Going Mobile on Games: Determinant on Payments

RAFAEL A. BARBERA
Department of Applied Economics
Universidad Rey Juan Carlos
rafael.barbera@urjc.es

LUIS MIGUEL DONCEL
Department of Applied Economics
Universidad Rey Juan Carlos
luismiguel.doncel@urjc.es

JORGE SAINZ*
Department of Applied Economics
Universidad Rey Juan Carlos
jorge.sainz@urjc.es

Abstract

The mobile game industry is going to one of the fastest growing businesses over the next few years, amounting only in Spain more than 141 million Euros by 2008. The purpose of this paper is to explore the drivers behind M-game adoption and spending among Internet users, focusing on the gamer's profile and technological behavior based on data from an online survey. Our results show that purchasing decisions are irrelevant in terms of the users' personal characteristics and are more focused on the user's prior gaming profile. The introduction of new technology does not change the users' behavior, but it does allow current users to access that content more easily..

Keyword: Mobile games, network economies, early adopters, consumer behavior.

Área temática: Economía de la Información y el Conocimiento.

1. Introduction

Spanish mobile sector has spread rapidly over the last few years. Recent Data from Eurostat shows that mobile penetration is already 89,6%, above the 79,9% of the average of the European Union. The liberalization of the sector slowly experienced over the end of the last century resulted on the gradual introduction of the new technologies; 3G was only marketed over the last year, and the diffusion of UMTS terminals still fairly slow (Jupiter Research, 2004a).

The market is characterized by a large numbers of prepaid customers and the high popularity of SMS services. Still, the strong consumer adoption of new technologies like GPRS, picture and video messaging and mobile games has experienced in other European countries leave room for further growth in these areas. For companies, they are especially attractive if we account for a market that is already reaching saturation and consumer loyalty still is one of the main challenges for the operators. The push for new services is a key driver for that objective and one of the most promising sources of future revenue. In the case of mobile games, Jupiter Research data (2004a) shows a market expectative for 2008 of 141 million euros, being the third mobile content market, after ring tones and logos.

This emerging market is influenced by strong network externalities. As gamers increase in number, a larger user base allows users to have more “fun” while representing for the game industry an increased competitive advantage on complementary products suitable for marketing and transactions (Liang and Huang, 1998).

As Majumdar and Venkataraman (1998) point out, network effects literature focuses on technology adoption decisions, technology compatibility decisions and decisions among competing incompatible technologies. In this paper we will focus on the first point, the decisions taken within the mobile game market, as no previous studies have been conducted on why users choose to start paying for mobile games.

The purpose of this paper is to explore the drivers behind mobile game adoption among users and the effect of the price on the choice of the consumers as a key factor

on the purchase decision. Also to research on the profile and behavior of the game adopter by using data that are rarely available to researchers. Understanding the factors that drive adoption and the consumer characteristics is important as the wider usage of UMTS technologies allows for faster, more interactive games and, as mobile are more widely available for all kind of users, it represent a serious alternative for console and PC games (Nohria and Leestama, 2001; MacInnes *et al,* 2002).

The paper proceeds as follows. Section 2 describes the online game industry as a network process. Section 3 describes the data and summary statistics. Section 4 presents the methodology and discusses the results and its implications, and Section 5 draws some conclusions and avenues for future research.

2. Background and Related Studies

In the game industry, development costs (R&D) are extremely high (a typical game for Playstation or Gamecube costs over $5 million to develop) and most of the platforms outsource new game development and marketing (Dhebar, 1994; Brandemburger, 1995). The success of their games depends, obviously, on the number of users, the companies' competitive advantage, the latter depending on their ability to enhance their reputation (Porter, 1998) and, specially, their ability to foment the consumers' loyalty by means of the reputation of their games (Klein and Leffler, 1981). Additionally, creating a network of users is a strategic asset for the company in order to gain this competitive advantage, bringing full benefits to the organization.

The network size of a company depends on its fixed user base; those who have already downloaded the game and are currently using it, creating a virtual community as described by Balasubramanian and Mahajan (2000), sharing a common bond as the computer game allows the users to exchange tips, experiences and knowledge, building ties among its members, and making the community more attractive to new users, who will be willing to pay a premium on those products that already have a large network of users (Brynjolfsson and Kemerer, 1996). Companies

need to create and build those networks because their own existence depends on it (Kawasaki, 1999; Rosen, 2000), making the product successful independently of its quality (David, 1985). Loyalty among the games' users is especially relevant on assets with a short life span and large marketing expenditures (Klein and Leffler, 1981; Wernerfelt, 1984).

To develop those networks, the companies have to overcome the first obstacle: the adoption of their games as a new technology by an ever-more individualistic consumer, informed and independent, with less time to spare (Lewis and Bridger, 2001). Developing this network is central for companies to spread the word about its new product within the segment that is crucial for their games' diffusion. The adoption of product role models and the product's continuous usage represent a step towards the success of the diffusion, as individuals may reject the innovation after the first use, truncating the possibility of any further development of the network (Robertson, 1971; Rogers, 1995). Therefore, the efforts of the company must be directed at attracting innovators that will allow for the deepening of their product's use.

During the adoption process, prospective users become aware of the innovative technology, its advantages and benefits and its drawbacks, making the decision to continue using it in an environment where, unlike with other information system applications, they have different choices, becoming not just users, but consumers (Kauffman and Walden, 2001). The faster individuals acquire knowledge about the product and experience it first hand, the faster the adoption occurs, the continuous use of the technology being the key step behind the process. How to define it varies across products and users because it is heavily dependent on the characteristics of the product.

As Rogers (1995) points out, the innovations consist of several attributes: i) the advantage with respect to previous methods; ii) its compatibility and complementariness with previous technologies; iii) the complexity in learning to use the new technology, iv) the possibility of testing the new product; and v) being able to observe the acquired benefits, allowing the first adopters to transmit his/her

experience to other prospective users, thus expanding the network and increasing as the ability to observe and appreciate the game's benefits (Chakravarty and Dubinsky, 2005). This psychological process is obviously determined by cultural factors that depend on country, group, etc, making it difficult to translate results from one region to another (Choi and Geistfeld, 2004). Companies interested in succeeding in this market need to understand what kind of user they need to market to in order to build a network that will ensure its success (Lewis and Bridger, 2001).

As mobile technologies develop, so does the literature devoted to it. Bértele *et al* (2002) survey the literature and groups it between technological papers, those related to the enabling technologies and architectures, and those that analyzed the market from the business perspective. Among this ones only a handful relate to the behavior of the consumer on the adoption of the new technology. Yang (2005) uses psychological models to analyze the adoption of the new technologies in a group of Singapore students, finding demographic factors, sex, and innovativeness among the main drivers for the adoption. Kleijnen, Wetzels and Ruyter (2004) analyzed the adoption of wireless finance services. They find that age, computer skills and also innovativeness are key variables for the users' acceptance of the new technology. Jonason and Eliasson (2001) empirically test the pricing problem on an I-mode portal the possibility of consumer expending on mobile portals. Their results show that brand and network are significant aspects for the pricing decisions of mobile portals.

Buellingen and Woerter (2004) and Lehrer (2004) also signify the relevance of mobile network on the success of the technology. The bandwidth increase will boost consumer satisfaction, specially on products like mobile games. MacInnes *et al* (2002), focus on the business models that are currently developing on M-games finding that the key element for the companies is the emergence of a users network that avoid the migration to more sophisticated game platforms. As technology improves this issue will be less relevant for newcomers, but still relevant on the first stages of the technology.

3. Data

The data for this study was obtained via an online survey carried out by Yahoo! Spain in April 2004. According to Nielsen, that month Yahoo!'s Spanish-IP audience consisted of 2.96 million users with a reach close to 30%. The questionnaire was made available to its users via a banner campaign with a frequency set at one, that is, the users were only offered the survey once, installing a cookie in the user's computer once the survey banner was viewed and so avoiding users filling out the survey more than once.

In total, 394 users answered the questionnaire. The sample was roughly equally distributed between male and female respondents. The larger group was made up by users between the ages of 25-34, the cumulative representing between 34 and 68.1% of the total number of users. A little over 40% (41.8%) lived in either one of the regions with the greatest Internet penetration in Spain (Catalonia and Madrid). Also interesting to note is that 68.5% of the users connected at least once a day to Internet in a *proxi* for heavy technology users.

Out of the total, 162 were missing one or several of the 24 questions asked (of which only 11 were relevant for this study). We discarded those incomplete questionnaires, reducing the sample to 232 users. Questions were asked to explore the decision factors behind buying games online for their use on mobile telephones covering as one of the main emerging game interface. Jupiter Research (2004b) points out that spending on this platform are one of the key drivers for the growth of spending on the mobile platform. The question was made for different prices; 1 euro (roughly the price of an ring tone download), 5, 15 and 30 Euros to analyze the propensity of paying depending on the game prices.

For our analysis, the variables used were: i) Internet characteristics - to distinguish heavy from average technological users (the first being those that connect at least several times a week). We also distinguished between those users that connect from home (that own a PC and a connection) to better analyze the difference between those who may be able to substitute mobile by Internet games (those who

own a connection) and those who don´t.; ii) Game related issues - here we distinguished two issues, first intense users of games (those who spend more than 30 minutes per game session or less) and second, those users that are already offline purchasers of games for any of the three platforms analyzed; iii) Personal characteristics - we asked the user his/her age, gender and geographical localization. In terms of age, we separated between younger (34 or below) and older players. In terms of geographical location, we distinguished between Catalonia and Madrid and the rest of the country, as the first two areas show the largest ICT penetration.

The questions mimic our test hypotheses for the different prices levels:

- **H1**: *Strong usage of computers and the Internet is a key driver behind mobile game spending.* Kleijnen, Wetzels and Ruyter (2004) quote this issue as key for the adoption or the likelihood of the adoption of mobile technologies, as it supposes that users with greater computer usage will be keener on trying new, related products.

- **H2**: *Heavy game users are more likely to use Internet as an additional channel to acquire games.* As with the previous hypothesis, we expect that game adoption will depend on the previous usage of games and the gamers' greater likelihood to adopt mobile gaming as a new channel. Hayashi and Klee (2003) and Gowrisankaran and Stavins (2004) demonstrate that it is a key aspect when adopting a financial innovation and we expect to have similar results among our dataset for games.

- **H3**: *Demographic and geographical characteristics are relevant on whether to pay or not for mobile games.* Kleijnen, Wetzels and Ruyter (2004) and Yang (2005) use a similar strategy when analyzing the age factor, dividing the sample into groups, expecting them to be keener on adopting the new technologies according to the specific group. Similarly, we expect, in line with Choi and Geistfeld (2004), that the data will show a digital divide between regions with a greater technological penetration and users more propitious to innovations.

Table 1: Main statistics for the sample.

Purchasing decision				
Variable	**Scale**	**Observations**	**Mean**	**Std. Dev.**
1 Euro	0:No - 1:Yes	232	0.495690	0.501062
5 Euros	0:No - 1:Yes	232	0.336207	0.473432
10 Euros	0:No - 1:Yes	232	0.185345	0.389417
30 Euros	0:No - 1:Yes	232	0.099138	0.299493
Internet Characteristics				
Variable	**Scale**	**Observations**	**Mean**	**Std. Dev.**
Heavy User (*user*)	0:No - 1:Yes	232	0.849138	0.358688
Home User (*connect*)	0:No - 1:Yes	232	0.823276	0.382260
Game Characteristics				
Variable	**Scale**	**Observations**	**Mean**	**Std. Dev.**
Intense User (*inten*)	0:No - 1:Yes	232	0.685345	0.465382
Offline Purchaser (*offl*)	0:No - 1:Yes	232	0.547414	0.498823
Personal Characteristics				
Variable	**Scale**	**Observations**	**Mean**	**Std. Dev.**
Age <34 (*young*)	0:No - 1:Yes	232	0.681034	0.467083
Female (*sex*)	0:No - 1:Yes	232	0.517241	0.500783
Madrid-Catalonia (*geo*)	0:No - 1:Yes	232	0.418103	0.494314

Source: Yahoo! Spain Survey, Spring 2004.

4. Analysis and Discussion

In order to test our first three hypotheses, we used both logit and probit models, but as Greene (2000) suggests, the results in both cases show little difference. For the sake of simplicity, we will just show the logit specification. As optimization

algorithm we used the quadratic hill climbing with a maximum number of iterations of 1,000 and a convergence point of 0.0001[1]. As the function we estimated is as follows:

$$\Pr\left(PURCHASE_i = 1/X\right) = TECHNOLOGY + GAMES + DEMO \qquad [1]$$

That is, the probability of purchasing a game depends on the users' affinity to technological and game usage and some demographic and geographical variables. The same equation is repeated for the four different prices of the games. The results of the estimations are shown in Tables 2, 3, 4 and 5.

Table 2: Regression results for 1 euro payments

	Coefficient	**z-stat**
User	-0.33	-0.84
Connect	-1.16*	-3.22
Inten	-0.01	-0.02
Offl	1.26*	4.13
Young	1.23*	4.17
Sex	-0.43	-1.49
Geo	-0.16	-0.52
Log likelihood	-134.92	
Pseudo R2	0.45	
Nº Obs	232	

*: Significant at 95% level

[1] We tested the results with different algorithm methods like Newton and Rapshon or Berndt, Hall, Hall and Hausman, different number of iterations and level of convergence and result quite similar. We report this ones for simplicity.

In the category "technological characteristics", we can see that if a user connects from home, it reduces the possibility of purchasing a game for mobile platforms. Its coefficient presents a negative and statistically relevant value. So it seems that people spending time at home on Internet are reluctant to pay for mobile games as there is substitution between platforms (MacInnes *et al*, 2002). Also, contrary to Hypothesis 1, being an intensive Internet user is not relevant when deciding whether to buy games for mobile devices. On the contrary, our results show that purchasing propensity decreases on prices and computer usage, suggesting that substitution is higher on more advanced players.

Table 3: Regression results for 5 euro payments

	Coefficient	**z-stat**
User	-0.67	-1.83
Connect	-1.12*	-3.34
Inten	0.15	0.47
Offl	1.19*	3.80
Young	0.43	1.44
Sex	-0.27	-0.96
Geo	-0.21	-0.70
Log likelihood	-134.64	
Pseudo R2	0.45	
Nº Obs	232	

*: Significant at 95% level

In "Game characteristics", and as expected by Hypothesis 2, those users that already buy games off-line are more likely to do so on-line for mobile devices; Internet becomes an additional channel to satisfy the preferences of the consumers.

Finally, when testing Hypothesis 3, we rejected it. We find that none of the demographic variables are relevant for buying games. The exception is young people and mobile phones according to Jupiter Research (2004b), which concludes that only younger users take advantage of mobile phones not only as communications devices but also as game platforms when prices are low. The data shows that younger users are willing to acquire games for prices of 1 Euro (similar to prices paid for logos or ring tones). Since this group age is used to purchase other mobile products, the transitions to new utilizations of mobile devices is easier (Buellingen and Woerter, 2004). In other cases, personal characteristics are irrelevant and users are more focused on their prior behavior, as people who are already users and purchasers of games are more likely to acquire them on other platforms, those being the ones who spend more time playing and more likely to buy.

Table 4: Regression results for 10 euro payments

	Coefficient	**z-stat**
User	-0.52	-1.30
Connect	-1.39*	-3.88
Inten	-0.27	-0.77
Offl	1.03*	2.77
Young	-0.29	-0.89
Sex	-0.18	-0.56
Geo	0.02	0.07
Log likelihood	-161.41	
Pseudo R2	0.44	
Nº Obs	232	

*: Significant at 95% level

The basic conclusions that we can draw from the previous results are that those who are more intense content users, games in this case, are those who will be willing to purchase the product through the new channel, independently of other considerations. The introduction of a new technology does not change the behavior of the users, but it does allow the current product users to have additional access to it.

Table 5: Regression results for 15 euro payments

	Coefficient	**z-stat**
User	-1.20*	-2.59
Connect	-1.29*	-3.05
Inten	-0.52	-1.18
Offl	0.97*	1.99
Young	-0.54	-1.32
Sex	-0.01	-0.01
Geo	-0.16	-0.36
Log likelihood	-72.46	
Pseudo R2	0.30	
Nº Obs	232	

*: Significant at 95% level

5. Conclusions

The importance of understanding that most of the new mobile industries are network-based economies is key to ensuring the success of the business models involved. The video game industry, which already has strong network effects, has started to use other platforms as a way to increase the distribution of its products.

The success behind the introduction of a new product in these economies depends on understanding why the adoption of the product occurs.

To build the network, companies need to understand the possible adopter's profile in order to target their marketing resources to them. Using an Internet-based survey we have been able to investigate the characteristics of those users who are more willing to pay online for M-games. We find that heavy offline game users (those who already purchase video games in traditional stores) are those who are more willing to pay for games. Surprisingly, geographical or personal characteristics (with the exception of young users, which are willing to pay a SMS price for content download) are not relevant for the buying decision, nor are the intensity of their use of other technologies, as the Internet. Again this result comes with an exception; advanced users are less willing to pay for high priced content. On the other hand, there is a negative relationship between people willing to download games for their mobile and those who connect from home, suggesting a substitution between games usage on more sophisticated platforms.

This result has two implications: First, heavy Internet users are not willing to pay for content, games in this case, as they are used to getting that content for free. Second, there is a strong substitution between Internet use and M-games use. Further research could focus on this substitution between game platforms, as new devices that merge mobile and internet characteristics like Nokia N-Game or the new Sony PSP appear on the market, and on the evolution of consumer willingness to pay for Internet games/content. As new surveys are carried out in this area, it will be easy to add new data on the mobile consumer's behavior.

References

1. Balasubramanian, S. and Mahajan V. “The Economic Leverage of the Virtual Community,” *International Journal of Electronic Commerce*, Vol. 5 (Spring): 103-138, 2000.

2. Bertelè, U., Rangone, A., and Renga, F. “Mobile Internet: An Empirical Study of B2c WAP Applications in Italy.” *Electronic Markets*. Vol. 12(1): 27-37, 2002.

3. Brandenburger, A. “Power Play (A): Nintendo in 8-bit Video Games,” Harvard Business School case 9-795-102, 1995.

4. Brynjolfson, E. and Kemerer C. “Network Externalities in Microcomputer Software: An Econometric Analysis of the Spreadsheet Market,” *Management Science*, Vol. 42 (12): 1627-47, 1996.

5. Buellingen, F., and Woerter, M. “Development perspectives, firm strategies and applications in mobile commerce.” *Journal of Business Research*, Vol. 57(12): 1402-1408, 2004.

6. Chakravarty, S. and Dubinsky, A. “Individual investors' reactions to decimalization: Innovation diffusion in financial markets”. Journal of Economic Psychology, Vol. 26 (1): 89-103, 2005.

7. Choi, J. and Geisfeld, L.V. “A cross-cultural investigation of consumer e-shopping adoption.” *Journal of Economic Psychology*, Vol. 25 (6): 821-838, 2004.

8. David, P. “CLIO and the Economics of QWERTY.” *American Economic Review*, Vol. 75: 332-337, 1985.

9. Dhebar, A. “Nintendo and Its Three Video-Game Systems: The Technology and the Business of Fun,” Harvard Business School case 9-594-120. 1994.

10. Gowrisankaran, G. and Stavins J. "Network Externalities and Technology Adoption: Lessons from Electronic Payments," *RAND Journal of Economics*, Vol.35: 260-276, 2004.

11. Greene, W. H. Econometric Analysis, New Jersey: Prentice-Hall. 2000.

12. Hayashi, F. and Klee, E. "Technology Adoption and Consumer Payments: Evidence from Survey Data", *Review of Network Economics*, Vol. 2: 175-190, 2003.

13. Jonason, A., and Eliasson, G. “Mobile Internet revenues: An empirical study of the I-mode portal.” *Internet Research*, Vol. 11(4): 341-348, 2001.

14. Jupiter Research. “European Paid Content and services: Market Trends and Forecast”. Jupiter Research, London. 2004a.

15. Jupiter Research. “Data Essentials, Spain.” Jupiter Research, London. 2004b.

16. Kauffman, R. and Walden, E. “Economics and electronic commerce: Survey and Research Directions”, *International Journal of Electronic commerce*, Vol. 5(4): 5-116, 2001.

17. Kawasaki, G. “Rule for Revolutionaries: The Capitalist Manifesto for Creating and Marketing New Products and Services.” New York: HarperCollins. 1999.

18. Kleijnen, M., Wetzels, M., and Ruyter, K. “Consumer acceptance of wireless finance.” *Journal of Financial Services Marketing*, Vol. 8(3): 206-217, 2004.

19. Klein, B. and Leffler K. “The Role of Price in Guaranteeing Quality,” Journal of Political Economy, Vol. 89: 615-641, 1981.

20. Lehrer, M. “National Lead Markets and the Design of Competition for 3G Network Applications.” *Journal of Business Research*, Vol. 57: 1397-1401, 2004.

21. Lewis, D., and Bridger D. “The Soul of the New Consumer”. London: Nicholas Brealey Publishing. 2001.

22. Liang, T.P. and Huang, J.S. “An Empirical Study on Consumer Acceptance of Products Electronic Markets: A Transaction Cost Model.” *Decision Support Systems*, Vol. 4(1): 29-43, 1998.

23. MacInnes, I., Moneta, J., Caraballo, J and Sarni, D. “Business Models for Mobile Content : The Case of M-Games.” *Electronic Markets*, Vol. 12 (4): 218-227, 2002.

24. Majumdar, S. and Venkataraman S. “Network effects and technology adoption in US telecommunications”, *Strategic Management Journal*, Vol. 19 (11): 1045-1062, 1998.

25. Nohria, N., and Leestma, M. “A Moving Target: The Mobile-Commerce Customer.” *MIT Sloan Management Review*, Vol. 42(3): 104, 2001.

26. Porter, M. “Competitive Advantage: Creating and Sustaining Superior Performance”, New York, Free Press. 1998.

27. Robertson, T.S. “Innovative Behavior and communication”. New York, Rinehart and Winston. 1971.

28. Rogers, E.M. “Diffusion of Innovations”. New York: The Free Press. 1995.

29. Rosen, E. The Anatomy of Buzz, New York: Doubleday. 2000.

30. Wernerfelt, B. “A Resource-Based View of the Firm.” *Strategic Management Journal*, Vol 5: 171-180, 1984.

31. Yang, K. C. C. “Exploring factors affecting the adoption of mobile commerce in Singapore.” *Telematics and Informatics*”, In Press, 2005.