at all," and 10 means "very efficient," how would you rate your general feelings about digital cable?

c) On a scale of 1 to 10 where 1 means "not convenient at all," and 10 means "very convenient," how would you rate your general feelings about digital cable?

Each item was separately measured, and summed to create a composite measure. The coefficient Cronbach alpha, in turn, was calculated as an indicator of internal consistency on the measure.[3] The coefficient alphas for the construct was .84.

Perceived complexity of digital cable was also measured by asking respondent to evaluate on three ten-point scales: easy vs. difficult, simple vs. complex, and comfortable vs. uncomfortable. The following questions were used for the scales.

a) On a scale of 1 to 10 where 1 means "easy," and 10 means "difficult," how would you rate your general feelings about using digital cable?

b) On a scale of 1 to 10 where 1 means "simple," and 10 means "complex," how would you rate your general feelings about using digital cable?

[3] In general, there are no standard rules to evaluate the magnitude of reliability coefficients. However, Nunnally (1978) 's guideline suggests that a modest reliability above .60 is considered acceptable. All composite scales used in this study had a reliability of at least .65.

c) On a scale of 1 to 10 where 1 means "comfortable," and 10 means "uncomfortable," how would you rate your general feelings about using digital cable?

Each item was separately measured, and summed to create a composite measure. The coefficient alpha for the construct was .84.

Three statements were created to assess responses on the perceived utilities of using the IPG. A five-point Likert scale was used to measure the degree of agreement with a range from "strongly disagree" to "strongly agree." The statements used in the study were:

a) The interactive programming guide allows me to save time in checking out what's on TV.

b) The interactive programming guide makes it easier to find out what I want to watch.

c) The interactive programming guide helps me not to miss what I really want to watch.

The coefficient item alpha for the perceived utility of IPG was a little lower because the items for the construct were originally created for the study. It was .65.

The perceived complexity of using the IPG was measured with the following three measurement statements. They were adopted from Lin's (1998a) study which used the statements to assess the perceived complexity of the PC. The same "agreement-disagreement" five-point Likert scale was also used for this measurement. To get better

measurement, polarity was reversed for one item (item "b"). The statements used here were:

a) It is frustrating for me to use functions of the interactive programming guide.

b) It is easy for me to use functions of the interactive programming guide.

c) It is intimidating for me to use functions of the interactive programming guide.

The item scores were then summed after coding of the item "b" was reversed. The coefficient Cronbach alpha for the scale was .77.

Motivations

Two different motivations were measured: 1) motivation for digital cable subscription; and 2) motivation for television viewing.

Previous studies have shown that the main motivations for cable use have been changing over time. In the 1970s, for instance, the most important reason for cable subscription was to get better signal reception (Baldwin & McVoy, 1988). As cable services developed during the following decade, people were more interested in getting program variety (Becker et al., 1983). Similarly, the primary motive for digital cable subscription was somewhat different from that of the existing analog service. According to a pilot study (Kang, 1999), the most frequently cited motivations for digital cable subscription were "to use specialized basic channels," "to use interactive program guide," and "to use more movies." From this, the subscription motivations for digital cable should include motivations for specialized channels, interactive guide, and more movies.

To assess their subscription motives, respondents indicated their agreement with the following seven statements on a five-point scale (1=strongly agree, 5=strongly disagree). They were:

a) I subscribe to digital cable because it provides more premium channels such as HBO2, HBO3, or Starz2.

b) I subscribe to digital cable because it provides more movie titles.

c) I subscribe to digital cable because it provides more special interest channels numbered 120 through 503 that I can't get with regular cable.

d) I subscribe to digital cable because it provides a flip bar which displays program title, starting time and rating.

e) I subscribe to digital cable because it provides a program information button which gives summary of program, starting time and rating.

f) I subscribe to digital cable because it allows me to search for program listings by time, channel, category and title.

g) I subscribe to digital cable because it allows me to order pay-per-view movies directly by remote control without making a phone call.

The items assessing respondents' subscription motives were, in turn, factor analyzed to determine potential grouping. Since it was expected that the subscription motives were not orthogonal, but interrelated, exploratory principle factor analysis with

oblique rotation was used (Kim & Mueller, 1978). The criteria for a factor to be retained were an eigenvalue greater than 1.0 and loadings of at least .55 (Comrey & Lee, 1992).[4]

Exploratory factor analysis of the seven statements yielded two factors with eigenvalues greater than 1.0. In the first factor, one item "I subscribe to digital cable because it provides more special interest channels" was loaded less than .55. Therefore, the item was deleted for the final solution. The final factor analysis is summarized in Table 5, and the factor correlation matrix is presented in Table 6. The correlation matrix showed that two components are correlated, indicating there is enough variance to warrant oblique rotations.

The first factor had an eigenvalue of 2.97, and explained 49.42% of the total variance, marking digital cable as a motivational technology to use the interactive programming guide. It was thus labeled "Guide Use Motivation."

The second factor showed an eigenvalue of 1.05, and accounted for 17.45 % of the total variance. It covered movie-related dimension as a main motivation to subscribe to digital cable (i.e., more movie titles, PPV use, and multiplexed premium channels). Accordingly, it was named "Movie Use Motivation."

Based on the factor analysis results, two composite variables were constructed: 1) guide use motivation (subscription motive1); 2) movie use motivation (subscription motive2). The Cronbach coefficient alphas for the constructs were .81 and .66, respectively. Each factor score was estimated by regression methods for further analysis.

[4] According to Comrey & Lee (1992), loadings in excess of .71 (50% overlapping variance) are considered excellent, .63 (40% overlapping variance) very good, .55 (30% overlapping variance) good, .45 (20% overlapping variance) fair.

Table 5

Factor Analysis of Subscription Motives for Digital Cable (after oblique rotation)

I subscribe to digital cable because	Guide Use Motive	Movie Use Movie
it allows me to search for program listings	**.86**	-.04
it provides a program information button	**.86**	.02
it provides a flip bar	**.84**	.02
it provides more movie titles	-.03	**.88**
it provides more premium channels	.01	**.82**
it allows me to order PPV movies directly	.01	**.61**
Eigenvalue	2.97	1.05
% of Variance	49.42	17.45
Alpha	.81	.66

Note:
- Extraction Method: Principal Component Analysis
- Rotation Method: Oblimin with Kaiser Normalization

Table 6. Component Correlation Matrix

	Guide use motive	Movie use motive
Guide use motive	1.00	.47
Movie use motive	.47	1.00

To indicate television viewing motives, respondents expressed their agreement with the following eight statements about their reasons for watching television. The statements for instrumental viewing motives were:

a) I watch television, because it helps me learn things about myself and others.

b) I watch television, so I can talk with others about what's on.

c) I watch television, so I can learn about what could happen to me.

d) I watch television because it amuses me.

The statements for ritualistic viewing motives were:

a) I watch television just because it's on.

b) I watch television when I have nothing better to do.

c) I watch television because it passes the time away, particularly when I'm bored.

d) I watch television because it's habit, just something I do.

Those statements were drawn from a previous research (Perse, 1990), because they were items that loaded an instrumental and ritualistic motive factor in the study. Further, the statements have been widely used to measure instrumental and ritualistic viewing motives by other studies (e.g., Ferguson & Perse, 1993).

Since research points out that ritualistic and instrumental television viewing motivations are uncorrelated (Rubin, 1984), the statements were submitted to exploratory principal factor analysis with varimax rotation (Kim & Mueller, 1978). In other words, because there were the two dominant uses of television identified in past research (Rubin,

1984; Wenner, 1985), a two-factor solution was required. The same criteria for retaining a factor were used: a minimum eigenvalue of 1.0 and a loading of at least .55.

The factor solution yielded two factors with eigenvalues greater than 1.0. In the solution, two items "I watch TV, so I can talk with others about what's on," and "I watch TV because it amuses me" were loaded less than .55 and cross-loaded. Thus, the two items were deleted for the final solution. The final result of the factor analysis is summarized in Table 7. Also, Table 8 displays the factor component correlation matrix which show that two components are not correlated.

As seen in Table 7, factor analysis identified ritualistic and instrumental viewing motivations. The two factors accounted for 69.14% of the total variance.

Factor 1 accounted for 44.0% of the variance with an eigenvalue of 2.64. The first factor included two pass-time statements (I watch TV when I have nothing better to do; I watch TV because it passes the time away) and two habit statements (I watch TV because it's habit, just something I do; I watch TV just because it's on). This factor reflects a television viewing that is less content centered, more process oriented, and related to filling empty time. Therefore, it was labeled "Ritualistic Viewing Motivation."

Factor 2 accounted for 25.14% of the variance with an eigenvalue of 1.51. This factor was made up of two learning statements (I watching TV because it helps me learn things about myself and others; I watch TV, so I can learn about what could happen to me). This factor shows a television use that focuses more on seeking information from television viewing. Therefore, it was termed "Instrumental Viewing Motivation."

Table 7

Factor Analysis of Television Viewing Motivations (after varimax rotation)

I watch television...	Ritualistic Motive	Instrumental Movie
because it passes the time away	**.83**	-.01
when I have nothing better to do	**.83**	-.00
just because it's on	**.82**	-.05
because it's habit, just something I do	**.76**	.01
because it helps me learn things	-.07	**.87**
so I can learn about what could happen to me	.04	**.87**
Eigenvalue	2.64	1.51
% of Variance	44.00	25.14
Alpha	.83	.67

Note:
- Extraction Method : Principal Component Analysis
- Rotation Method: Varimax with Kaiser Normalization

Table 8. Component Correlation Matrix

	Ritualistic motive	Instrumental motive
Ritualistic motive	1.00	-.07
Instrumental motive	.07	1.00

Based on the factor analysis results, two composite variables for television viewing motivations were constructed: 1) ritualistic viewing motivation (Cronbach's alpha = .83), and 2) instrumental viewing motivation (Cronbach's alpha = .67). Subsequent analyses used the viewing-movie factor scores computed via the regression method.

Prior Experience

The level of prior experience with similar media was operationally measured by asking respondents whether they subscribed to any premium channels. In addition, to measure the amount of interactive e-mail use, the respondents were asked how many messages they send and receive in a typical day. By summing up both measurements, an index was then made to reflect the degree of e-mail use. Also, to measure amount of web use, the respondents were asked how many hours they use the web in a typical day.

Adoptive Innovativeness

For a measure of adoptive innovativeness, which reflects one's adoption strength, diffusion studies have generally utilized the relative time of adoption by asking respondents' purchase date (See, Midgley & Dowling, 1978; Robertson & Wind, 1980).

To assess the extent of adoptive innovativeness, the information for a respondent's subscription date to digital cable was obtained from the cable company. The subscription dates were transformed into a continuous rating scale on number of months prior to the time when the survey was conducted (10/2000). For those who subscribed to digital cable in September, 2000, for example, their level of adoptive innovativeness

became 2. The measurement ranged from "1" month (October, 2000) to "31" months (April, 1998).

The sooner people subscribed to digital cable, the higher their level of adoptive innovativeness. Here, however, it is necessary to screen newcomers who moved to this surveyed area after the first introduction of digital cable. Even though the people may have had a high intention to subscribe to digital cable, they may have subscribed to it lately because digital cable was not available at another address. Those subscribers were excluded in this analysis, by a screening question which determined how long they had have lived in the surveyed community.

Also, the existence of disadopters who subscribed to digital cable before, but already dropped it, should be considered because their experience with digital cable may be somewhat different. Perhaps, their perceived utility of digital cable is lower than that of current subscribers. However, data showed that their existence was not a level of concern. According to a recent survey (Kang, 1999), there were 6 disadopters out of 152 cases, which is just 4%.

In this study, the measure of innovativeness was directly used and interpreted as a measure of length of subscribership (i.e., how long they have had digital cable). Put another way, the higher the level of adoptive innovativeness, the longer the length of subscribership.

Digital Cable Usage

As discussed earlier, digital cable uses included three types of expanded channel uses (specialized channels use, multiplexed channels use, and PPV channels use), and a use of an interactive programming guide (IPG). To measure the expanded channel uses, respondents were asked how often they used the channels on a five-point scale (1=never, 2= two or three times a month, 3= once a week, 4= two or three times a week, and 5= daily). For example, the specialized channel use was measured with the following question:

"The digital cable service offers you new special interest channels numbered 120 through 503. How often do you use the special interest channels? Would you say never, two or three times a month, once a week, two or three times a week, or daily?"

The IPG use was operationally defined as "an aggregate of uses of each sub-menu." The variable was measured by asking how often the respondents used each of the seven guide menus (information button, time menu, channel menu, movie program menu, sport program menu, search function, and reminder) on the same five-point scale (1=never, 2= two or three times a month, 3= once a week, 4= two or three times a week, and 5= daily), and then summed.

Amount of TV Viewing

Television viewing time was assessed by the self-reports of the amount of viewing in morning, afternoon and evening on the previous day with the following question: "Yesterday morning before noon (afternoon from noon to 7 p.m./ night from 7

p.m. to 12 midnight), how much time did you watch television?" Responses to the three dayparts were analyzed separately, and they were then summed to create the composite measure, overall TV viewing.

Satisfaction with Digital Cable

For a measure of satisfaction with digital cable, the following question was used: "On a scale of 1 to 10, where 1 means 'not at all satisfied' and 10 means 'completely satisfied,' how satisfied are you with the overall job that digital cable does in providing you with the things you are seeking?" The satisfaction measure was drawn from past studies (Palmgreen & Rayburn II, 1985; Perse & Rubin, 1988; Perse & Ferguson, 1993).

Diversification of Viewing Type

To assess the diversification of viewing type, respondents were asked their frequency of watching a list of ten program types. The ten program genres used here were children's program, comedy, daytime series, drama, game show, movie, news, sports, talk-show, and music. The ten types of program categories have been used by previous studies (Rubin, 1981, 1983; Rothe et al., 1983). Respondents were asked if they watched each type of program at least 10 minutes on the previous day, if any. The number of types they mentioned was then summed to create an index reflecting one's diversification of program types.

Channel Repertoire

Channel repertoire can be operationalized in two ways: aided channel repertoire and unaided channel repertoire (Ferguson & Perse, 1993). The aided channel repertoire is defined as "the number of channels viewers watched, using aided recall," whereas unaided repertoire is defined as "these channels identified by viewers through unaided recall" (Ferguson & Perse, 1993, p. 37). Since unaided recall provides a smaller set of channels in the channel repertoire of the individual viewer, unaided channel repertoire is considered as a more conservative measure of channel repertoire (Greenberg, Heeter, & Lin, 1988).

Without revealing a channel roster or offering help (i.e., unaided channel repertoire), respondents were asked whether there were any channels they had watched at least once a week among specialized basic channels, and if so, what channels they were. An index of the total channel repertoire was created by summing all channels for which responses were given.

Consumption of Competing Media

The media behaviors competing with digital cable use included movie-going and video rentals. The former was measured by asking the respondents the number of movies they had seen in a theater, and the number of times the respondents rented videos during the past three months. As for use level of PPV, actual data obtained from the cable company were used. The timeline for all these media behaviors was identically provided with a period of three months to control any possible bias.

Data Cleaning for Statistical Analysis

Before statistical analysis was performed, all items and scales were examined for accuracy of data entry, missing values, outliers, and the assumptions for multivariate analysis.

Missing Data

Several steps were taken to screen the data prior to analysis. The first step is to evaluate missing data and treat it. If only a few units of data are missing from a large data set, the problem will not be serious and almost all procedures for handling the data will yield similar results (Tabachnick & Fidell, 2000). Although there are no standard rules regarding how much missing data can be tolerated for a given size of sample, it was decided for this sample of 365 that variables with 5% or less data missing would not yield a serious problem for statistical data analysis. By using this criterion, only one variable presented a potential problem: the income variable. Some people seemed reluctant to give their level of income. The variable had 23 missing cases, which was 6.3 % of sample size.

Tabachnick and Fidell (2000) suggest that as long as a variable with missing data is not critical to the analysis, deletion of the missing cases is a reasonable solution to deal with the problem. If the variable is important, however, mean values can be substituted as a way to preserve the variable. It was decided that the missing values for income variable would be replaced by the mean value. Missing cases for other variables with less than 5 % were left untreated since those cases were not critical to the analysis.

Outliers

The next step is to identify and deal with outliers. Outliers are cases with such extreme values on one variable that they unduly affect the average value or the variability of scores.

One way to detect outliers is to use a standardized score in excess of 3.29 as a cut (Tabachnick & Fidell, 2000). According to Tabachnick and Fidell (2000), cases with standardized scores in excess of 3.29 ($p < .001$, two-tailed test) are considered as potential outliers. By using this criterion, several variables were found to have outliers. Examples are the number of email messages and the frequency of movie-going. Some respondents, for example, reported to use 100 email messages in a day (standardized score = 7.17). Some people also responded they watched movies 25 times in a theater during the last three months (standardized score = 6.77).

To reduce the influence of outliers, outlying cases were first checked for accuracy of input. As a solution to treat outliers, Tabachnick and Fidell (2000) suggest that deletion of them is a good strategy. Therefore, it was decided that standardized scores plus and minus larger than 3.29 would be deleted for analysis. By using this procedure, the average number of email messages respondents reported was reduced from 8.40 (S.D. = 12.77) to 7.31 (S.D. = 8.74), and the average number of movie-going was reduced from 2.63 (S.D. = 3.30) to 2.34 (S.D. = 2.56).

Multivariate Normality

Multivariate normality is the assumption that each variable and all linear combination of the variables are normally distributed. Although normality of the variables is not always required for analysis, the solution is usually quite a bit better if the variables are all normally distributed (Tabachnick & Fidell, 2000). Screening continuous variables for normality is thus an important step in multivariate analysis.

Normality of variables is assessed by either statistical or graphic methods. In terms of statistical technique, the value of skewness can be used to check for normality. Skewness has to do with the symmetry of the distribution. If a distribution is closer to normal, the value of skewness is closer to zero. By using this statistical value, six variables were found to have substantial skewness: "Email Use" "Web Use" "Movie-going" "Movie Rental" "PPV Use," and "Length of Subscribership."

Violation of the normality assumption can be corrected by transforming the data (Tabachnick & Fidell, 2000). With nonnormality of the variables, a logarithmic transformation was applied to the variables. By the logarithmic transformation, skewness was reduced from 1.893 to .077 for the "Email Use," as was skewness reduced from 1.454 to .509 for the "Web Use." In addition, skewness was reduced from 1.739 to .181 for the "Movie-going," reduced from 1.582 to -.017 for the "Movie Rental," reduced from 2.760 to 1.094 for the "PPV Use," and reduced from 1.239 to .425 for the "Length of Subscribership" by the same logarithmic data transformation (See Table9).

Table 9

Descriptive Statistics

	N	Min.	Max.	Mean	S.D.	Skewness	S.E.	Kurtosis	S.E.
Age	364	18.00	72.00	32.82	12.11	.856	.128	-.109	.255
TV Viewing	362	.00	12.17	3.91	2.40	.768	.128	.427	.256
# of Genre	365	.00	9.00	3.95	2.02	.200	.128	-.682	.255
# of Repertoire	363	.00	7.00	1.91	1.59	.524	.128	-.540	.255
Email Use (Log)	358	.00	1.61	.71	.43	.077	.129	-.722	.257
Web Use (Log)	361	.00	.78	.27	.20	.509	.128	-.478	.256
Movie-going (Log)	358	.00	1.15	.42	.30	.181	.129	-.709	.257
Movie Rental (Log)	358	.00	1.32	.55	.39	-.017	.129	-.956	.257
PPV Use (Log)	360	.00	1.53	.28	.33	1.094	.129	.596	.256
Length of Subscribership (Log)	364	.30	1.43	.77	.32	.425	.128	1.001	.255

After data were transformed, scatterplots were used to check for normality. If the scatterplot is roughly oval-shaped, a distribution is normal. This graphic method ensured that the normality assumption was satisfied. Table 9 displays descriptive statistics of the continuous variables used in the present study.

Statistical Analysis

A multiple regression analysis with hierarchical entry of independent variables - hierarchical regression analysis - was performed to test the hypotheses H1 – H7, and to answer research question 1. In general, multiple regression is used to control possible confounding variables that may have influenced the hypothesized relationship between variables. A minimum significance level for hypothesis testing was set at .05.

Partial correlation coefficients were also calculated to test hypothesis H8 and examine research question 2, controlling for sex, age, education, and income.

On the other hand, the four hypotheses regarding impacts of digital cable use (H9 – H12) were tested by using "two-stage least squares (2SLS)" regression analysis, because there might be reciprocal relations among the dependent variables. Standard linear regression assumes that errors in the dependent variable are uncorrelated with the independent variables. When this is not the case, linear regression using ordinary least squares (OLS) no longer provides optimal model estimates. In the conceptual model used in the current study, the error terms are not assumed to be independent of all the independent variables due to the reciprocal relations among the dependent variables. As a solution to this problem, two-stage least squares regression analysis was used

(Wooldridge, 2000). At the first stage, two-stage least squares regression applies ordinary least squares to the reduced form equation to compute the estimated values of dependent variables. At the second stage, then, estimated values are used for the second round equations instead of actual values. Since the computed values are based on variables that are no longer correlated with the error terms at the second stage, the specification problem can be solved (Wooldridge, 2000).

In addition to these analytic methods, canonical correlation analysis was performed to answer research question 3 that investigates the relationships between the independent variables and each IPG functions. Since the goal of canonical correlation is to analyze the relationships between two sets of variables (one set of variables as independent variables and the other set as dependent variables), it provides a statistical analysis to determine if and how the two sets related to each other (Tabachnick & Fidell, 2000). SPSS 10.0 was used to conduct all statistical analyses.

Chapter V

RESULTS

Descriptive Results

Motivations for Subscribing

Out of the motivations for subscribing to digital cable, the motive "to search for program listings" by the programming guide was ranked first (M= 4.00, S.D.= .88). The reason "to use the information button" which gives subscribers a summary of program, starting time and rating, was ranked second (M = 3.96, S.D. = .92). The third ranked motivation was "to watch more special interest channels" (M = 3.92, S.D.= .99). Other motivations included: "to access more movie titles" (M = 3.84, S.D. = .97), "to use flip bar" which displays program titles, starting times and ratings (M = 3.78, S.D.= 1.06), and "to access more premium channels" (M = 3.70, S.D.= 1.08). The least mentioned reason was "to order PPV movies directly by remote control" (M = 3.63, S.D.= 1.06). The mean values for the motives are reported in Table 10.

Table 10. Motivations for Digital Cable Subscription

Motivations	N	Min.	Max.	Mean	S. D.
Program Listing	364	1.00	5.00	4.00	.88
Information Button	365	1.00	5.00	3.96	.92
Specialized Channels	365	1.00	5.00	3.92	.99
More Movie Titles	365	1.00	5.00	3.84	.97
Flip Bar	364	1.00	5.00	3.78	1.06
Premium Channels	365	1.00	5.00	3.70	1.08
Easier PPV Ordering	365	1.00	5.00	3.63	1.06

Note:
- Scale ranged from 1= strongly disagree, 2= disagree, 3=neutral, 4=agree, and to 5= strongly agree.

Digital Cable Uses

The most frequently used guide functions were "Information Button" (M = 4.25, S.D.= 1.23), followed by "Time Menu" (M = 4.05, S.D.=1.38), "Channel Menu" (M = 3.68, S.D = 1.59), and "Movie Program Menu" (M = 3.42, S.D. = 1.48). The relatively rarely used functions were "Reminder" (M = 2.91, S.D. = 1.56), "Sports Program Menu" (M = 2.90, S.D. = 1.60), and "Search Function" (M = 2.32, S.D. = 1.47).

On the other hand, the degree of use for "Multiplexed Premium Channel" fell into nearly "two-three times a week" (M = 3.98, S.D = 1.07) as did "Specialized Channels" 3.80 (S.D. = 1.26). Also, the company data showed the interviewees ordered nearly three times PPV motives (M = 2. 67, S.D.=2.88) in the last three months. Table 11 shows the mean values of digital cable uses, including the use of each guide menu.

Table 11. Frequency of Digital Cable Uses

	N	Min.	Max.	Mean	S. D.
IPG Use*					
Information Button	365	1.00	5.00	4.25	1.23
Time Menu	365	1.00	5.00	4.05	1.38
Channel Menu	365	1.00	5.00	3.68	1.59
Movie Program Menu	365	1.00	5.00	3.42	1.48
Reminder	365	1.00	5.00	2.91	1.56
Sports Program Menu	365	1.00	5.00	2.90	1.60
Search Function	365	1.00	5.00	2.32	1.47
Multiplexed Premium Channels*	247	1.00	5.00	3.98	1.07
Specialized Basic Channels*	363	1.00	5.00	3.80	1.26
PPV Use (3 Months)**	362	1.00	18.00	2.67	2.88

Note:
- * : Scale ranged from 1 = never, 2 = 2-3 times a month, 3 = once a week, 4 = 2-3 times a week, and to 5 = daily.
- **: The frequency of PPV use was based on the data provided by the cable company. Thus, it reflects subscribers' actual PPV uses.

Perceptions for Guide Uses

Most users seemed to perceive the interactive program guide to be very useful in their television viewing behaviors. The item of guide utility "to make it easier to find what to watch" appeared to be the most agreeable in using the guide (M = 4.34, S.D.= .63), followed by the utility item " to save time in checking out what's on television" (M = 4.18, S.D. = .71), and the item "not to miss what to watch" (M = 3.75, S.D. = .93).

Incidentally, the users perceived the guide to be easier to use. They felt that it was "not intimidating" (M = 1.79, S.D. = .74), "not difficult" (M = 1.90, S.D. = .78), and "not frustrating" (M = 2.00, S.D. = .86) for them to use the new programming guide. Table 12 summarizes respondents' perceptions for using the interactive programming guide.

Table 12. Perceptions for using IPG

	N	Min.	Max.	Mean	S. D.
Utility Items					
Making easier	363	1.00	5.00	4.34	.63
Saving time	363	1.00	5.00	4.18	.71
Helping not to miss	363	1.00	5.00	3.75	.93
Complexity Items					
Intimidating	362	1.00	5.00	1.79	.74
Difficult	363	1.00	5.00	1.90	.78
Frustrating	363	1.00	5.00	2.00	.86

Note:
- Scale ranged from 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and to 5 = strongly agree.

General Media Use Behaviors

The respondents reported spending an average of 3.91 hours watching television per day (S.D. = 2.40). Their average number of program genres out of ten types was 3.95 with a standard deviation of 2.02. The respondents also reported to use an average of 7.31 email messages per day (S.D. = 8.74), including both sending and receiving the messages, and spend about 1 hour using the web per day (M = 1.08, S.D. = 1.06).

The respondents also reported they rented about 4 times in a video store (M = 4.19, S.D. = 4.59), and went approximately 2 times to see a movie in a theater (M = 2.34, S.D.= 2.56), during the same time period (last three months). Table 13 summarizes the respondents' general media use behaviors.

Table 13. General Media Use

	N	Min.	Max.	Mean	S. D.
Hours of TV Viewing	362	.00	12.17	3.91	2.40
# of Program Genres	365	.00	9.00	3.95	2.02
#of Email Messages	358	.00	40.00	7.31	8.74
Hours of Web Use	361	.00	5.00	1.08	1.06
Frequency of Movie Rental (3 Mo.)	358	.00	20.00	4.19	4.59
Frequency of Movie-going (3 Mo.)	358	.00	13.00	2.34	2.56

Digital Cable Adoption

Before a multiple regression analysis was performed, multicollinearity was checked because the problem may result in difficulties in estimating regression statistics. Multicollinearity occurs when two independent variables are perfectly, or nearly perfectly, correlated with each other, or when one independent variable is perfectly correlated with the combination of other independent variables. Multicollinearity can be detected by first producing a correlation matrix for all independent variables. Correlation coefficients that are above .90 reveal redundant variables. Multiple regression is then conducted with each variable in turn serving as dependent variable and all others as independent variables. A high squared multiple correlation indicates a possibility of multicollinearity among independent variables (Tabachnick & Fidell, 2000). The same procedure can be done to check for singularity. Singularity occurs when a subscale of an independent variable can be derived on the basis of another subscale or a linear combination of several subscales. If independent variables do not appear to be multicollinearity, they are seldom singular.

In order to screen potential multicollinearity problems with the independent variables for the predictive equation involving adoptive innovativeness, Pearson's correlation coefficients were computed for all independent variables. The Pearson correlation results in Table 14 clearly indicated that multicollinearity was not a concern, as none of the correlation coefficients reveled any cause for alarm (the highest coefficient was .471 between "guide use motive" and "movie use motive"). Finally, a multiple regression analysis with hierarchical entry of independent variables was performed to test the hypotheses.

Table 14

Pearson's Correlations between All Independent Variables

	Age	Education	Income	Utility	Complexity	Guide Motive	Movie Motive	Premium Sub.
Age	1.000							
Education	.228**	1.000						
Income	.451**	.368**	1.000					
Perceive Utility	.006	-.157*	-.118	1.000				
Complexity (Log)	.209**	.098	.091	-.306**	1.000			
Guide Use Motive	-.123*	-.040	-.061	.287**	-.082	1.000		
Movie Use Motive	-.134*	-.111	-.187**	.278**	-.128*	.471**	1.000	
Premium Sub.	.010	-.126*	-.070	.141*	-.155*	-.019	.231**	1.000

Note:
- * p<.05 (two-tailed); ** p<.001 (two-tailed)

Demographics

H1a: Age will be negatively related to the level of adoptive innovativeness in adopting digital cable. The younger the people are, the sooner they will adopt the digital cable.

H1b: Education will be positively related to the level of adoptive innovativeness in adopting digital cable.

H1c: Income will be positively related to the level of adoptive innovativeness in adopting digital cable.

The multiple R, R square, the standardized regression coefficients (β), and t values produced by the multiple regression analysis are presented in Table 15. The multiple R's generated by each block were statistically significant. Overall, the final regression equation accounted for 22.9% of the total variance.

Age was hypothesized to be negatively related to adoptive innovativeness for digital cable, but both directions of standardized beta and correlation coefficient were contrary to the predicted relationships (See Table 15). In other words, age was found to be positively associated with the adoptive innovativeness ($\beta = .201$, $p < .01$), indicating that older people tended to subscribe to digital cable earlier. Therefore, the hypothesis H1a was not supported.

Although the relationship between education level and adoptive innovativeness was positively significant by the Pearson's correlation ($r = .194$, $p < .01$), the relationship became insignificant ($\beta = .041$, $p > .05$) after controlling for other independent variables. Therefore, the hypothesis H1b was not supported.

Table 15

Hierarchical Multiple Regression of Predictive Factors on Adoptive Innovativeness

Predictors	Step Entered	R	R^2	R^2 change	Final β	Final t	Sig.
Demographics	1	.463	.214	.214**			
Age					.201	3.112	.002
Education					.041	.678	.499
Income					.303	4.618	.000
Perception	2	.466	.217	.003			
Utility					.081	1.257	.210
Complexity					.017	.281	.779
Motivation	3	.477	.227	.010			
Guide use motive					.012	.209	.835
Movie use motive					-.120	-1.835	.068
Premium sub.	4	.478	.229	.001	.040	.692	.489

Note:

- Model 1: $F(3, 258)=23.445$, $p < .001$; Model 2: $F(5, 256)=14.220$, $p < .001$; Model 3: $F(7, 254)=10.682$, $p < .001$
- Final Model: $R^2 = .229$, $F(8, 253)=9.388$, $p < .001$
- * $p < .05$; ** $p < .001$

With regard to income, the hypothesis H1c was strongly supported. The correlation coefficient for income was .418 ($p < .001$) in the positive direction. In addition, the income factor was found to be the strongest predictor ($\beta = .303$, $p < .001$) for the adoptive innovativeness. These demographic findings suggest that older people with higher income, than others, would subscribe to digital cable relatively earlier.

Perceptions

H2a: The level of perceived utility for digital cable will be positively related to the level of adoptive innovativeness in adopting digital cable.

H2b: The level of perceived complexity for digital cable will be negatively related to the level of adoptive innovativeness in adopting digital cable.

With regard to perception, the hypotheses predicted that the higher the perceived utility and the lower the perceived complexity for digital cable, the sooner people would subscribe to it. Contrary to the expectations, these perceptions were not correlated with digital cable adoption. As seen in the second step of Table 15, neither the perceived utility ($\beta = .081$, $p > .05$) nor the perceived complexity ($\beta = .017$, $p > .05$) were found to be related to the adoptive innovativeness in adopting digital cable. Therefore, both hypotheses H2a and H2b were not supported.

Motivations

RQ1: What motives are related to earlier adoption of digital cable?

As discussed in the previous section, the factor analysis regarding subscription motivation produced two motivation factors: 1) guide use motivation, 2) movie use motivation. The first research question examined which motivation was related to the adoption speed for digital cable. The results of regression analysis in the third block of

Table 15 showed that no subscription motivations were related to the adoptive innovativeness. The results suggest that how soon people adopt digital cable was not influenced by the motivations for "guide use" (β = .012, p > .05) as well as for "movie use" (β = - .120, p > .05).

Prior Experience

> H3: The subscribership to premium channels will be positively related to the level of adoptive innovativeness in adopting digital cable.

The hypothesis H3 expected a positive relationship between the premium channel subscribership and the level of innovativeness in adopting digital cable because premium channel subscribers were assumed to have prior experience in using a similar medium.

As seen in the final block of Table 15, however, there was no significant relationship between the two variables (β = .040, p > .05), indicating that prior experience with premium channels did not contribute to the upgrading behavior toward digital cable. Therefore, hypothesis H3 was not supported.

Digital Cable Usage

Before a multiple regression analysis for digital cable use was performed, a possibility of multicollinearlty problem was checked. As seen in Table 16, the highest intercorrelation among the independent variables was .454 between "email use" and "web use," which was not strong enough to cause multicollinearity problems in the multiple regression. Since no evidence of multicollinearity and singularity among the independent variables was found, the hierarchical regression analysis was, then, performed.

Table 16

Pearson's Correlations between All Independent Variables

	Age	Education	IPG Utility	IPG complexity	Ritualistic Motive	Instru. Motive	Prem. Sub.	Email	Web
Age	1.000								
Education	.261**	1.000							
Perceived IPG Utility	-.044	-.045	1.000						
Perceived IPG Complex.	.183**	-.020	-.421**	1.000					
Ritualistic Motive	-.353**	-.238**	.101*	-.042	1.000				
Instrumental Motive	.059	.027	.197**	-.065	.000	1.000			
Premium Subscribership	-.006	-.053	.130**	-.072	.010	.067	1.000		
Email Use (Log)	-.170**	.223**	-.077	-.089	.006	-.136**	.056	1.000	
Web Use (Log)	-.230**	-.006	-.010	-.096	.096	.009	.102	.454**	1.000

Note:
- * p<.05 (two-tailed); ** p<.001 (two-tailed)

Demographics

H4a: Age will be negatively related to the use of IPG.

H4b: Education will be positively related to the use of IPG.

Table 17 presents multiple R, R square, the standardized regression coefficients (β), and t values of the predictive variables for the IPG use. The multiple R's generated by each block were statistically significant. Overall, the final regression equation accounted for 14.8% of the total variance.

As expected, age was found to be negatively associated with IPG use (β = -.153, $p < .01$), suggesting that younger people were more likely to use the IPG. Therefore, H4a was supported. However, education did not appear to have any significant relationship with IPG use (β = .019, $p > .05$), which failed to support hypothesis H4b.

Perception

H5a: The level of "perceived IPG utility" will be positively related to the use of IPG.

H5b: The level of "perceived IPG complexity" will be negatively related to the use of IPG.

Hypotheses H5a and H5b dealt with the relationships between user's perception and the actual use of IPG. The results supported both hypotheses (See Table 17).

Table 17

Hierarchical Multiple Regression of Predictive Factors on IPG Use

Predictors	Step Entered	R	R^2	R^2 Change	Final β	Final t	Sig.
Demographics	1	.191	.036	.036**			
Age					-.153	-2.660	.008
Education					.019	.348	.728
Perception (IPG)	2	.354	.125	.089**			
Perceived Utility					.172	3.008	.003
Perceived Comp.					-.152	-2.694	.007
Motivation	3	.360	.130	.004			
Instrumental Mot.					.038	.737	.462
Ritualistic Mot.					.147	.872	.384
Prior Experience	4	.385	.148	.019			
Premium Sub.					.132	2.592	.010
Email Use (Log)					-.059	-.989	.323
Web Use (Log)					.008	.145	.885

Note:

- Model 1: $F(2, 348)=6.559$, $p < .001$; Model 2: $F(4, 346)=12.378$, $p < .001$; Model 3: $F(6, 344)=8.532$, $p < .001$
- Final Model: $R^2 = .148$, $F(9, 341)=6.592$, $p < .001$
- * $p < .05$; ** $p < .001$

"Perceived IPG utility" was positively related to "IPG use" (β = .172, $p < .01$) which supported hypothesis H5a (See Table 17). This result suggest that as people's guide utility was higher, they were more likely to use the IPG.

"Perceived IPG complexity" appeared to have a significant predictor for IPG use as well. The relationship between "perceived IPG complexity" and "IPG use" was negative and significant (β = -.152, $p < .01$). Thus, hypothesis H5b was also supported, indicating that as users perceived the IPG to be easier to use, their use of it would also increase.

Motivation

H6: The instrumental viewing motive will be positively related to the use of IPG.

Hypothesis H6 predicted that viewers with an instrumental motive were more likely to use the IPG as an active participation to seek television content. Contrary to the expectation, the instrumental motive did not appear to contribute to IPG use, as seen in the third block of Table 17. The relationship between the motive and IPG use was positive, but not significant (β = .038, $p > .05$). Therefore, hypothesis H6 was not supported.

Even though the ritualistic viewing motive was found to be significantly related to IPG use by Pearson's zero-order correlation ($r = .122$, $p < .05$), the significant relationship became insignificant and negligible (β = .047, $p > .05$) when other independent factors were controlled.

RQ2: Are the subscription motives for digital cable actually related to their relevant uses?

The second research question examined any relationships between subscription motives and their actual uses. The main motives to subscribe to digital cable were: 1) "guide use motive"; and 2) "movie use motive" produced by a factor analysis. In addition to these two motives, "specialized channel use motive" can be considered as another important motive to use digital cable (Kang, 1999), although the motive failed to be in a group by the factor analysis.

Table 18. Zero-Order and Partial Correlations between Motives and Their Actual Uses

	Specialized Channel Use	IPG Use	Multiplexed Premium Use
Specialized Channel Motive	.437** (.438**) *N*=363[a]		
Guide Motive		.304** (.292**) *N*=363[a]	
Movie Motive			.289** (.280**) *N*=247[b]

Note:
- a: *N* includes all digital cable subscribers.
- b: *N* includes only digital cable subscribers with premium channels.
- ** $p < .001$
- Coefficients in the parenthesis represent partial correlations controlling for sex, age, education, and income.

Table 18 displays how each motive relates to its actual use. As seen in the table, the motive for "special channel use" was related to its actual use ($r = .437$, $p < .001$).

Similarly, "guide use motive" was also associated with its actual IPG use ($r = .304$, $p < .001$), as was the relationship between "movie use motive" and multiplexed channel use ($r = .289$, $p < .001$). All significant relationships remained significant at .001 level after controlling for sex, age, education, and income. In sum, subscription motives and their actual uses were strongly correlated with each other. The results show how people select and use media purposefully in order to fulfill their needs, which is consistent with the basic assumptions of uses and gratifications theory.

Prior Experience

H7a: The subscribership to premium channels will be positively related to the use of IPG.

H7b: The interactive use of e-mail will be positively related to the use of IPG.

H7c: The interactive use of web will be positively related to the use of IPG.

It was hypothesized that people would use IPG more if they had prior experience to use similar interactive media. Results showed that prior experience to use premium channels could contribute to use of IPG. As seen in the final block of Table 17, the subscribership to premium channels was found to be associated with IPG use ($\beta = .132$, $p < .01$), which supported hypothesis H7a.

However, neither email use ($\beta = -.059$, $p > .05$) nor web use ($\beta = .008$, $p > .05$) appeared to have any relationships with IPG use. Therefore, both hypotheses H7b and H7c were not supported.

Length of Subscribership

H8a: The length of digital cable subscribership will be positively related to the use of "specialized channels."

H8b: The length of digital cable subscribership will be positively related to the use of "multiplexed channels."

H8c: The length of digital cable subscribership will be positively related to the use of "PPV channels."

H8d: The length of digital cable subscribership will be positively related to the use of "IPG."

Table 19 provides Pearson's zero-order correlations and partial correlation coefficients for the relationships between the length of digital cable subscribership and each dimension of digital cable uses.

Table 19

Zero-Order correlations and Partial Correlations between Length of Subscribership and Digital Cable Uses

	Specialized Channel Use	Multiplexed Channel use	PPV Use (Log)	IPG Use
Length of Subscribership (Log)	.060 (.066) *N*=362[a]	-.060 (.024) *N*=246[b]	.035 (.062) *N*=359[a]	-.105* (-.043) *N*=364[a]

Note:
- a: *N* includes all digital cable subscribers.
- b: *N* includes only digital cable subscribers with premium channels.
- ** $p < .05$
- Coefficients in the parenthesis represent partial correlations controlling for sex, age, education, and income.

Results indicated that there were no significant relationships between length of subscribership and digital cable uses. According to Pearson's zero-order correlation

coefficients, the length of subscribership was found to be negatively associated with the use of IPG ($r = -.105$, $p < .05$). However, the significant relationship removed ($r's = -.043$, $p > .05$) when controlling for demographic variables such as sex, age, education, and income. Thus, all hypotheses (H8a - H8d) regarding length of subscribership were not supported.

Interactive Program Guide (IPG) Usage

RQ3: Which factors are related to the use of specific IPG features?

The third research question explored factors to explain the use of each function of IPG. Canonical correlation coefficients were calculated in order to examine the multivariate links between the set of predictive factors and the set of specific functions of IPG.

The predictive factor set included age, education, premium channel subscribership, perceived IPG utility, Perceived IPG complexity, subscription motives, television viewing motives, and length of digital cable subscribership. The IPG function set measured a variety of guide functions: time menu, channel menu, search function, movie program menu, sports program menu, and program information button. As Table 20 shows, two significant roots were identified. The first canonical correlation was .498 (χ^2 (70) = 173.689, $p < .001$), and the second canonical correlation was .297 (χ^2 (54) = 76.459, $p < .05$). The remaining five canonical correlations were not significant. The first two pairs of canonical variates accounted for the significant relationships between the two sets of variables, and only these are, therefore, interpreted.

Table 20. Canonical Correlations

Set	Canonical Correlations	Wilk's Lamda	Chi-Square	DF	Sig.
1	.498	.601	173.689	70.00	.000
2	.297	.799	76.459	54.00	.024
3	.253	.876	45.002	40.00	.270
4	.182	.936	22.489	28.00	.758
5	.147	.968	11.018	18.00	.894
6	.093	.990	3.549	10.00	.965
7	.042	.998	.591	4.00	.964

Table 21 displays data on the first two pairs of canonical variates. Canonical loadings are presented in the table. Redundancy coefficients, which explain the variance of one set accounted for by the other set's canonical variate, are also reported.

Interpretation of reliable pairs of canonical variates is based on the canonical loading. Each pair of canonical variates is interpreted as a pair, with a variate from one set of variables interpreted vis-à-vis the variate from the other set. A variate is interpreted by considering the pattern of variables highly correlated (loaded) with it. In general, variables with correlations of .30 (9% of variance) and above are interpreted as part of the variate, and variables with loadings below .30 are not (Lambert & Durand, 1975; Tabachnick & Fidell, 2000).

Table 21

Canonical Correlations: Independent Factors and IPG Functions

	Root 1	Root 2
Set 1: Predictors		
Age	.425	-.391
Education	.196	.639
Premium Subscribership	-.374	-.125
Guide Use Motive	-.456	.156
Movie Use Motive	-.551	-.207
Perceived IPG Utility	-.683	-.006
Perceived IPG Complexity	.577	-.314
Ritualistic Motive	-.273	-.069
Instrumental Motive	-.226	-.334
Length of Subscribership	.335	.206
Redundancy Coefficients	[.047]	[.008]
Set2: IPG Functions		
Reminder Function	-.839	-.165
Time Menu	-.326	.507
Channel Menu	-.458	-.013
Search Function	-.196	.127
Movie Menu	-.540	-.372
Sports Menu	-.357	.074
Information Button	-.379	.705
Redundancy Coefficients	[.057]	[.012]

The first canonical root (R_c = .498, p < .001) explained 24.8 % of the common variance between the canonical variates. With a cutoff correlation of .30, the variables in set one that were correlated with the first canonical variate were age (.425), premium channel subscribership (-.374), guide use motive (-.456), movie use motive (-.551), perceived IPG utility (-.683), perceived IPG complexity (.577), and length of subscribership (.335). The dominant relationship in set one was a positive association between age and perceived IPG complexity, indicating that older people feel the IPG is more complex to use. A negative link also was evident between age and perceived IPG utility, meaning that perceived IPG utility is lower among older people than others.

Set two was marked by negative loadings of "Reminder Function" (-.839), "Time Menu" (-.326), "Channel Menu" (-.458), "Movie Menu" (-.540), "Sports Menu" (-.357), and "Information Button" (-.379).

Across the set, then, the canonical loadings indicated that older people perceiving a higher IPG complexity were less likely to use a variety of IPG menus. In particular, it was found that those who have lower perceived utility for IPG and feel less comfortable with it, were less likely to use the "Reminder Function," the usage of which may demand the highest involvement and mental effort. Length of digital cable subscribership was found to be negatively related to uses of all the guide menus. The longer the IPG has been in the home, the less it would be used by people. In a similar fashion, this result suggests that most IPG functions would be more frequently used by the later subscribers when the new guide was initially introduced in the home.

The second canonical root (R_c = .297, p < .05) explained 8.8 % of the common variance between the canonical variates. The small amount of variance, however, suggests that cautious interpretation of the second pair is necessary. The first set was dominated by age (-.391), education (.639), perceived IPG complexity (-.314), and instrumental viewing motive (-.334), and the second set by "Time Menu" (.507), "Movie Menu" (-.372), and "Information Button" (.705).

The primary association in set one was negative links between education and age, perceived IPG complexity, and instrumental viewing motive. Set two had a positive association between "Time Menu" and "Information Button." There also were negative links between these variables and "Movie Menu" in the second set.

Across the two sets, then, the canonical loadings showed that as people were better educated, they were more likely to use the "Information Button" as well as the "Time Menu," and less likely to use the "Movie Menu." The canonical loadings also indicated that younger people with lower perceived IPG complexity and a lower instrumental viewing motive, were more likely to use the "Information Button" and the "Time Menu," and less likely to use the "Movie Menu."

Impacts of Digital Cable Use

As discussed in the previous section, it is assumed that there are reciprocal relationships among the dependent variables in the current study. As seen in the Table 22, correlation coefficients among the dependent variables indicated they were correlated with each other, which supports using the simultaneous equation model.

Table 22. Correlation Coefficients among Dependent Variables

	TV Viewing	Satisfac.	Diversifica.	Repertoire	Movie-Going	Movie-rentals
TV Viewing	1.000					
Satisfaction	.124*	1.000				
Diversification	.381**	.206**	1.000			
Repertoire	.188**	.157**	.202**	1.000		
Movie-going	-.011	-.081	.043	-.009	1.000	
Movie-Rentals	-.037	-.121*	-.089	-.025	.250**	1.000

Note:
- *N* ranged from 359 to 362
- * p <.05; ** p <.001

As a simultaneous equation model, two-stage least squares regression (2-SLS) was used to solve this problem (Wooldridge, 2000). Two-stage least squares regression uses instrumental variables that are *uncorrelated* with the error terms to compute estimated values of the problematic predictors (the first stage), and then uses those computed values to estimate a linear regression model of the dependent variables (the second stage). Since the computed values are based on variables that are uncorrelated with the errors, the results of the two-stage model are optimal (SPSS, 1999).

To describe this approach, the simple regression equation is written as

$$y = \beta_0 + \beta_1 x + u$$

where x and u are correlated. That is,

$$\text{Cov } (x, u) \neq 0$$

In order to obtain consistent estimators of β_0 and β_1 when x and u are correlated, one needs an observable variable z. Here,

1) z is *uncorrelated* with u, that is,

$$\text{Cov } (z, u) = 0$$

2) z is *correlated* with x, that is,

$$\text{Cov } (z, x) \neq 0$$

Then, one can call z an instrumental variable for x.

A technique to find "instrumental variables" is to identify the variables through a correlation matrix. If there are any variables that are highly *correlated* with explanatory variables, but assumed to be *uncorrelated* with the errors, one can use them as an instrumental variable. By using this technique, some variables in the current study were identified, and then used as "instrumental variables."

They were: a) "age," which was negatively correlated with guide use ($r = -.190$, $p<.001$), b) "guide use motive" correlated with IPG use ($r = .304$, $p < .001$), c) "movie use motive" correlated with multiplexed channel use ($r = .311$, $p <.001$), d) "perceived utility for digital cable" correlated with IPG use ($r = .200$, $p < .001$), e) "perceived complexity for digital cable" negatively correlated with IPG use ($r = -.232$, $p < .001$), f) "perceived IPG utility" correlated with IPG use ($r = .276$, $p < .001$), and g) "perceived IPG complexity" negatively correlated with IPG use ($r = -.262$, $p < .001$).

That is, the instrumental variables used in this study were z_1 = age, z_2 = guide use motive, z_3 = movie use motive, z_4 = perceived utility for digital cable, z_5 = perceived complexity for digital cable, z_6 = perceived IPG utility, and z_7 = perceived IPG complexity.

The output provided by the analysis and its interpretations are typically quite similar to those for standard regression analysis (Wooldridge, 2000). In other words, the two-stage least squares regression analysis produces standardized (β) and unstandardized regression coefficients (B), multiple R, R square, adjusted R square, and analysis of variance for each regression model.

Amount of TV Viewing

H9a: The use of "specialized channels" will be positively related to the amount of TV viewing.

H9b: The use of "multiplexed channels" will be positively related to the amount of TV viewing.

H9c: The use of "PPV channels" will be positively related to the amount of TV viewing.

H9d: The use of "IPG" will be positively related to the amount of TV viewing.

Hypothesis H9 dealt with the impact of digital cable uses on television viewing time. The 2SLS regression equation for this hypothesis is written as

$$y_1 = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + u_1$$

where y_1 = amount of TV viewing, x_1 = specialized channel use, x_2 = multiplexed channel use, x_3 = PPV use, and x_4 = IPG use.

Then, the reduced form equation for endogenous regressors is,

$$x_1 = \pi_{10} + \pi_{11}z_1 + \pi_{12}z_2 + \pi_{13}z_3 + \pi_{14}z_4 + \pi_{15}z_5 + \pi_{16}z_6 + \pi_{17}z_7 + v_1$$

$$x_2 = \pi_{20} + \pi_{21}z_1 + \pi_{22}z_2 + \pi_{23}z_3 + \pi_{24}z_4 + \pi_{25}z_5 + \pi_{26}z_6 + \pi_{27}z_7 + v_2$$

$$x_3 = \pi_{30} + \pi_{31}z_1 + \pi_{32}z_2 + \pi_{33}z_3 + \pi_{34}z_4 + \pi_{35}z_5 + \pi_{36}z_6 + \pi_{37}z_7 + v_3$$

$$x_4 = \pi_{40} + \pi_{41}z_1 + \pi_{42}z_2 + \pi_{43}z_3 + \pi_{44}z_4 + \pi_{45}z_5 + \pi_{46}z_6 + \pi_{47}z_7 + v_4$$

where x_1 = specialized channel use, x_2 = multiplexed channel use, x_3 = PPV use, x_4 = IPG use, z_1 = age, z_2 = guide use motive, z_3 = movie use motive, z_4 = perceived utility for digital cable, z_5 = perceived complexity for digital cable, z_6 = perceived IPG utility, and z_7 = perceived IPG complexity.

Correlation and regression results are shown in Table 23. The 2SLS regression model was able to account for 10.9% of the total variance.

The results of 2SLS regression analysis showed that "multiplexed channel use" (β = .146, $p < .01$) and "IPG use" (β = .260, $p < .001$) were significantly related to television viewing time, supporting the expectation that the digital cable may stimulate people to watch more television. People who used "multiplexed premium channels" were more likely to watch more television, as did people who used IPG more. Therefore, hypotheses H9b and H9d were supported.

However, neither "specialized channel use" (β = -.005, $p > .05$) nor "PPV use" (β = -.070, $p > .05$) contributed to TV viewing time, leaving H9a and H9c without support.

Table 23. Two-Stage Least Squares (2SLS) Regression of Digital Cable Uses on TV Viewing Time

	B	S. E.	β	T	Sig.
(Constant)	-.258	.953		-.271	.7866
Specialized Channel Use	-.009	.139	-.005	-.068	.9462
Multiplexed Channel Use	.351	.157	.146	2.240	.0261
PPV use (Log)	-.546	.488	-.070	-1.094	.2753
IPG Use	-.258	.952	.260	3.955	.0001

Note:
- Model: $R = .331$, $R^2 = .109$, $F(4, 225) = 6.917$, $p < .001$

Satisfaction

H10a: The use of "specialized channels" will be positively related to overall satisfaction with digital cable.

H10b: The use of "multiplexed channels" will be positively related to overall satisfaction with digital cable.

H10c: The use of "PPV channels" will be positively related to overall satisfaction with digital cable.

H10d: The use of "IPG" will be positively related to overall satisfaction with digital cable.

Hypothesis H10 expected that digital cable uses might contribute to higher satisfaction. The 2SLS regression equation for this hypothesis is written as

$$y_2 = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + u_2$$

where y_2 = satisfaction, x_1 = specialized channel use, x_2 = multiplexed channel use, x_3 = PPV use, and x_4 = IPG use.

Then, the reduced form equation for endogenous regressors is,

$$x_1 = \pi_{10} + \pi_{11} z_1 + \pi_{12} z_2 + \pi_{13} z_3 + \pi_{14} z_4 + \pi_{15} z_5 + \pi_{16} z_6 + \pi_{17} z_7 + v_1$$

$$x_2 = \pi_{20} + \pi_{21} z_1 + \pi_{22} z_2 + \pi_{23} z_3 + \pi_{24} z_4 + \pi_{25} z_5 + \pi_{26} z_6 + \pi_{27} z_7 + v_2$$

$$x_3 = \pi_{30} + \pi_{31} z_1 + \pi_{32} z_2 + \pi_{33} z_3 + \pi_{34} z_4 + \pi_{35} z_5 + \pi_{36} z_6 + \pi_{37} z_7 + v_3$$

$$x_4 = \pi_{40} + \pi_{41} z_1 + \pi_{42} z_2 + \pi_{43} z_3 + \pi_{44} z_4 + \pi_{45} z_5 + \pi_{46} z_6 + \pi_{47} z_7 + v_4$$

where x_1 = specialized channel use, x_2 = multiplexed channel use, x_3 = PPV use, x_4 = IPG use, z_1 = age, z_2 = guide use motive, z_3 = movie use motive, z_4 = perceived utility for digital cable, z_5 = perceived complexity for digital cable, z_6 = perceived IPG utility, and z_7 = perceived IPG complexity.

Table 24 summarizes correlation and 2SLS regression results. The results of the regression model, which explained 6.4 % of the total variance.

Out of four dimensions of digital cable uses, only "IPG use" ($\beta = .198$, $p < .001$), turned out to be related to satisfaction with digital cable, providing supports for hypothesis H10d. This result indicated that as people used IPG more, their satisfaction with digital cable was higher.

"Specialized channel use," "multiplexed channel use," and "PPV use," however, did not appear to contribute to digital cable satisfaction. Thus, H10a, H10b, and H10c were not supported.

Table 24. Two-Stage Least Squares (2SLS) Regression of Digital Cable Uses on Satisfaction

	B	S. E.	β	t	Sig.
(Constant)	6.714	.581		11.552	.0000
Specialized Channel Use	.144	.086	.114	1.667	.0969
Multiplexed Channel Use	-.080	.095	-.056	-.839	.4023
PPV use (Log)	-.185	.307	-.039	-.601	.5482
IPG Use	.403	.137	.198	2.932	.0037

Note:
- Model: $R = .253$, $R^2 = .064$, $F(4, 226) = 3.872$, $p < .001$

Diversification

H11a: The use of "specialized channels" will be positively related to the level of diversification. The use of specialized channels will lead to watching more different types of programs.

H11b: The use of "IPG" will be positively related to the level of diversification.

Hypothesis H11 predicted that the use of specialized channels and IPG might increase the breath of viewing program types. The 2SLS regression equation for this hypothesis is written as

$$y_3 = \beta_0 + \beta_1 x_1 + \beta_4 x_4 + u_3$$

where y_3 = diversification, x_1 = specialized channel use and x_4 = IPG use.

Then, the reduced form equation for endogenous regressors is,

$$x_1 = \pi_{10} + \pi_{11} z_1 + \pi_{12} z_2 + \pi_{13} z_3 + \pi_{14} z_4 + \pi_{15} z_5 + \pi_{16} z_6 + \pi_{17} z_7 + v_1$$

$$x_4 = \pi_{40} + \pi_{41} z_1 + \pi_{42} z_2 + \pi_{43} z_3 + \pi_{44} z_4 + \pi_{45} z_5 + \pi_{46} z_6 + \pi_{47} z_7 + v_4$$

where x_1 = specialized channel use, x_4 = IPG use, z_1 = age, z_2 = guide use motive, z_3 = movie use motive, z_4 = perceived utility for digital cable, z_5 = perceived complexity for digital cable, z_6 = perceived IPG utility, and z_7 = perceived IPG complexity.

Table 25 summarizes the results of correlation and 2SLS regression, which explained 6.2% of the total variance.

The hypotheses were partly supported. "IPG use" was found to be significantly related to channel diversification, suggesting that the more people use IPG, the more they would watch different types of television programs (See Table 25). The strong relationship between "IPG use" and "diversification" was sustained in the results of 2SLS regression analysis. The results of the regression analysis showed IPG use was positively and significantly related to the diversification of program types ($\beta = .256$, $p < .001$), which is in support of H11b.

However, no relationship was found between "specialized channel use" and "diversification," which rejected H11a.

Table 25. Two-Stage Least Squares (2SLS) Regression of Digital Cable Uses on Diversification

	B	S. E.	β	T	Sig.
(Constant)	2.180	.659		3.308	.0011
Specialized Channel Use	-.009	.107	-.061	-.928	.3546
IPG Use	.679	.174	.256	3.893	.0001

Note:
- Model: $R = .248$, $R^2 = .062$, $F(2, 230) = 7.577$, $p < .001$

Channel Repertoire

H12a: The use of "specialized channels" will be positively related to the number of channel repertoire among the specialized channels.

H12b: The use of IPG will be positively related to the number of channel repertoire among the specialized channels.

Both hypotheses H12a and H12b predicted the use of "specialized channels" and "IPG" would contribute to the increase of channel repertoires. The 2SLS regression equation for this hypothesis is written as

$$y_4 = \beta_0 + \beta_1 x_1 + \beta_4 x_4 + u_3$$

where y_4 = channel repertoire, x_1 = specialized channel use and x_4 = IPG use.

Then, the reduced form equation for endogenous regressors is,

$$x_1 = \pi_{10} + \pi_{11} z_1 + \pi_{12} z_2 + \pi_{13} z_3 + \pi_{14} z_4 + \pi_{15} z_5 + \pi_{16} z_6 + \pi_{17} z_7 + v_1$$

$$x_4 = \pi_{40} + \pi_{41} z_1 + \pi_{42} z_2 + \pi_{43} z_3 + \pi_{44} z_4 + \pi_{45} z_5 + \pi_{46} z_6 + \pi_{47} z_7 + v_4$$

where x_1 = specialized channel use, x_4 = IPG use, z_1 = age, z_2 = guide use motive, z_3 = movie use motive, z_4 = perceived utility for digital cable, z_5 = perceived complexity for digital cable, z_6 = perceived IPG utility, and z_7 = perceived IPG complexity.

Table 26 displays the results of correlation and 2SLS regression analysis. The regression model explained 34.2% of the total variance.

Both H12a and H12b were supported by the results of Table 26. "Specialized channel use" was significantly related to the number of channel repertoire ($r = .518$, $p < .001$), as was "IPG use" ($r = .373$, $p < .001$). When channel repertoire was regressed on the two expected predictors, both specialized channel use ($\beta = .476$, $p < .01$) and IPG use ($\beta = .243$, $p < .01$) were also found to be contribute to increase of channel repertoires. These results explained that as people used the "specialized basic channels" and the "IPG" more, the number of channels they watch regularly was also increased.

Table 26 Two-Stage Least Squares (2SLS) Regression of Digital Cable Uses on Channel Repertoire

	B	S. E.	β	t	Sig.
(Constant)	-2.006	.422		-4.754	.0000
Specialized Channel Use	.591	.069	.476	8.613	.0000
IPG Use	.492	.112	.243	4.408	.0000

Note:
- Model: $R = .585$, $R^2 = .342$, $F(2, 229) = 59.659$, $p < .001$

Consumption of Competing Media

H13a: The use of "multiplexed channels" will be negatively related to the frequency of movie-going.

H13b: The use of "multiplexed channels" will be negatively related to the use of video rentals.

H13c: The use of "PPV channels" will be negatively related to the frequency of movie-going.

H13d: The use of "PPV channels" will be negatively related to the use of video rentals.

Finally, hypothesis H13, which expected digital cable movie uses would displace established movie consumption, was supported in part. As Table 27 shows, PPV use appeared to be negatively related to movie-rentals by a partial correlation coefficient (r's = -.131, $p < .05$) , in support of H13d. Although small in absolute size, the linkage of this negative relationship was significant, indicating that PPV use via digital cable may displace or substitute for movie-rentals. However, no significant relationship was found between "PPV use" and "movie-going," which failed to support H13c.

On the other hand, no "multiplexed premium channel use" appeared to have significant relationships with "movie-going" (r's = .124, $p > .05$) and "movie-rental" (r's = .121, $p > .05$). Therefore, both the hypotheses H13a and H13b were not supported. These results suggest that "multiplexed premium channels" did not reduce established movie consumption.

Table 27 provides the zero-order Person's correlation coefficients and partial correlation coefficients controlling for sex, age, education, and income.

Table 27. Zero-Order and Partial Correlations between Digital Cable Uses and the Consumption of Their Competing Media

	Movie-going (Log)	Movie Rental (Log)
Multiplexed Premium Channel Use	.145* (.124) N=242[b]	.125 (.121) N=243[b]
PPV Use (Log)	.050 (-.006) N=353[a]	-.117* (-.131*) N=353[a]

Note:
- a: N includes all digital cable subscribers.
- b: N includes only digital cable subscribers with premium channels.
- * $p < .05$
- Coefficients in the parenthesis represent partial correlations controlling for sex, age, education, and income.

Table 28 summarizes the results of the hypothesis testing. In the results, there is full support for two hypotheses, H5 and H12, and partial support for H1, H4, H7, H9, H10, H11, and H13. In the next chapter, these results, alone and in a broader context, are discussed.

Table 28. Summary for Hypothesized Relationships and Their Results

Independent Variables	Dependent Variables	Hypothesis	Hypothesized Relationships	Results
Age	Innovativeness	H1a	-	Unsupported (+)
Education	"	H1b	+	Unsupported (ns)
Income	"	H1c	+	Supported
Perceived Utility	"	H2a	+	Unsupported (ns)
Perceived Complexity	"	H2b	-	Unsupported (ns)
Premium Sub.	"	H3	+	Unsupported (ns)
Age	IPG USE	H4a	-	Supported
Education	"	H4b	+	Unsupported (ns)
Perceived IPG Utility	"	H5a	+	Supported
Perceived IPG Comp.	"	H5b	-	Supported
Instrumental Motive	"	H6	+	Unsupported (ns)
Premium Sub.	"	H7a	+	Supported
E-mail Use	"	H7b	+	Unsupported (ns)
Web Use	"	H7c	+	Unsupported (ns)
Length of Subscrib.	Specialized Ch. Use	H8a	+	Unsupported (ns)
"	Multiplexed Ch. Use	H8b	+	Unsupported (ns)
"	PPV Channel Use	H8c	+	Unsupported (ns)
"	IPG Use	H8d	+	Unsupported (ns)
Specialized Ch. Use	TV Viewing	H9a	+	Unsupported (ns)
Multiplexed Ch. Use	"	H9b	+	Supported
PPV Channel Use	"	H9c	+	Unsupported (ns)
IPG Use	"	H9d	+	Supported
Specialized Ch. Use	Satisfaction	H10a	+	Unsupported (ns)
Multiplexed Ch. Use	"	H10b	+	Unsupported (ns)
PPV Channel Use	"	H10c	+	Unsupported (ns)
IPG Use	"	H10d	+	Supported
Specialized Ch. Use	Diversification	H11a	+	Unsupported (ns)
IPG Use	"	H11b	+	Supported
Specialized Ch. Use	Repertoire	H12a	+	Supported
IPG Use	"	H12b	+	Supported
Multiplexed Ch. Use	Movie-Going	H13a	+	Unsupported (ns)
"	Video Rentals	H13b	+	Unsupported (ns)
PPV Channel Use	Movie-Going	H13c	+	Unsupported (ns)
"	Video Rentals	H13d	+	Supported

Note:
- Ch.: Channel / ns: non-significant

Chapter VI

SUMMARY AND DISCUSSION

This chapter summarizes the results of the hypothesis testing in terms of the contribution of each variable to our understanding of digital cable adoption, uses, and their impacts. Based upon the findings, theoretical and practical implications are discussed together with limitations of this study and suggestions for future research.

Digital Cable Adoption

The first goal of this study was to explore characteristics of existing digital cable subscribers by examining adoptive innovativeness and its relations to demographics, perceptions, motivations and premium channel subscribership. Findings of this study partly supported the propositions that have been derived from diffusion theory.

The current study found that people who have higher income tended to subscribe to digital cable earlier. This finding confirmed the diffusion theory's postulation that earlier adopters of new communication technology would be of higher income.

It should be noted here that cost is one of the most important factors in determining whether current cable customers will upgrade, downgrade or maintain their level of cable service (Umphrey, 1991). Although the initial cost to upgrade to digital cable was at most about $50 ($ 40 for installation charge plus $10 for monthly fee), it

seemed to influence some current subscribers on how soon they would upgrade to the new cable service. For upscale customers, the cost might not be a significant deterrent to adopt digital cable, but it might be for lower income people.

On the other hand, age appeared to be positively related to consumers' innovativeness in upgrading to digital cable, suggesting that older people would subscribe to digital cable earlier. This is opposite of the original expectation. Perhaps, since older people tend to have a higher income, their greater buying power could lead them to subscribe to digital cable earlier. These interpretations were supported in this study by a high correlation coefficient between age and income ($r = .478$, $p < .001$). Although digital cable involves high technology, on the contrary, younger people's lower income may constrain them from earlier access to the technology.

Even though, in fact, several studies have provided demographics profiles of cable subscribers (e. g., LaRose & Atkin, 1988; Reagan, 1987; Sparkes, 1983), the studies have been tempered by the inconsistent and often contradictory nature of predictor sets among common demographic variables that are included across studies. Some find income is an important predictor, along with education (e. g., Rothe, Harvey, & Michael, 1983), for example, but others fail to uncover any differences in education level (e. g., Collins, Reagan, & Abel, 1983). Similarly, in this study education was found to be unrelated and age appeared to be even negatively related to digital cable subscribership. These inconsistent or contradictory findings may be due, in part, to the time in which studies were conducted. Perhaps, since this study was conducted in the early "take-off" stage, the traditional demographic differences might not apply to the early diffusion stage of this new cable service.

Contrary to the expectation generated from the diffusion literature, consumers' perceptions toward digital cable were found to be irrelevant to the earlier adoption of the new technology. In this study, neither perceived utility nor perceived complexity appeared as a significant factor in predicting earlier adoption of digital cable, in contrast to past research findings (e.g., Carlin, 1998; LaRose & Atkin, 1991; Lin, 1998a). This result is somewhat interesting in that perception factors appeared much more important than demographic factors in predicting whether or not people adopted digital cable in an earlier study (Kang, in process). Even though the perception factors have an important role in determining whether or not people adopt digital cable, the factors seem to be less important in predicting *how early* the digital cable subscribers adopt.

In addition, the subscription motives appeared to be irrelevant factors in explaining how soon people would adopt digital cable. Although a significant and negative relationship of "movie use motive" with the adoptive innovativeness was found in Pearson's correlation coefficients ($r = -.170$), the relationship became insignificant and negligible when controlling for all other independent factors.

IPG Use

The second research goal of this study was to examine the use of the interactive programming guide (IPG) and its relationship with each predictive factor in terms of demographics, user perceptions, motivations, prior experience, and length of subscribership. Significant results drawn from empirical hypothesis testing are discussed below.

Demographics

As expected, age was found to be negatively related to IPG use. The negative relationship between the two variables reflects that younger people are more likely to use the new technology than their counterparts. It seems likely that they are relatively more at ease and enthusiastic with such a new technology. As Mundorf and Westin (1996) noted, their venturesomeness or willingness to try new technologies might stimulate younger people to use the innovative technology, IPG. This finding was consistent with past research (Garramone et al., 1986).

Education level, however, was not relevant to IPG use. In this study, there was no evidence that education level was a significant deterrent. This suggests that consumers' education level be of no real concern for cable companies in marketing the emerging technology.

Perceptions

Not surprisingly, it was found that users' perception is important in making use of the new technology, IPG. Both "perceived IPG utility" and "perceived IPG complexity" appeared to be associated with IPG use. Of them, the perceived IPG utility was the strongest factor for IPG use ($\beta = .172$), confirming the notion that "media use behavior may be related to the perceived benefits of engaging in the behavior" (Atkin & LaRose, 1994, p. 101).

Nevertheless, it can not be determined whether perception of utility preceded usage or usage created a perception of utility. Either behavior supports a post-adoption

marketing objective of attempting to elevate the perception of utility and encouragement of usage.

The perceived advantages such as "saving time in checking out television programs" or "helping not to miss what viewers want to watch" seem to encourage people to use the new guide. The importance of perceived guide utility in using IPG was further supported in the results of canonical correlation analysis, which showed that those with higher guide utility tended to use even the "Reminder" function frequently (See, Table 21).

Perceived IPG complexity was found to be negatively associated with the use of IPG. This clearly signifies that the less people perceive the new guide as complex to use, the more likely they would be to use the guide. This finding was consistent with past work by Bagozzi, Davis and Warshow (1992), who noted that potential complexity or ease involved in using interactive media is a strong perceptual antecedent to influencing uses of such media.

The importance of the complexity issue in IPG usage is also supported by the results of canonical analysis, which showed there were systematically negative relationships between the guide complexity and a variety of IPG functions. Those who perceive guide use as complicated were less likely to use "Reminder," "Movie Menu," "Channel Menu," and the "Information Button" (See Table 21).

It may be interesting to note here that perception of guide utility and perception of guide complexity are strongly negatively correlated with each other. In preliminary research (Kang, 1999), digital cable users were asked to cite the most helpful function of

a variety of IPG functions. In turn, a follow-up and open-ended question was asked in order to find out specific reasons why the function was the most helpful. In the study, users mentioned "Time Menu" most frequently (34.9%) as the most helpful function, followed by "Channel Menu " (17.2%), "Flip Bar" (14.8%), "Information Button" (13.6%) and "Category Menu" (10.1%). However, "Search function" (7.1%) and "Reminder" (1.2%) were relatively rarely mentioned as helpful.

Interestingly, when subscribers cited the function as helpful, the most frequently mentioned reason was "because it was easy to use" (45.9%). In parallel fashion, the strong relationship between "perceived IPG utility" and "perceived IPG complexity" was confirmed by a higher correlation coefficient ($r = -.421$, $p < .001$) in the current study.

The findings essentially suggest a need of continual consumer education. As James et al. (1995) pointed out, as long as a new technology is perceived as complicated, people will not use it much. Although the survey did not include people who disconnected digital cable, IPG complexity could be a reason for the disconnectors.

TV Viewing Motivation

An interesting result emerged from the relationship between individuals' television viewing motivation and their IPG use. It was expected that viewers' instrumental motive, which focuses more on the specific content rather than medium itself, would be associated with IPG use. The linkage was found to be positive, but it was too weak to be statistically significant ($\beta = .038$, $p > .05$).

As Heeter and Baldwin (1988) already noted, in fact, instrumental television viewing has been associated with more planning *ahead to* watch a particular channel and *less* channel changing once the channel is initially selected. This notion further implies a possibility that those who have *less* planning before viewing might use program guides *more* during viewing to change channels. This interpretation does closely parallel a result of the correlation analysis that "ritualistic viewing motive," which focuses more on the medium rather than the particular content, was correlated with IPG use ($r = .122$, $p < .05$).

Since the viewers with ritualistic motives are inclined to be non-selective and be exposed to a variety of different program types (Rubin, 1984), the IPG may appeal to those people who continuously surf channels *on the spur of the moment*. Put another way, if a personal television viewing goal were to always watch the programs that would provide the greatest satisfaction at any given time, the IPG would stimulate the viewers to change channels on the impulse of the moment, providing higher likelihood of locating the programming best suited to them. The findings suggest that the IPG is a tool to enable viewers with ritualistic motives, not to mention people with instrumental motives, to participate more actively in their television viewing behavior.

The nature of digital television, which adds 36 channels or more to a 70-channel analog service, may require that we study television viewing behavior again. The concept of an inveterate channel surfer serially clicking through channels as a mode of viewing was developed from studies in an analog environment. With more than 100 channels, the "channel surfer" may need the aid of an advanced program guide like IPG.

Prior Experience

The study found that new technologies were more likely to be used if they were functionally similar to existing ones. With prior experience in using the cable set-top box, premium channel subscribers were found to be more likely to use the IPG. This result coincides with the findings of past research (e.g., Ettema, 1984, 1989; Reagan, 1987).

To people who have experience with premium channels, the IPG is perhaps more familiar, easier to use, and thus more likely to be used. According to previous studies (e.g., Greenberg, Srigley, Baldwin, & Heeter, 1988), premium channel subscribers generally are more likely to be familiar with a printed program guide than the basic subscribers.

Also, guide benefits regarding movie viewing might encourage the premium subscribers to use the IPG more. Because the new guide system provides useful information on a movie (e.g., name of movie, length of movie, or summary of story) at any time, viewers may perceive greater advantages in the use of IPG than basic subscribers. This interpretation can be confirmed by a significant relationship between "premium channel subscribership" and "perceived IPG utility" ($r = .130$, $p < .05$).

It was expected that experience with similar interactive technologies such as email or the web would lead to more uses of the IPG. However, no evidence to support the expectations was found. A possible explanation for this finding is that people might judge the IPG as different from other interactive information technologies. They may perceive IPG just as a video technology, not an information technology, even if it has some interactive attributes.

As an information technology, as a matter of fact, interactive media such as email and the web are somewhat different from IPG in the way in which people use them. The component parts of the former include a keyboard, mouse, and display device, whereas the IPG system is composed of an on-screen menu and a remote control device. In this regard, as Atkin and LaRose (1994) argued, the use of new technology should be observed in the boundary of media that fall "within the same technology cluster."

Length of Subscribership

It was predicted that digital cable uses such as IPG would increase as the length of time of digital cable subscription increases. There was no evidence to support such expectations in the hierarchical regression analysis. However, a Person's correlation between length of subscribership and IPG use revealed a negatively significant relationship ($r = -.105$, $p < .05$), which explained the IPG was more frequently used by those who have had the technology for a shorter period of time. This "novelty effect" was supported by the results of cannonical analysis (See Table 21). As an innovative technology, the IPG may provide novelty or curiosity to newer users, and the novelty may thus stimulate more uses of IPG. The effect nevertheless did not remain statistically significant when controlling for other independent variables.

Impacts of IPG Usage on Viewing Behaviors

The final research goal was to examine impacts of digital cable uses on users' television viewing behaviors. Based on the data, impacts of digital cable use are discussed below.

Amount of TV Viewing

Some uses of digital cable were found to be associated with users' amount of TV viewing. The use of "IPG" was positively correlated to "total TV viewing time," as was the use of "multiplexed premium channels." Also, the result of 2SLS regression analysis showed that IPG use was the strongest predictor of the amount of TV viewing (β=.260, $p<.001$), indicating that those who use IPG more, are likely to watch more television.

The positive relationship of multiplexed channel use with television viewing time is not surprising, given the previous findings that the amount of television viewing has increased with more channel choices (e.g., Becker et al., 1983; Weimann, 1996). However, the finding here that IPG use is associated with increased TV viewing time is interesting. Perhaps, IPG users are more likely to find satisfying viewing options, which may encourage the users to watch more television.

Obviously, there was evidence in these findings that digital cable use coincided with watching more television, consistent with a past result of Umphrey's (1991) study, in which he found that cable upgraders watched more television as a result of upgrading to higher cable service. Furthermore, the finding offers additional support to a recent

survey result that more than half of digital cable households reported watching more television after subscribing to digital cable (See, Higgins, 1999).

More importantly, the finding also provides an answer to illustrate why there was a significant difference in TV viewing time between digital cable subscribers and non-digital subscribers (Kang, 1999). Because digital cable uses appeared to be associated with increased TV viewing time, this implies that digital cable has a potential to increase the subscriber's TV viewing time. In other words, it seems to be untrue that the difference comes from heavier TV viewing *per se* among digital cable subscribers. Rather, it seems likely that subscription to digital cable stimulates more television viewing, which is an indirect evidence illustrating digital cable's impact on television viewing behaviors. Of course, the cross-sectional data cannot directly confirm that the digital uses lead to increased television viewing. More direct evidence about the impact of digital subscription on viewing time could be observed and monitored by a longitudinal study.

Satisfaction

In the current study, only "IPG use" was found to be associated with satisfaction with digital cable. This result confirmed the basic assumptions of the "uses and gratifications" tradition that media satisfaction results from the gratification derived from media consumption (Katz, Blumer, & Gurevitch, 1974). Consistent with earlier media research (Lin, 1990; Perse & Ferguson, 1993), there was clear evidence in the findings that heavier users of digital features were more satisfied with the medium.

The results also reinforce the importance of interactive features in the digital medium. The finding that IPG was only contributor to explain digital satisfaction projects an important implication for the future of the digital medium. Of digital features such as more channels, higher picture quality, or interactive functions, people seem to perceive the interactivity as more unique and attractive feature.

Further, the result regarding IPG provides a possibility that the advanced programming guide could also increase viewers' satisfaction with television. Perhaps, the smarter guide increase the ease with which viewers can select and evaluate television programs, resulting in greater satisfaction with all television viewing. This explanation is consistent with a finding in past research which reported that more re-evaluation during programs and more channel checking were significantly related to channel satisfaction (Greenberg, Heeter, & Lin, 1988).

Genre Diversification

Interestingly, it appeared that "IPG use" was related to the number of program types people watch. This finding suggests that IPG use leads to a diversification of the viewing types; as people use the IPG more, they have a large number of program-types.

The IPG may reduce the effort involved in program selection and scheduling, allowing viewers to find many program alternatives more easily. For example, viewers may be able to find what's on other channels directly and easily by the use of the "Time Menu" or "Channel Menu" which display all kinds of program lists at any given time.

The easier program selection through the IPG may encourage a viewer to reevaluate programs while viewing, and thus search more actively for the programming best suited for him or her. Eventually, this will enrich the spread of his or her program types, allowing the viewer exposure to a variety of program contents.

With regard to program viewing types, researchers have observed "an unbalanced diet of very limited types of programs" in a multichannel situation (Youn, 1994, p. 472). In other words, it has been reported that as the number of channels increase, people conversely tend to decrease the types of programs they watch, reinforcing their program type preferences. In this regard, it is important to document the finding that the IPG enriches the diversity of viewers' program types. This suggests that the technology has the potential to revolutionize the approach to television from a relatively passive mode of program choice to a more active, discriminating mode, at least for some people. This would be some solace to many critics of television who express concern for the decadence of the "couch potato."

Channel Repertoire

In addition to increased channel options, "IPG use" was found to be associated with higher channel repertoires, suggesting that those who use IPG more have a larger number of channels they regularly watch. It is also apparent that the guide use was a significant predictor of channel repertoire, which similar to Greenberg et al.'s (1988) finding that channel repertoire is linked to the use of the printed program guide. This was also similar to the results of Ferguson and Perse's study (1993), who found that newer television technologies, especially cable and remote control devices, increase channel

repertoire. Perhaps, frequent use of the IPG would expose viewers to which would otherwise be unknown to them. The IPG may increase channel awareness and, eventually, channel repertoires.

Heeter (1985) noted that when deciding what to watch on TV people usually only go through a limited repertoire of channels, remaining unaware of potentially attractive programs on the other channels. Although this was not the case in 1985, it may be even more likely in a situation where 200 or more channels are carried, making the task of program selection more complex and making perfect viewer awareness of alternatives more difficult to achieve. An advanced guide like the IPG could be an effective tool to allow viewers to become aware of all the channels available to them. That is, an advanced program guide increases the likelihood that program alternatives will be discovered, and lead to actual watching, giving viewers information on all the channels on their system. Furthermore, the findings provide a possibility that some of the basic subscribers will upgrade to premium services or order more PPV movies, as a result of increased awareness of programming *through* the IPG.

Consumption of Competing Media

A "displacement effect" was found between digital cable's movie uses and the consumption of competing media. Specifically, it was found that there was a negative relationship between "PPV use" and "video rental."

As predicted, it was found that the use of PPV infringed upon the consumption of video rentals. This result offers some support for LaRose and Atkin's (1991) finding that pay-per-view use is associated with negative attitude toward other competing media. Furthermore, the finding empirically supports a recent survey data conducted by CTAM (Cable Television Administrative & Marketing Society). According to the survey data, 45% of digital cable users reported that they rented fewer videotapes after subscribing to digital cable (Hogan, 2000a). Applying the concept of video-windowing to this finding (Owen & Wildman, 1992), the two media activities seem to be competitive because the windows are not far from each other. This result implies that the near-video-on-demand of digital PPV is much more competitive with video rentals, as long as an advanced ordering system and earlier offerings of newly released movies are available.

Research Implications

The findings of this study offer theoretical insights for academic researchers as well as practical implications for cable operators. They are discussed below.

Theoretical Implications

The findings have several implications for researchers in the academic circle.

First, this study contributes to literature on diffusion theory. It confirms in part theoretical propositions of the theory that earlier adopters tend to be of higher income than later adopters or non-adopters (Rogers, 1995). The demographic profiles postulated by the diffusion theory, so far, have been confirmed by the studies on VCRs, Videotex, DBS, the Internet, and HDTV, and now, in this study, digital cable.

Despite "a diminished role for demographics" indicated by past research (Jeffres & Atkin, 1996, p. 328), the multiple regression model of this study suggests that certain demographic characteristics such as "age" or "income" are still useful predictors in explaining digital cable adoption. As mentioned earlier, digital cable is still in its infancy in terms of its deployment. In this early stage, perhaps, the new cable service has been attractive to some targeted group, not to general subscribers. If the service's penetration becomes nearly universal as did analog services, one might expect to again see the leveling of demographic differences.

Second, the current study also offers an important contribution to lend credence to the assumption of "uses and gratifications," holding that media consumption is *purposeful*. Put another way, this study provided overall support for a basic tenet of uses and gratifications theory; people will select and use media that they believe are useful. Those who indicated that digital cable was able to fill movie-related needs were more likely to use the medium to satisfy those needs. Digital cable users also have been found to use the technology actively in order to fulfill their IPG-related motivations.

Also, the findings that their digital satisfaction was directly linked to actual uses of digital cable, confirm the "active audience" concept of the uses and gratifications approach, because it assumes that people purposefully select and use certain media in order to achieve their gratifications (Katz et al., 1974).

Third, as discussed in the first chapter, this study assumed that digital cable could be a "discontinuous innovation" based on Krugman's (1985) model which conceptualized a hierarchy of cable technologies. In the model, Krugman argued that if a new technology requires users to alter existing consumption patterns dramatically, it could be considered as a discontinuous innovation. This study provides some evidence that digital cable falls into the discontinuous innovation category. The data of this study show that digital cable uses, especially IPG use, increase users' television viewing time, diversity of viewing types, and channel repertoires. Particularly, the IPG with interactivity seems to have much more impacts upon users' television viewing behaviors. The technology enables viewers to watch television more, to enrich use of program types, and to have larger channel repertoires. Because there is sufficient evidence that the technology has the potential to dramatically alter existing viewing patterns, as Krugman argued, the interactive guide really can be considered a "revolutionary device" or "discontinuous innovation" in the hierarchy of cable telecommunications.

Practical Implications

On the practical side, the research findings offer some important implications for cable operators.

First, this study provides some possibilities that IPG could be a gateway for TV viewers to move from one channel to another channel in the digital era of hundreds of channels. The findings of the study showed that IPG use was associated with the uses of other channels such as specialized basic channels ($r = .198$, $p < .001$) and multiplexed premium channels ($r = .222$, $p < .001$) (See, Appendix A). Perhaps, whenever viewers

want to move from one selected channel to another, they may return to the on-screen guide, and then go *directly* to another selected channel from the guide screen.

The fact that viewers are heavily reliant on the guide while watching TV essentially shows that the guide system could be *a TV portal* – the Yahoo of television. If cable operators put the on-screen programming guide on the first screen that viewers see when they turn on TVs, the TV portal would be unavoidable. If this is the case, cable operators could promote other cable services such as local news, weather and email into the on-screen guide, not to mention television program listings. The guide system offers cable operators a huge strategic, branding, merchandising, and promotional opportunity. By using the valuable platform, cable companies could promote their own channels, pay-per-view movies, telephony, and Internet services.

More importantly, the real potential for the IPG is in advertising and T (television)-commerce. In the near feature, the on-screen guide will be a good place to put ads, generating additional revenue. Media analysts predict that advertisers will pay more for the ads via the on-screen TV guide because interactive ads usually are more effective and justify a higher cost-per-thousand price (Freeman, 1999). Given that TV is far more pervasive than the Internet, the TV portal through the guide will be more powerful than Yahoo's Internet gateway. TV is on at least five hours a day in the typical American home, and it is predicted viewers will use their program guide at least four times an hour (McLean, 1999).

Recently, there has been a good example of utilizing the on-screen guide system as a TV portal. Insight Communications Co. has provided digital offerings with an interactive guide called "SourceGuide." When digital subscribers turn on their TV, they can see the on-screen guide as an opening menu page. The menu screen is composed of "Program Guide," which is just a television program menu, "On Demand TV," which lists PPV movie options, "Digital Music," and "Local Source." The company's unique menu may be the "Local Source," which includes city-and neighborhood-specific real estate listings, as well as lists of restaurants, movies, entertainment events, news, weather, and sports updates. The cable subscribers are able to get their local information by simply clicking on the menu (See, Forkan, 1999).

In this regard, it would be important for operators to create unique on-screen formats that their customers would not find at other portals. For example, a cable operator would be able to carry viewing guide information, interactive applications such as online games, and local and personalized information.

Second, the fact that the IPG will eventually be an essential tool for navigating hundreds of TV channels has another implication for cable operators in terms of management of the channels they provide. In the digital era with 500 plus channels, it may be impossible for people to effectively manage the plethora of channels, unless advanced programming guides are provided. Particularly, the finding that people who use the IPG more are more likely to have greater channel repertoires, underscores the importance of such an efficient guide tool. Given that the ultimate goal for cable companies is to maximize viewing the channels they provide, perfect viewer awareness

of the channels may be essential. As Ferguson and Perse (1993) argued, "Clearly, channel repertoire is not stagnant, but evolves as individual media factors and audience availability change" (p. 44). It is important, in this regard, for cable companies to comprehend the value of the guides and then provide guide systems their customers need and want.

In the digital interactive television world, furthermore, cable operators' offering of state-of-the art program guides may enable them to differentiate their images from DBS. It should be noted here that "a poor guide could have a negative effect on the company image and, ultimately, on retention" (Greenberg, Srigley, Baldwin, & Heeter, 1988, p. 286).

Third, this study suggests the necessity of continual consumer education. Since the results indicate younger people are more likely to use the IPG, and those who perceive IPG functions as less complex tend to use the IPG menus, cable operators should build consumer education programs to encourage them to use more. Although some people, usually younger people, are trained to experienced with interactive digital devices, others seem reluctant to use some menus such as "Reminder" or "Search Function," which require higher mental efforts.

Finally, this study clearly shows that "near video-on-demand" is competing with video rental, providing more variety of titles and an easier ordering system. In terms of development of the near-video-on-demand, operators have to exploit their broadband capability to the fullest extent. If operators are able to build fuller broadband capability,

and thus provide *full* video-on-demand, not staying in near-video-on-demand, their PPV buy rate might increase. Considering that video movie rental is the biggest competitor of near-video-on-demand in the video-windowing, earlier access to newly released movies would be important in improving the competitiveness of the near-video-on-demand. For cable operators, it is also important to provide consumers a more effective searching tool for PPV programming like the IPG. For example, the options of special entertainment events such as sports or concerts are given through the guide *ahead of* time, and thus consumers knows what kind of programming is available in advance. This, in turn, would increase the buy rate for PPV in the near future.

Limitations of the Study

This study is not without limitations, despite some theoretical contributions and practical implications.

First, the sample used in the study was limited to a single market. Therefore, the composition of the sample would be slightly different from the U.S. population and may represent an atypical region, constraining the generalizability of the results. Because the surveyed community is a college town, for instance, students in the sample are overrepresented. Furthermore, the sample of digital subscribers may be influenced by the marketing used by this particular company, and the nature of the service itself. Future study should be replicated in a variety of markets where user profiles are not different from those of the national population.

Second, this study is also limited by its method. The findings in this study are subject to the usual limitation of telephone survey research which has been dependent on individuals' recall to elicit responses about their media behaviors or attitudes. Particularly, the self-report measurement of IPG uses may be problematic because it assumed that the respondents could accurately report their use behaviors. Future study on IPG behaviors needs more objective assessment, possibly through meters instead of traditional surveys or diaries. For instance, a two-way monitoring system for actual IPG behaviors could better validate the construct of IPG use. Moreover, the impacts of IPG use could be examined by subjective research methods such as focus group interviews or observational study. By relying on focus group interviews, researchers could examine users' various experiences of interactive uses with the IPG. Researchers also can explore users' viewing behaviors by observing them in a natural setting.

Finally, another limitation is that only a cross-sectional analysis was conducted in examining the impacts of digital cable use. As stated earlier, a cross-sectional study cannot demonstrate cause and effect directly. For example, the findings that heavy use of the IPG is associated with heavy viewing does not necessarily mean that IPG use causes heavy viewing. A longitudinal study should be conducted to investigate actual impacts of IPG use over time. Perhaps, longitudinal data could provide more obvious evidence to determine the causality.

Suggestions for Future Research

The characteristics of digital cable subscribers and their digital cable use patterns should be reassessed over the years to determine trends. This study of a new digital technology conducted in the early "take-off" stage could be a base line for determining trends in use over time. Of course, further study is encouraged to replicate any portion of this study.

Of special concern for this study is the "digital disconnector" group of digital cable subscribers. Do they share the same characteristics as those found in this study? Do they share the same patterns of IPG use found in this study? Are there similar impacts on their media activities? Future research should explore why they dropped digital cable. It might be interesting to compare their attitudes and behaviors, and impacts of digital cable on them with the current digital cable users.

This study was also confined to the limited number of predictors in explaining digital cable adoption or IPG use. For example, the regression model for IPG use produced 14.8% explained variance. Future research needs to consider more potential variables such as "family size" or "gender" for fuller explaining the adoption and use of the new cable service. The adoption of the new cable service might be influenced by the family size. Also, gender might play a more important role in the differences of the use pattern of the new technology, IPG.

Additionally, future study of the impacts of digital cable on the cable industry is encouraged to see how consumers' use of IPG or its satisfaction is linked to the system's churn rate for premium channels or buy rate for PPV channels. Researchers should address these issues in the near future.

APPENDICES

[Appendix A] Correlation Coefficients among All Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Age	1.000												
2 Education	.261**	1.000											
3 Income	.478**	.395**	1.000										
4 Guide Motive	-.146**	-.083	-.083	1.000									
5 Movie Motive	-.115*	-.093	-.148**	.471**	1.000								
6 PU	-.030	-.121*	-.104	.349**	.346**	1.000							
7 PC	.182**	.075	.062	-.096	-.122*	-.266**	1.000						
8 IM	.059	.027	-.020	.149**	.108*	.254**	-.035	1.000					
9 RM	-.353**	-.238**	-.427**	.033	.192**	.139**	-.072	.000	1.000				
10 IPG Utility	-.044	-.045	-.006	.272**	.268**	.380**	-.139**	.197**	.101	1.000			
11 IPG Com.	.183**	-.020	.046	-.251**	-.195**	-.296**	.288**	-.065	-.042	-.421**	1.000		
12 PCS	-.006	-.053	-.032	.059	.240**	.162**	-.119**	.067	.010	.130*	-.072	1.000	
13 Email (Log)	-.170**	.223**	.057	-.012	-.019	-.110*	-.034	-.136*	.006	-.077	-.089	.056	1.000
14 Web (Log)	-.230**	-.006**	-.080	.017	.107*	.012	-.073	.009	.096	-.010	-.096	.102	.454**
15 LS (Log)	.358**	. 232**	.403**	-.001	-.079	.013	.080	.059	-.255**	.049	.057	.028	-.018
16 SCU	.007	.025	.014	.132*	.037	.159**	-.079	.058	-.034	.093	-.169**	.019	-.015
17 MCU	-.116	-.110	-.155**	.163*	.289**	.133*	-.109	.019	.100	.100	-.161**	-.002	-.035
18 PPV (Log)	-.044	-.043	-.020	-.007	-.009	.009	-.034	-.004	-.058	.078	.010	.002	-.058
19 IPG Use	-.190**	-.056	-.086	.304**	.311**	.200**	-.232**	.090	.122*	.276**	-.262**	.166**	-.022
20 TV Viewing	.013	-.146**	-.111*	.060	.184**	.150**	-.171**	.143**	.155**	.109**	-.086	.088	-.056
21 Satisfaction	-.069	-.198**	-.114**	.261**	.249**	.617**	-.313**	.104*	.103	.290**	-.239**	.039	-.135*
22 DV	-.079	-.116**	-.165**	.157**	.281**	.279**	-.101	.081	.143**	.171**	-.165**	.156**	-.053
23 Repertoire	.035	.094	.041	.065	.035	.112*	-.119*	.121*	-.112*	.148**	-.184**	.056	-.020
24 MG (Log)	-.194**	.002	-.124*	.043	-.024	-.086	-.044	-.098	.088	.002	.032	-.020	.107*
25 VR (Log)	-.170**	-.006	.024	.054	.015	-.156**	.079	-.093	.034	-.038	-.029	.001	.119*

	14	15	16	17	18	19	20	21	22	23	24	25
1 Age												
2 Education												
3 Income												
4 Guide Motive												
5 Movie Motive												
6 PU												
7 PC												
8 IM												
9 RM												
10 IPG Utility												
11 IPG Com.												
12 PCS												
13 Email (Log)												
14 Web (Log)	1.000											
15 LS (Log)	-.089	1.000										
16 SCU	-.008	.060	1.000									
17 MCU	.001	-.060	.218**	1.000								
18 PPV (Log)	-.040	.035	-.093	.050	1.000							
19 IPG Use	.048	-.105*	.198**	.222**	-.031	1.000						
20 TV Viewing	.157**	-.110*	.109*	.200**	.017	.269**	1.000					
21 Satisfaction	-.011	-.078	.168**	.056	.017	.239**	.124*	1.000				
22 DV	.045	-.114*	.063	.215**	-.031	.270**	.381**	.206**	1.000			
23 Repertoire	.017	.064	.518**	.128*	-.031	.373**	.188**	.157**	.202**	1.000		
24 MG (Log)	.058	-.071	.035	.144*	.001	.083	-.011	-.081	.043	-.009	1.000	
25 VR (Log)	.058	-.011	.026	.125	-.117*	.006	-.037	-.121*	-.089	-.025	.250**	1.000

Note: PU = Perceived Utility, PC= Perceived Complexity, IM= Instrumental Motive, RM= Ritualistic Motive, PCS= Premium Channel Subscribership, LS= Length of Subscribership, SCU= Specialized Channel Use, MCU= Multiplexed Channel Use, DV= Diversification, MG= Movie-Going, VR= Video Rentals

- * $p < .05$ (two-tailed); ** $p < .001$ (two-tailed)

[Appendix B]

Telephone Survey Questionnaire

Hello, this is _____ calling from the Department of Telecommunication at Michigan State University. We are doing a telephone survey about digital cable use. After you complete this survey, the company has allowed us to give you a free pay-per-view movie coupon. It will be mailed to you. Are you over 18 years old?

[IF YES] (RESPONDENT IS OVER 18 YEARS OLD):

Any information you provide will be kept confidential and used for research purposes only. The survey may take about 10 minutes. May I begin?

→ **YES:** PROCEED TO THE NEXT PAGE.

→ **NO:** PERSUADE ONCE OR TWICE

You have been specially selected as a participant in this survey. The success of this survey depends on the cooperation of people like you. We are sure you will find the questions stimulating and interesting to answer. May I begin?

[IF NO] Would I be able to reach someone over 18? **(WHEN PERSON OVER 18 COMES TO THE PHONE)** Hello, this is _____ calling from the Department of Telecommunication at Michigan State University. We are doing a telephone survey about digital cable use. After you complete this survey, the company has allowed us to give you a free pay-per-view movie coupon. It will be mailed to you. Any information you provide will be kept confidential and used for research purposes only. The survey may take about 10 minutes. May I begin?

→ **YES:** PROCEED TO THE NEXT PAGE.

→ **NO:** PERSUADE **(USE THE PURSUATIVE SCRIPT ABOVE)**

[IF NO] AND THERE IS NO ONE OVER 18:

Would I be able to reach someone else over 18 later?

[IF YES] NOTE WHEN TO CALL:

_____

[IF NO] TERMINATE THE INTERVIEW.

Q 1. Digital cable is a new cable service that offers channels numbered above one hundred and the Interactive On-screen Programming Guide. Do you subscribe to this digital cable service?

YES 1
NO (TERMINATE THE INTERVIEW) 2

READ: The following questions are about your reasons for subscribing to digital cable. Would you tell me to what extent you agree or disagree with each statement?

Q 2. I subscribe to digital cable because it provides more premium channels such as HBO2, HBO3, or Starz2. Would you say you **strongly agree**, **agree**, **neutral**, **disagree**, or **strongly disagree**?

STRONGLY AGREE 1
AGREE 2
NEUTRAL 3
DISAGREE 4
STRONGLY DISAGREE 5
DON'T KNOW / REFUSE 9

Q 3. I subscribe to digital cable because it provides more movie titles. Would you say you strongly agree, agree, neutral, disagree, or strongly disagree?

STRONGLY AGREE 1
AGREE 2
NEUTRAL 3
DISAGREE 4
STRONGLY DISAGREE 5
DON'T KNOW / REFUSE 9

Q 4. I subscribe to digital cable because it provides more special interest channels numbered 120 through 503 that I can't get with regular cable. Would you say you strongly agree, agree, neutral, disagree, or strongly disagree?

STRONGLY AGREE 1
AGREE 2
NEUTRAL 3
DISAGREE 4
STRONGLY DISAGREE 5
DON'T KNOW / REFUSE 9

Q 5. I subscribe to digital cable because it provides a flip bar which displays program title, starting time and rating. Would you say you strongly agree, agree, neutral, disagree, or strongly disagree?

STRONGLY AGREE	1
AGREE	2
NEUTRAL	3
DISAGREE	4
STRONGLY DISAGREE	5
DON'T KNOW / REFUSE	9

Q 6. I subscribe to digital cable because it provides a program information button which gives summary of program, starting time and rating. Would you say you strongly agree, agree, neutral, disagree, or strongly disagree?

STRONGLY AGREE	1
AGREE	2
NEUTRAL	3
DISAGREE	4
STRONGLY DISAGREE	5
DON'T KNOW / REFUSE	9

Q 7. I subscribe to digital cable because it allows me to search for program listings by time, channel, category, and title. Would you say you strongly agree, agree, neutral, disagree, or strongly disagree?

STRONGLY AGREE	1
AGREE	2
NEUTRAL	3
DISAGREE	4
STRONGLY DISAGREE	5
DON'T KNOW / REFUSE	9

Q 8. I subscribe to digital cable because it allows me to order pay-per-view movies directly by remote control without making a phone call. Would you say you strongly agree, agree, neutral, disagree, or strongly disagree?

STRONGLY AGREE	1
AGREE	2
NEUTRAL	3
DISAGREE	4
STRONGLY DISAGREE	5
DON'T KNOW / REFUSE	9

Q 9. Now, I would like to ask your general feeling about digital cable. On a scale of 1 to 10 where 1 means **"not useful at all,"** and 10 means **"very useful,"** how would you rate your general feelings about digital cable?

[ENTER SCORE 1-10] SCORE _____

Q 10. On a scale of 1 to 10 where 1 means **"not efficient at all,"** and 10 means **"very efficient,"** how would you rate your general feelings about digital cable?

[ENTER SCORE 1-10] SCORE _____

Q 11. On a scale of 1 to 10 where 1 means **"not convenient at all,"** and 10 means **"very convenient,"** how would you rate your general feelings about digital cable?

[ENTER SCORE 1-10] SCORE _____

Q 12. On a scale of 1 to 10 where 1 means **"easy,"** and 10 means **"difficult,"** how would you rate your general feelings about using digital cable?

[ENTER SCORE 1-10] SCORE _____

Q 13. On a scale of 1 to 10 where 1 means **"simple,"** and 10 means **"complex,"** how would you rate your general feelings about using digital cable?

[ENTER SCORE 1-10] SCORE _____

Q 14. On a scale of 1 to 10 where 1 means **"comfortable,"** and 10 means **"uncomfortable,"** how would you rate your general feelings about using digital cable?

[ENTER SCORE 1-10] SCORE _____

READ: Now, I would like to ask you specifically about your use of **the Interactive On-screen Programming Guide**.

Q 15. The interactive on-screen guide reminds you when a program you want to see is about to start. How often do you use the reminder? Would you say **never**, **two or three times a month**, **once a week**, **two or three times a week**, or **daily**?

NEVER	1
2 – 3 TIMES A MONTH	2
ONCE A WEEK	3
2 – 3 TIMES A WEEK	4
DAILY	5
DON'T KNOW / REFUSE	9

Q 16. The interactive on-screen guide displays a program listing menu by time. How often do you use the time menu? Would you say never, two or three times a month, once a week, two or three times a week, or daily?

NEVER	1
2 – 3 TIMES A MONTH	2
ONCE A WEEK	3
2 – 3 TIMES A WEEK	4
DAILY	5
DON'T KNOW / REFUSE	9

Q 17. The interactive on-screen guide displays a program listing menu by channel. How often do you use the channel menu? Would you say never, two or three times a month, once a week, two or three times a week, or daily?

NEVER	1
2 – 3 TIMES A MONTH	2
ONCE A WEEK	3
2 – 3 TIMES A WEEK	4
DAILY	5
DON'T KNOW / REFUSE	9

Q 18. The interactive on-screen guide has a search function that looks for any program if you know the title of the program you want to watch. How often do you use the search function? Would you say never, two or three times a month, once a week, two or three times a week, or daily?

NEVER	1
2 – 3 TIMES A MONTH	2
ONCE A WEEK	3
2 – 3 TIMES A WEEK	4
DAILY	5
DON'T KNOW / REFUSE	9

Q 19. The interactive on-screen guide has a movie program menu which displays movie lists with starting times and available channel numbers. How often do you use the movie menu? Would you say never, two or three times a month, once a week, two or three times a week, or daily?

NEVER	1
2 – 3 TIMES A MONTH	2
ONCE A WEEK	3
2 – 3 TIMES A WEEK	4
DAILY	5
DON'T KNOW / REFUSE	9

Q 20. The interactive on-screen guide has a sports program menu which displays lists of sports programs with starting times and available channel numbers. How often do you use the sports menu? Would you say never, two or three times a month, once a week, two or three times a week, or daily?

NEVER	1
2 – 3 TIMES A MONTH	2
ONCE A WEEK	3
2 – 3 TIMES A WEEK	4
DAILY	5
DON'T KNOW / REFUSE	9

Q 21. The interactive on-screen guide has a children's program menu which displays lists of children's programs with starting times and available channel numbers. How often do you use the children's program menu? Would you say never, two or three times a month, once a week, two or three times a week, or daily?

NEVER	1
2 – 3 TIMES A MONTH	2
ONCE A WEEK	3
2 – 3 TIMES A WEEK	4
DAILY	5
DON'T KNOW / REFUSE	9

Q 22. The digital cable service provides you a program information button about what you are now watching, such as summary of program, starting time or rating. How often do you use the program information button? Would you say never, two or three times a month, once a week, two or three times a week, or daily?

NEVER	1
2 – 3 TIMES A MONTH	2
ONCE A WEEK	3
2 – 3 TIMES A WEEK	4
DAILY	5
DON'T KNOW / REFUSE	9

READ: Now, I would like to ask your feelings about using **the Interactive On-screen Programming Guide**. Here are some statements. Do you agree or disagree with each statement?

Q 23. The interactive programming guide allows me to save time in checking out what's on TV. Would you say you **strongly agree**, **agree**, **neutral**, **disagree**, or **strongly disagree**?

STRONGLY AGREE	1
AGREE	2
NEUTRAL	3
DISAGREE	4
STRONGLY DISAGREE	5
DON'T KNOW / REFUSE	9

Q 24. The interactive programming guide makes it easier to find what I want to watch. Would you say you strongly agree, agree, neutral, disagree, or strongly disagree?

STRONGLY AGREE	1
AGREE	2
NEUTRAL	3
DISAGREE	4
STRONGLY DISAGREE	5
DON'T KNOW / REFUSE	9

Q 25. The interactive programming guide helps me not to miss what I really want to watch. Would you say you strongly agree, agree, neutral, disagree, or strongly disagree?

STRONGLY AGREE	1
AGREE	2
NEUTRAL	3
DISAGREE	4
STRONGLY DISAGREE	5
DON'T KNOW / REFUSE	9

Q 26. It is frustrating for me to use functions of the interactive programming guide. Would you say you **strongly agree**, **agree**, **neutral**, **disagree**, or **strongly disagree**?

STRONGLY AGREE	1
AGREE	2
NEUTRAL	3
DISAGREE	4
STRONGLY DISAGREE	5
DON'T KNOW / REFUSE	9

Q 27. It is easy for me to use functions of the interactive programming guide. Would you say you strongly agree, agree, neutral, disagree, or strongly disagree?

STRONGLY AGREE	1
AGREE	2
NEUTRAL	3
DISAGREE	4
STRONGLY DISAGREE	5
DON'T KNOW / REFUSE	9

Q 28. It is intimidating for me to use functions of the interactive programming guide. Would you say you strongly agree, agree, neutral, disagree, or strongly disagree?

STRONGLY AGREE	1
AGREE	2
NEUTRAL	3
DISAGREE	4
STRONGLY DISAGREE	5
DON'T KNOW / REFUSE	9

Q 29. Do you subscribe to any premium channels such as HBO, Showtime or Encore?

YES ....1 → **NEXT QUESTION (Q 30)**

NO.....2 → **GO TO Q 31**

Q 30. The digital cable gives you additional premium channels such as HBO2, HBO3, Starz2 or Showtime2 with more frequent start times than ever before. How often do you use the additional premium channels? Would you say **never**, **two or three times a month**, **once a week**, **two or three times a week**, or **daily**?

NEVER	1
2 – 3 TIMES A MONTH	2
ONCE A WEEK	3
2 – 3 TIMES A WEEK	4
DAILY	5
DON'T KNOW / REFUSE	9

Q 31. The digital cable service offers you new special interest channels numbered 120 through 503. How often do you use the special interest channels? Would you say **never**, **two or three times a month**, **once a week**, **two or three times a week**, or **daily**?

NEVER	1
2 – 3 TIMES A MONTH	2
ONCE A WEEK	3
2 – 3 TIMES A WEEK	4
DAILY	5
DON'T KNOW / REFUSE	9

Q 32. Now, we are going to ask you about the channels you watch at least once a week or more. Since you had digital cable, you can watch new special channels numbered 120 through 503. In the new channel group, do you have any channels you've watched at least once a week?

YES .....1 → **NEXT QUESTION**

NO ..... .2 → **GO TO Q 34**

Q 33. Could you tell me the new channels numbered 120 to 503 you watch at least once a week by channel name, channel number or brief description of the channel?

[WRITE **CHANNEL NAME** OR **CHANNEL NUMBER** OR **DESCRIPTION OF CHANNEL**]

CHANNEL 1:

_____

[AFTER THEY PAUSE, SAY **ANY OTHERS?**]

CHANNEL 2:

_____

[AFTER THEY PAUSE, SAY **ANY OTHERS?**]

CHANNEL 3:

_____

[AFTER THEY PAUSE, SAY **ANY OTHERS?**]

CHANNEL 4:

_____

[AFTER THEY PAUSE, SAY **ANY OTHERS?**]

CHANNEL 5:

_____

Q 34. Now, I would like to ask you about your personal satisfaction with digital cable. On a scale of 1 to 10, where 1 means **"not at all satisfied"** and 10 means **"completely satisfied,"** how satisfied are you with the overall job that digital cable does in providing you with the things you are seeking?

[ENTER SCORE 1-10] SCORE _____

READ: Next, I would like to read to you several statements about your television viewing motivations and have you tell me to what extent you agree or disagree with each statement.

Q 35. I watch television because it helps me learn things about myself and others. Would you say you **strongly agree**, **agree**, **neutral**, **disagree**, or **strongly disagree**?

STRONGLY AGREE	1
AGREE	2
NEUTRAL	3
DISAGREE	4
STRONGLY DISAGREE	5
DON'T KNOW / REFUSE	9

Q 36. I watch television, so I can learn about what could happen to me. Would you say you strongly agree, agree, neutral, disagree, or strongly disagree?

STRONGLY AGREE	1
AGREE	2
NEUTRAL	3
DISAGREE	4
STRONGLY DISAGREE	5
DON'T KNOW / REFUSE	9

Q 37. I watch television, so I can talk with others about what's on. Would you say you strongly agree, agree, neutral, disagree, or strongly disagree?

STRONGLY AGREE	1
AGREE	2
NEUTRAL	3
DISAGREE	4
STRONGLY DISAGREE	5
DON'T KNOW / REFUSE	9

Q 38. I watch television because it amuses me. Would you say you strongly agree, agree, neutral, disagree, or strongly disagree?

STRONGLY AGREE	1
AGREE	2
NEUTRAL	3
DISAGREE	4
STRONGLY DISAGREE	5
DON'T KNOW / REFUSE	9

Q 39. I watch television just because it's on. Would you say you strongly agree, agree, neutral, disagree, or strongly disagree?

STRONGLY AGREE	1
AGREE	2
NEUTRAL	3
DISAGREE	4
STRONGLY DISAGREE	5
DON'T KNOW / REFUSE	9

Q 40. I watch television when I have nothing better to do. Would you say you strongly agree, agree, neutral, disagree, or strongly disagree?

STRONGLY AGREE	1
AGREE	2
NEUTRAL	3
DISAGREE	4
STRONGLY DISAGREE	5
DON'T KNOW / REFUSE	9

Q 41. I watch television because it passes the time away, particularly when I'm bored. Would you say you strongly agree, agree, neutral, disagree, or strongly disagree?

STRONGLY AGREE	1
AGREE	2
NEUTRAL	3
DISAGREE	4
STRONGLY DISAGREE	5
DON'T KNOW / REFUSE	9

Q 42. I watch television because it's habit, just something I do. Would you say you strongly agree, agree, neutral, disagree, or strongly disagree?

STRONGLY AGREE	1
AGREE	2
NEUTRAL	3
DISAGREE	4
STRONGLY DISAGREE	5
DON'T KNOW / REFUSE	9

Q 43. The next set of questions are about watching TV.

First of all, yesterday morning, before noon, how much time did you watch television?

[ENTER VALID NUMBER 0-99] _____ Hours _____ Minutes

Q 44. Yesterday afternoon, from noon to 7 p.m., how much time did you watch television?

[ENTER VALID NUMBER 0-99] _____ Hours _____ Minutes

Q 45. Yesterday night, from 7 p.m. to 12 midnight, how much time did you watch television?

[ENTER VALID NUMBER 0-99] _____ Hours _____ Minutes

Q 46. [IF TOTAL VIEWING TIME IS LESS THAN 10 MINUTES, **GO TO NEXT QUESTION**]

I would like to read to you some types of programs. Could you tell me which types of programs you watched yesterday for more than 10 minutes or so? [READ **ALL** AND MARK **ONLY "YES"** CATEGORIES]

Children's programs	_____	Comedy	_____
Soap-opera	_____	Drama	_____
Game show	_____	Movie	_____
News	_____	Sports	_____
Talk-show	_____	Music	_____

Q 47. About how many times did you go to see a movie **in a theater** during the last three months?

[ENTER VALID NUMBER 0-99] _____ Times

Q 48. How many times did you rent movies **in a video store** during the last three months, if any?

[ENTER VALID NUMBER 0-99] _____ Times

Q 49. About how many personal **e-mail messages** in a typical day do you send, if any?
[ENTER VALID NUMBER 0-99] _____ Messages

Q 50. About how many personal **e-mail messages** in a typical day do you receive, if any?
[ENTER VALID NUMBER 0-99] _____ Messages

Q 51. On average, how much time in a typical day do you spend using **the web** for the personal purposes, if any?
[ENTER VALID NUMBER 0-99] _____ Hours _____ Minutes

Q 52. I have just a few demographic questions that will be used for research purposes only.
What's your age? [ENTER VALID NUMBER 0-99] AGE: _____

Q 53. What is your highest level of education? [**READ** THE CHOICES IN LOWER CASE ONLY]

no high school education	1
some high school education	2
high school education	3
some college education	4
college education	5
graduate / beyond college education	6
DON'T KNOW/ REFUSE	9

Q 54. About what is your annual income level for the whole household ? [**READ** THE CHOICES]

less than $ 10,000	1
$ 10,000 - Less than $ 30,000	2
$ 30,000 – less than $ 60,000	3
$ 60,000 - Less than $ 90,000	4
$ 90,000 – less than $ 120,000	5
$ 120,000 or more	6
DON'T KNOW/ REFUSE	9

Q 55. Are you currently a full time student?

YES 1
NO 2

Q 56. This is the last question. Have you lived in East Lansing or Meridian Township since 1998 or more than three years?

YES 1
NO 2

Q 57. [IDENTIFY THE RESPONDENT'S GENDER BY THE VOICE.]

MALE 1
FEMALE 2

Read: That's it. Thank you very much. The coupon will be mailed to you in 4 to 6 weeks. Bye.

PHONE # :	INTERVIEWER :
DATE OF COMPLETION: / /	

Please don't forget to check the "Daily Checking Sheet."

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