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Real money trade model in virtual economies

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Abstract

The most interesting real estate transaction has been executed after a several months long auctioning process in December 15, 2004, a sale of a whole island at a rather incongruent price of 26,500 USD, BBC reports[1]. The peculiar part of the deal is the location of the island; it is not situated in a lush Mediterranean climate or off the costs of Florida but in a rather constrained space of a few mainframe servers of MindArk company in Gothenburg, Sweden. It is a *virtual* property[2] coded in the massively-multiplayer online role-playing game (MMORPG) game Project Entropia which can be used only by *virtual personages*, the so-called *avatars* existing as human user's digital extensions, but at the same time that property can be traded using real money. *Virtual* economies traded in the real world or so to speak *virtual economy* spillover into the real world (i.e. real money trade) resulting from the trade of these properties is not small by any standards and is estimated to be $880 millions[3] in 2005 and rapidly growing.

The owners of those virtual worlds, most often medium to very large companies, themselves face the consequences of sprouting economic relationships based on their product, either by embracing them as MindArk did or by banning them as Blizzard did in their hugely successful MMORPG World of Warcraft[4].

What are the causes for this virtual economy's spillover into the real one? Why does it happen in the first place? The answers to these questions may not only be the analysis of the current situation of the economies in the *virtual worlds* but also serve as a direction for further analysis of emergent *Homo Economicus Virtualis*.

My thesis will explore two cases of virtual world economies in detail and examine the real money trade creation in those economies using abductive approach. The study will base itself on the information recollected using online interviews and surveys of the active population inhabiting the two virtual economies. Various secondary sources will be analyzed and existing theoretical frameworks will be used in the thesis. Consequently, theoretical virtual economy real money trade model based on the digital assets growth dynamics in the challenge level framework will be inferred and outlined. In the end, suggestions for the further research will be presented.

Acknowledgments

I would like to thank Dr. Peter Hagström for his support and advice in this fascinating field of research. I would also like to acknowledge Dr. Edward Castronova's comments and help for getting constructive critique from TerraNova's resident gurus.

Without the continuous support, wise advice and love of my family, this work and everything else would not have been possible… you have my eternal gratitude

[1] http://news.bbc.co.uk/1/hi/technology/4104731.stm
[2] Lastowka, Hunter, 2003
[3] http://guildwars.ogaming.com/data/2315~IGEInterview.php
[4] Finance And Economics: A model economy; Economics and gaming, 2005, The Economist

Glossary and Abbreviations

RMT – Real money trade, a term to denote virtual assets in the real-money terms (first introduced on TerraNova)
Role-playing games - Type of game where players assume the roles of fictional characters via role-playing. In fact, many non-athletic games involve some aspect of role-playing; however, role-playing games tend to focus on this aspect of behavior.[5]
MMORPG – Massively multiplayer online role-playing games
MMOG – Massively multiplayer online games
Virtual World – A virtual world is a computer-simulated environment intended for its users to inhabit and interact with via avatars. This habitation usually is represented in the form of two or three-dimensional graphical representations of humanoids (or other graphical or text-based avatars). Some, but not all, virtual worlds allow for multiple users[6].
Virtual Gods or Gods – Virtual world designers or makers, an authority overlooking and maintaining the virtual world, e.g. Sony Online Entertainment in case of Everquest 2.
Online-Persistent World – A virtual world active and available 24 hours a day and seven days a week[7]
Commodification - The injection of real-world cash as a motivating factor for MMORPG players to trade away their in-game items and currency.
Avatar - In the Hindu religion, an avatar is an incarnation of a deity; hence, an embodiment or manifestation of an idea or greater reality. In 3D or virtual reality games and in some chat forums on the Web, your avatar is the visual "handle" or display appearance you use to represent yourself.[8]
NPC – In the game lingo, it is a *non-player character*, usually an animated entity with complex behavior exhibiting some kind of intelligence.

[5] http://encyclopedia.thefreedictionary.com/role-playing%20games
[6] http://encyclopedia.thefreedictionary.com/virtual%20world
[7] http://encyclopedia.thefreedictionary.com/virtual%20world
[8] http://whatis.techtarget.com/definition/0,289893,sid9_gci211625,00.html

1. Introduction

1.1 Background

In 2001, the seminal work by Edward Castranova titled "Virtual Worlds: A First-Hand Account of Market and Society on the Cyberian Frontier", introduced an exploration of a rather new and overlooked phenomenon, the existence of purely digital assets and their real currency trade in the real world. Dr. Castranova then derived the basic macroeconomic indicators of that virtual economy based on the MMORPG Everquest produced by Sony Online Entertainment and what he found was astounding.

There was a virtual world with its virtual GDP per capita roughly between the levels of Russia and Bulgaria and the hourly wage of $3.42[9]. In 2004, Dr. Castranova presented an update of his original numbers with the GDP of the *virtual worlds* equal to that of Namibia[10] with GNI/capita[11] equal to $2,000. With the different methodology and an updated data, another calculation took place on TerraNova[12] with the GDP roughly between Benin ($7.49 billion) and Malta ($7.04 billion) and for that occupying 134th place out of the 185 countries.

The virtual economy is the trade of purely virtual assets in-game with thousand of players competing on either side of demand and offer in best traditions of market-based economies. It would all remain in-game but suddenly a spillover effect emerged with the virtual assets beginning to trade for the real currency. As with any economy, its structure is complex and in this thesis we will use the term *virtual economy* to denote either a full economy or the spillover of that economy into the real world.

The virtual worlds are not all about money however, they occupy a significant part of the waking hours of a part of the population. And those are not teenagers either but a rather solid population of well-established men and women[13], with the current estimates of total MMORPG players of approximately 8 millions[14].

Thousands of people cause uproar everyday in forums, lawsuits are filed and innovations are being created almost daily, while there is a clear trend of *virtual world* population growth[15]. The global corporate sector stands ready to grab a piece of that pie, judging by the number of virtual worlds in development or already fully running[16], and given the fierce competition many of them search for additional streams of income. The trade of digital assets in the real world has slowly begun to gain reputation as a profitable and potentially highly attractive source of income, considering recent announcements by

[9] Castronova, 2001
[10] http://terranova.blogs.com/terra_nova/2004/08/virtual_world_e.html
[11] Gross National Income, statistic used by the World Bank, http://www.worldbank.org/data/dataquery.html
[12] http://terranova.blogs.com/terra_nova/2005/04/h1mmo_gdp_qed_w.html
[13] http://www.nickyee.com/daedalus/archives/000550.php
[14] Appendix 1
[15] http://mmogchart.com/Chart4.html
[16] Appendix 2

Sony Online Entertainment[17]. However, the causes for the RMT (real money trade of digital assets) are still very vague and unclear, which quite possibly forces the companies to overlook a potential source of income for the lack of understanding for its mechanics.

1.3 Structure of the thesis

This thesis is organized in the following structure. After the introduction to the thesis in the chapter 1, a methodology discussion will proceed. This section in the chapter 2 will describe the conducting of this study and discuss the quality of the research.

Chapter 3 will give an overview on the theoretical frameworks used in this thesis and give the foundation for the case analysis in the thesis. The following chapter under number 4 will describe the empirical study that was done. This section would begin with a historical overview of MMORPGs and then continue to the descriptions of the two cases studied, namely Everquest 2 and Project Entropia. The case analysis will also take place in that section.

The next chapter under number 5 will bring forth the necessary conclusions and will also provide questions and directions for further research.

The concluding chapters would provide additional data in form of the appendices containing numerical data and primary information sources details. The references separated into books, articles and papers web sources and company websites will come last.

1.4 Purpose

Following Booth et al[18] guidelines for problem statement, the purpose of this thesis is to infer a theoretical framework from the observed phenomena of real money trade of digital assets, which would explain real money value creation in the MMORPG. The purpose is to first explore the real money trade of digital assets in games, then construct a qualitative model using existing theories.

It would be suitable at that point to assert a real-world importance of the MMORPG phenomena, quite to the contrary to what most academics and general public thinks. We should not disregard any phenomenon for any *a priori* disparaging or pejorative attitude due to "childishness" of the characteristic we attach to them. An adoption of the scientific approach, following the lines of Castronova's statement[19], would be to subject to the scientific scrutiny a phenomenon which plays an important part in the reality of many people[20], while abstracting from any prejudice or a prior judgment on the topic.

[17] http://stationexchange.station.sony.com/
[18] Booth et al, 1995
[19] Castronova, 2001
[20] Appendix 1; http://www.nickyee.com/daedalus/archives/000550.php

1.5 Delimitations

This thesis will look at the real money trade in the virtual MMORPG economies and explore the nature of this real money value creation. The amount of MMORPG economies however is vast at the present moment with approximately 20 eligible virtual worlds, and a full scale research would be out of scope of this study. On the other hand, many of the virtual economies share similar characteristics in their content, technical characteristics, legal obligations and economies. Consequently, variables of interest were chosen and the study was limited to real money trade in two virtual economies of Everquest 2[21] and Project Entropia[22]. The case selection is discussed however more thoroughly in the methodology section.

The study was limited to Western MMORPG in order to reduce possible cultural bias. The main reasoning was also that existing theoretical frameworks, discussed later on, have been inferred from the Westernized MMORPG and gaming culture.

2. Research Methodology

2.1 Research Approach.

According to Yin[23], there exist three major approaches for the research: inductive, deductive and abductive. The inductive approach is focused on the observation of the phenomena and collecting respective empirical data as a way to study that phenomenon. This approach is involved in the inferring of the new theoretical framework or models, or in such a case, an expansion of the already existing theory. A deductive approach has the opposite direction of the inductive approach, in that it starts with an existing theory and applies observed empirical results to this theory[24]. The third approach, the abductive one, which in a sense could be described as a mixture of the aforementioned approaches is [25] based on the existing theory which then is used on the empirical results in order to extend or reformulate the theory. The goal would be to discover unknown and unexplored connections and concepts[26].

Due to the little amount of research on the topic and the scarce theoretical framework[27], this thesis will be of the abductive nature, seeking to extend or modify existing theoretical framework based on the empirical observations of the reality.

The abductive approach permits to use already researched theories on gaming and virtual economies to reformulate, extend or modify them to create a qualitative real money trade model with sufficient predictive or explanatory power.[28]

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[21] http://everquest2.station.sony.com/
[22] http://www.project-entropia.com/
[23] Yin, 2003
[24] Sekaran, 2000
[25] Dubois, Gadde 2002
[26] Dubois, Gadde 2002
[27] Lehdonvirta, 2005
[28] Booth et al, 1995

The author has also adopted a pedagogical approach in presenting the evidence and the theoretical frameworks[29] due to the heavy interdisciplinary content and jargon-laden evidence.

2.2 Research Strategy

According to Yin[30] there are five methods that can be used for research within the social sciences: experiment, survey, archival, history and case study. Yin suggests that a case study research should be used when the main questions are "how" and "why", when there is no control of the behavioral events and the focus is on the present observations rather than historical events. He also mentions that the case study is appropriate when the border between the observed phenomenon and the context is not clearly evident[31].

In our case, the observations are taken within the real-world context and the contextual delimitations are not evident due to our limited knowledge about the phenomenon.

On the other hand, a *virtual economy* aka MMORPG, is a separate entity per se with its own development and economic dynamics. At the present moment the trade *between* virtual economies is almost non-existent (excluding individual cases of barter) and even then it is done through the conduits of the real world. Consequently it would be pertinent to study the real money trade within the case representing one virtual economy.

Inside the case study, unit of analysis will be the player as the MMORPG use due to the fact that he is the main actor in the phenomenon to analyze. We cannot at the moment pinpoint the border between the real money trading phenomenon and the context. Moreover, given that the phenomenon is largely occurring in the current time frame, a unique opportunity is created to conduct a case study research.

2.2.1 Case Study Design

Given the already mentioned vast number of virtual worlds and their similarities, such as content, legal obligations and technical specifications, however the economy and the consequent real money trade is treated in a rather binary way. At one extreme there are *virtual worlds* that are designed to profit from RMT phenomenon in mind and at the other extreme a whole slew of traditional MMORPGs that have been designed without RMT in mind or expressly prohibit it.

Everquest 2 and the Project Entropia are the two representatives of the whole group of high-budget commercial mainstream MMORPGs with highly active populations. Both are active in Europe and in U.S.A which permits to discard the cultural factor. On the other hand, their treatment of the real money trade is completely different[32], while

[29] Ibid
[30] Yin, 2003
[31] Ibid
[32] At the moment of writing this thesis, SOE's StationExchange was not fully operational and thus the SOE still prohibited real money trade.

Everquest 2 is an example of a traditional RMT-negative approach, the Project Entropia is an example of a newer RMT embracing design.

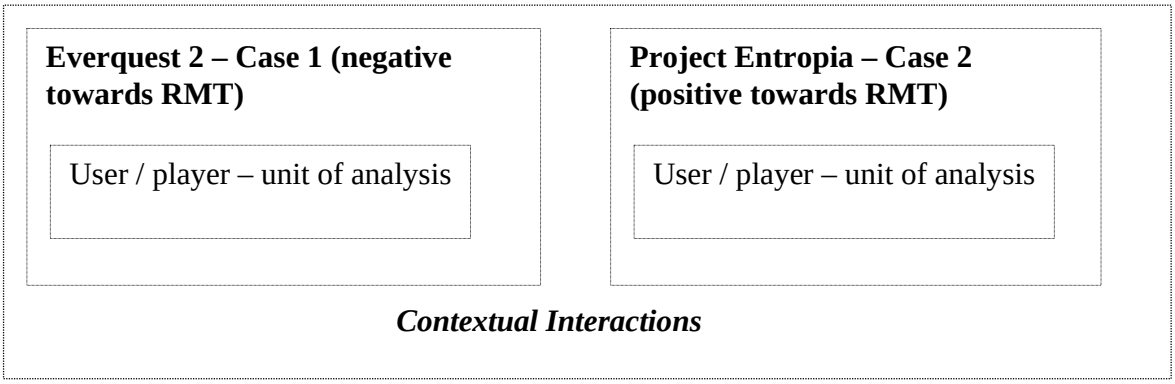

Figure 1 Case study design

Project Entropia is a well established constantly developing *virtual world* with a vibrant and active community while at the some time almost the only MMORPG that has been designed with RMT in mind.

Everquest 2 is a traditional kind MMORPG with a rather large player community, vibrant out of the game trade, and an expressly negative stance towards real money trade by the owner company, Sony Online Entertainment. It is also an heir to Everquest, which was a target of several academic researches[33].

Consequently, following Yin's delimitations regarding case study design, we see that the most appropriate would be multiple case study with a single unit of analysis[34]. This design would be best aimed at covering our research objective due to the two identified differentiated cases covering the spectrum of possible unit of analysis variations to be investigated.

2.2.2 Data collection

According to Yin[35], there exist six forms of evidence or data source for the case study research: documentation, archival records, interviews, direct observation, participant observation and physical artifacts.

As the information sources, the author has chosen online interviews and surveys with email questionnaires used in particular cases. Sometimes the email communication was the only choice first due to the distance and second due to the sources' avoidance of public forums. Online form has permitted to achieve variety in the information sampling while providing a fixed structure for information recollection. The author also

[33] Castronova, 2001; Castronova, 2002; Yamaguchi, 2004
[34] Yin, 2003
[35] Yin, 2003

acknowledges the bias first expressed in Castronova, 2002, on the existent skewness of the online forum population. The respondents to online surveys are usually players with significant experience in the game, so called "hard core" gamers in terms of resources dedicated to the game playing. As Castronova aptly put it[36], if you have time to visit the forums on your game besides playing it, you would qualify for a dedicated gamer.

The additional information on the primary sources along with the typical survey questions can be found in the Appendix 4 of this thesis.

Secondary sources consist of books, articles, seminar and working papers, web sources and web sites. Moreover, owing to the cutting-edge nature of the area of research and the scarcity of the sizeable body of knowledge on the topic, this thesis will often refer to the most up-to-date secondary sources like weblogs (commonly shortened to "blogs"). In order to ensure validity of the research, extra attention has been dedicated to scrutinize these sources for their veracity and validity[37].

2.3 Research Quality

When judging the quality of the research design, Yin[38] identifies two main variables to consider: validity and reliability. Validity can be further down broken into three subgroups: construct validity, internal validity and external validity. Additional discussion on the research quality can be found in the Appendix 4 of the present thesis along with the details of the information recollection.

2.3.1 Construct Validity

Construct validity concerns the establishment of observational measures that correctly measure what they are supposed to measure. The case study contains one major drawback in that the researcher can never attain a complete objectivity. To minimize researcher's subjectivity, Yin presents three ways to increase the construct validity: 1) use of multiple sources of evidence, 2) establishing chain of evidence during the data collection, 3) having the case study report reviewed by the key informants.

This thesis has used multiple sources of evidence, such as online interviews and surveys, reports published by the 3rd parties and academic papers all to ensure the inherent construct validity. While the author acknowledges that a wider scope of information recollection consisting in surveying over more forums would possibly provide a better validity, nonetheless a preliminary study showed lack of major differences of forum composition and variety of opinions. Establishing a chain of evidence was done with the preliminary observations of the phenomena and the following construction of the interviews, while following a structured and clear-cut procedure. The interviews were done on the 2 round basis to ensure chain of evidence, with the preliminary and main rounds.

[36] Castronova, 2001
[37] Herring et al, 2005
[38] Yin, 2003

Given the perceived informality and the online character of the information recollection, spurious answers would be unavoidable. For that, triangulation of information between units of analysis as the tool to increase construct validity has been used[39]. The key informants have not reviewed the report, but the said report will be provided to them as the part of the agreement.

All in all, the author deems the construct validity to be acceptable.

2.3.2 Internal Validity

Given that model construction involves inferring causal links, internal validity which deals precisely with the causal relationships, acquires higher importance in this thesis.[40] The causality between cause and effects is often hard to determine in a case study. An additional set of measures including pattern matching techniques[41] has been used during the information recollection and causal link construction. The existing applicable theoretical framework also helps in defining causal relationships with higher precision and consequently higher internal validity.[42]
Considering the abductive nature of the study, pattern matching techniques use and the considerable amount of surveys, the author considers the internal validity to be semi-strong.

2.3.3 External Validity

External validity refers to whether the finding of the study can be generalized beyond the specific study. Yin[43]recommends that a theory derived from a single case must be tested through the replication on other cases in order to find out whether the findings are valid, as the case studies can not be statistically generalized.

The author applied this model in the *virtual world* of Dark Ages of Camelot[44] and its expansion Trials of Atlantis. It would seem that the theory would explain the real money trade phenomenon in this *virtual world* too: a higher challenge level of the expansion along with lowered growth rate of digital assets has increase the real money trade.

Consequently, due to the fundaments used in the thesis and the adequate coverage of Western style MMORPG, we would assume the external validity to be semi-strong.

[39] Patton, 1987
[40] Yin, 2003
[41] Shadish, Campbell, Cook, 2002
[42] Ibid
[43] Yin, 2003
[44] http://www.darkageofcamelot.com/

2.3.4 Reliability

A high level of reliability implies that another researcher repeating the study using the same methodology would end up with the same result as the original study. The data collection procedures are in particularly important for achieving high reliability. The transparency of presentation of how the conclusions were reached is also very important.[45]

However Sekaran[46] mentions that the qualitative studies would have reliability problems due to the general dynamicity of the people's opinions and behavior. The author considers that even if the same surveys were conducted again even with the same respondents, the responses would inevitable vary due to the time effect. However the variance in opinion would produce the same conclusions in the end. The Appendix 4 however lists typical questions used in the interviews so that the researchers using the same set of questions would come up with similar results, thus increasing reliability.

According to the aforementioned, the author judges the reliability to be medium.

3. Theoretical Frameworks

The author faced a daunting task when doing a preliminary research for the thesis topic – absence of extensive body of knowledge on the virtual economies. The inquisitive reader may himself check the academic paper databases EBSCO, Econlit, SSRN and JSTOR[47] (references and links in the References section) on the keywords *virtual economies, MMORPG, trade virtual worlds* to find a surprisingly small amount of literature on the topic. On the other side, the social and psychological effect of virtual worlds have shown a much larger amount of varied research with well defined niches and deep insights[48]. The abductive nature of the investigation alleviated this problem somewhat, permitting to focus instead on acquiring and interpreting the information, nonetheless there was a dire need for logically sound and error proof fundament to use in the interpretation phase.

3.1 Homo Ludens

Given the nature of the subject of this thesis, the author decided to investigate the existing theories of the play or the game applicable for this case. As Jacques Ehrmann declares[49], no study of the play can forego Johan Huizinga's seminal work of *Homo Ludens*[50]- The Playing Man, published in 1938, the first academic work on the *game and the play* from all points of view, cultural, mythological, philosophical and historical. It clearly extended and redefined the concept of the play in the cultural *ego* of the man, assigning it a vital role within the psyche.

[45] Yin, 2003
[46] Sekaran, 2000
[47] Checked as of 09 May 2005
[48] Jenkins, 2004; Balkin, 2005
[49] Ehrmann et al, 1968
[50] Huizinga, 1950

Being the first work of its kind[51], it was obviously a daring foundation on which the following researchers furnished the whole theory framework. In 1958, in response to Huizinga's book, Robert Caillois published his now famous "*Les Jeux et les Hommes*" translated to English as "*Man, Play, and Games*". In his attempt to find "the most meaning and comprehensive term possible"[52] Caillois choose to remove himself from his native French while proposing the framework for his study of games. Caillois divided games into four main categories; *agon, alea, mimicry,* and *ilinx*. **Agon** games are games based on direct competition between players. The category of **alea** covers games that based on chance, games that are mainly considered to be forms of gambling. Games that we might refer to as role-playing or simulation are games of **mimicry**, such as "playing house". Finally, **ilinx** describes games centered on the pleasures of movement. Caillois readily admits that an activity could easily be placed under more than one classification of game. Moreover, later researchers have tried to modify this framework, for example adding the category of **repens** - a surprise[53] in sequentially embedded events.

Furthermore, Caillois introduced the concepts of *ludus* and *paidia*, the first meaning the ordered game with rules while the second implying spontaneity in a more rule-free play. Caillois in his work also gave some examples for his rather exotic names for the categories in his system of names, which we show below.

PAIDIA	AGON	ALEA	MIMICRY	ILINX
Tumult, Agitation, Immoderate laughter, Kite-flying, Solitaire, Patience Crossword puzzles	Racing, Wrestling Athletics, Boxing Billiards, Fencing, Contests, Sports	Counting-out rhymes, Heads or tails, Betting, Roulette, Lotteries	Masks, Disguises, Theater, Spectacles	Children whirling, Swinging, Waltzing, Mountain climbing, Tightrope walking/
LUDUS	AGON	ALEA	MIMICRY	ILINX

Figure 2 Examples of playing activities according to the Caillois framework.

Huizinga and Caillois mention several phenomena which would be useful for our research. Huizinga first describes the game as a phenomenon occurring in a delineated space, time and as a set of rules[54]. The players or the actors of the game are also expected to uphold the rules and their mere fact of participation in the game implies their *in-lusio*[55] (Latin for "illusion") status. In other words, the players are expected to feel, think and act according to a framework of a separate reality. They will of course know that they are playing *and* at the same time they will play. Joe the Accountant will play Joe the Frankenstein at a Halloween party, while knowing that the next day he will run his spreadsheets again.

[51] Ehrmann, 1968
[52] Caillois, 1961
[53] Ehrmann, 1968
[54] Huizinga, 1950

Amidst the ranks of *in-lusio* players, there is always a possibility of a Spielbrecher[56], a rebel in denial of the game, a game-breaker. He does not play "fair", either *à propos* stomping other feet while waltzing or suddenly using modern day Brooklyn slang in a *Hamlet* play. He denies the game and breaks the rules, he becomes an outlaw from the game, be it a political election, a poker party or an academic conference. A hypocrite is always more welcome in the game than the game-breaker, for the hypocrite keeps the *in-lusio* world alive for other players, affirms Huizinga.

Moreover, the game-breaker is a figure created by a whole variety of motivations, ranging from visionary drive to break the old to the profit-driven economically rational defecting actors[57]. Huizinga, next admit that the game structure would influence the appearance of game-breakers or in other words, that there is always a certain possibility of game breakers to appear. Caillois follows with the following declaration: "As for the professionals . . . it is clear that they are not players but workers. When they play, it is at some other game."[58] The concept of workers will be useful for our main analysis later on, where the distinction between players and workers will have to be made. However, both researchers concurred that the each player under a common set of rules in a collective game will possess different motivations and different incentives, rational or irrational (the concept of rationality taken from Weber[59]).

The author here would like to mention the "economical unproductivity" of the game as stated by Caillois. Given the vague nature of the term productivity and the modifications made to the theory of the game, later studies claimed that the games could be economically productive[60], without leaving the general framework posed by Caillois.

The concept of play acquired a new meaning in the wake of computerized virtual spaces, followed by the academic inquiries in the ramifications of the virtual *Homo Ludens.* One example of these more modern game studies is the "Rules of Play: Game Design Fundamentals" written by Eric Zimmerman and Katie Salen which introduces several new concepts such as open-endedness of the play and the view of the game systems as *emergent*[61]. According to these concepts, the *ludique* world can be open-ended without a clear-cut game termination or winning conditions. The open-ended world in this case would permit a certain degree of mobility of players in and out of the game, while providing usually a wider spectrum of possible play scenarios.

The concept of emergence, on the other hand, would imply the emergency of more complex interaction patterns out of the much simpler rules of the game. For example, the Chess game exhibits rather easy rules, with the game pieces obeying strict rules on their possible actions at any moment at time. However, the emergence of sophisticated interaction patterns such as Sicilian defense for example[62], and the subsequent increase in

[56] German for "game-breaker", we would use the English term in our work
[57] Caillois, 1961
[58] Caillois, 1961
[59] Weber, 1958
[60] Juul, 2003; Ehrmann, 1968
[61] Zimmerman, 2004
[62] http://chess.about.com/library/openings/blob2000.htm

complexity indicates a high degree of emergence as a characteristic for the chess. Zimmerman also mentions that the emergence is closely related to the interaction of objects or players, the concept we would later use in our analysis part.

3.2 Homo Economicus

In this section of the theoretical frameworks, the author would like to refer to the paper "On Virtual Worlds" by Dr. Castronova[63]. This paper was the follow up to his famous seminal work on virtual economies, basically applying economical approach to the utility and satisfaction parameters of the players. The economical framework in this article would be useful for the interpretation of the data in the analysis section and the author deems it worthwhile of description.

The first question that we must pose ourselves is what drives the satisfaction of the game for the player. The simplest case would be the puzzle solving, where the player receives the satisfaction out of overcoming the obstacle or in this case joining the pieces into one coherent picture. The satisfaction of our lonely hypothetical game player is directly dependent on the difficulty level of the puzzle or the quantity of puzzle pieces. Quite obviously, the extremes in the difficulty scale would bring less satisfaction to the game player in the simplest case – for as Castronova[64] aptly puts, 2 piece and 10,000 piece puzzles will not bring much satisfaction to our puzzle solver, in the first it would be solved in a flash, while in the second case, the difficulty of the task at hand would be enormous. Consequently, if we were to propose the form for this function we would propose its quadratic form where the extremes of parabola offer minimum satisfaction. Castronova suggests the following utility or satisfaction function:

Equation 1. Satisfaction of the game player

$$S = \alpha R - \beta(C - \Omega)^2$$

Where C is the challenge level of the game, R is the reward out of the puzzle, Ω is the challenge level that is ideal for the player, the S is the emotional satisfaction the player receives out of the puzzle. Alpha and beta are the respective coefficients.

This simple but revelatory formula is used to calculate the utility of the player based on the constraints of available time H, price of gaming P and the challenge level C. Castronova then draws a total utility function including the real life parameters such as wages, time spent in the real life and etc.

For our purposes however the formula above is enough as we shall not introduce the rest of the econometric model suggested by Castronova.

[63] Castronova, 2002
[64] Castronova, 2002

3.3 Homo Legal

The author found himself in a strange position, the phenomenon of the virtual economies was there and the trade volumes mounted according to the EBay and IGE reports[65], but the missing point was the legal foundation of the property. The question was: What was traded? Whom it belongs to and who receives the ownership of the property? Is there even a concept of property in what is called virtual economics?

Using U.S. legal structure, several researches discuss the concept of property in the MMORPGs[66], among them probably the most interesting one is "The Laws of the Virtual Worlds" by Lastowka and Hunter (2003). Their posture is definite: virtual goods and virtual alter-egos can be considered property under the current legal norms. At the present moment, the researchers concur however, the current legislation structure has not yet developed a sound legal framework for treating virtual property conflicts *"de jure"*.

Drawing a comparison to the real world's property system, the virtual *homo legal* enjoys the same features of exclusive ownership, persistence of rights, transfer under conditions of agreement and duress and a currency system to ensure functioning trade system[67]. The innate features pertinent to the virtual property such as intangibility and evanescence can be found in common legal frameworks of today[68]. Intangibility means precisely the unreality or the impossibility to touch, but the patents, copyrights and trademarks have gone that way quite a time ago and now are fully furnished with the legal foundation[69]. Evanescence on the other hand denotes the temporal limitations of the virtual property, the virtual property exists only during certain periods of time when the game server is up and running or when the person is logged in[70]. In our opinion, however it is debatable, whether the notion of access to the property or the change of the status of the property is more of interest here than the property rights at all.

A major problem, Orin Kerr argues[71], is the misunderstanding or the lack of clear and legal distinction between physical and virtual legal realities, which he designates with names of "external" and "internal" perspectives. A clear example of the external perspective would be treating a virtual property as a set of bytes stored on a hard drive array in a server of a MindArk company in Gothenburg, Sweden. They are stored in a file which is designated to a certain user, so when the user logs in to the server, this set of bytes is sent to his computer. This set of bytes is always stored on the server, and if changed the changes are also stored on the server. A view from the internal perspective is very different however, the user runs his game from his computer and enter the sci-fi game of Project Entropia and *rightfully* expects to continue possessing his virtual property as he did the last time he logged off. As Kerr points out[72] both perspectives are

[65] Castronova, 2001; http://www.okratas.com/modules.php?op=modload&name=News&file=article&sid=57
[66] Lastowka, Hunter, 2003; Damgaard, 2002
[67] Lastowka, Hunter, 2003
[68] Under market system economies, make the distinction Lastowka, Hunter, (2003)
[69] http://www.patents.com/patents.htm
[70] Lastowka, Hunter, 2003
[71] Kerr, 2003
[72] Kerr, 2003

valid and have legal foundation, but the sets of facts underlying each perspective are quite different. Moreover, existing legal systems have not made an explicit distinction between these perspectives and this, introduces a significant uncertainty in the result of legal proceedings, according to Kerr.

One of the other obstacles, the researchers cite[73], is the all-inclusive End-User Licensing Agreement[74] the users sign when purchasing the right to access MMORPGs. Listed in the Appendix 3 of this thesis are the clauses that expressly define the ownership of the game designer company, in that case Sony Online Entertainment over all data or information sent from the player to their server and vice versa. The clauses also expressly prohibit the sale or auctioning of the game items, characters and any game object without the company's express written permission[75]. The vast majority of commercially sold major MMORPGs sport the same kind of EULAs, however there is one notable exception – Second Life[76] famous for its creativity that expressly gave the ownership to the players to their creations inside the virtuality[77].

Moreover, the legality of the virtual property has already endured several prominent lawsuits[78], among them (in) famous Verant and Sony vs. EBay lawsuit, forcing EBay to take down the auctions of virtual objects from their MMORPGs[79]. The charges were the infringement of intellectual property rights by auctioning the virtual items and goods. The trade however has migrated to the sites like IGE.com[80] and other sites[81].

In conclusion, legal framework's research is that while the notion of property and the consequent alienation of the property and its transfer is viable legally, the current legal agreements signed by game users would do little to help them in case of the legal proceedings against the game owners or designers.

4. Empirical study

4.1 MMORPG Historical Overview

This study focuses on the variation on the one of the most ancient human activities – playing[82]. According to papers on history of playing[83], acting in the separate reality defined by a specific set of rules either for enjoyment or sacred reasons was one activity always present in the man, even before the culture encaged him in its own set of rules.

[73] Lastowka, Hunter, 2003; Damgaard, 2002
[74] Appendix 3
[75] Please note that EULA may be modified with the introduction of StationExchange, Sony's own trade site for virtual goods.
[76] www.secondlife.com
[77] http://secondlife.com/newsletter/2005_03_03_archive.php
[78] Stephens, 2002
[79] Stephens, 2002
[80] www.ige.com
[81] Castronova, 2002
[82] Lastowka, Hunter, 2003
[83] Caillois, 1961

The playing in the virtual space in any of its innumerable forms is as vital and as inescapable for the man as its instinctive need for survival[84].

Playing, or being more precise, the concept of the game, has endured countless transformations, extensions, innovations while generally maintaining its intrinsic qualities[85]. For our present task, however we will start much closer to the present moment, at the time when the network of computers was first used to create a virtual space for several users. It happened in 1979 with the first MUD (Multi-User Dungeon), bearing a rather simple name of MUD1, and coded by Roy Trubshaw and Richard Bartle in MACRO-10 (the machine code for DECsystem-10's)[86] in the Essex University's precincts. While being limited as to the number of available rooms, and capabilities, it still permitted the users to meet and chat while exploring the world. This virtual space was not primarily used for socializing or communication purposes but more for the acting out a Tolkienesque world of hunting and role-playing. Being in the virtual space however required a lot from the imagination of the user to create that immersion in the game, due to the text-based interface with the text-only description of the actions or chat from the fellow avatars roaming the same space. The word avatar coincidentally was used for the player's representation on the screen with seemingly no connection to its ancient Hindu counterpart which also symbolized the same concept[87]. Nonetheless, the game was a success and spawned countless off-springs modifying or extending the text-based content[88],[89]. The degree of its success can be measured by the price of playing a commercial MUD1 version launched on Compuserve in 1987, a hefty $12.50 an hour[90].

The next important step however was taken when the graphics entered the play (pardon the pun) with the first multi-user adventure game Habitat[91] by Lucasfilm in 1985 one the Commodore 64 personal computer. It was programmed by Chip Morningstar and F. Randall Farmer and could support 20,000 users however, only 4 of them could co-exist in one specific location.

[84] Huizinga, 1950
[85] Huizinga, 1950
[86] http://www.mud.co.uk/richard/avftd.htm
[87] Castronova, 2002
[88] http://www.mud.co.uk/richard/avftd.htm
[89] Lastowka, Hunter, 2003
[90] http://www.iol.ie/%7Eecarroll/mud/mr_5a
[91] Morningstar, Farmer, 1991

Figure 3 -- A typical Habitat scene (© 1986 LucasArts Entertainment Company)[92].

The demise of Commodore 64 and the supporting network for the game however brought an untimely end to the Habitat. Nonetheless, the lessons learnt in the first experiment of this level were used to set the basic principles for the virtual space interaction[93].

The representation of the player on the screen possessed a certain degree of customization permitting identification with the player's virtual alter-ego, the *avatar*. More than just changing the colour of the hair, the avatar could develop certain skills through overcoming obstacles, challenges or by executing repetitive actions. This development dynamic created an "android" feeling to the avatar[94] that of an intrinsically related entity on the other side of the screen, not altogether bereft of rights and obligations. Players from early MUD days exhibited strong connections to their pixilated selves[95] easily surpassing simple emotional ties and contributing to produce rather peculiar declarations like the one of the rights of the avatar[96].
The game system permitted certain communication between avatars and the same game system had hard coded rules which the players must obey. The rules suppose the ruler or the existence of any law-emitting power, in some virtual worlds it is composed out of the game designers who have access to the inner working of the game code, while in others, the legislative functions was delegated to the players themselves[97]. The separation of powers[98] found its way also in the first computerized virtual spaces too, in some of which the laws would be compiled and stated by the players and acted upon in the case of transgression by the game designer or GM[99]. Perhaps, one of the most peculiar examples

[92] Morningstar, Farmer, 1991
[93] Lastowka, Hunter, 2003
[94] Castronova, 2003
[95] Lastowka, Hunter, 2003
[96] http://www.legendmud.org/raph/gaming/playerrights.html
[97] Dibbell, Person, 1999
[98] Montesquieu, 1748
[99] GM stands for the game master, a supreme role of game ruler coming from the early AD&D board games. While possibly different from the game designer the game master was the singular most influential entity in his virtual world (http://en.wikipedia.org/wiki/Gamemaster).

was the punishment by "toading"[100] in LambdaMOO (a variation of the MUD), where the "charged as guilty" avatar was converted into a toad, with significantly less "degrees of freedom". Given the amplitude of the actions available to the game designer to exercise upon the avatars, it is no wonder they were often called gods of that particular world[101].

Once the basic virtual space principles were elaborated and the wheels of technological progress were set in motion, the result was rather expectable. The first 3D multiplayer game to hit the market was Meridian 59[102] by 3DO in 1996, building on the 1st person look, where you could actually see the environment and the other avatars from the eyes of your avatar like it was *you* inside the environment. It was also the 1st graphically enhanced persistent world, in the sense that it didn't reset each time you logged out or shut down your computer. The usual fantasy setting also applied with monsters to kill and the treasures to loot. The commercial scheme was rather common by today's standards, consisting in one time retail copy buy and a consequent monthly payment. The audience's reaction however was mixed[103] and the game while sprouting a sizeable following never broke free from the "boutique" feel to it[104], however still surviving to this day.

One year later, Origin Systems, launched its own persistent world, combining the world of critically acclaimed Ultima game series with Internet to bring forth Ultima Online (i.e. UO)[105], a first truly massive and graphically appealing virtual space. Even with isometric top down 3rd person view on the world, which reduces the immersion factor, the virtual world endured several add-ons and 250,000 active subscriptions in its heyday in 2001[106]. The virtual space included some real-life features like banking, real estate owning, professions while plunging the players into the fantasy setting with different races[107], monsters and treasures to loot. It was, also, the first game to exhibit the phenomenon we seek to investigate in this thesis – real money value creation.

In 1999, auction sites like EBay were suddenly faced with an onslaught of dollar-denominated items[108] and objects: plate mails, copper ingots and even bodies put out on the sale by their earthly owners[109]. The puzzling feature was that it was not the biggest sale of medieval collections around the world but the emergence of the bustling virtual trade between UO players and nascent small companies.

The advanced real estate system and the production chain contributed to an advanced internal virtual economy while the real money trade gateway (RMT gateway) in form of

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[100] Dibbell, Person, 1999
[101] Lastowka, Hunter, 2003
[102] http://www.meridian59.com/
[103] Lastowka, Hunter, 2003
[104] http://www.meridian59.com/
[105] http://www.owo.com/
[106] Appendix 5
[107] http://www.owo.com/
[108] Branscum, 1999
[109] http://retailsupport.ea.com/corporate/pressreleases/uo_ebay.html

the EBay[110] introduced a whole slew of spillover effects. The edges between this physical world and the other Tolkienesque fantasy reality began to blur. Before, avatars used the innate dynamics of the virtual world to undergo all the challenges and to receive the enjoyment and what not from the game. In a sense the world was self-contained, your avatar could not get overpowered equipment or own a house at the entrance into the game, he had to gain it. Gaining more powerful equipment and developing a more skilled avatar required time and obviously some devotion on the part of the player. However, the financial resources of the human player mattered little inside the game – it was after all in some kind a utopian democracy, everybody started the game with exactly the same resources[111], a feat made possible by the digital "magical wand". You could become a blacksmith, a farmer, a warrior or a thief, but you knew that all the others had the some humble beginnings as you did.

Nonetheless, this egalitarian paradise did not last for long; it actually lasted only until the real money trade entered the game (no pun intended). Why, then, spend arduous real time weeks carting ore, toiling over your anvil, and selling breastplates and chain mail[112] to acquire enough virtual funds (gold pieces in UO's economy) to buy a virtual house deed? When you can get some cash out and buy some real estate for 500 USD as Mr. Kiblinger from the UO items trading site did for the two storied Large Tower in a nice location in Britannia[113]. In a sense, the fantasy world got suddenly economically very close to the real one, where even now for 160 bucks you could indulge your taste for power and buy a rare magical artifact[114] like the one below.

Figure 4 Spirit of the Totem artifact in Ultima Online (© 2005 Origin All rights reserved)

[110] Dibbell, 2003
[111] Lastowka, Hunter, 2003
[112] Dibbel, 2003
[113] Dibbel, 2003
[114] http://cgi.ebay.com/ws/eBayISAPI.dll?ViewItem&category=1655&item=8189602136&rd=1

These offers are met with their consequent demand and the volume of this "real world virtual items" type of trade is not small by any means, in 2005 a reputable industry executive cited this economy to measure $880 million annually[115] with the current total population of virtual worlds at 8 millions as detailed in the Appendix 1. A simple analogy would be international capital flows of one country, where the main GDP would be all goods and assets produced and consumed inside the virtual world, and the real money trade would be just a small part of those assets bought and sold with the imported money so to speak. Yamaguchi (2004)[116] has shown that this type of virtual currency most resembles a local exchange traded systems with a considerable degree of importance for the real economies.

At the present, the virtual world of Ultima Online however has decreased in population, now measuring at 157,000[117] and some may foretell its demise[118], however some signs show that the world is surviving. At one given ordinary in May 2005, there was 1854 virtual items and avatars traded under Ultima Online category on the EBay auction system, and as of now IGE.com one of the leading virtual currency gateways has no intention of delisting its Ultima Online currency trades.

Since the inception of the Ultima Online, MMOG market has seen a veritable wave of virtual worlds, counting right now at 32 virtual worlds with several titles at the moment counting more than 500,000 subscribers[119].
The time has come to move on to the newer virtual economies, the two of which will be analyzed in detail in the following sections.

4.2 Everquest II

The world of Norrath in the game Everquest[120] produced by Sony Online Entertainment (SOE) came into being first in March, 1999 in San Diego, CA[121] and immediately was a huge success. Critics still hail it as a granddaddy of all current MMORPGs[122](including the Everquest 2), and mention that the designers of other MMORPGs unwillingly accept some similitude at least in spirit.

The first game in the Everquest series was a rather traditional but very well executed 1st person graphical MMORPG based on central-server architecture. Not straying far from path of the usual fantasy fare with wizards and dragons, it nonetheless received a very warm welcome from the crowd and quickly became a favorite with subscriptions amount surpassing 400,000 for several years.[123]

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[115] http://www.okratas.com/modules.php?op=modload&name=News&file=article&sid=57
[116] Yamaguchi, 2004
[117] Appendix 1
[118] http://britannia.blogspot.com/2005/02/is-uo-dying.html
[119] Appendix 1
[120] www.everquest.com
[121] Castranova, 2001
[122] http://pc.gamespy.com/pc/everquest-ii/568257p1.html
[123] Appendix 5

Everquest (later as EQ) was a VW (*virtual world*) with a traditional business scheme based on the retailing the client software package and then charging the monthly fee for the account in the game. The EQ was using a server system[124] similar to the UO shards, where each server could contain a certain amount of players all obliged to follow a set of rules, like PvP treatment, leveling restrictions and what not. Each server would contain the same cities, scenery, and run the same world but populated with different players. The player's avatar once set on one server would not be able to freely move between servers. This was done in order to reduce the workload, and the second to probably present different playing rules to the variety of tastes.

Finally, this game also was the first game to have an economic analysis by Dr. Castranova effectuated upon it[125]. This analysis later made it to a published paper with an enormous popularity ranking all-time 3rd most downloaded paper in the SSRN database[126].

And then, on 8 November 2004 after an extensive beta-testing, the sequel to the granddaddy of all MMORPGs was released by the same SOE– Everquest 2 (later as EQ2)[127]. Being a sequel based on events 500 years after the original Everquest in the land of Norrath, it introduces an updated high-level graphics engine, a modified world structure with new crafts, possessions and etcetera, while still using the same server architecture from the original Everquest. And again it was a quite a success in the North-American market with the subscription number rising up to 300,000 in a matter of months.

The business scheme for EQ2 included selling a retail software package for $35-45 and a monthly subscription fee of $14.99 as of November 9th, 2004, which is in line with other MMORPGs offered by the same SOE (e.g. Star Wars Galaxies) and other commercial VWs. The whole legal structure of the SOE – player agreement is based on the EULA or which is also sometimes called Terms of Service (TOS) already discussed in the Homo Legalis and excerpts of which can be found in the Appendix 3.

While the EQ2's subscription numbers may pale in comparison to recently launched World of Warcraft MMORPG from Blizzard[128] with the latter racking up to 1.5 million subscriptions during the first months, it still represents a mainstream high quality virtual world with a history.

Even with the trade of the items/avatars outside of the game prohibited, the RMT phenomenon prospered[129]. The sales or the out of the game trading however are taken on the 3rd party sites like IGE.com[130], Game Open Market[131] and such, as was in the case

[124] http://eqlive.station.sony.com/manual/manual.jsp?id=46468
[125] Castranova 2001
[126] http://papers.ssrn.com/sol3/topten/topTenResults.cfm?groupingtype=3&groupingId=1
[127] http://pc.gamespy.com/pc/everquest-ii
[128] http://www.worldofwarcraft.com/
[129] http://www.gameusd.com
[130] www.ige.com
[131] http://www.gamingopenmarket.com/

with Everquest after a crackdown on the EBay trading. Given SOE plans to introduce their own auction site called StationExchange[132] and continuously expand their game with new content[133], Everquest 2 would be in the position to take the lead from the Everquest as the MMORPG standard.

The EQ2 recently made a bold move by launching an agreement with PizzaHut[134] to offer an online in-game command "/pizza" which sends the hungry gamer to the company's website for the online ordering[135]. The immediate reaction of EQ2 inhabitants and TerraNova resident analysts were expectable, for it was the first visible introduction of the real world corporate commercial offers into the mainstream VWs. While relatively simple and unobtrusive it nonetheless could signal the realization of long expected fusion of VWs with the real world corporate structures. On TerraNova it was jokingly prophesied[136] that the next time you could call a stylized magical store to appear out of nowhere with the NPC trader offering graphical representations of pizza to the weakened avatars and with the delivery choice to the hungry gamer on the other side of the screen.

4.3 Project Entropia

Project Entropia (afterwards denoted as PE) even at the development stage was causing ruckus with the experts[137]. A virtual world with the underlying virtual economy, closely connected to the real economy? A world with shiny virtual Wal-Marts in the skies, where we would fly to do our shopping[138]? And even more startling, a totally free no-strings attached cream-of-the-crop MMORPG?

At last on January 30 in 2003[139], the Swedish company MindArk[140] released the game into the public. The business plan for the game was a whole new concept in the MMORPGs world dominated by commercial monthly-fee virtual worlds like Sony's or NCSoft's[141] brainchildren. The world in itself was free to download and with no required monthly fee to live through your avatar in his reality. Moreover, PE sported high-quality graphics engine, advanced in-game communication system and sophisticated trading market[142], with an almost transparent currency gateway. It even had monsters to fight against, dangerous and wild areas and a sense of exploration built-in unlike other free communication-oriented MMORPGs. The action transpired in the newly colonized world Calypso with the avatars acting like colonists in the high-tech sci-fi setting with laser rifles and with the Mindforce[143], an ESP ability not unlike the magic in other VWs.

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[132] http://stationexchange.station.sony.com/
133 http://eq2players.station.sony.com/en/content.vm?page=FreeContent
[134] www.pizzahut.com/
[135] Liddle, 2005
[136] http://terranova.blogs.com/terra_nova/2005/02/that_pizza_stor.html
[137] Castronova, 2001; Shachtman, 2002b
[138] Castronova, 2002
[139] http://www.stratics.com/content/portals/entropia/content/info/gameInfo.php
[140] www.mindark.com
[141] Appendix 1 for the subscribers for Lineage I and II
[142] http://www.stratics.com/content/portals/entropia/content/gameplay/faq/tech.php
[143] http://www.project-entropia.com/Content.ajp?id=1655

On the other hand, any server-based commercial MMORPG must remain profitable and PE was not an exception for MindArk. Going off the beaten path with the traditional retail sales and monthly fee scheme, MindArk embraced the virtual economy. They became an economic intermediary who set the base prices for any object in the game, not unlike a retailer, and also acts as a bank receiving deposits from the players[144]. Another income stream was scheduled to be royalties from advertisers and retailers setting their virtual stores in the game, where you could pay with your local virtual currency called PEDs[145]. An interesting detail, the purchases could be not only for your avatar but also for your real self, something along the lines of spending $30 for Nike's ghost armor for your monster hunter and also getting a Nike sweatshirt for yourself at the same virtual store. Probably an attentive reader would draw parallels to the Everquest 2 newly introduced "/pizza" command[146] described in the Everquest 2 section of this thesis, although the degree of spillover is expected to be much more in PE.

In 2004, the PE economy was booming, and following the data posted in the news section of the PE website[147] the total economy turnover for 6 months period was an astounding $40.7 millions. The exact calculations or the composition of this number however remained rather vague. Moreover, not unlike the newly established colonizer government, Mindark announced land sales[148] with the most famous being probably the island sale mentioned in the first section of the thesis[149].

Figure 5 Sprawling vistas of the Treasure Island from Project Entropia © MindArk PE[150]

[144] http://www.project-entropia.com/Content.ajp?id=1303
[145] http://entropia-pioneers.kicks-ass.org/phpBB2/viewtopic.php?t=13996
[146] New Media Age, 2005
[147] http://www.project-entropia.com/news/Index.ajp
[148] http://www.project-entropia.com/news/Index.ajp
[149] BBC News UK, 2004
[150] https://www.project-entropia.com/Content.ajp?id=1346

According to the buyer Zachurm "Deathifier" Emegen, his winning bid of $26,500 was based on investment analysis which promised an adequate return in the future[151]. If it sounds bizarre to the common reader to think of paying a sum of money this large for the virtual object, it's probably because common parallels have not been drawn. We pay happily for the sophisticated 3D design software packages even though we cannot touch the bits and bytes we are actually buying, and on the other hand a Picasso though sufficiently real cannot be used for many other purposes than admiration or analysis.

Considering how "virtual" and "unreal" the goods we buy have become, it would not be surprising to see that sort of the deals become more frequent. The most important is the price dynamics of the asset, in this case, the island not its nature or its metaphysical sense. Pragmatically speaking, if it can be acquired now and sold later with a positive present value then the notions of virtuality should not matter much.

Project Entropia and MindArk's welcoming stance towards such a mindset should not be overly surprising; their revenue stream comes in part from the amount deposited in the game by the players. According to the official rap[152], MindArk gets money from decay of the items, the latter being much like in the real world the entropy chipping away at everything material. In other words, player deposits money through his avatar, buys a laser rifle and ammunition and goes hunting monsters so he can loot their bodies. He is not a good marksman though, half of his shots miss and the weapon is more used now but he killed the beast and looted its body for some PEDs. Now, the player spent for example 50 PEDs on the ammunition and his rifle is now worth less due to the wear, but he got 30 PEDs in loot, and more importantly his skills at being a marksman have slightly improved. In simpler words, MindArk got its profit from the spent ammunition and wear of the rifle, a feat impossible for any real earth organization to accomplish. The balance of the game mechanics is obviously a precarious one, from one side MindArk receives deposits and from another it has to give away value in form of the loot, but given the server-based centralized architecture it would be possible to continuously adjust the virtual world parameters so the general economic equilibrium is maintained.

Possibly due to the fact that the disclosed mechanics of their business scheme are unclear and outdated[153], rumors circulating through the forums[154] offer enough conspiracy theories suggesting that MindArk manages the deposits in a different manner so it receives more than the decay value. However, we can not consider those rumors as valid without any proof, noting in passage that the increased transparency in game owner's policy in the virtual economies is becoming a lot more important as observed by the player reactions. When the real money is in play, interests escalate.

On the technical side, MindArk has had an impressive track record of updating their client software[155] and ironing out the bugs out of their software which plagued the game

[151] http://sama.kayatana.com/index.php?title=Deathifier_March_2005
[152] http://web.archive.org/web/20030704024455/www.friendsofmindark.org/financial.html
[153] http://web.archive.org/web/20030704024455/www.friendsofmindark.org/financial.html
[154] http://entropia-pioneers.kicks-ass.org/phpBB2/viewtopic.php?t=21818
[155] http://www.project-entropia.com/news/Index.ajp

from the beginning causing uproar with the players[156]. For example, the auto-fire bug[157] where the weapon fired uncontrollably was especially bothersome if you deposited your dollars to buy the ammunition. You would feel your dollars turn to ashes with every unintended shot. However, technical problems with the implementation of the virtual economy of such scope were to be expected and MindArk proved to be responsive to its customers' claims.

At the present moment the Project Entropia is counting 250,500 subscribers[158] and is steadily growing, with promising features being added in every major client update. While it would be hard to consider PE as a holy grail of virtual worlds[159], it is no doubt a major achievement and a revolutionary project on its own.

4.4 Analysis

4.4.1 First Steps – Basic framework

Having analyzed two virtual economies in the previous sections and effectuated the primary information recollection, the time has come to analyze the information to proceed with a theoretical framework for the real money trade creation (RMT value).

In a first step we would describe MMORPGs in a theory of the game framework presented by Caillois and Huizinga. Virtual economies are populated by competing avatars, who though cooperate and form organizations, still compete on a large scale. On the other hand, the MMORPGs do impose certain rules on the player by the mere fact of their game-nature. They are delimited in time, space and rules, which in the case of EQ2 for example consist of pseudo-medieval setting with the high tech sci-fi scenario for PE. Players through their avatars are expected to act accordingly to the setting, so for example, wielding lasers or selling spaceship parts would look out of place in the EQ2. A frequent virtual world visitor, however, would claim that certain games or even certain servers in one game, for example EQ2 are populated by the majority of avatars who use totally un-medieval language with expressions like *"noob"* or *"pwned"* [160]. However, if not the outer atmosphere then the fundamental dynamics of the game are most certainly one of the most sacred rules. The players are supposed to role-play it after all, they assume a role, be it a warrior, a cleric or a wizard, and they are supposed to play the game as a closed world. In other words, you may speak modern day IT lingo while battling ogres straight out of Tolkien fan's wet dream, but you may not sidestep the rags to riches process all the others follow.

The characteristics described above belong directly from *agon* and *mimicry* factors discussed in the *homo ludens* section above. Moreover, it would seem that the role-

[156] http://entropia-pioneers.kicks-ass.org/phpBB2/viewforum.php?f=41
[157] http://entropia-pioneers.kicks-ass.org/phpBB2/viewtopic.php?t=250&highlight=autofire
[158] www.project-entropia.com
[159] Castronova, 2001
[160] http://eq2.ogaming.com/forum/index.php

playing in a competitive environment is the core of the *virtual world* of the current crop of MMOGs (massive-multiplayer online games).

An interesting side-note and the food for more metaphysical questioning stems from the definition of the word "virtuality", which according to the American Heritage Dictionary "tends to be used in reference to things that mimic their "real" equivalents". The word *"mimicry"* directly refers to the role-playing elements of the Caillois's categorization. Combining the two together, we would not be too far from a tantalizing hypothesis of the universality of the *game* in the *virtuality* or of a *role-playing* of reality. Given the scope of this thesis, it would not be wise to pursue this topic further into the mazes of metaphysics of the virtual.

Continuing with *alea* concept, mentioned in the *Homo Ludens* section, it would be hard to deem virtual worlds as games primarily based on chance, while most certainly chance does play a role in the game. If we were to distinguish between *alea* natures, we would differentiate the computationally probabilistic chances of player vs. NPC environment interaction and the invariably unpredictable player vs. player social interaction. In any case, *alea* nature of these mini games would not play a major part in the overall picture we are interested in.

As for *ilinx*, the vertigo is not large in the virtual worlds, for it would require a direct access to human senses to induce that kind of immediacy. A vertiginous "play" however can perceived in arcade sequences in EQ2 and PE, or in flight moments in some MMORPGs like Second Life[161]. We would wager that the technological progress and its applications in virtual worlds, beginning with force feedback technologies and finishing by totally immersive experiences would introduce a much larger *ilinx* factor that can be currently found in the current VWs.

In the end, we have concluded that the virtual economies would "play out" in a *ludique* space mainly consisting of *agon* and *mimicry*, with other aspects present but secondary.

Nonetheless, as Huizinga states, the games are delimited in space and in time. In our case, that's where the virtuality by technology comes in. Applying the external perspective mentioned in the *Homo Legal*, a MMORPG would be essentially an application written or coded in a programming language running on a server. Given the enormous level of difficulty of providing a real time graphical environment for the dozens of thousands of players, it would be expectable that the software would not be totally bereft of glitches (commonly called bugs) and problems. While some bugs are just amusing like a "no draw" tile bug in the Ultima Online, and the others like the already mentioned "auto-fire" bug in PE are quite bothersome, a different category of glitches would allow a player to perform actions unforeseen by the designers of the game. This category of glitches would allow players to perform certain actions, quite possibly amassing wealth and riches.

[161] www.secondlife.com

Lessig mentions[162] that the code is law, but the emergence and complexity characteristics of the MMORPGs would imply that this is not true, the code is most certainly the foundation of the virtual reality but this is not the law *per se*, for the emergence of stable, complex and unforeseen patterns would not be possible.

Now that we have defined the general nature of MMORPGs as games and the space it occurs in, it would be useful to analyze them as systems with participating actors and interactions between them. We assume evolutionary factor away for the moment and perceive the system as static. According to the surveys on the EQ2 and PE forums, two basic virtual economy actor types have been found: the player type and the worker type. The first tries *to play* the game in a more Caillois and Huizinga way, he's a *role-player* in a sense, that he follows the role within the rules of the game. Numerous EQ2 players complaining that the people buying high level gear with the real money[163] and *breaking* the illusion, shows clearly their *in-lusio* status using Huizinga's terminology. They seek to be actors in their own separate played out world with the definite rules. Moreover, they expect the world to uphold its advertised structure and values, when they make their choices on playing or not.

The *"worker"* type is the game user who seeks objectives entailing positive real world income. The online interview with Mr. Rich Thurman, who kindly gave his permission to use his name in this thesis, shows clearly the tactics used in receiving real money income from the MMORPGs. Mr. Thurman was a "farmer" in several virtual worlds using game mechanics to receive a positive real money income from the games, in fact during a prolonged period of time, he used the virtual worlds only as a source of income and not for playing *per se*. The following excerpts from the interview where "Q:" denotes the question and the "A:" denotes the answer, will introduce the "worker" type in more detail:
Q: "How many accounts/bots do you have in average for one MMORPG?"
A: "The most accounts I had active at one time was 30 accounts, the average was about 25 bots running at any given time, not including mule characters."

Clarifying the lingo, bots are usually scripted or programmed avatars with a specific goal for a prolonged period of time, like killing a respawning monster in EQ2 or collecting "sweat" in PE. Mule characters, unsurprisingly, are the avatars used only for transportation of goods or items. In its heyday, the "bot farm", the set of bots structured in a way to automate the profit extraction, was so efficient and fast that he spent more time making deliveries than watching over it. The structuring is similar to a production chain in a sense. In the end he switched to wholesaling the gold to the top 10 EBay sellers.

Regarding the "worker" vs. "player" type perhaps the following excerpt would serve to clarify that point more:
Q: "Do you consider yourself playing or working (activities to bring positive income in the real currency) when in MMORPGs?"

[162] Lessig, 1999
[163] http://eq2.ogaming.com/forum/index.php

A: “Hands down, working. The games are designed with a specific model for its players to follow. Sometimes, I refer to my self as a meta-gamer, in that I am playing a different game on top of the designer's original intent. But regardless, once you are doing it to receive positive income, it *is* work.”

His point of view is revelatory in that he does not follow the model imposed by the game designers on the game players. He chooses not to *follow* the implicitly established rules of the *in-lusio* game. Coming back to Huizinga’s terminology, we might perhaps call him a “game-breaker” stripping it in passage of any negative moral judgment. As Huizinga and Caillois state, the professionals are “workers” and do not play this game anymore, if they play it is in the other game they do it. They are in the game but they *work*.

A critic might retort that the same EQ2 contains inhabitants that do not fall exactly into one category. As Mr. Thurman recounts, there are players (“meta-gamers”) who maintain the “bot farms” and gain excessive amounts of riches but use it *in-game* only, that is to say they do not seek real money income from this activity. This does not in any way upsets our definitions, for as soon as the real money objectives enter in play, the perceptions of the game nature *change*. A player who would maintain the “bot-farm” and use it in-game only would consider himself essentially as a “player” and not as a “worker”, falling into the first category.

4.4.2 RMT and the “puzzle” challenge level

The view of the MMORPG as the system of actors with their interactions permits us to delineate such interactions from point of view of the actor. Consequently this allows us to use the “puzzle” and player utility framework introduced by Castranova[164] and described in the *Homo Economicus* section of this thesis. The “puzzle” or rather “puzzle of puzzles” is in this case the virtual world, and the puzzle solver is the player acting through the avatar.

Considering the game as the set of actors with separate preference functions and constraints interacting with each other, we can amplify the original Castronova[165] framework by adding utility function of the game designer. The utility function of the game designer directly depends on the satisfaction of the virtual world inhabitants. In the two cases this study is based on, this utility function is refers to different internal processes. In the EQ2 case this utility is derived from the price paid for the copy of the game and the monthly fee, which corresponds directly to monetary outputs. The upcoming StationExchange service described in the EQ2 section, however will add the profit stream of transaction fee on virtual trade. In the case of PE, as already mentioned in its respective section, the utility function is derived from the quantity of the players and the amount of deposits they make, which also depends on the satisfaction on the of the puzzle solvers.

[164] Castranova, 2002
[165] Castronova, 2002

Consequently, the dynamics of the game like EQ2 or any scalable virtual world show that the larger the scale of the virtual world, the larger the population and consequently the variation of preference functions. Consequently, the VW designers to adapt the "puzzle of puzzles" to the ideal challenge level of each player have to introduce a much higher variety of puzzles. This translates into increase of new crafts, professions and items in PE[166] and into add-ons in EQ2.

The player or the "puzzle solver" is not an unchangeable entity and can develop and possess assets. For the purposes of analysis, first we will distinguish between dynamics of development of the player and the avatar. The player on the entrance into the virtuality develops the essential knowledge[167] about the functioning of the world, where the intrinsic learning process of the player-avatar is engaged and cannot be circumvented.

However, the avatar also starts its own development through the actions of the player. We shall designate social capital and digital assets, the first composed out of ties with fellow players, guild memberships, karma, reputation, fame and such concepts that can only be developed and are specific to that state of the virtual world – avatar interaction. We assume that the player acquires social capital through the avatar. The player-avatar also gains alienable digital assets, such as local virtual currency, items such as weapons, armor, tools, trinkets, housing and etc.

Exemplifying the above, say Joe the Accountant enter the EQ2 virtual world and creates his avatar, Joe the Warrior, at the entrance. He will not be able to use the game features immediately simply because he does not know how to use them, he lack the tacit knowledge of experience[168]; it will take him a while to know the basic rules of the game mechanics and to know how to surpass the basic challenges the game throws at him, like killing a pack of rats. And at the same time Joe the Warrior starts gaining skills, fame, reputation, and other player-avatars will be more likely to recognize him. Moreover, Joe the Warrrior will gain money and perhaps find a better axe or with time buy himself some housing. At any point in time Joe the Accountant may pass the ownership of the Joe the Warrior to another player with or without all the assets, but his own experience is inalienable.

The rate of growth of digital assets is defined by the dynamics of the virtual world[169]. The avatar kills a monster in EQ2, collecting the loot and gaining experience to become a better monster slayer, so he can try and beat a tougher monster with a perhaps more expensive item in the loot. Given the formally closed nature of EQ2 style virtual economies, the basic priceable input for the digital asset growth there is time. That is one of the basic concepts behind the way the virtual GDP or the growth of virtual wealth is calculated, according to Castronova[170].

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[166] http://www.project-entropia.com/news/Index.ajp (the history of updates)
[167] Polanyi, 1967
[168] That experience is very well described in the Castranova, 2001
[169] Castranova, 2001
[170] Castranova, 2001

Now returning to the challenge level of the "puzzle of puzzles", it is not that straightforward anymore. The player-avatar is a more complex structure now with its characteristics and assets subject to the virtual dynamics. The challenge level of the virtual world now depends on the assets and characteristics the player has or is in process of gaining. Reframing, if Joe the Accountant after 20 hours of playing in the EQ2 cannot amass enough gold to buy a small enchanted axe to defend against marauding wolf packs, the challenge level of the puzzle will be too high, obviously given that the ideal level for him would be 5 hours. On the other hand, if he had enough gold, or in other words, if the rate of growth of assets was higher, he would be able to keep the beasts at bay and consequently the level of the puzzle would be closer to his ideal thus providing him with more satisfaction[171]. Turning it more sophisticated, the challenge level of the world now also depends on the thousands of other Joe the Warriors roaming around.

Nonetheless, perhaps due to the information asymmetricity between game designers and VW inhabitants, in the heterogeneously populated sufficiently large worlds, the challenge level offered by the game designers will not be equal to the ideal challenge level of one or more players. This will according to the satisfaction function of the player, introduced earlier by Castranova, result in the lower satisfaction from the game by the player. In the figure 6 below the challenge level of the game will not coincide with the Ω - ideal challenge level of the player thus resulting in a lower satisfaction levels.

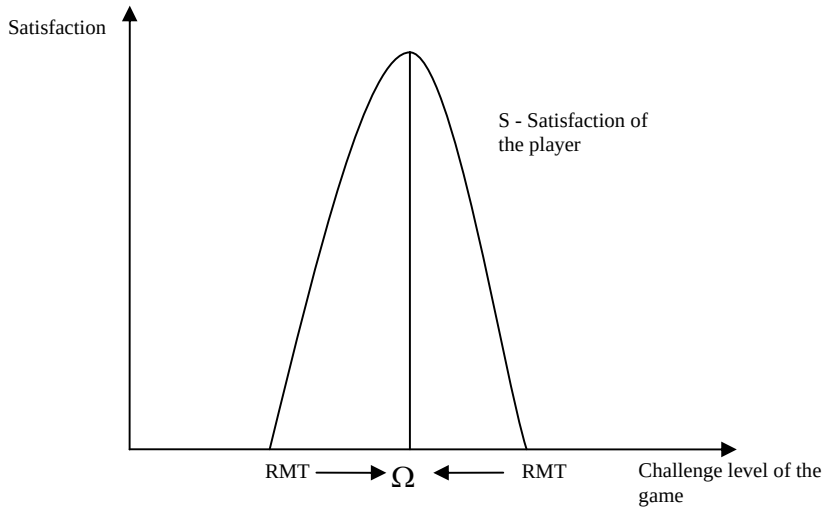


Figure 6 RMT influence on the satisfaction of the player

In the case mentioned above, the challenge level of the game offered to the player will be either too easy or too hard, the latter exemplified by the "grind" phenomenon, referred to the necessity of highly repetitive actions to achieve a certain objective. Like camping for days at a certain spot in EQ2 to wait for the monster to appear to slay it and hope that the law of probability kicks in and you receive an expensive or rare item as loot.

[171] See the Homo Economicus section

If the virtual world were a closed system with the actors subject to one set of starting conditions and dynamics, they would have a limited set of alternatives each subject to the prevalent dynamics. Nonetheless, given the "game" nature, these actors also exist in the real world and are subject to its dynamics too with the respective satisfaction, utility functions and constraints. Now adding the digital assets into the discussion, the challenge level of the "puzzle of puzzles" can be changed given that it depends on the dynamics of the growth of virtual assets. Consequently, at high enough discrepancies between the "puzzle of puzzles" challenge level and the ideal for a certain player, his satisfaction will be so low that he will be tempted to increase his assets to change the puzzle's challenge level. Given that being a player acting through the avatar, he is also subject to the dynamics of the real world with its own rate of growth of assets. Therefore, he's tempted to price the virtual assets needed for the higher satisfaction of the game in a real world currency.

We are considering here a case when the puzzle is too hard and consequently the utility is low, in a different case when the challenge level of the world is too easy, the player has different choices to make, either start a new avatar and become climbing the ladder again or begin another "puzzle". We would not delve into multidimensional structures of the puzzles here, mainly because *mimicry* forces them to be similar to or derivable from the real world[172].

Online surveys seem to support that point with the cited cause for trading as to increase the satisfaction of the game, open new possibilities or overcome the "grind". Mr. Thurman in his interview actually states if when being a *player* in the VWs he spent several months saving to buy a house, however if the secondary markets were present he would rather buy it using the real money and save himself several months of game-play time. The demand then would come from systematic limitations of the VWs of providing the ideal challenge level to each gamer for his "puzzle" solving.

Going back to profiteering game-breaker and the term "meta-gaming", we see that their original positioning is to exploit game's complexity and emergence features to execute profitable operations. Quite probably, first game-breakers were akin to curious "pioneers", the "rule-benders" so to speak, before the secondary market were perceived to be possible and the economic rationality entered the play. It would still be a topic of more psychological or social research, if everyone can adopt the "game-breaker" posture in certain conditions.

Some dynamics for game-breakers or "workers" can be inferred. First, the emergence of game-breakers directly stems from the quantity of players in the game, for the more players we have the more the possibility of the anonymous defection, the rebel or the curious pioneer appearing. Second, the view of the game as a set of rules would imply that the more varied the rules are, the more possible it is to slip out of them, so to speak the *mimicry* would become more complicated and thus harder to adopt, besides perceptions of the rules by fellow avatars would diffuse becoming more vague with the consequent diminishing of the peer pressure. The game-breakers or the "meta-gamers",

[172] Caillois, 1961; Lastowka, Hunter, 2003

using Mr. Thurman's term, would then exploit intrinsically weak game's structure to receive abnormal profits. Being game-breaker or "worker" their satisfaction functions are based on the real money value trade out of the game instead of challenge of the "puzzle of puzzles" as for the "player".

As the online recollection of information has shown, at least in EQ2 and in PE, the final or the end-buyer of these "workers" is the "player" type, who wants to maximize his satisfaction out of the game by changing the challenge level closer to his ideal. The trade between "workers" resembles more the distribution chain in the real world with wholesaling and retailing, as mentions Mr. Thurman. The trade between "players" is possible because of the variety of puzzles or scenarios, each may be engaged in solving and the different pricing of the real world vs. virtual world assets.

A critic might then argue that the digital assets are essentially "unreal" or "virtual", that the "puzzle" solver would not consider them priceable in the real money equivalents, and even less, trade them. Nonetheless, as we have already mentioned in the other sections of the thesis, the current real world vs. virtual world interaction process actually steers towards the pricing of the more and more ephemeral concepts[173]. The reign of economic rationality, wide pervasion of priceable information-ware and the blur between real and virtual as Baudrillard so aptly described in his *tour de force*[174], would contribute to the evaluating the virtual in the real equivalents.

Most certainly an application of the aforementioned reasoning to the worlds as systems would be in order. First, the creation of the real money evaluation of the virtual assets seems to be almost unavoidable, for in the sufficiently varied virtual worlds with large populations discrepancies between offered and ideal challenge levels would be inevitable.

Second, the creation of real money trade and pricing of virtual assets in terms of real money, immediately introduces a real world dynamics of pricing producing commodification[175]. In other words, once secondary markets are created, the overall challenge level of the puzzle of puzzles begins to change adjusting to the spillovers into a world with different dynamics – the real world. Even the players who found themselves satisfied with the challenge level of the game find that the dynamics of the game begin to change. Suddenly, the rags-to-riches process is broken, and the structure of the puzzle begins to fluctuate, growing more chaotic. However, the many effects of commodification are outside the scope of this thesis and are an incredible field of research on their own.

As a third consequence, the inevitability of real money trade creation forces the game designers, the gods, to adjust their own utility functions based on the satisfaction of the players. The pungent dissent between "players" and "worker" was evident on forum in EQ2 during the time this research has been made and before that too. The upholder of *in-*

[173] Lastowka, Hunter, 2003
[174] Baudrillard, 1981
[175] Balkin, 2005

lusio world will have several options, one of them migrating to another VW and thus reducing the profits of the game designers.

The consequences above would apply to the PE also, but here we discover a new phenomenon. The advertised structure of the *in-lusio* world already included the RMT and spillovers into the real world. So to speak, it was already in the game, and the "players" who chose to enter already implicitly accepted the rules of the virtual vs. real interaction. On the other hand, the game owners, the gods, already had included the RMT in their challenge level of the puzzle at the design stage, so the dynamics of the game basically offer a slower rate of growth of digital assets if the "player" mimicked the closed system of EQ2-like worlds. As with EQ2 world there was an incentive for the player to use real money to increase his satisfaction from the game but in the case of EQ it was due to a systemic "imperfection" and in PE it is due to an intentional "feature". Our assumptions hold here as well, it is the presumptions of the game that changed.

5. Conclusion.

Returning to the case of corporate giants seeking for additional streams of profit out of the fiercely competitive MMORPG market, the research comes to a tantalizing set of conclusions. The model developed in this research proves that in sufficiently large *virtual worlds* with varied challenge structure, the creation of the real money trade of digital assets is almost inevitable. Moreover, the real money trade can actually increase the overall satisfaction level out of the game as the example of Project Entropia shows, consequently increasing loyalty of the subscribers and securing traditional profit streams.

In simple terms, it means that real money trade is an inevitable side effect and its taxation or mediation would bring a rather secure profit stream to the game owner company. The recent announcement made by Sony Online Entertainment about its StationExchange goes well in line with the predictions of the model inferred in this thesis.

The observed real money trade phenomena according to the present study have their source in the qualities of MMORPGS as systems, and the *homo ludens* intrinsic characteristics. While there are many other factors, the ones mentioned above are the most important one. This framework would basically imply that in sufficiently large MMORPGs with sufficiently varied scenarios of development, the emergence of the real money trade is theoretically inevitable, for the challenge level of the world would be sufficiently different from the ideal challenge level of one or more players forcing them to seek ways to increase their satisfaction out of the game. This framework was inferred directly from the information recollected from the forum in EQ2 and PE, two major examples of the design of MMORPGs.

EQ2 and PE both show a radically different approach to the real money trade in their games. While EQ2 just until recently was prohibiting it expressively, PE built it in their game from the scratch – two extremes of the treatment of one phenomenon. A major problem was difference between complacency of the PE inhabitants towards RMT and the pungently hostile attitude of some EQ2 users. However, one common theory was

found which explained both quite reasonably. The *ludique* nature of the MMORPGs is a strong motivator to segregate the players who follow the implicit rules or the advertised of the game and who not.

This research has tried to explain real money trade phenomenon from one standpoint while arriving to a general framework and even more questions. However, in current conditions in such a surprisingly vast area of research, any advance is a beachhead for the further invasion into the unknown.

6. Suggestions for further research.

It would be hard to somehow limit the list of possible further research. The industry and the virtual worlds are continuously evolving and anyone who would want to get a taste of an increasingly frenetic pace of the MMORPGs development would do well to visit the famous Terranova weblog[176].

Nonetheless, there are some directions for the further research that the author would want to indicate explicitly. For example, the propagation model of the economical changes in the MMORPGs would be an interesting field of research with definite practical utility for VW business schemes based on transactions like the PE's.

An extremely interesting and far-reaching field of research would be the virtuality of the real, exemplified by the LiveShot's business model[177]. Even though it sounds straight of out bad cyber thriller movies from the 80's, being an actual business model facilitated by the technological advances, it's worthy of a further inquiry. Could it be that in a couple of years, our infamous Joe the Warrior will be fighting some otherworldly beast and as loot he would find a magical artifact offering a discount on the new Dell computer? Or maybe the Nissan representative besides his usual duties will also sell a flying limo to be used in a next generation MMORPG?

On the other hand, there are current researches into *virtual economies* completely resistant to commodification. Given our thesis conclusions these *virtual worlds* would find a definite niche in the market with a loyal user base, and thus would represent a definite interest to the game designers with the traditional monthly fee-based subscription.

The other fields of research would include: social organizations and their effect on the economy, perceptions of value in VWs, invention and construction of new objects and their value, legality of virtual property, economy influence on egalitarian societies, economies of the distributed decentralized VWs.

[176] http://terranova.blogs.com/
[177] http://live-shot.com/index.shtml

Appendix 1. Table of current MMORPG subscribers on April 2005

MMOG	Current Subscribers
Lineage	2085385
Lineage II	2065187
World of Warcraft	1500000
Final Fantasy XI	550000
EverQuest	460000
RuneScape	338826
Ragnarok Online (JP)	300000
EverQuest II	275000
Star Wars Galaxies	254000
Dark Age of Camelot	175000
Ultima Online	157000
City of Heroes	124435
Eve Online	54900
PlanetSide	53000
EverQuest OA	46000
Asheron's Call	37000
The Sims Online	35500
Toontown Online	30000
Second Life	26000
Anarchy Online	23000
Shadowbane	20000
There	17000
Sphere	15000
Asheron's Call 2	14000
Horizons	13000
WWII Online	13000
Puzzle Pirates	10000
Era of Eidolon	7000
Mankind	5000
The Realm Online	5000
A Tale in the Desert	1381
Total	**8,710,614**

Source: www.mmogchart.com , visited on April 20, 2005

Appendix 2. Table of MMORPG games available, in development or cancelled.

	MMORPG List			
Name	**Publisher**	**Release**	**Status**	**Type**
A Tale in the Desert	eGenesis	6/1/2003	Released	MMORPG
Age of Conan	Funcom	1/1/2006	Alpha	MMORPG
Anarchy Online	FunCom	6/27/2001	Released	MMORPG
Anarchy Online: Shadowlands	FunCom	9/18/2003	Released	MMORPG
Auto Assault	NCSoft	1/1/2006	Beta	MMORPG
City of Heroes	Cryptic Studios	4/28/2004	Released	MMORPG
Dark Age of Camelot	Mythic	10/23/2001	Released	MMORPG
Dark Fall	Aventurine/Razorwax	1/1/2005	Released	MMORPG
Dragon Empires	Codemasters	9/30/2004	Cancelled	MMORPG
Dungeons and Dragons Online	Turbine Entertainment, Atari	7/1/2005	Alpha	MMORPG
EVE Online	CCP	N/A	Released	MMORPG
Everquest	Sony	3/16/1999	Released	MMORPG
Everquest 2	Sony	11/8/2004	Released	MMORPG
Everquest: Dragons of Norrath	Sony Online Entertainment	6/1/2004	Released	MMORPG
Everquest: Lost Dungeons of Norrath	Sony	9/16/2003	Released	MMORPG
Face of Mankind	Duplex Systems	9/1/2005	Beta	MMORPG
Ferion	Ferion	1/1/2000	Released	Browser
Final Fantasy XI	Square Enix	10/28/2003	Released	MMORPG
FreeWorld	MindSurge Entertainment	1/1/2008	Alpha	MMORPG
Gods and Heroes: Rome Rising	Perpetual Entertainment	12/1/2005	Alpha	MMORPG
Guild Wars	Arena.net	4/28/2005	Released	MMORPG
Guilds	OGaming	3/29/2005	Released	MMORPG
Horizons	Artifact Entertainment	11/11/2003	Released	MMORPG
iClod	iClod.com	1/1/2005	Released	Browser
Kingdom Wars	C.La.W.	1/1/2005	Released	Browser
Lineage 2	NC Soft	4/27/2004	Released	MMORPG
Lord of the Rings Online	Turbine @ Vivendi Universal	8/1/2005	Alpha	MMORPG
Matrix Online	Ubisoft	4/1/2005	Released	MMORPG
Most Wanted	Antlu Productions	1/1/2000	Released	Browser
Mourning	Limitless Horizons Ent.	7/1/2005	Beta	MMORPG
Mythica	Microsoft	6/1/2004	Cancelled	MMORPG
OfficeDebo	AGamersCo	3/21/2005	Beta	Browser
Pirates of the Burning Sea	Flying Lab Software	1/1/2007	Alpha	MMORPG
Planetside	Sony Online Entertainment	5/19/2003	Released	MMORPG
Project Entropia	MindArk	1/1/2002	Released	MMORPG
Ragnarok Online	Gravity Inc.	N/A	Released	MMORPG
Risk Your Life	Planet Wide Games	3/17/2005	Released	MMORPG
Saga of Ryzom	Nevrax	N/A	Released	MMORPG
Seeds of Empires	Epinephrine Rush Network	2/27/2005	Beta	Browser
Star Trek Online	Perpetual Entertainment	1/1/2007	Alpha	MMORPG
Star Wars Galaxies	Sony	6/26/2003	Released	MMORPG
Starpeace	Pugland	2/5/2005	Released	MMORPG
Tabula Rasa	NCSOFT	12/1/2005	Alpha	MMORPG

The Five Pillars	Olav Bringedal	2001	Released	MMORPG
The Realms of Stelanthir	The Realms of Stelanthir	1/1/2006	Beta	MMORPG
Tibia	CiP Soft	1/1/1995	Released	MMORPG
Ultima Online	Electronic Arts	9/21/1997	Released	MMORPG
Ultima X: Odyssey	Electronic Arts	4/27/2004	Cancelled	MMORPG
Vanguard	Sigil Games	6/1/2005	Alpha	MMORPG
Visions of Zorth	Visions of Zorth	6/1/2005	Beta	Browser
Wish	Mutable Realms	5/1/2005	Cancelled	MMORPG
World of Warcraft	Blizzard	6/1/2004	Released	MMORPG

Source: http://www.ogaming.com/data/1881~GameList.php, last visited on May 10, 2005

Appendix 3 Sony Terms of Use Excerpt

Source: http://eq2players.station.sony.com/en/support_article.vm?label=EQIIEULA , Visited on May 12, 2005

EVERQUEST® II USER AGREEMENT AND SOFTWARE LICENSE

….

8. We and our suppliers shall retain all rights, title and interest, including, without limitation, ownership of all intellectual property rights relating to or residing in the CD-ROM, the Software and the Game, all copies thereof, and all game character data in connection therewith. You acknowledge and agree that you have not and will not acquire or obtain any intellectual property or other rights, including any right of exploitation, of any kind in or to the CD-ROM, the Software or the Game, including, without limitation, in any artwork, music, character(s), item(s), coin(s) or other material or property, and/or any compilation or copyrightable arrangement of any of the above (collectively, “Rights”), and that all such property, material, items and Rights are exclusively owned by us.

9. You may not use any software to modify the Software to change Game play. You may not create, facilitate, host, link to or provide any other means through which the Game may be played by others, such as through server emulators. You may not decrypt or modify any data transmitted between client and server and you may not use, post, host or distribute macros, “bots” or other programs which would allow unattended game play or which otherwise impact game play. You may not take any action which imposes an unreasonable or disproportionately large load on our infrastructure. You may not buy, sell or auction (or host or facilitate the ability to allow others to buy, sell or auction) any Game account, characters, items, coin or copyrighted material or any other intellectual property owned or controlled by us or our licensors without first obtaining our express written permission.

Appendix 4. Primary information sources

Forums used in the information recollection:
EverQuest 2 OGaming Forums, http://eq2.ogaming.com/forum/index.php
IGN VN forum boards for EQ2, http://vnboards.ign.com/EQ2_General_Board/
Entropia Forum, http://www.entropiaforum.com/index.php
Entropia Pioneers, http://entropia-pioneers.kicks-ass.org

The information recollection was constructed so the interview or the main body of questions could be reused in each of the cases: EQ2 and PE. In separate cases, like email questionnaires to persons of interest, additional questions were added. The main reasoning was to reduce possible bias, increase construct validity, thus increasing research quality. Other reasoning was to increase reliability of the study by presenting the questions used in the interviews, so that the results could be reproduced by other researchers.[178]

The questions were designed to use a medium level of jargon, given the bias mentioned by Castronova[179] that active forum users are mainly high level avatars in game and so, know most of the jargon used in this thesis.

Excerpt of typical 1st round interview questions:

How many MMORPGs do you play/own/use for trading/farming?

How much time approximately do you spend per week directly in the MMORPGs (playing, or supervising the bots, etc)?

In your opinion, what causes the trading of the virtual items/avatars outside the game?

What are you using "out of the game trade" for?

When you trade out of the game, how do you think the price for the item/avatar/virtual currency is set or what essentially determines the price in your opinion?

What's your primary view on the out of the game trade for EverQuest2 (including StationExchange)?

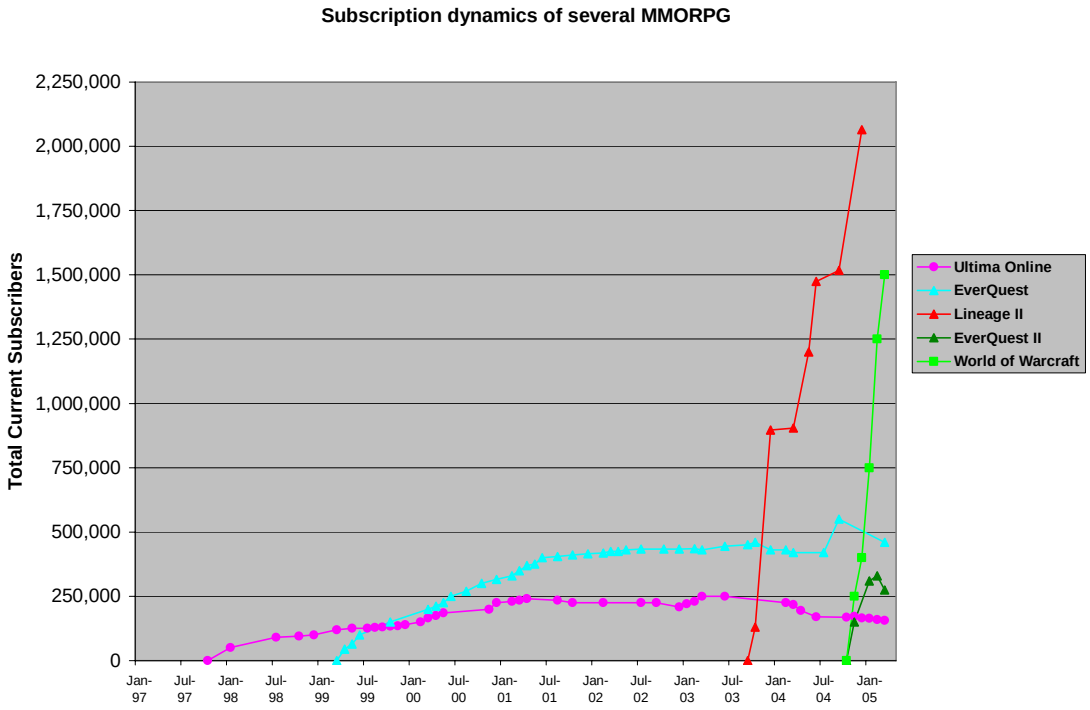
What's your primary view on the out of the game trade for Project Entropia?

Who in your opinion is the most frequent end buyer for digital goods/avatars?

Do you consider yourself playing or working (activities to bring positive income in the real currency) when in MMORPGs?

[178] Yin, 2003
[179] Castronova, 2001

Appendix 5 Subscription dynamics of several MMORPG



Source: http://mmogchart.com/ database, version 16.0 on May 19, 2005.

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