

INVESTIGATING ON SUCCESSFUL FACTORS OF ONLINE GAMES BASED ON EXPLORER

Sarfraz Hashemkhani Zolfani, Mahdi Farrokhzad, Zenonas Turskis

Introduction

Multiplayer online games have become one of the most popular game types these days. The new online games are generally hosted in some server machines running on the Internet, which are referred as game servers rather than running such games on peer computers and connecting the game machines through modems. Game players from different geographical locations can connect to the games through some broadband network connections using a computer or a game console. Such game platforms (computer or a game console) are referred as game clients. 'Meridian 59' was the first commercial multiplayer online game of this type which was published in 1996 by 3DO [3]. After that some major game types, including FPS, RTS, and RPG, have appeared in the market of multiplayer online games [13].

GameSpy believes that the multi-player online game had over 2 million subscribers at the end of 2002. Also in 2002, Everquest had 450,000 and Asheron's Call had 250,000 subscribers. Friday January (2004) believes that The numbers for concurrent online gamers is more than 91,000 for Counter-Strike, 9,000 for Call-of Duty and 8,000 for Battlefield 1942. The numbers clearly show the amount of interest in both multi-player online 'role playing' games and action based computer games is significant. The overall trend based on the number of players continues to increase though the popularity of the games is different [10].

Many factors are important in this area that may influence player's selection of online game. The factors affecting player's game selection can be regarded in two dimensions; one is the intrinsic factor of consumer and

some other environment factors; the other side is the controllable factor by business operators or designers before starting and releasing the game. Researchers point out that using external plug-in will affect the fairness of game, and also the reputation of game agencies and it reduces their profits. The identification of player can help player's sense of group in online game, self-respect and increase participation desire. This is based on the viewpoints of online games [9].

Lou et al [9] proposed the factors that influence player's selection of games which include: game quality, game design, and fairness of the game, player's game group and game maker's reputation.

1. Literature Review

1.1 History of Multiplayer Online Games

Multiplayer online games have been developed as early as the late 1980s. The uniqueness of this game type is that it connects people from geographically dispersed locations to a common game environment for game playing. One of the early developed online games was the Modem Wars, which was a simple 2-D game designed for the personal computer "Commodore 64". The game connected two game players using modems into a shared game environment. During game playing, game players can interactively move the game items around the game environment to attack any enemy items located within a certain predefined range. Despite the game design being simple, it set a good foundation [13].

Nowadays, multiplayer online games have become one of the most popular game types. Unlike the old days, instead of running such

games on peer computers and connecting the game machines through modems, the new online games are generally hosted in some server machines running on the Internet, which are referred as game servers. Game players from different geographical locations can connect to the games through some broadband network connections using their preferred game platforms, which can be a computer or a game console. Such game platforms are referred as game clients. The first commercial multiplayer online game of this type was, Meridian 59, published in 1996 by 3DO [3].

Thereafter, some major game types, including FPS, RTS, and RPG, have dominated the market of multiplayer online games [13].

According to GameSpy, the multi-player online role playing game Lineage had over 2 million subscribers at the end of 2002. Also in 2002, Everquest had 450,000 and Asheron's Call had 250,000 subscribers. The numbers for concurrent online gamers (based on Friday January 2004 figures) exceeds 91,000 for Counter-Strike, 9,000 for Call-of Duty and 8,000 for Battlefield 1942. The numbers clearly show the amount of interest in both multi-player online role playing games and action based computer games is significant. While popularity of games varies from year to year, the overall trend based on the number of players continues to increase [10].

Many factors are important in this area that may influence player's selection of online game. The factors that influence player's selection of game can be regarded as two aspects; one is the intrinsic factor of consumer and some other environment factors; the other aspect is the controllable factor by business operators or designers prior the launch of the game. A game's quality and level of fluency can be the factors that influence customer's selection of online games. Group communication is also the factor that influences customer's

selection of online games. Lou et al [9] indicates that the identification of player can help with online game player's sense of group, self-respect and increase participation desire, based on the viewpoints of online games. They [9] proposed the factors that influence player's selection of games so far include (A) game quality (B) game design (C) fairness of the game (D) player's game group (E) game maker's reputation.

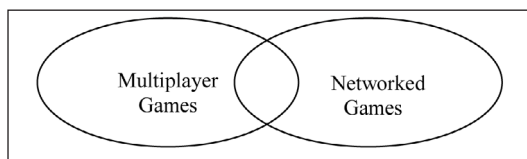
1.2 Defining Networked and Multiplayer Games

By its very definition, a network game must involve a network, meaning a digital connection between two or more computers. Multiplayer games are often network games in that the game players are physically separated and the machines, whether PCs or consoles or handhelds, are connected via a network. However, many multiplayer games, especially early ones were not network games.

Typically, such multiplayer games would have users take turns playing on the same physical machine. For example, one player would take turns fighting alien ships while the second player watched. Once the first player was destroyed or when he/she completed the level, the second player would have a turn. Scores for each player were kept separately. For simultaneous multiplayer play, either cooperatively or head-to-head, each player would see their avatar on the same screen or the screen would be 'split' into separate regions for each player [3].

For example, a multiplayer sports game may have each player working one member of opposing teams. The game field could either be entirely seen by both players or the screen would be physically split into the part of the field viewable by each player. Thus, the area of multiplayer games includes some games that are not network games [6] (figures 1 and 2).

Fig. 1: The Sets of Multiplayer Games and Network Games Are Overlapping, but Not Subsets or Supersets of Each Other



Source: [6]

The advances in computer networks, while is respectable in their own right, look slow when compared to advances in graphics cards. 56Kbps modems first became widely available in 1990s.

Based on surveys by Nielsen/Net Ratings while 75 % of Americans have internet access in 2003, 59 % of these users connect to the internet at 56Kbps or less. While US is fifth among OECD countries in terms of broadband penetration (Korea, Canada, Belgium, Denmark

and Sweden having higher subscriber connectivity), it has a larger impact on network architecture and has a more prominent role in the development of computer games and interactive entertainment technologies. The market penetration of broadband in US is expected to be as high as 70 % at the end of 2005 for users connected to the internet which will make high speed network connection the default rather than the exception [10].

Fig. 2: Timeline Overview of Early Online and Multiplayer Games

1960s – Era of early multiplayer games	1958 Tennis for two
1970s and 1980s – Era of arcade multiplayer games	1961 Space war
1990s and beyond – Era of on-line multiplayer games	1970 Galaxy war
	1972 Pong
	1978 Atari Football
	1993 Doom
(a)	(b)

Note: (a) Lists approximate game eras. (b) Lists the release of important milestone games

Source: [6]

1.3 Game Industry Bright Future

It is also interesting that the Game economy is one of the few profitable businesses now. Many online games have obtained huge success in less time. Online gaming has become a multi-billion dollar industry in these years. The market will also take steps in this direction too, because people like to play with real human opponents and sometimes they also want to pay for this reason [3].

According to statistics by ESA i-nstitute and the Digital economy Fact Book:

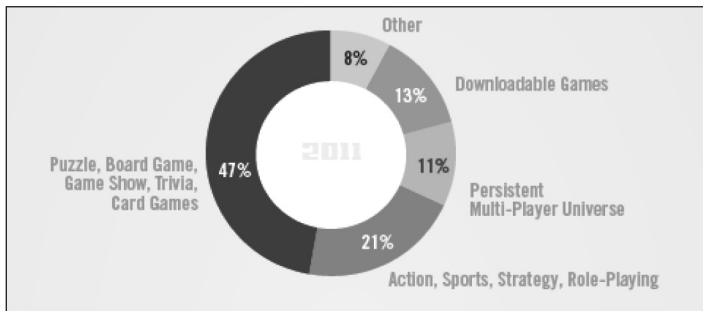
- In 2007, 67 % of American heads of households play computer or video games; in 2011 this figure reached up to 72 %.
- In 2007, 51 % of gamer shave said that they play online games, this statistics compared to year 2000, increased by 32 %, in 2011; also population of gamers has reached up to 65 %.
- According to this 2011 statistics, more than 19 % of online game users, also paying fee for this group of games [1], [2].
- U.S. retail sales of portable and console gaming hardware, software, and accessories generated \$18 billion in revenue in 2007, up

43 % from the \$12.5 billion generated in 2006. PC game software revenues fell to \$911 million from the \$970 million generated in 2006. PC and console software sales reached \$9.5 billion in 2007, up 28 % from the \$7.4 billion those sales totaled in 2006.

- Worldwide mobile gaming revenue is expected to climb to \$4.5 billion in 2008, up from \$3.9 billion in 2007. The industry is expected to grow at a compound annual growth rate of 10.2 % from 2007 to 2011, and reach \$6.3 billion in revenue in 2011.
- Twenty-eight % (nearly 217 million people) of the worldwide online community visited an online gaming site in May 2007, an increase of 17 % over May 2006.
- According to Juniper Research, mobile gaming revenues were \$5 billion in 2007, and are expected to grow to nearly \$16 billion by 2012.
- The top 5 MMOGs in the first quarter of 2008 were World of Warcraft, RuneScape, Lord of the Rings Online, Final Fantasy XI, and City of Heroes.63.

- World of Warcraft is the world's largest Massive Multiplayer Online Role Playing Game.
- (MMORPG), recently surpassing 10 million subscribers.64 Subscriptions to the game brought in \$1 billion in revenues in 2007 and, at the current pace of more than \$100 million per month in sales and subscriptions, the game is likely to surpass that figure in 2008.
- E-Marketer expects the U.S. in-game advertising market to grow from \$295 million in 2007 to \$650 million by 2012.
- Among virtual worlds, Second Life has 12 million registered users, but only 1 million are active. Fewer than 10 % of all virtual world registrants are actually active users [15]. Fewer than 10 % of all virtual world registrants are actually active users [15] (figure 3).

Fig. 3: Types of Online Games Played Most Often



Source: own

The gaming ecosystem is undergoing major technology and business model transitions that will last beyond 2015. Gartner-Inc, estimates that worldwide spending on the gaming ecosystem will exceed 74 billion dollars in 2011, 10.4 % greater than 2010 (67 billion dollars). By 2015, this growth will reach 112 billion dollars [4].

According to Table 1, Online games industry in the next 5 years will have highest growth compared to other sections of this industry, also its market spending at least 2.38 more greater than 2011, and will be reach 28.2 billion dollars in 2015 [4].

Tab. 1: Total Gaming Market Spending, 2010–2015 (millions of dollars)

	2011	2013	2015
Gaming Hardware	17797	24621	27354
Gaming Software	44730	51129	56512
Online Gaming	11899	21453	28298
Total	74426	97204	112163

Source: [4]

2. A Step-Wise Weight Assessment Ratio Analysis (SWARA) Method

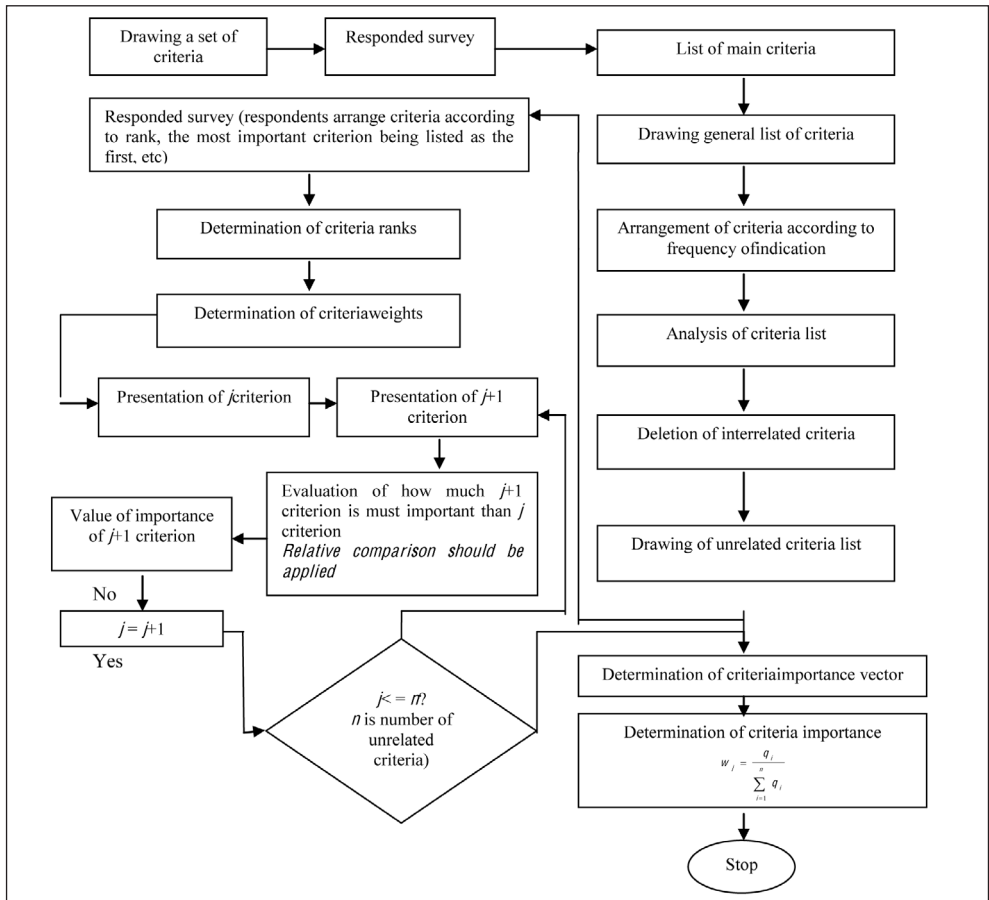
The procedure, applied in the case study, for the criteria weights determination is presented in Fig. 4.

There are various approaches for assessing weights [14], [15], e.g. the eigenvector method, SWARA [8], expert method [16], analytic hierarchy process (AHP) [11], [12], Entropy method, etc [7], FARE [5].

In SWARA method each of experts first of all ranks criteria. The most significant criterion is given rank 1, and the least significant criterion is given rank last. The overall ranks to the group of experts are determined according

to the mediocre value of ranks [7]. The step-wise weight assessment ratio analysis (SWARA) [8] methodology is developed in 2010 and applied for the selection of rational dispute resolution method [7].

Fig. 4: Determining of the Criteria Weights



Source: based on [7]

The main feature of SWARA method is the possibility to estimate experts or interest groups opinion about significance ratio of the criteria in the process of their weights determination [8]. This method helps is useful for coordinating and gathering data from experts. SWARA applications are uncomplicated and experts in various fields can contact with general idea of this method easily.

3. Evaluation of Research Model

There are many important factors in this area and field. In table 2 you can find a framework about important factors about online games which is presented by Farrokhzad [3]. Those factors are based on explorer. Based on literature review and interviews with experts, Farrokhzad [3] proposed his model.

Tab. 2: Research Model of Online Games

	Factors
C ₁	Transaction Fees
C ₂	Game Scenario
C ₃	Customer Service
C ₄	Game Rewards
C ₅	Game Play
C ₆	Attractive Website Graphic
C ₇	Similarity to real world

Source: based on [3]

Like other similar methods (AHP and ANP), SWARA is also based on expert’s ideas but experts can be participated easily in this method. Information about experts is shown in table 3.

Tab. 3: Background Information of Experts

Category	Classification	No.
Working background	Web designer	2
	Game designer	3
	Graphics	2
	Marketing instructor	1
	Software experts	2
Education Level	Bachelor	0
	Master	6
	Ph.D.	4
Sex	Male	8
	Female	2

Source: own

Ten experts of game designing participated in this research. They have worked on web designing, graphics, marketing instructing and software. All of the experts were interested in this topic and had experiences on this issue. Presenting a framework and evaluating the needs from several perspectives, the researcher proposed these five areas and field in this research. Then the experts stated their opinions on identifying relative importance of each criterion for estimating the values of each criterion.

Procedure of this section was based on SWARA method and the result is shown in table 4.

Conclusion

Game industry, as we know, is one of the powerful industries which is based on

knowledge and is also a field of interesting for investigators in developed country. Game industry is consisted of several categories and online games are one of the most profitable ones. The main aim of this research was online games based on explorer that the researcher decided to develop a framework for constructing game in highest level. In this research a new method in MADM is applied to categorize factors and calculate relative importance and value of each factor which is called SWARA.

The model of research is included seven factors: transaction fees, game scenario, customer service, game rewards, game play, attractive website graphic and finally similarity to real world.

In process of research ten experts participated in different fields and they were: two web

Tab. 4: Final Results of SWARA Method in Weighting Criteria

Criterion	Comparative importance of average value s_j	Coefficient $k_j = s_j + 1$	Recalculated weight $W_j = \frac{x_{j-1}}{k_j}$	Weight $g_j = \frac{w_j}{\sum w_j}$
C ₆		1	1	0.192
C ₅	0.1	1.1	0.90	0.173
C ₂	0.093	1.093	0.823	0.158
C ₇	0.137	1.137	0.723	0.138
C ₃	0.112	1.112	0.65	0.125
C ₄	0.1	1.1	0.59	0.114
C ₁	0.118	1.118	0.527	0.100

Relative importance of each criterion was calculated by SWARA method.

Source: own

designers, three game designers, two graphics, one marketing instructor and two experts in software.

Results of SWARA method illustrated that attractive website graphic is the most important factor in this area and also show that importance of factors is very close. The importance and weight of each factor is shown in table 4.

This research can be useful as a powerful framework for game producers companies and designers of online games specially and also this model can be developed by each case and situation by producers and designers. Authors suggest that this research is powerful as a general form and model.

Competitive situation of markets is different from case by case and different markets and didn't consider by this research and that is one of limitations of this research. Authors propose that to applicants consider this matter in real world cases.

References

- [1] ENTERTAINMENT SOFTWARE ASSOCIATION. *Essential Facts About The Computer And Video Game Industry*. 2007.
- [2] ENTERTAINMENT SOFTWARE ASSOCIATION. *Essential Facts About The Computer And Video Game Industry*. 2011.
- [3] FARROKHZAD, M. *Evaluating Online Game Industry in E-Commerce: Preparing a New Scenario in Online Coaching Game*. M. Sc Thesis, Shiraz University, 2012.
- [4] GARTNER INC. *Gaming Software Spending Dominates but Online Gaming Growing Fastest Over the Next Five Years* [online]. Stamford (CT): Gartner, Inc. c2012 [cit. 2011-08-29]. Available from: <http://www.gartner.com/it/page.jsp?id=1737414>.
- [5] GINEVICIUS, R. A new determining method for the criteria weights in multi-criteria evaluation. *International Journal of Information Technology & Decision Making*. 2011, Vol. 10, Iss. 6, pp. 1067–1095. ISSN 0219-6220.
- [6] GRENVILLE, A., CLAYPOOL, M., BRANCH, P. *Networking and Online Games: Understanding and Engineering Multiplayer Internet Games*. 1st ed. John Wiley & Sons Ltd., 2006. 232 p. ISBN 978-0470018576.
- [7] KERSULIENE, V., TURSKIS, Z. Integrated fuzzy multiple criteria decision making model for architect selection. *Technological and Economic Development of Economy*. 2011, Vol. 17, Iss. 4, pp. 645–666. ISSN 2029-4913.
- [8] KERSULIENE, V., ZAVADSKAS, E.K., TURSKIS, Z. Selection of Rational Dispute Resolution Method by applying new Step-wise Weight Assessment Ratio Analysis (SWARA). *Journal of Business Economics and Management*. 2010, Vol. 11, Iss. 2, pp. 243–258. ISSN 1611-1699.
- [9] LOU, S.N., CHEN, Y.T., ZHANG, Y.S., LIN, C.T. Prioritizing critical success factors for online game industry – A Fuzzy AHP analysis. *International conference on Business and Information, Kitakyushu, Japan*, 2010.
- [10] PISAN, Y. Challenges for Network Computer Games. *IADIS International Conference WWW/Internet 2004*. pp. 589–595.

[11] SAATY, T.L. A scaling method for priorities in hierarchical structures. *Journal of Mathematical Psychology*. 1977, Vol. 15, Iss. 3, pp. 234–281. ISSN 0022-2496.

[12] SAATY, T.L. *The Analytical Hierarchy Process*. New York: McGraw-Hill. 1980.

[13] WAH, W.B. *Wiley Encyclopedia of Computer Science and Engineering*. 1st ed. John Wiley & Sons Ltd., 2008. 3328 p. ISBN 978-0-471-38393-2.

[14] ZAVADSKAS, E.K., TURSKIS, Z., USTINO-VICHIUS, L., SHEVCHENKO, G. Attributes weights determining peculiarities in multiple attribute decision making methods. *Inžinerine Ekonomika – Engineering Economics*. 2010, Vol. 21, Iss. 1, pp. 32–43. ISSN 1392-2785.

[15] ZAVADSKAS, E.K., TURSKIS, Z., VILUTIENE, T. Multiple criteria analysis of foundation instalment alternatives by applying Additive Ratio Assessment (ARAS) method. *Archives of Civil and Mechanical Engineering*. 2010, Vol. 10, Iss. 3, pp. 123–141. ISSN 1644-9665.

[16] ZAVADSKAS, E.K., VILUTIENĖ, T. A multiple-criteria evaluation of multi-family apartment block maintenance contractors: I-Model for maintenance contractor evaluation and the determination of its selection criteria. *Building and Environment*. 2006, Vol. 41, Iss. 5, pp. 621–632. ISSN 0360-1323.

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Doručeno redakci: 2. 9. 2012

Recenzováno: 15. 10. 2012, 17. 10. 2012

Schváleno k publikování: 12. 4. 2013

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Game industry is one of the profitable industries nowadays and a lot of individuals and companies are working in this field. A lot of people like the products of such industries, especially online games which are new. The aim of this research is studying the category of online games based on explorer. Designers and producers can create a game based on a useful framework which can be underlined in this study. Transaction fees, game scenario, customer service, game rewards, game play, attractive website graphic and similarity to real world are the model of this research. SWARA method applied in evaluating important factors of model are used in this research and results shown that attractive website graphic are the most important factors in this area. Authors believe that results of this research are very useful for game producers and designers of game.

Key Words: *online games, online games based on explorer, game industry, SWARA.*

JEL Classification: *C63, M31, M15.*