

# **The Diffusion of Networked Gaming in the United States and Korea**

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## **Abstract**

This paper seeks to explain the different rates of adoption for networked gaming and mobile gaming technology in the United States and Korea. We use the Global Acceptance of Technology model to analyze the diffusion of online gaming technology according to cultural and socio-demographic factors mediated by the influence of technology-related factors. Using data collected from a survey of U.S. and Korean gamers, we find that the high rate of adoption of online gaming services in Korea compared to usage in the United States can be partially explained by social and cultural differences between the two countries. From this data we also analyze the willingness of consumers in each market to pay for online gaming services and find marked differences between U.S. and Korean consumers. We additionally consider the implications and potential barriers to the adoption of advanced online gaming features such as mobile online gaming in the United States.

*Keywords: Online Gaming; Mobile Gaming; Advanced Mobile Features; Diffusion of Mobile Technology; Korean Mobile Market*

## **1. Introduction**

Although gaming (video and online) has grown rapidly in both the U.S. and Korea, preferences and other aspects of usage differ markedly in these two environments. Delineating these differences contributes to understanding of how new offerings, such as mobile gaming, already a popular subscription-based service in Korea will develop in the U.S. As a means of analyzing the differences and similarities in adoption rates we use the Global Acceptance of Technology (GAT) model, which includes social and cultural factors at the individual level, perceptions, social norms, and demographics. We apply the GAT model to the survey data representing thousands of gamers in the U.S. and Korea, and find that the high rate of adoption of online gaming in Korea compared to usage in the United States can be partially explained by social and cultural differences between the two countries. Using the survey data we also analyze the willingness of consumers in each market to pay for online gaming services and find marked differences between U.S. and Korean consumers. The GAT model suggests that these differences are the result of cultural factors as well as the technology adoption catalyst. Finally, we examine the challenges to further the adoption of advanced online gaming features such as mobile online gaming in the United States.

### **1.1 Networked Gaming in the U.S.**

The gaming industry in the U.S. earns the majority of its revenues from an enthusiastic core of gamers, who also are the segment most interested in access to games through broadband. More moderate and casual gamers are less interested in games on demand or networked games and instead tend to play web-based and Internet-only downloadable games like those offered by Yahoo! Games and Real Networks. These companies tend to target the “moderate” and “casual” gamer, rather than the “hardcore” gamer. (Cai, 2004).

Nonetheless, online gaming can be considered a mass market activity in the U.S. In 2000, 35% of all Americans found computer and video games to be their most enjoyable activity, with television taking second place at 18%. (Bjork, Holopainen, et.al., 2002). Attesting to the importance of this relatively new industry, U.S. games revenue in 2001 surpassed film box office ticket sales. The main segments in 2003 were console games (73%), and PC-non-networked markets (17%), with online and wireless games still making up a small proportion (6.4 and 3.4% respectively). Online games however are widely considered the future of the industry (OECD, 2004).

### ***1.2 Networked Gaming in Korea***

South Korea has shown the most rapid growth in the online gaming industry supporting over one dozen online game developers with revenues above \$50 million annually and profit margins between 30-40% (IGDA, 2004). To show the magnitude of Korean interest, while popular networked games such as Everquest have approximately 440,000 subscribers in the U.S. and Europe, Korean market leader NCSoft's Lineage has over 4 million subscribers. (Seay, Jerome, Lee & Kraut, 2004).

Enjoying the highest broadband penetration rate in the world, and plentiful numbers of Internet cafes, the Korean enthusiasm for gaming has taken the world by surprise. The South Korean game market is mass market, including all ages, with several of the major game companies specializing in casual gamers. Diversified content is one means by which the Korean market has spread to the masses. Board games makeup over half of the computer games played by over-35 year olds while short games tend to appeal to older players who spend 1-10 minutes playing a game (OECD, 2004, p.39). Mobile gaming is widely popular and in fact, revenues from online gaming surpassed revenues from screensavers and ringtones (McClelland, 2004).

### ***1.3 Background***

The social and cultural aspects of electronic game play are an area of inquiry that still has yet to be fully explored. Of greater interest have been the effects of game play on adolescents and young people, in terms of violence and potential addictiveness as well as future societal impact (Anderson & Bushman, 2001, Funk, Baldacci, et.al., 2003). There are still few studies investigating how social factors affect interest in playing electronic games. Sherry and Lucas (2003) examine 18-22 year olds' motivations for play, finding that competition, challenge, social interaction, and diversion are principal gratifications. Players enjoy not only improving their skills, but keeping score and competing against friends. Another recent study of Microsoft Xbox Live, an online networked console, finds that social interaction is in fact valued in multiplayer gaming environments under specific conditions (Hew, Gibbs, et.al., 2004). Users in this study generally expressed the view that team-based play was more enjoyable with friends and prior associates, and capabilities for interaction could be useful in these circumstances. The addition of voice communication had limited value; it added distraction, it was difficult for the listener to identify who was speaking, and voice often did not support game play. Voice communication is not yet a perceived value to current gaming in the U.S. environment. Another study of online gaming communities also finds that simply having fun as well as development of one's character are the driving forces for play, with social communication ranking third (Seay, A. Fl, Jerome, W.J., et.al.). Seay et al. found that

relationships formed in the game were related to the game itself, involving support, advice, and coordination, rather than personal issues or further involvement outside the game.

The genre of game also is reflective of player motivations to engage. For example, first-person shooter games are played most often by people who enjoy speed and arousal while role-playing fantasy games fulfill needs that include the freedom to do things that cannot be done in real life (Sherry & Lucas, 2003, p.20). Motivations for playing the most popular of the Internet-only massively multiplayer online role-playing games (MMORPG), Sony's Everquest, have also been uncovered. Griffiths, et.al, (2004) compares adult and adolescent playing behavior and finds that a primary motivator for both groups was the social aspects of the game (social contact with others, assisting others, competing with others), with adolescents also valuing the violent aspects of the game (hand-to-hand combat, player-to-player options). Chee and Smith's case study of Everquest also notes the importance of the social attributes of this game, as social exchanges in the game context lead to further interactions that have helped form a vast online community with its own specific modes of expression, norms, and overall sense of identity (2003). The OECD (2004, p. 41) cites a few small scale survey studies from Germany and Spain that have also found that game players consider the social aspects of a game important and prefer playing games in groups (VUD, 2004, aDeSe, 2000). More comprehensive study of this relationship is needed as cultural preferences, game genre, usability, compatibility and access are additional factors that appear to be related to user's perceptions of electronic games.

## **2. Survey Methodology and Demographics**

A standard survey was distributed in hardcopy in the U.S. and online in Korea to gamers of varying intensity of involvement. The combined sample size of the U.S. and Korean survey was 12,160 responses. The U.S. respondents were 67% male and 33% female. Most U.S. respondents (55%) were between the ages of 18 and 22 years old, and 32% were 23-27 years old. The vast majority of U.S. respondents have had some college. The Korean respondents had an average age of 31 and a range from 9 to 69 years old.

Both surveys contained confirmatory questions about networked and mobile game usage. Respondents were asked to evaluate most questions on a standard Likert scale. The significant results of these questions are given in the form of descriptive statistics. The Korean survey additionally contained exploratory questions on a wide range of mobile and networked game issues. The exploratory questions were not used to confirm a predetermined hypothesis. Instead this data was principally used to construct linear models to help validate the explanatory power of the framework used in this study, the Global Adoption of Technology Framework (GAT). Linear models are used to validate the framework due to their power in showing relationships and explaining variability in key adoption variables.

## **3. Global Acceptance of Technology (GAT) Framework for Analysis**

Research into usage of media has examined genres, media types, and differences by country (Greenberg, Li, Ku & Tokinoya, 1996, & Tokinoya, H., 1996). There appear to be few universal underlying motivators to use a specific type of media as perceptions of value differ across media, genre and culture (Sherry & Lucas, 2003). Lee, et.al., (2005) examine the psychological effects of using technologies such as virtual reality, game consoles, TV and film and suggest that the value that users find is associated to the concept of "presence" which is the degree of engagement engendered by sensory stimuli or social engagement.

The process of adopting new technology, by firms and individuals has been traced out in multiple studies. Several models exist to help explain the diffusion of technology; the more widely used include the Technology Acceptance Model (TAM), (Davis, et.al., 1989) which is based upon intentions to use a technology. Next, the Unified Theory of Acceptance and Use of Technology (UTAUT), (Venkatesh, Morris, et.al., 2003) incorporates the “social influence” factor which is the degree to which users feel that their perception by others depends upon using a technology. Finally, the Diffusion of Innovation Model (Rogers, 1995) serves as a starting point for much analysis of technology adoption by individuals and organizations. Despite a proliferation of models from which to choose from, there remain significant gaps in the explanatory power of these frameworks specifically in relation to the following three issues:

1. Different adoption rates of innovation across national markets or within societies

Korea and the U.S. have experienced different rates of adoption for online and console games. Networked and mobile games which are to some extent intended to meet the desire for community should likewise show differing rates of adoption across these two national markets.

2. Different adoption rates of innovations in the same ethnic group across different national markets

Environment and lifestyle are thought to influence interest in video gaming. On the surface this explanation seems to have validity; however, when PC Bangs, internet cafes for gamers have opened in the U.S., Korean games are popular, despite the fact that Korean games such as Lineage have not had success in the U.S. market overall. Likewise, many U.S. games that have been launched in Korea have not been popular.

3. Different adoption rates of innovations within the same age groups across different national markets

Online and video games are associated with a younger demographic in both the U.S. and Korean markets. Differences are apparent, as survey data demonstrates in terms of intensity of interest, willingness to pay, brand loyalty and other facets of use. Additionally, differences across other demographic groups, age and gender require greater explanation. There is less known about the female gamer for instance. Websites such as Pogo.com for example, are thought to be attracting gamers of all ages and genders. Some statistics indicate that a substantial and growing percentage of gamers are females in their late 30's to 40's, although this claim needs further validation (Cai, 2004).

Although the importance of culture as a variable to explain technology adoption is often suggested, there are actually few empirical studies to actually substantiate this claim with the exception of focus groups, observational studies and studies looking at a small number of individuals. The GAT model incorporates social and cultural norms as factors to help explain the dramatically varied rates of adoption in online gaming between the U.S. and Korean markets. Culture is defined broadly in terms of lifestyle, learned behaviors, values and beliefs that a group or nation share. Although any group of people in a society will show a range of individual behaviors, there are still certain features of personality and outlook that many will share, in addition to norms, language, and shared historical experience. Korean culture is

considered highly collectivist, community-oriented, risk averse and non-confrontational. In contrast, U.S. culture stress competition and individualistic behaviors (Hofstede, 1994).

The GAT model shown below in Figure 1 incorporates cultural norms and social factors to a greater extent than other existing models of innovation diffusion as drivers of technology adoption. A user base can be created if an innovation is perceived to have a high value, is compatible with existing practices, and is compatible with the social and cultural norms of a group. Mass take-up of a technology however, requires visibility and communication throughout and across groups. The GAT model examines technology adoption through the lens of four drivers: perceived relative value, usability-compatibility, cultural socialization and the technology adoption catalyst.

To test the empirical validity of the GAT model we will attempt to identify the four drivers of user adoption and then test the degree of variability in user adoption related variables that are explained by the four drivers. We find that the cultural value in Korea stresses the importance of community compared to the more individualistic characteristics of U.S. society, explains much of the variability in several adoption related results.

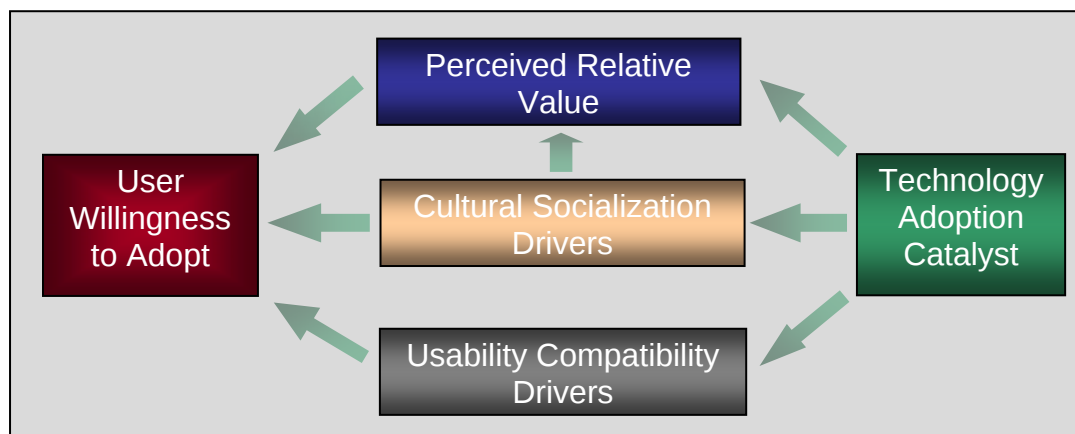


Fig. 1. The Global Acceptance of Technology Framework

## 4. Results

### 4.1 Cultural Socialization Drivers

Cultural drivers of game usage are strikingly different between the United States and Korea. Korean gamers express a cultural desire for collaboration and group communication through networked games, and use games as a group social activity. U.S. gamers on the other hand desire competition and personal entertainment, and utilize networked games accordingly. These cultural attributes manifest themselves in where people play games, in what context they play, what motivates their play and what value they extract from playing games. Unlike in the United States where games are primarily played in the home, the Korean game market has a vibrant existence in public “Bangs” or game rooms where games and other media are consumed in a wider social setting (Stewart & Choi, 2003). “Bangs” also spur and serve as physical focal points of social gaming communities. The community-focused use of games in Korea reflects a collaborative social activity based motivation for playing games that impact what is demanded in new products and technologies in the Korean marketplace.

The Korean cultural desire to play games collaboratively in Bangs as well as the home motivates the need to access networked games from many locations. The usage of games in multiple locations results in the need for robust and varied network access. When Korean respondents were asked “When you evaluate online games and services, how important are the following reasons to you?” the highest average score was given to “ease of access and the stability of the networked gaming server.” Community-based networked game play is also manifested in the desire to communicate with other members of the gaming community. The degree of attractiveness of a game based on the games’ capacity to enable and encourage communication across players is particularly strong. In the Korean survey there was a high correlation (0.748) between the responses for “This game is very attractive” and “This game provides a well defined chatting function so that I can easily communicate with others.” While the survey data indicates that the average Korean gamer is 31 years old with a 9.2 year standard deviation, a surprising result of the study reveals that there is not a statistically significant relationship between age and either money spent per month or time spent playing online games per day.

In stark contrast to Korean gamers, U.S. gamers play games principally because they are an intrinsically enjoyable activity, and the wish to be a part of a larger gaming community is not a universally motivating factor to play. The U.S. respondents were asked a series of questions pertaining to the involvement of community in their favorite game. Most respondents felt relatively neutral about issues of community (Figure 2). The results suggest that there is a general indifference with regards to the role of social interaction in the lives of U.S. gamers.

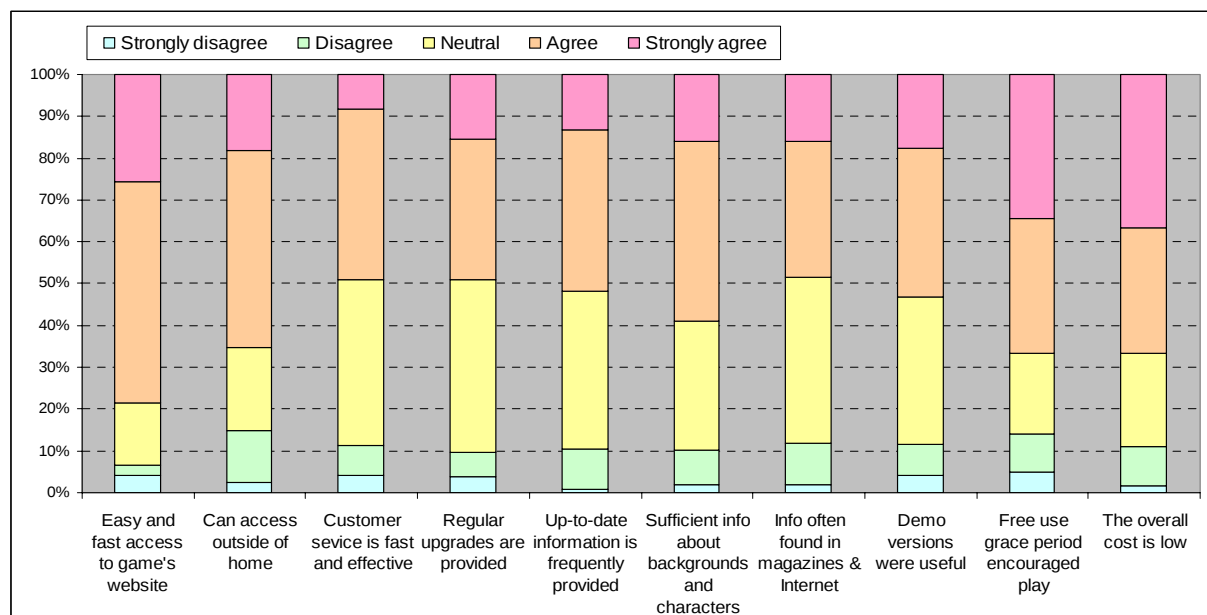


Fig. 2. U.S. Respondents answers to “what extent do you agree or disagree with the following statements about the gaming community associated with this game”.

The results specifically indicate that the chance to chat or communicate with other gamers was not seen as a draw to play a game. Respondents were neutral about their participation in the gaming community associated with their favorite game, despite the fact that the game did allow them to share their views with others. Thus, the assumption that social interaction is perceived as a primary driver of interest in the U.S. should be considered carefully. While role-playing games such as Everquest have an apparent social draw, this may not hold for

other genres. U.S. gamers did however consider the ability to compete with others as an important factor driving their interest in subscribing to networked games. This highlights a fundamental cultural difference between the U.S. and Korea. That is, in Korea there is a cultural preference for collaborative game playing behavior, while American cultural norms tend to favor individualist actions and competitive game playing behaviors.

#### 4.1.3 Implications for Mobile Gaming

Without an underlying social and cultural underpinning, the value offered by networked games and the adoption of advanced network game technologies is inhibited. The desire to play networked games as part of a social and cultural network has spurred the development of physical networks and game features that facilitate this social interaction in the Korean marketplace, including the spread of mobile gaming network technology. Korean culturally based demand for varied network access has contributed to mobile networked games that allow game play on portable devices over wireless networks and (GoD) games-on-demand that can be streamed over terrestrial and wireless networks (Yuanzhe, 2004). Similarly, Korean demand for enhanced communication capabilities has led to (VoIP) Voice-over-Internet-Protocol becoming an increasingly common feature of networked games. Since the most in-demand features of games in Korea are the culturally motivated desire for communication and varied access, it is logical that mobile devices, which enable data access and communication, would be utilized for networked gaming.

The diffusion of mobile gaming technology may be inhibited by technological barriers in the United States; however it is not clear that the same cultural motivators are in place to make strong use of mobile devices for gaming regardless of technology. Since social interaction and varied access are not highly demanded features in the U.S. market, it is not clear that mobile games would offer additional value by facilitating increased access and communication ability. As indicated in Figure 3, the desire for competition is a more likely candidate for a cultural motivator affecting mobile game adoption, as multi-player competition can be facilitated through mobile network access.

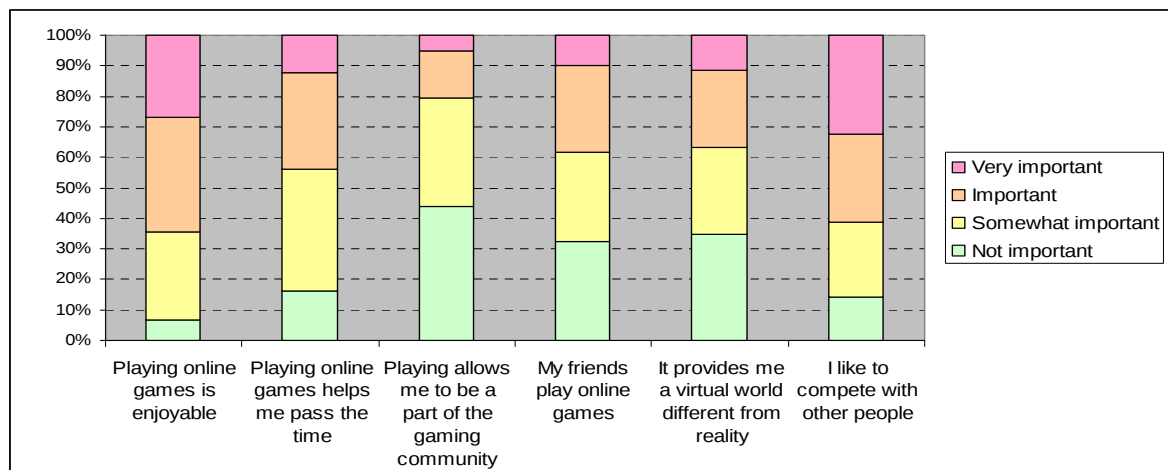


Fig. 3. U.S. Respondents answers to “Rank the following reasons why you play online games”.

#### 4.2 Usability – Compatibility Drivers

Usability is related to prior and existing contact with technology as well as demands on ease of use and user experience. It is also manifested in the physical space and location that

people are willing or desire to utilize technology. Prior contact and compatibility of technology differs in the U.S. and Korea with regards to exposure to and infrastructure of game consoles, and exposure to and prevalence of high speed data networks. The U.S. game market is built on both consoles and PC's, while the Korean market is centered on PC's, with little exposure to and interest surrounding game consoles. With the highest broadband penetration rate (78%) of any country in the world, Korean gamers are both exposed to and possibly accustomed to high speed network based entertainment experiences.

Demands for ease of use may be higher for networked games than most other consumer products since the purpose is entertainment and engagement. When U.S. respondents were asked about features of their favorite online game they were most likely to strongly agree with the following statements "It has easy to understand rules" and "I can loose track of time when I play this game." A similar line of questioning revealed that Korean gamers were most likely to agree with, "I am satisfied with the function of chatting while playing" and "It is not hard to control the characters while playing the game." This highlights both the unique demand of communication ability in the Korean market and the common demand of ease of use in both markets.

Social and lifestyle compatibility in the Korean market is influenced by location of usage. Korean gamers may access their favorite networked game from home, school, while waiting, utilizing public transportation or in various PC Bangs. A significant percentage of Koreans utilize public transportation to move between home and school or work, a process that is often hours long in duration. This time spent while waiting for and using public transportation represents a time when many Koreans utilize mobile devices. There is a correlation (0.238) between how long Korean users play their games and the ability to access their favorite game anywhere outside of their home. The desire to use networked games in varied locations, including locations where wireless networks are principally available is an enabling compatibility factor in the adoption of wireless networked gaming and games-on-demand technology.

Where people tend to play games is a usability-compatibility factor that appears to be markedly different in the U.S. compared to Korea. U.S. players most frequently play games at home and infrequently or never in all other locations on average (Figure 4). While not common, some U.S. respondents do value the ability to play games in various locations. Interestingly a linear regression showed that as the usage of online games while utilizing public transportation increases, the total duration of average game play per day decreases.

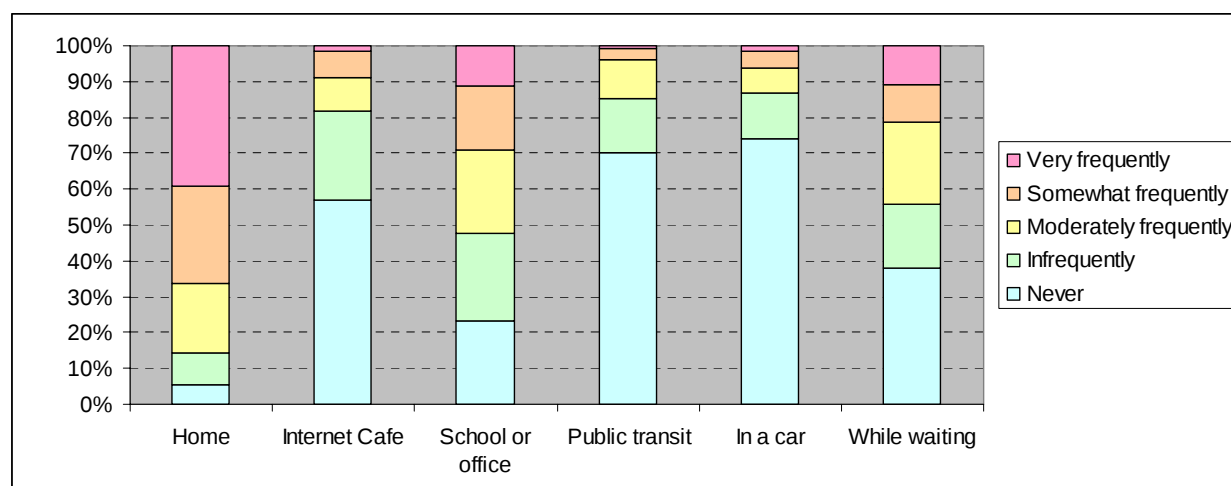


Fig. 4. U.S. Respondents answers to "How frequently do you play online games in the following places/situations".

#### 4.2.2 Implications for Mobile Gaming

Usability and compatibility are both motivators and inhibitors of mobile based game technology and services. Both socio-cultural and technology drivers must support growth in adoption of mobile gaming technology. The primary location of use and prior experience affects mobile service adoption in dramatic ways in both the U.S. and Korea. We have already seen that in the United States mobile game usage while using transportation decreases total average duration of play. This is perhaps explained by the nature of the games available over wireless networks in North America. If mobile games are a less engaging substitute for traditional networked games then it could be expected that those who use mobile games on transportation spend less overall time playing games than traditional gamers. In Korea the hit game Lineage is available in a mobile networked version. The Mobile Lineage product is designed to increase total hours of play with the Lineage game by supplementing the popular networked PC version of the game. The current games available over or utilizing mobile networks in the United States tend to be less involved and absorbing games in comparison to networked PC games such as World of Warcraft. These less involved games may be reaching a more casual audience than is those who play highly involved networked games.

Prior experience with technology may affect perceptions and willingness to adopt new features or services based on that technology. The utilization of mobile technology for either work or fun is a critical factor affecting the usefulness and purpose of mobile technology in the cultural context of the U.S. and Korean marketplaces. Figure 5 shows user preferences for a selection of mobile services categorized as either “fun” or “work-related.”<sup>1</sup> We see a much higher percentage of Korean users prefer “fun” services compared to U.S. users whose preference is for productive-oriented services. Interestingly, even Korean users see a high perceived relative value in useful activities. It is possible that the use of games over mobile devices may be more culturally compatible in Korea than the U.S. due to the prior usage based perception of mobile devices providing fun activities.

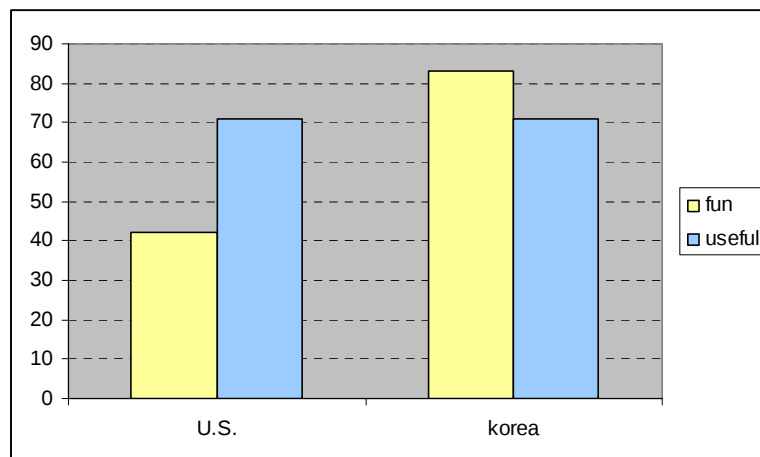


Fig. 5. Preference for “fun” or “usefulness” in mobile devices services in the U.S. and Korea

Although current statistics are still not necessarily reliable, there are indications that more women are playing games. Recent data suggests that 25% of gamers in the U.S. are women

<sup>1</sup> The Worldwide Mobile Internet Survey (WMIS) distributes an annual collaborative survey of over 10,000 mobile users in Asia, Europe and the U.S. and represents an international research consortium of university partners in Japan, Korea, Finland, Taiwan, China, Greece, the U.S. and Australia.

over the age of 18. Perhaps because they were not introduced to games through prior experience with game consoles, they are more open to playing games on mobile devices. While console games are popular with men, it is estimated that women make up 30-45% of the market for mobile games (OECD, 2004, p.37).

#### **4.3 Perceived Relative Value**

The perceived relative value of networked games is shaped by socio-cultural drivers as well as the technology catalyst and usability-compatibility drivers. The value that gamers extract from networked gaming services, affects the genres of games they demand, the features demanded within those games and the gamers willingness to pay for services. Korean gamers value the social qualities associated with games while U.S. players who were surveyed did not perceive value in being a part of a gaming “community” or in features related to communications and gaming. They want easy to learn games that are enjoyable, and they tend to be fairly price sensitive.

Korean gamers extract value from games principally from the enabling role that games play in game related social activities. The features that are most likely to deliver value to customers and be most quickly adopted are communication and access related features, as these features enable the cultural tendency towards collaborative and social game play. These features also affect the willingness to pay for service in the Korean market. The Korean survey data reveals that there is a relationship between how long players play a game and whether their favorite game is either “action” or “role playing.” This is not surprising since these two genres of games are likely to have a communication based networked multiplayer component to them.

Overall, value is delivered to the U.S. market through highly enjoyable games with high quality graphics, and stable network access. The relationship of the game to the gaming community and the support for chatting ability was deemed most likely to be unimportant and would unlikely add value to new games (Figure 6). Action and strategy games were the favorite genres of games for the U.S. survey respondents followed by sports, war, adventure, puzzle and then role playing.

When analyzing the factors that contribute to the amount of money spent per month on online games in the United States, 20% of the variability in “How much money do you spend per month on online gaming” is explained by “price – 5%” and “duration of daily play time – 15%.” Likewise in Korea 14.5% of the variability in money spent per month on online games is explained by how long people play games per day and location of usage. In both cases duration of daily play is the greatest predictor of money spent per month on online games. The Korean survey respondents indicate a greater willingness to spend money on games than the U.S. respondents who spend less than \$10 per month (60%) for playing time up to 30 minutes per day (30%) or up to one hour (24%). Price appears to be a critical characteristic when deciding whether to subscribe to an online gaming service, as shown below in Figure 6.

U.S. respondents were also asked why they do not play online games. The respondents were most likely to agree with the following reasons: “no interest in online gaming,” “online games are a waste of time,” “they take away from my work time,” and “the price of online games is expensive.” These responses highlight an important trend not seen in the Korean survey regarding networked games being a poor utilization of time and money. A possible

explanation of this trend is that networked games have a higher value when they are utilized as a social activity or within a social context, as they typically are in Korea. This also highlights how value is delivered to culturally unique markets. The community enabling nature of networked games builds on the cultural desires of Korean gamers, while they perhaps do not as effectively address the culture of U.S. gamers. New networked games may overcome the stigma of “being a waste of time” if they build on the cultural desired values of the U.S. market, including the strong desire for competition. One possibility for spurring competition could be the introduction of formal tournaments sponsored by the networked game provider that result in recognition or prize money for winners nationwide.

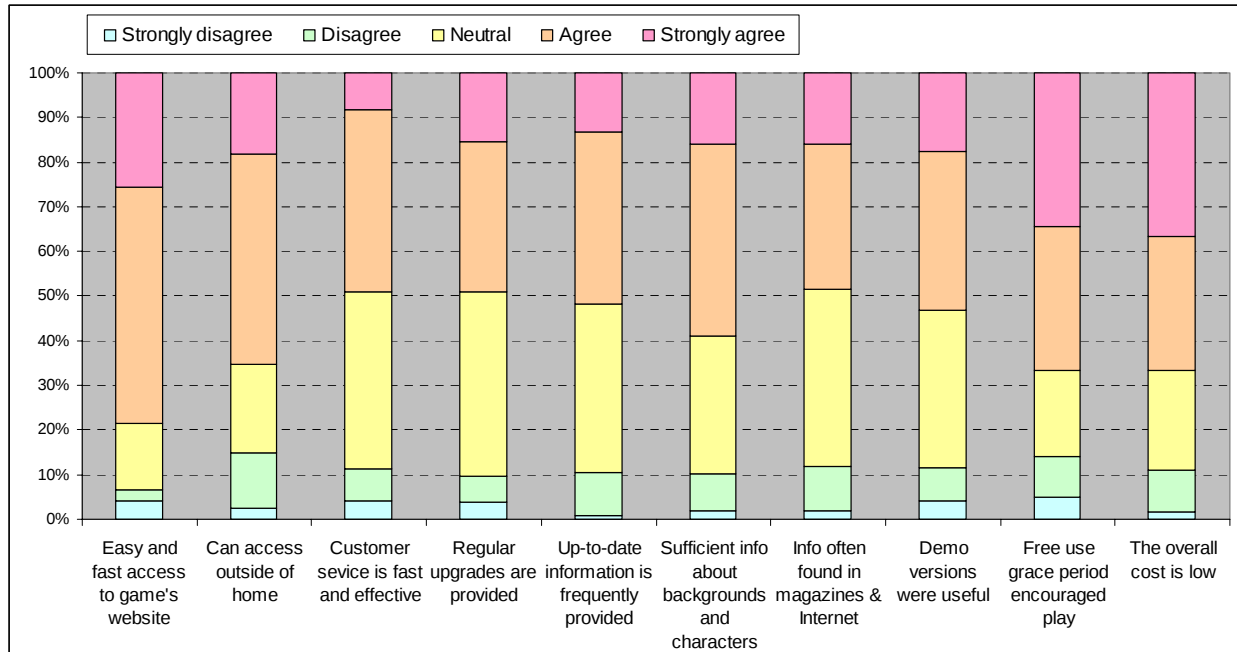


Fig. 6. U.S. Respondents answers to “How important are the following characteristics to you in deciding whether to subscribe to an online gaming service”.

#### 4.3.1 Implications for Mobile Gaming

In the mobile world, gaming can be viewed as a sporadic activity, especially in the U.S. market where gamers show a preference for playing in the home. Single player games then seem appropriate in addition to fantasy games such as Everquest that involve cooperation and interaction or sports-related gaming that involves statistics. It is hoped by many in the industry that instant messaging can support community growth for certain kinds of games and encourage even greater use of the game and ultimately enhance value for players. (MacInnes, Moneta, et.al., 2002). Given the perceived relative value of the U.S. gamer, for communications to be of interest, this kind of service will need to be carefully conceived and delivered. The high value placed on communication capability in the Korean market is already evident as shown by the adoption of communication enabling technologies like the networked mobile game technology found in Lineage Mobile and other cooperation/competition based mobile game services.

Perceived relative value will be different depending on the type of gamer – the hardcore gamer who is accustomed to sophisticated graphics and high depth of user control may not be interested in simple games on small screens that are currently available in the United States. However, Korea’s Lineage Mobile is targeted at avid Lineage fans and designed to extend

their play time, an established predictor of willingness to pay for service. This is possible in the Korean market due to advanced enabling network and handset technologies. Particularly critical is the high bandwidth and low cost mobile data rates in the Korean market that enable multiplayer network access over mobile devices, and the powerful graphic capability of Korean handsets. The recent introduction of the Sony Playstation Portable (PSP) in the United States may be an indicator that action games can effectively translate into small devices in the U.S. market. The strong sales of action titles on the PSP, which is capable of wireless internet connections over wi-fi networks, does indeed indicate the possible appeal of small format action games.

#### ***4.4 Technology Adoption Catalyst***

In the highly R&D intensive games industry, Korea's technology adoption catalyst is government-driven; the game industry has been considered of strategic importance for the last 10 years, and efforts have been made to reach the objective of making the country one of the five major providers of mobile and online games by 2007 (OECD, 2004, p.46). The Korean government has targeted development of online multi-platform game engines and core technologies including 3D computer graphics. In addition, a "Game Institute" was opened in 2000 to distribute core technologies, support development of next generation game technologies and extend cooperation between research organizations (ibid, p.46).

Although the U.S. government does not have explicit policies to further industry growth, U.S. companies such as Electronic Arts and Microsoft are world leaders in game publishing, console and PC markets, respectively. A majority of game development occurs in Southern California and New England, and titles published by U.S. companies make up 44% of the world market (OECD, 2004). In the U.S. market the three large console manufactures compete with the PC based gaming industry in providing networked gaming technology. One of the factors that may affect the growth of online gaming is the differing approaches of the three major console makers in the United States. Sony uses online play as a means to solidify customer loyalty and offers online play free of charge, while Microsoft has improved its online services and network as a draw to subscription services. Nintendo on the other hand, has pursued the handheld console gaming segment with wi-fi networks set up in North America, Japan and Europe to provide access to their free online service (Brightman, 2006).

##### ***4.4.1 Implications for Mobile Gaming***

Mobile networks in Korea are based on unique standards and less expensive and wider bandwidth than in the United States. Also, mobile devices are used for a wider variety of activities in Korea than in the United States, including significantly higher volumes of text messaging and SMS. The business and geographic landscape of Korea is conducive to advanced mobile services and data rates. Korean wireless operators benefit from close ties with equipment manufactures that allows them to extract a great deal of influence over the entire mobile value chain. In terms of geography, the dense population and small geographic area of South Korea result in relatively low cost base station deployment (Shim, 2005). Besides these many advantages, pricing, demographics, and a strong perception of value for online gaming also bode well for the diffusion of mobile gaming.

In the U.S. market there are several technological barriers to the adoption of mobile games including incompatibilities in operating systems, languages, chip sets as well as differing wireless standards. U.S. mobile operators do not enjoy a tightly integrated value chain

compared to Korea, but nonetheless, their strategy has generally been to control content (the walled garden approach) which limits the emergence of creative and unanticipated offerings. If delivery models emerge that allow content providers more direct access to customers perhaps we will see mobile games that are consistent with perceived relative values and socio-cultural drivers (Holson, 2006). In terms of product deployment this study has suggested that products that complement popular online gaming products rather than act as substitutes could result in increased mobile game adoption rates for mobile operators.

## 5. Validating the GAT Model

The validity of the GAT model can be verified from the level of explanatory power found in the survey data. Specifically, we find that in the Korean survey data a high degree of variability in key adoption measures, such as intent to purchase and intent to continue usage, are explained by variables related to the GAT model direct drivers (cultural factors, perceived relative value and usability-compatibility). The technology adoption catalyst does not directly drive adoption, it instead indirectly drives adoption through the other three factors, and since the survey was not designed to measure the effect of the technology adoption catalyst its role will not be specifically validated.

As can be seen from the linear regression (Figure 7) attempting to model the willingness to purchase games, cultural factors significantly help explain Korean gamers' willingness to buy games. Seventy percent of the variability in the responses to "willingness to buy games from a particular company" is explained by three attributes, including two that speak directly to issues of community and culture. As can be seen in Figure 7 there is a strong increase (Beta = 0.482) in the willingness to buy a game from a particular company as the variable "I like to talk to other people about my experience with this game" increases. There is also a significant increase associated with the variable "This game is a hot subject of conversation among many people." This model strongly suggests that a significant percent of Korean gamers' willingness to buy games from particular companies can be explained by the degree of social interest the game generates within communities of gamers. The model also indicates the strong relationship in the Korean market between "Willingness to buy games from a particular company" and a usability factor, namely, "I don't think much effort is needed to learn how to play this game." The fact that these three cultural and usability related variables predict 70% of the variability of a key adoption factor strongly supports the validity of the GAT model in explaining technology adoption.

| "Willingness to buy games from a particular company" $R^2 = 0.700$ |       |       |          |
|--------------------------------------------------------------------|-------|-------|----------|
| Attributes                                                         | Beta  | SD    | P-value  |
| Constant                                                           | 0.342 | 0.055 | 0.0005   |
| I like to talk to other people about my experience with this game  | 0.482 | 0.027 | < 0.0001 |
| This game is a hot subject of conversation among many people       | 0.188 | 0.025 | 0.0078   |
| I don't think much effort is needed to learn how to play this game | 0.198 | 0.024 | 0.0157   |

Fig. 7. Model for the "Willingness to buy games from a particular company"  $R^2 = 0.700$

A second linear regression (Figure 8) attempts to explain the motivators behind continued use of games. 60.2% of the variability in the question "I will continue using this game" is explained by variables in the Korean survey. We find that communication functionality "This game provides a well designed chatting function" had the largest impact on the continued use

of games. The usability related factor “This game clearly specifies my goals” had the second greatest impact on continued usage. Other important factors were related to quality of service (QoS) and location of usage, both important usability drivers. Also present was the cultural driver “Related to the gaming community” and the relative value drivers “The game is fun” and “The game has high quality sound.” As before, we find that a significant amount of the variability in an important adoption factor is explained by cultural factors, perceived relative value and usability-compatibility factors. Once again this validates the GAT model.

| “I will continue using this game” $R^2 = 0.602$                |       |       |          |
|----------------------------------------------------------------|-------|-------|----------|
| Attributes                                                     | Beta  | SD    | P-value  |
| Constant                                                       | 0.343 | 0.021 | < 0.0001 |
| Where do you usually play online games?                        |       |       |          |
| - work/school                                                  | 0.036 | 0.016 | 0.0212   |
| How important are the following reasons you play online games? |       |       |          |
| - fun                                                          | 0.017 | 0.006 | 0.0050   |
| - quality of sound                                             | 0.020 | 0.009 | 0.0364   |
| - ease of access and stability of server                       | 0.035 | 0.008 | < 0.0001 |
| - related to gaming community                                  | 0.026 | 0.008 | 0.0013   |
| It is easy and fast to get access to the website               | 0.036 | 0.009 | < 0.0001 |
| I could access the game anywhere outside my home               | 0.091 | 0.009 | < 0.0001 |
| In case of problems, customer service is fast and effective    | 0.072 | 0.007 | < 0.0001 |
| This game clearly specifies my goals                           | 0.207 | 0.008 | < 0.0001 |
| This game provides a well-designed chatting function           | 0.234 | 0.011 | < 0.0001 |

Fig. 8. “I will continue using this game”  $R^2 = 0.602$

Since there has not been wide spread adoption of networked and mobile networked games in the U.S. the GAT model can not be retrospectively validated against the U.S. data. Using the GAT model in a predictive fashion for the U.S. data though indicates a lack of strong social or cultural benefits from mobile game or networked game usage in the U.S. market. This indicates a missing cultural component in the current available technology that is needed for wide spread adoption in the United States. The usability and compatibility of networked games, however, had moderate benefit to U.S. gamers.

The highest degree of explanatory power with regards to an adoption variable in the U.S. data is seen in a model (Figure 9) attempting to explain “average duration of play.” Duration of play is partly explained (23%) by the usability-compatibility factor, location of usage. We find that location of usage can either increase or decrease average duration of play depending on the location. As mentioned before, duration of play decreases with the use of mobile technology (while using public transportation).

| Model for “average duration of play per day” $R^2 = 0.23$ |        |       |          |
|-----------------------------------------------------------|--------|-------|----------|
| Attributes                                                | Beta   | SD    | P-value  |
| I play online games at home                               | -0.642 | 0.110 | < 0.0001 |
| I play online games at school or work                     | 0.262  | 0.101 | 0.0280   |
| I play online games at internet cafes                     | 0.357  | 0.162 | 0.0294   |
| I play online games while using public transportation     | -0.292 | 0.154 | 0.0402   |

Fig. 9. “Average duration of play per day”  $R^2 = 0.23$

## 6. Discussion

The success of Korean companies to profit from networked games and to grow the market for mobile games is founded on unique cultural and technological features and initiatives that do not necessarily translate in the same form into another market. The U.S. market is characterized by different modes of usage for mobile technology as well as a political and business environment in the fields of both communications and game technology that is far less structured than the Korean government's directed push into broadband and game technology. The diffusion of networked gaming in the mobile arena will be driven by many factors including the need for social interaction, use while waiting, intensity of involvement, role of game competition, level of infrastructure and market geography.

There are still only a small number of online games, and even fewer networked mobile games. Limitations in bringing games to the mobile device include user's price sensitivity and targeted game content that meets preference and use requirements, in addition to device and network issues that must be addressed to propel the mobile gaming market forward in the U.S. market. In the Korean market however, we see that cultural social drivers and usability compatibility drivers are mutually supporting. Koreans use mobile devices to pass the time on long commutes by bus, train or subway (sometimes for two hours per day) and play games for enjoyment and in a manner that could be described through Hofstede's (1994) discussion "collectivist," emphasizing relationships and assimilation into the social fabric, rather than individualist behavior.

The use of the GAT model in this study has led to the examination of social and cultural variables that in turn explain a high degree of the variability in many aspects of the data. Culture and community related variables help explain the differences in responses to questions about "willingness to buy games from a specific game company" and "how often do you play games in the following places," as viewed through the GAT framework for understanding the adoption of gaming technology. As shown below in Figure 10 we see that applying the GAT model anticipates adoption of networked mobile games in the Korean market, while there is much less certainty in the U.S. market.

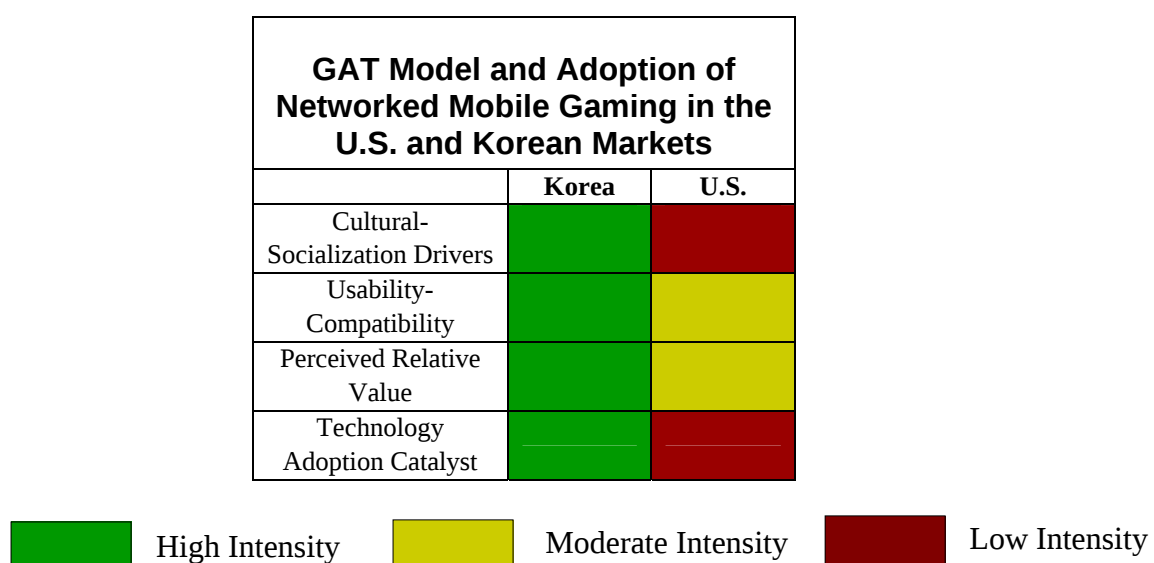


Fig. 10. GAT Model and Adoption of Networked Mobile Gaming in the U.S. and Korean Markets

The fact that many U.S. consumers view games as a waste of time may simply indicate that networked games in their current state are not delivering the culturally desired values and features to these consumers. For U.S. consumers who do play games, the question that remains is whether the advantages of the mobile device, including flexibility and portability are perceived values for the potential mobile gamer in the U.S. market, given the preference for playing games at home shown in our survey data. Although we are measuring current capabilities, since the mobile gaming experience is limited compared to the console or PC experience, it may still hold true that the habits of gaming especially among avid players are well established and there is little motivation to incorporate mobility on a hand-held device.

The survey data also shows that U.S. players are not necessarily interested in expanding the quantity of games they play. Rather, they seek an enhanced experience with the game(s) they enjoy the most. As for the general consumer, an over-riding perception was that the perceived relative value for games, both online and mobile was quite low. If games are perceived as “wasting time,” then perhaps game developers need to emphasize qualities that improve skill, foster rewarding competition, knowledge, awareness, or other utilitarian qualities rather than a singular focus on entertainment.

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