

Virtual-World Alchemy: Implications for Service Engineering from Mobile Social Games in Japan

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Abstract—There is an increasing visibility of mobile social games in Japan. The radical growth of item-purchasing in mobile social games provides a new perspective for service engineering. The author comes to recognize that the know-how in mobile social games provides lessons for further general service engineering. The author proposes the concept of virtual-world alchemy for parsing the new paradigm of service engineering.

I. INTRODUCTION

Recently, social network games over social network services have become popular. There is an increasing visibility of mobile social games as revenue-generating engines on the Internet. Major Japanese social network services launched an open platform strategy to open up their OpenSocial-based APIs to third-party vendors in the 2nd half of 2009. It provides a revenue opportunity for mobile social game vendors. Item-purchasing in mobile feature phones has shown a radical increase. A market estimate by the Mitsubishi-UFJ Morgan Stanley Securities is shown in Fig. 1.

The major part of revenue comes from the feature-phone market, not the fast-growing smart phone market.

In 2010, one survey by Mobile Marketing Japan showed that 70 % of SNS users answered that their purpose for joining an SNS was “playing games”, which outnumbered social interactions with friends.

This represents an interesting turning point for Internet business, because legacy Internet business depended on

a freemium model without charging end users. Revenue-generating engines have boosted the profits of major mobile social game vendors. Even the top advertising agencies, the top e-commerce companies, and the top broadcasting company were outnumbered by the top social game vendors according to records published in 2011.

The service industry comprises more than 70 % of major developed countries. It is important to conduct a systematic analysis of services and to develop a service science for further study, research and industrial applications. It encouraged The emergence of a service science has been encouraged in the last decade. Services have been classified as acts, deeds, or performance in contrast to tangible goods and products. This intangibility often creates obstacles to quantitative verification of service engineering methodologies.

The author comes to recognize that the strong revenue-generation mechanisms as well as the operation-oriented value creation of mobile social games provide some implications for the general principles of service engineering.

The author proposes the concept of “virtual-world alchemy” to describe this turning point and presents the implications for service engineering.

II. BACKGROUND

A. Purpose of Research

The aim of this research is to identify the key factors that drive service engineering in the virtual world.

B. Related Works

The rise of service industries and the immaturity of service science and engineering has been clearly recognized among researchers. Productivity improvements as shown in past agriculture and manufacturing have been pursued, but are still unsatisfactory. Chesbrough et al argued for a research manifesto of service science [1] and discussed the grand challenges of service science as an academic field. Bitner et al highlight the development of service science knowledge and education in business schools [2].

Järvinen discussed how social game design can benefit from interaction design and service design [3].

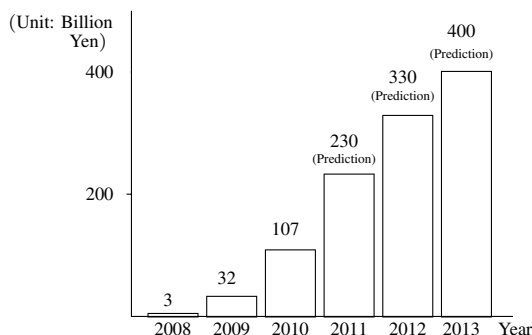


Fig. 1. Market Estimate of Mobile Social Game in Japan

Pinhanez proposed a framework based on service science for online service applications in considering 6 basic characteristics of services – customer-as-input, heterogeneity, simultaneity, perishability, coproduction, and intangibility [4].

Featherman et al examined the obstacles due to the intangibility of e-service [5].

Lau et al discussed the wider scope of services to cover non-commercial services for a better definition of service [6].

There is also literature for service oriented architecture and web services, e.g. [7].

In order to reduce the complexity of service engineering, choosing the target industry and focusing IT services is one method for exploiting an in-depth view of service engineering. Chen et al discussed an integrated service-oriented business-IT alignment framework in the financial industry [8].

Yamakami discussed hybrid service engineering based on lessons learned in mobile social games [9].

Gaming has been an arguable artifact in research. However, the term “gamification” has become popular in recent days. Deterding et al presented that “Gamification” is an informal umbrella term for the use of video game elements in non-gaming systems to improve user experience and user engagement [10].

The originality of this paper lies in its examination of a new framework for service engineering based on lessons learned in mobile social games.

III. VIRTUAL-WORLD ALCHEMY

A. Alchemy

Alchemy is the domain of engineering where technology is applied to turning common low-value materials into precious materials. Alchemy was popular in the 16th century, and led to the early stage of chemistry as a science. Many chemical materials and equipment for chemical experiments were invented in the exploration of alchemy during the time frame of the 16th and 17th centuries. In a narrow sense, alchemy covers the techniques for producing precious materials. In a wider sense, alchemy covers some matters of medical science and the mind, where the final products of alchemy cover both physical health and the higher mind.

B. Definition of Virtual-World Alchemy

The author defines Virtual-World Alchemy as the techniques used to produce user-sensed values in the virtual world. The virtual world means the places of communication created on the Internet. The virtual world consists of digital bits and bytes without any physical existence. Virtual-world alchemy is a collection of techniques used to produce sensed values that users pay for without any physical material. Literally, it refers to service engineering, however, virtual-world alchemy focuses on the process that directly leads to a revenue-generating engine, while service engineering focuses more on the overall process of a “service”. In other words, service engineering is a more general term, and virtual-world alchemy emphasizes a unique process of generating revenue which does not occur in the physical world.

TABLE I
FACTORS WHICH REQUIRES VIRTUAL-WORLD ALCHEMY

factor	description
Virtual-Worldization	Users spend more time in the virtual world including social interactions.
Revenue growth in the virtual world	Revenues generated in the Internet are quickly shifting toward revenue-generation depending upon unique characteristics of the virtual-world.
High-level user desire	As the global economy grows, the fundamental desires are shifting from low-level desires like eating and sleeping to high-level desires like social recognition and self-satisfaction.
Self-love	Advances of computer communications allows individuals armed with a rich set of information. Also, the information flood makes each individual vulnerable, which needs some compensation for each individual.

Virtual-world alchemy focuses on the process of combining the user-perceived values and payment actions.

C. Why do we need Virtual-world Alchemy

There are four factors illustrated in Table I.

In the past, the virtual world was an easy, fast, and convenient replacement of the real-world. For example, a user could search a massive amount of electronic information in an easy manner. Or, a user could transfer cash between banks in a fast and convenient manner. In today’s business landscape, some business in the virtual world explicitly exploits the unique characteristics of the virtual world, which not a replacement of the real-world any more. The concept of virtual-world alchemy is an attempt to capture this change in trend.

IV. IMPLICATIONS FOR SERVICE ENGINEERING

A. Changes in the Underlying Trend

There are several underlying trend changes which drive the virtual-world alchemy. One is the advances in the Internet. The penetration of the Internet has caused the radical change of the Internet itself. In the past, the Internet was just a pathway of information. Information itself is owned by each individual. The social existence of human beings was not threatened by the Internet. In some sense, the Internet was just a method for exchanging information.

The current landscape is quite different. More and more human interactions are moving from the real-world to the Internet. Examples include Facebook, Twitter, and other social network services. The impact of these social network services is significant. Groupon is the fastest growing company in human history. It achieved 20 billion US dollars sales within two years of its establishment. It is one of the exceptional companies that refused an M&A offer from Google, the Internet giant.

The Internet paradigm shift is depicted in Fig. 2.

The term “Real-time Internet” existed even in the early stages of the Internet. However, it seems to the author that past perceptions of the real-time Internet as video broadcasting networks or massive machine-to-machine networks was misleading. The transition of the real-time Internet is depicted in Fig. 3.

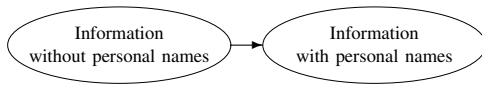


Fig. 2. Trend of Information with Personal Names

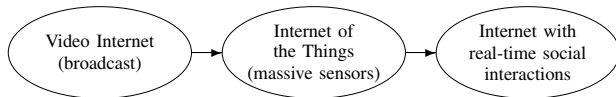


Fig. 3. Transition of the meaning of the real-time Internet

A positive response from a human being is one of the ultimate pleasure for human beings. It is more rewarding than anything else because human beings are social creatures. Today's business landscape shows that the real-time Internet is an Internet with billions of people interacting in a real-time manner.

Another trend is servicization. Servicization is defined as a trend that causes a shift from legacy industrialization (agriculture, fishing, and manufacturing) to service industrialization. As the center of industry moves towards "services", we need to coin a new methodology to capture this focus shift. In the early stages, a service was just a combination of various techniques to form a service. However, virtual-world alchemy, which focuses on revenue-generation engines, indicates that the today's services should focus on the creation of artificial user satisfaction, which will not exist if a user will not use a service. This shift is depicted in Fig. 4.

B. Limitations in Legacy Service Engineering

Service engineering was coined in the first half of this decade. The purpose for coining this term was to provide a systematic methodology for producing services. It was an

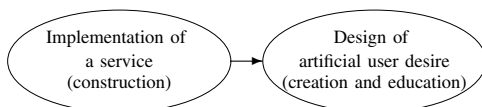


Fig. 4. Shift of focus of service engineering

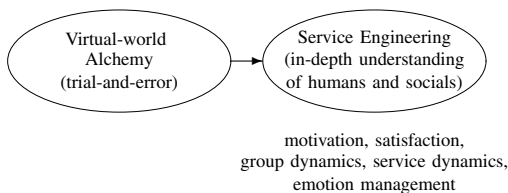


Fig. 5. Virtual-world alchemy as science

TABLE II
LIMITATIONS OF EXISTING SERVICE ENGINEERING

issue	summary
analysis-synthesis approach	Analysis and synthesis approach is limited in the dynamic and balanced social contexts where many different factors interact.
modeling approach	Motivation and social interactions are difficult to model and parameterize.
limited understanding of high level user desires	High-level user desires are difficult to capture.
limited coverage of social cognition and emotion	Cognition and emotion are just external parameters, not the central exploration targets.

attempt to improve service productivity according to similar best practices exercised in manufacturing.

The emergence of revenue-generation in mobile social games has exposed limitations of this legacy service engineering. The limitations are depicted in Table II.

C. Three Layer Model of Implicit Network Values

Many feature-phone-based games are very simple. This may lead to the impression that the major customer values are based on social factors such as group support and competition.

The social factors work strongly behind the scenes of the major revenue-generation phases: hook, retention and monetization.

Friend-invitation is a major driving factor in the early stages of mobile games. However, once people are addicted to social games, the landscape changes. Friend invitation does not work as it did before. Heavy game users are addicted to multiple games which requires intensive time management and therefore, is no time to play any additional games. During the peak period of mobile social games, SNS portal guidance works the best to generate user flow.

In the early stages of mobile social games, friend invitation directly leads to competition among friends. To beat known friends, people will pay for premium items to improve their changes of winning.

During the revenue growth phase of mobile social games, the majority of revenue comes through in-depth exploration of user satisfaction. Winning is just one aspect of user satisfaction. The major source of user satisfaction comes from recognizing one's own incremental growth. This growth comes from spending time, spending money and inventing good strategies. A good mixture of these factors creates user satisfaction. During this process, social factors work as background factors. Paying something for one's virtual growth is justified by the fact that others do the same. Standalone games are weak in terms of this background awareness. In this sense, social factors work well.

This is the implicit interconnection.

A three layer model of network values is depicted in Fig. 6.

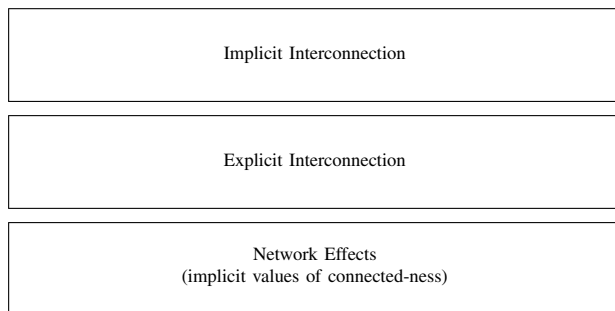


Fig. 6. Three-layer model of network values

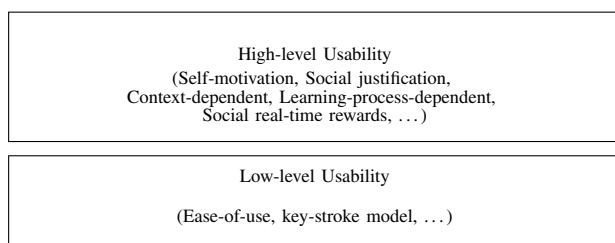


Fig. 7. Two-layer model of usability

D. Social Stream Mining

It is a challenge to capture user belief and satisfaction in services. In services, user experience and expectation grow in a dynamic manner. Especially, in social contexts, interactions among a large number of users further increase the complexity.

Social stream mining is one methodology used in examining mobile social games. With increased availability of user behavior and interactions in the digital world, social stream mining provides a method for heuristically indentifying revenue-generation opportunities in a massive amount of user behavior logs.

For example, click rates of advertisement banners on Web pages differ from banner to banner. The difference in click rates can reach an order of magnitude. However, the deciding principles for creating higher click rates are usually unknown. Sometimes amateur-created banners can produce higher click rates compared to the ones produced by professionals. In this case, Web operators can choose social-stream-oriented filters to produce better click rates. They just present banners in a random manner and choose a small number of highly clicked banners. This is also a best practice in mobile social games, making frequent game system adjustments using a massive log record of user behaviors.

This is a promising method, in the era of the Web, which provides engineering opportunities for complicated, difficult-to-analyze social systems. It can deal with challenging aspects of human systems, like trust, beliefs, satisfaction, and excitement.

E. Two Layer Model of Usability

A two-layer model of usability is depicted in Fig. 7.

Past research relies on one-dimensional deterministic measures, which are difficult to apply to high-level mental states including satisfaction, belief, excitement, and social rewards. The methodologies embedded in mobile social games indicate the existence of know-how for capturing these high-level factors. Virtual-world alchemy provides a stepping-stone towards understanding the complicated human senses of services.

V. DISCUSSION

A. Advantages of the proposed approach

Past research on service engineering follows the growth of service commerce with the hope of achieving similar productivity improvements achieved in the past advances in agriculture and manufacturing. The focus was on easiness, quickness and completeness according to digital properties and networking capabilities in IT service engineering.

The emergence of revenue-generation in mobile social games provides an opportunity to observe a mechanism for creating values out of a vacuum in the digital world. Combined with operation-oriented knowledge-generation mechanisms in social stream mining, it demonstrates the merit of dealing with the high-level desires of human beings, in particular, in social contexts. Intangible senses of value can be mined through revenue-generation in daily game tuning of social stream mining. This provides a break-through for capturing high-level human desires, which are difficult to capture using one-dimensional analysis methodologies.

The advantage of the approach in this paper is to highlight the proto-science status of digital value creation of mobile social games in order to facilitate further study of context-specific user-sensed-value-centric service engineering.

B. Limitations

This is a descriptive study of the high-level concept of “virtual-world alchemy”. The identification of different aspects of virtual-world alchemy, and the quantitative analysis of them is beyond the scope of this paper.

This is an exploratory work, therefore, in-depth analysis of “virtual-world alchemy” remains for further research.

VI. CONCLUSION

Since 2009, feature-phone-based mobile social games have created strong revenue-generating engines that have a significant impact on mobile business model engineering in Japan. Strong revenue-generation was not recognized as a fundamental challenge for service engineering in the early stage.

As business model engineering has been parsed and examined, it has led to the awareness that mobile social game design explores the fundamental nature of human factors in an interdisciplinary field of science.

Contrary to the superficial observations made through hypes, the success of the mobile social game business opens up a new door to the in-depth examination of human nature for service satisfaction.

Alchemy is an ancient tradition, of which the primary objective was to create of the mythical "philosopher's stone," which was said to be capable of turning base metals into gold or silver, and which could act as an elixir of life that would confer youth and immortality upon its user. Alchemy can be viewed as a protoscience, a precursor to modern chemistry that provided procedures, equipment, and terminology that are still in use today.

In the late 20th century, human beings radically changed the direction of science direction from external space to internal space. Before then, human beings explored the faster and the bigger. Typical examples include the extension from cars, airplanes, and to rockets using modern physics, chemistry, and engineering. The birth of the Internet is a radical turn from these physical things to internal, mental space.

In the 21st century, human beings will explore the internal, mental space using service engineering. Motivation, commitment, expectation, psychological dependence, and social emotion are all difficult to capture, measure and control.

This creates challenging obstacles for modern virtual-world alchemy.

Virtual-world alchemy is a journey to high-level human desires, the fundamental inner workings of human mind. It could become the protoscience for modern service engineering, providing procedures, guidelines, and terminology for next-generation service engineering.

REFERENCES

- [1] H. Chesbrough and J. Spohrer, "A research manifesto for services science," *CACM*, vol. 49, no. 7, pp. 35–40, July 2006.
- [2] M. Bitner and S. Brown, "Services science: The evolution and discovery of services science in business schools," *CACM*, vol. 49, no. 7, pp. 73–78, July 2006.
- [3] A. Järvinen, "Game design for social networks: interaction design for playful dispositions," in *Proceedings of the 2009 ACM SIGGRAPH Symposium on Video Games*, ser. Sandbox '09. New York, NY, USA: ACM, 2009, pp. 95–102. [Online]. Available at: <http://doi.acm.org/10.1145/1581073.1581088>
- [4] C. Pinhanez, "A service science perspective for interfaces of online service applications," in *Proceedings of the VIII Brazilian Symposium on Human Factors in Computing Systems*, ser. IHC '08. Porto Alegre, Brazil, Brazil: Sociedade Brasileira de Computação, 2008, pp. 11–20. [Online]. Available at: <http://dl.acm.org/citation.cfm?id=1497470.1497473>
- [5] M. S. Featherman and J. D. Wells, "The intangibility of e-services: effects on perceived risk and acceptance," *SIGMIS Database*, vol. 41, pp. 110–131, May 2010. [Online]. Available at: <http://doi.acm.org/10.1145/1795377.1795384>
- [6] T. Lau, H.-C. Wang, and C.-C. Chuang, "A definition of service as base for developing service science," in *Proceedings of the 2011 International Joint Conference on Service Sciences*, ser. IJCSS '11. Washington, DC, USA: IEEE Computer Society, 2011, pp. 49–53. [Online]. Available at: <http://dx.doi.org/10.1109/IJCSS.2011.18>
- [7] H. Kreger, "E-services: Fulfilling the web services promise," *Communications of the ACM*, vol. 46, no. 6, pp. 29–34, June 2003.
- [8] H.-M. Chen, O. Perry, and R. Kazman, "An integrated framework for service engineering: a case study in the financial services industry," in *Proceedings of the 11th International Conference on Electronic Commerce*, ser. ICEC '09. New York, NY, USA: ACM, 2009, pp. 269–278. [Online]. Available at: <http://doi.acm.org/10.1145/1593254.1593295>
- [9] T. Yamakami, "Hybrid service integration engineering: Implications from a game-story-combined mobile social game," in *CloudCAT 2011*, vol. CCIS 223. Springer Verlag, September 2011, pp. 317–325.
- [10] S. Deterding, M. Sicart, L. Nacke, K. O'Hara, and D. Dixon, "Gamification. using game-design elements in non-gaming contexts," in *Proceedings of the 2011 annual conference extended abstracts on Human factors in computing systems*, ser. CHI EA '11. New York, NY, USA: ACM, 2011, pp. 2425–2428. [Online]. Available at: <http://doi.acm.org/10.1145/1979742.1979575>