From the Editor

It is a great pleasure to deliver to you the third issue of "Journal of Informatics and Regional Studies." This Journal intends to provide researchers and practitioners with the forum of discussion and sharing findings and ideas about Informatics and Regional Studies. We welcome you to join us to share your idea on this Journal.

This third volume is following up the first and second volumes. The main topic has been "IT-enabled Services," or in short, ITeS. As the previous volumes open up and expanded the scope of the studies of ITeS, this issue intends to explore wider range of topics which cover not only those topics focusing on ITeS but also fundamental theoretical studies relating to Informatics and Regional Studies.

As was the case of previous two volumes, this volume also consists of two parts. The first and main part is the papers, and the second part is the replications from presentations in ITeS research both in congress and workshops.

In the first section, the first paper, "The Conflict between Gold and Silver in the International Monetary Standard during the Nineteenth Century" is contributed by Dr. Takeshi NISHIMURA (Matsuyama University / Kansai University from April 2011). This paper illustrates how the role of silver standard in nineteenth century contributed the following development of gold standard. This article provides the readers with the scope about the role of monetary systems. The monetary system we see today is not in the existence for long time. Study of bimetallism – the Conflict between Gold and Silber – enlighten us to understand how regional economies are integrated into and formed one system.

The second paper, "The Problems for Diffusion of Location Based Services in Rural Areas" is contributed by Dr. Hidenobu SAI (Ehime University). This paper presents us issues relating to Location Based Services. There are various problems which surround the introductions of Location Based Services, especially, in rural areas. This paper illustrates the problems of diffusion of LBS.

The third paper, "An Approach of Enhancing Dependability in the System with the Perspective of System Architecture" is contributed by Manish POKHAREL (Korea Aerospace University) and Jong Sou PARK (Korea Aerospace University). This paper illustrates the role of System Architecture in order to enhance system dependability. They discuss the methodology of how to define the fundamental features of dependability. By applying their methodology, this paper identifies and shows how System Architecture enhances the dependability.

The fourth paper, “Young People’s Behavior and Consciousness for Online Shops” is contributed by Dr. Takashi OKAMOTO (Ehime University). This paper illustrates young people’s behavior in B to C markets, namely, online shops. The findings from surveys conducted in 5 different universities are presented. The findings include difference in region and gender.

The fifth paper, “The Evaluation of M-Commerce Interface on Smart Phone in Thailand - Differences in Age and Education Background -” is contributed by Dr. Nagul COOHAROJANANONE (Chulalongkorn University), Dr. Kanokwan ATCHARIYACHANVANICH (Matsuyama University), and Dr. Hitoshi OKADA (NII). This paper present thorough analysis of the use of M-Commerce in Thailand using raw data sampled recently. It identifies the factors which contribute the increase or decrease of the numbers of users.

The second part of this Journal consists of the reproductions of presentation slides from the conferences. The 3rd ITeS Workshop was held as a session in SAINT 2010 (The 10th Annual International Symposium on Applications and the Internet) held in Seoul Korea on July 20-24. This is a follow up of the 1st Workshop held in Turuku in July 2008 and the 2nd ITeS Workshop held in Bellevue WA, USA in July 2009.

The Workshop was made up from 3 sessions – “Trust and IteS,” “ITeS and Payment” and “ITeS and infrastructure.” Each session consist of 3 presentations. The papers presented in the workshop is included in the proceedings of SAINT2010 and retrieved from IEEE Xproler® Digital Library.

This edition of Journal is made of collections of up-to-date researches. The editor would like to express sincere thanks to the contributors of papers and the presenters in the Workshop who make this wonderful omnibus of journal come to existence.

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The Conflict between Gold and Silver in the International Monetary Standard during the Nineteenth Century

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Abstract:

This paper examined to analyze the role of silver to integrate the international monetary orders during the second half of the nineteenth century. Most previous studies have not emphasized the role of silver to establish the international gold standard after the beginning of the violent decline of the silver price in London market. However, during the second half of the nineteenth century, many people, such as the bankers, industrialists, merchants, continued to have the controversy whether their countries had to adopt the bimetallism not only in the European continental countries and Asian colonies but also in Britain. Silver had maintained the important role to integrate the international monetary order during the nineteenth century.

After the 1870s, violent decline of the silver price promoted the United States to establish the international bimetallism, because the United States was the largest silver exporter in this period. The United States organized the four international monetary conferences and emphasized the international bimetallism order. However, Britain and the most European continental countries did not agree to establish the international bimetallism order. After the ending the forth international monetary conference at Brussels in 1892 and stopping the free silver coinage in British India in 1893, the United States decided to transfer the gold standard from the bimetallism legally. After the 1890s, the role of silver as the international money was changed and maintained not only the subsidiary coins but also local currencies for daily transactions in rural markets and inter-regional currencies in Asian countries and colonies until 1935.

Keywords: silver standard, gold standard, bimetallism, silver price, silver parties, Latin Monetary Union, international monetary conference, international gold standard

1, Introduction

The purpose of this paper is to examine the development of international monetary arrangements in the backdrop of the evolution of the world economy during the second half of the nineteenth century, with special reference to periphery areas such as Asia and Latin America. Apart from a few exceptions, a majority of modern monetary historians of the nineteenth century have assumed that the international monetary system emerged as a system of international gold standard, and have concentrated on the questions of why it emerged and how it operated. The work of Alec Ford is representative of this trend and has influenced and inspired numerous scholars. However, the international monetary system, or at least the European monetary system in the first half of the nineteenth century, was not dominated by the gold standard. The evolution of the system in the nineteenth century was a result of various factors, including the growth of world trade, capital flows and international migration both in the Atlantic and among Asian Countries. The movement of silver prices in the second half of the nineteenth century were of particular relevance. As is well known, silver was a major monetary metal before the 1870s, and the fluctuation in the prices of silver attracted contemporary attention. In particular, a mild appreciation relative to gold in the third quarter of the nineteenth century was followed by a dramatic fall from the 1870s onwards, which lasted till the end of the century, and silver remained devalued until the beginning of World War I. These movements provoked considerable debates, resulting in a series of international monetary conferences. After the first meeting in 1867, the United States led a move towards the establishment of an international bimetallic monetary order, and this effort continued until 1893 when the fourth conference was held. However, the leadership of the United States was not successful. These conferences attempted to obtain agreements among major economies regarding an international monetary order and accordingly became a focus for the bimetallic agitation during the third and fourth quarters of the nineteenth century. The process of this effort will be described in greater detail in the subsequent sections.

2, The Beginning of the Monetary Controversy in the mid-Nineteenth Century

For approximately thirty years after the end of the Napoleon War, the prices of

silver and gold did not fluctuate widely on the London market, and the ratio between gold and silver remained relatively steady. However, from the 1840s onwards, the prices of silver began to appreciate relative to gold on the London market. After 1851, the price of silver exceeded 60 d. per British standard silver ounce. The high price of silver continued to fluctuate until 1860. In the mid-1860s, it reached 62 d. and remained above the pre-1851 level until 1873[1]. This mild appreciation of silver was vital in destabilizing the European monetary system; it provoked arguments and discussions in major European nations, and also encouraged the introduction of a currency system based on silver in England.

Some of those who insisted on the adoption of the silver standard in England indicated the importance of the stability of pound-sterling [2]. They indicated both the distributional effects arising from the movements of prices and great impacts of the economic crises resulting from increasing money supply caused by the proportional rise in the inflow of newly produced gold. The main person who argued the adoption of the silver standard in England was James Maclaren. He was supported by numerous scholars and politicians, mainly the members of the Currency School. However, their arguments lost favour. Those who wished to continue with the gold standard maintained that the bimetallic standard would definitely disturb various commercial and financial transactions because whether contracts in sterling would be based on the prices of silver or gold would not be clear and nobody would be able to decide who should gain between debtors and creditors. Furthermore, adherents of the gold standard regarded new gold as a result of the previous stringency in its supply. Its inflationary impacts lightened the burden of various debts to the gain of taxpayers and the loss of investors. There was the likelihood of an increase in the supply of silver caused by its appreciation relative to gold. New gold, particularly from mines in California, had already been introduced; moreover, mercury mines had also been opened, which required a more sophisticated method of refining silver ore. The main contribution of the appreciation of silver in the nineteenth century in England was the integration of the monetary system into the gold standard on account of the instability in the prices of silver and gold. In addition, it was also an important

[1] W.F. Spalding, *Eastern Exchange Currency and Finance*, fourth edition, London: I. Pitman, 1924.

[2] In the seventeenth and eighteenth centuries, silver played a more important role in the British monetary order as compared with the second half of the 19th century. S.D. Horton, *The Silver Pound and England's Monetary Policy since the Restoration*, London: Macmillan, 1887.

contribution that the Bank of England stopped accepting silver for the reserve of the Issue Department[3].

Although the mild appreciation in the price of silver in the third quarter of the nineteenth century merely resulted in academic debates in England, it encouraged Belgium and Switzerland to introduce the silver franc, and gold was demonetized in the Netherlands and British India. In the 1850s, monetary authorities all over Europe had been principally concerned with the difficulties arising from heavy arbitrage transactions that had taken place among France, Belgium and Holland. In 1850, Belgium possessed a stock of new silver coins while the French silver coins were rather worn (the loss in weight could be as high as 8%). It was profitable to export French coins to Belgium, which were bought with gold coins, and use them there for trade purposes at a lower cost than that which would have been incurred if silver had to be minted into Belgian coins. Alternatively, French silver coins could be taken to Belgium, exchanged there at par for Belgian 'heavy' coins, and later exported to Germany or the Netherlands. These opportunities were not missed by speculators: Belgium witnessed approximately 85% of the coins in circulation disappear beyond her borders to be replaced by 'light' French coins. French coinage also found its way into Switzerland, where 'heavy' coins were in circulation. Between 1861 and 1864, the strong demand for silver for shipping to the East finally deprived Belgium of all her coins. In addition, Italy adopted the French monetary standard. However, her coins contained only 83.5% pure silver, compared to 90.0% contained by French coins. Within a short time, Italian coins invaded France[4].

However, the largest flow of monetary metal during the third quarter of the nineteenth century was that of silver from Europe to the East. Taking advantage of the bimetallic ratio of French mint, but now out of line with market price movements, gold was shipped to France and exchanged for silver, which was exported to the East. This exchange of monetary metals and their international flow contributed towards the outflow of silver from France. France maintained the French franc backed by gold during the third quarter

[3] Gold and Silver Commission, 'Final Report on the Royal Commission appointed to inquire into the Recent Changes in the Relative Values of the Precious Metals', *British Parliamentary Papers*, C-5512, 1888; Gold and Silver Commission, 'Appendix to Final Report of the Royal Commission appointed to inquire into the Recent Changes in the Relative Values of the Precious Metals', *British Parliamentary Papers*, C-5512–1, 1888. Mainly, please refer to the Final Report and the minutes of H.H. Gibbs.

[4] M. de Cecco, *The International Gold Standard: Money and Empire*, New York: St. Martin's Press, 1984, pp.43–44.

of the nineteenth century. This was a complete reversal of the situation that had prevailed since 1803, as gold had been undervalued by the French mint ratio, which had led to it being either sunk in or exported from France in the first half of the nineteenth century.

According to several series of British statistics[5], the exports from the United Kingdom to France peaked in 1854 (£13.4m) and 1859 (£14.9m), while the export from the United Kingdom to the East, mainly British India, peaked in 1857 (£17.3m) and 1859 (£16.0m). Moreover, the imports of gold into British India also increased steadily through the 1850s, whereas the annual imports of silver into British India were adversely affected in the same period.

Numerous scholars have debated the system of the flow of treasures to the East during the mid-nineteenth century. It was caused by Europe's import surplus with the East, which was encouraged by differential rates of inflation leading to a cheapening of Eastern goods in European markets[6]. However, the prices (based on gold) of Eastern goods such as silk, tea and indigo etc. rose more than those of Western goods, thereby leading to a price inelasticity of demand for such Eastern goods[7]. When the demand for raw American cotton declined sharply because of the Civil War, there was a price inelasticity of demand for raw cotton from British India and Egypt in European markets.

The Cotton Famine, which caused a flow of silver to the East, not only contributed to the establishment of the bimetallic currency of France but also resulted in silver being abandoned by German states, while silver mined in South America (including Mexico) was shipped directly to the East. The introduction of the greenback in the United States encouraged the outflow of gold and silver to Europe, which were re-exported to the East from there[8].

The drain of silver to the East in the third quarter of the nineteenth century caused silver to be replaced by new gold in Europe. New gold was named

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5 These surveys of statistics are not completed. I would like to revise the figures to a more sophisticated standard in the next version. These figures were taken from *Statistical Abstracts relating to British India*, *Statistical Abstract for United Kingdom* and appendices of the Royal Commission Papers that have been referred to in this paper.

6 R.S. Sayers, 'The Question of the Standard in the Eighteen-Fifties', *Economic History: A Supplement of Economic Journal*, vol.2 no.8, January 1933.

7 J.R.T. Hughes, *Fluctuations in Trade, Industry and Finance*, Oxford: Oxford University Press, 1960.

8 W.C. Mitchell, *Gold, Prices & Wages under the Greenback Standard*, New York: A.M. Kelly, 1966; 'General Results of the Commercial and Financial History of 1867', in Commercial History and Review of 1867, Supplement of *The Economist*, vol.26 no.1,281, Saturday, March 14, 1868.

'Parachute' and enabled the lessening of the inflation risk as long as the East continued to absorb silver from the West. This implies that one monetary metal was replaced by another and the monetary order was integrated under one monetary metal. Numerous scholars debated the issue of the character of this 'Parachute'. However, it was a fact that new gold encouraged the enlargement of the money supply and raised the levels of economic productivity[9]. The concept of 'Parachute' provided an impression of the manner in which the monetary order was undergoing a smooth transformation. However, in reality, this was not the case as the outflow of silver and gold into the East created difficulties of monetary management, particularly in the Bank of France[10]. The management policies adopted by the French proto-central bank affected the Bank of England[11].

After the Crimean War, the relationship between the Bank of France and the Bank of England became closer than before. However, this relationship suffered a huge blow in the mid-1850s. Although the resumption of the treasure drain to the East in 1860 encouraged the Bank of England to exchange gold for silver from the Bank of France, on account of the cooperative management assisted by the Cobden-Chevalier Treaty[12] and the private mutual trust between the upper officials of the two banks, the mid-1860s boom, in addition to the Cotton Famine, was characterized by the struggle between the two banks[13].

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[9] D.A. Martin, 'The Impact of Mid-Nineteenth Century Great Depression Upon Western Monetary Standards', *The Journal of European Economic History*, vol.6 No.3, Winter 1977.

[10] Four official investigations were conducted in the Bank of France between 1857 and 1868. C.P. Kindleberger, *A Financial History of Western Europe*, London: Allen & Urwin, 1984.

[11] The policies included the payments of the premium on gold and sudden fluctuations in the discount rates of the Bank of France. K.R. Bopp, 'Bank of France Policy', *The American Journal of Economics and Sociology*, vol.11 no.3, April 1952; K. Mourse, *The Gold Standard Illusion: France, the Bank of France and the International Gold Standard, 1914–1939*, Oxford: Oxford University Press, 2002, chap.1. For the relationship between the Bank of France and other banks in the financial markets in the nineteenth century and thirteen years before 1913, the following were referred to: R. Cameron, 'France', in R. Cameron, O. Crisp, H.T. Patrick and R. Tilly (eds.), *Banking in the Early Stages of Industrialization*, New York: Oxford University Press, 1967; S. Nishimura, 'The French Provincial Banks, the Banque de France and Bill Finance, 1890–1913', *Economic History Review*, vol. 48 no.3, August 1995.

[12] M. Rist, 'A French Experiment with Free Trade: The Treaty of 1860' in R. Cameron (ed.) with assistance with F.F. Mendels and J.P. Ward, *Essays in French Economic History*, Illinois: Richard D. Irwin, Inc., 1970, pp. 286–314.

[13] These two banks had not completed the systems for conversion to central banks yet. It was in 1946 that the Bank of England was legally and

The Bank of France continued to buy gold at a premium in the London Market and drastically and unexpectedly altered its discount rates. As a result, the Bank of England also had to counter unexpected changes in Bank rates. During the 1860s, the difference in the interest rates between London and Paris influenced the credit demands in London.

3, Towards Monetary Unions

The silver arbitrage transactions among Europeans in the mid-nineteenth century encouraged Belgium to establish a currency union. Italy and Switzerland also attempted to establish the same wider currency union. They believed it was based on gold; however, this was not true. The debates between these nations caused their currency union to be based on gold and silver. In other words, their currency union was bimetallic and not gold standard. This implies that they were persuaded by France. Moreover, these debates also led to the creation of the Latin Monetary Union. However, there is no explanation how the silver arbitrage transactions and flow of silver into the East resulted in the franc being substantially based on the gold standard[14].

Until the mid-1860s, France was the leader of the Latin Monetary Union[15]. Britain was also invited to join the Union and conclude agreements for reasonable relations between the coinage of the Union and that of Britain. Of course, Britain did not accept the French invitation. However, Greece and Italy adopted currencies in line with that of the Union in 1868 and Austria concluded the treaty, which led to the creation of its cordial relationship with France in 1871[16].

In addition, the Latin Monetary Union also had to create a system that involved common standard changeable coins. In 1850, Chevalier[17] recommended

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administratively deemed a central bank.

[14] French financiers wished to maintain the bimetallism. M. de Cecco, *The International Gold Standard*, p.44.

[15] W.L. Wilson, *A History of the Latin Monetary Union*, New York: Greenwood Press, 1968 (originally published in 1901 by the University of Chicago Press); M. Flandreau, 'Was the Latin Monetary Union a Franc Zone?', in J. Reis (ed.), *International Monetary Systems in Historical Perspectives*, London: Macmillan, 1995; L. Einaudi, *Money and politics: European Monetary Unification and the International Gold Standard (1865–1873)*, Oxford: Oxford University Press, 2001.

[16] Romania also joined the Union in 1867. In the 1860s, the Union spread its influence in Europe. Britain did not have sufficient power to influence her own currency policies in other European nations until the end of the 1860s.

[17] Although he initially supported the introduction of gold currencies, he changed his belief to insist on the

the international introduction of gold coins of the same weight and fineness. With the appreciation of silver, he was encouraged to modify these plans on account of the unexpected functions of an annual determination of definite rates between his international gold coins and those of silver currencies. He reflected on the consensus reached among a majority of the nations who believed that there was a need for international common systems not only for currency units with the same weights and fineness, but also for the same coins in circulation. These debates continued and numerous scholars and politicians put forward various ideas[18]. In the mid-1860s, there was a consensus among a majority of the nations in favour of the unity of coinage of various nations.

The Latin Monetary Union was a step in this direction. The politicians and scholars who insisted on reforming the currency order in Britain began to argue that an easy and minor alternation was to be made in the sovereign alloy, which involved a slight reduction of the amount of gold in a dollar. They also insisted on producing a uniform international gold coin under which the pound-sterling would be equivalent to either 25 franc or 5 dollars in gold content.

What was the implication of this international money? It implied that one of the functions of international money was to prevent financial crises. All these matters were debated at the first International Monetary Conference held in Paris in 1867. At this conference, France took the initiative to create a partially or completely uniform international monetary order. The uniformity of the monetary order between European and North American nations was always one of the most significant purposes of the extension of the Latin Monetary Union.

The first conference in Paris was attended by 33 delegates from 20 nations. Although the French Government had taken the initiative, Graham and Wilson represented the British Government and attended the conference [19]. At the conference, all delegates agreed to the brief process of simply recommending the international monetary order. Although France had taken the initiative and continued to recommend the commitment of bimetallism, the conference was in favour of a single gold standard. The

introduction of silver.

[18] The International Statistical Meeting was held in Brussels in 1853. After the first meeting, European nations held several other meetings. In 1860, they finalized their ideas in London and in 1863 they submitted the reports to their meeting in Berlin.

[19] Graham was the Master of the Royal Mint and R. Wilson was the financial official of the Treasury. G.P. Dyer and P.P. Gaspar, 'Reform, the New Technology and Tower Hill, 1700-1966', in C.E. Challis (ed.), *A New History of the Royal Mint*, Cambridge: Cambridge University Press, 1992.

fineness of the gold coins was approximately 90%, struck on the basis of 5 francs. The international coin was a gold coin worth 25 francs. Only the Dutch delegates did not accept the proposal for the development of an international gold standard. Although the conference did not directly lead to an international treaty and consensus among major nations, a few nations had already began minting the 25 'international' gold francs before the treaty was signed or a consensus was arrived at[20].

After the first conference ended, the British House of Commons established the Royal Commission to debate the recommendations. After initiating the debates of the commission, the members encountered certain difficult subjects. These arose because the members regarded the conference's proposals as internationalist. As is well-known, Britain was the frontier nation for adopting the Free Trade Order and also led the spread of the Free Trade into European nations. It was the first embodiment of this British initiative to conclude the Cobden-Chevalier Treaty between Britain and France in 1860. After the treaty came into the effect, several nations in Europe were stimulated to conclude the trade treaty in order to participate in the Free Trade Order. As a consequence, the system of trade treaties among major European nations spread over Europe. W. Bagehot and W. S. Jevons agreed to the proposals of the conference and favoured the introduction of an international gold coin[21]. However, the commission did not encourage recommending either the introduction of the international gold coin or an alternative in the fineness of the sovereign[22].

As a result, the first conference led to an increase in the membership of the Latin Monetary Union, which was initiated by the French. However, it was evident that the opinion of the members of the first conference continued to oscillate from maintaining the silver standard to adopting the

[20] 'Report of the International Conference on Weights, Measures, and Coins, held in Paris, June 1867; Communicated to Lords Stanley by Professor Levi', *British Parliamentary Papers*, 4021, 1867–68; 'Report of the Master of the Mint and Mr. Rivers Wilson on the International Monetary Conference held in Paris, June 1867', *British Parliamentary Papers*, 4021, 1867–68.

[21] W. Bagehot; new edition introduction by H. Withers, *Lombard Street: Description of the Money Market*, fourteenth edition, London: John Murray, 1915; W.S. Jevons, edited, with an introduction by H.S. Foxwell ; new edition, abridged, with a preface by H.S. Jevons, *Investigations in Currency and Finance*, second edition, London: Macmillan, 1909.

[22] 'Report from the Royal Commission on International Coinage; together with the Minutes of Evidence and Appendix', B*ritish Parliamentary Papers*, 4073, 1867–68. Please refer to the Report and the minutes of Bagehot and Jevons.

recommendation of the gold standard[23].

The Franco-Prussian War ended in 1871, and France was forced to transfer a portion of her own lands in order to pay indemnity because of its defeat in the war. In economic terms, the indemnity led to the German Empire shifting from the silver to the gold standard [24]. This political process began in 1871 and was completed in 1873. However, all politicians and officials of the German Empire were not convinced that the transfer of her currency system was an effective decision for the economic development of the country. A few officials near Bismarck were also opposed to the adoption of the gold standard. One of the members of the counterforce was Bleichroder. He was a bimetallist and believed that the gold standard would encourage the currency system of German Empire to fluctuate (the gold standard exposed the system to a wider range of fluctuations)[25]. He continued to persist with his own policy throughout the 1870s in spite of criticisms from numerous other politicians and officials. Moreover, he also continued to argue that the German Empire would become dependent on the financial market in London and maintained that it was necessary that the German Empire raise the bills in the London financial market in order to reinforce the fragile gold reserves of the Reichsbank. He emphasized that the gold standard would lead to high interest rates, which would affect infant industries in the German Empire [26]. Although he insisted on opposing the adoption of the gold standard, his arguments had no influence on the policy-making of the German Empire. A majority of the politicians and officials believed that it was necessary for the German Empire to shift from the silver standard to the gold one. However, after the adoption of the gold standard by the German Empire in the early 1870s, this policy decision affected neighbour nations immediately. This implied that the transformation of the currency system of the German Empire led to a change in her trade relations with her neighbour nations. In 1873, Holland and the Scandinavian nations also decided to transfer from the silver to the gold standard.

Since the 1860s, there was a debate

[23] Austria-Hungary had been maintaining that the silver standard must be adopted in 1870. It was in 1892 that she decided to abandon the silver standard and transfer to the gold standard.

[24] K. Helfferich, *Das Geld*, sechste auflage, Leipzig: Verlag von C.L. Hirschfeld, 1923, ss. 159–164.

[25] He argued that the German Empire's financial market, particularly interest rates, fluctuated in a wider range than believed and changed suddenly when the German Empire decided to adhere to the gold standard.

[26] F. R. Stein, *Gold and Iron: Bismarck, Bleichroder and the building of German Empire*, New York: A.A. Knopf, 1977.

among the Scandinavian nations with regard to the reform of monetary systems. In 1872, Scandinavian economists established a commission to research the possibility of introducing a monetary union in Scandinavian nations. The commission was established in August and submitted its report in September. The report recommended introducing the gold standard as the monetary union of Scandinavian nations[27]. The proposals of this report were accepted by the Scandinavian governments and a monetary union was established between Denmark and Sweden in 1873. Thereafter, Norway also participated in the union in 1875. The monetary union known as the Scandinavian Monetary Union was developed further in the 1880s and 1890s[28]. Moreover, the monetary system of each nation grew increasingly closer in the last quarter of the nineteenth century[29]. The relations among the union members deepened over not only the monetary field but also the political and diplomatic fields. However, the Scandinavian Monetary Union began to disintegrate in 1905 with the withdrawal of Norway and Sweden.

4, The Influence of the Silver Policies on the International Monetary Order

According to a majority of scholars, the silver demonetization in the German Empire in 1873 was mainly responsible for the fluctuations between the gold and silver prices in the London silver market. The declining trend of the silver price based on gold continued until 1913. This contributed to the integration of the monetary systems of European nations into a single monetary order. The German Empire continued to sell her silver in London; however, silver protagonists criticized the silver policy of Germany.

The United States Coinage Act of 1873 did not include the silver dollar in the measure of coinage simplification. This legislation reflected that the silver coin was out of circulation during the Civil War. The United States exported large amounts of silver to Europe and Europe re-exported the silver to the East.

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27 The report recommended introducing the unit of krone, which was based on gold.

28 M. Bergman, S. Gerlach and L. Jonung, 'The Rise and Fall of the Scandinavian Currency Union 1873–1920', *European Economic Review*, vol.37, 1993; I. Henrinken and N. Kargard, 'The Scandinavian Currency Union 1875–1914', in J. Reis (ed.), *International Monetary Systems in Historical Perspectives*, London: Macmillan, 1995; W.F.V. Vanthoor, *European Monetary Union since 1848*, Cheltenham: Edward Elger, 1996.

29 For example, several central banks of the Scandinavian Monetary Union agreed to accept members' notes and eliminate gold movements among nations.

The Act also led to the suspension of free silver coinage in the United States. As a result, the Act encouraged gold coins to become the legal tender[30]. The silver lobbies of the United States passed the Act and the 'Crime of 1873' [31] as the policy that inflicted serious losses on American interests. The silver lobbies had tremendous influence on the process of legislative decisions in the Congress because the lobbies drew support from silver mining and agricultural states of the west and south. The questions with regard to silver accurately reflected regional interests.

The fall in the silver prices based on gold had a great influence not only on the United States but also on the world economy. The British protagonists who insisted on maintaining the gold standard realized that silver production was continually rising in the 1850s. In the mid-nineteenth century, numerous silver mines of the United States opened in the west. The amount of silver production in these areas was much larger than any other and the produce was transported to the east coast and exported to Europe and the East. In the 1850s, the silver production in the United States failed to substantially contribute to the world silver production; however, in the 1870s, the United States became the nation that produced the largest amount of silver worldwide. Finally, the United States became the most important silver supplier in the second half of the nineteenth century.

However, the most important consumers, mainly British India, had continued to decrease their silver imports in the 1870s. Although the amount of silver consumption in British India recovered in the 1880s, the situation of expanding output of silver and declining consumption of silver in the 1870s contributed to the changing status of gold under the international monetary order. The new gold discovered in the United States and Australia had peaked in the 1850s, and by the 1870s the world gold production had fallen. In the 1870s, the United States was still importing gold from Europe. The Treasury of the United States had to begin accumulating gold for the establishment of her own monetary order in the second half of the 1870s. However, after 1880, a large amount of gold imported from all over the world was

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30 The silver suppliers in the United States and their lobbies hoped to establish bimetallism domestically and internationally because it was rather necessary to continue consuming large amounts of silver within and outside the United States. J.L. Laughlin, *The History of Bimetallism in the United States*, fourth edition, New York: Greenwood Press, 1968 (originally published by Appleton and Company in 1896); A. Redish, *Bimetallism: An Economic and Historical Analysis*, Cambridge: Cambridge University Press, chap.7.

31 M. Friedman, *Money Mischief*, New York: Harcourt Brace Jovanovich, 1992, chap.3.

sent into British India. Since British India was playing a key role in the world economy, the benefits of the trade reflected in gold imports. Moreover, the accumulation of gold within British India had caused the most major nations to have serious apprehensions. They were anxious with regard to the currency reforms in British India. Their fears implied a lack of gold in Europe and the United States because British India had been accumulating gold and decided on a monetary reform to shift from the silver standard to the gold one. The Treasury of the United States pushed forward with the policy to accumulate gold in her reserves because of the worldwide shortage of gold.

Contemporary debates over the decline of silver price based on gold became increasingly serious. However, whatever the causes, the silver prices based on gold had an adverse influence immediately on the mint of the bimetallic Latin Monetary Union as soon as the decline began. This dealt a severe blow to the French monetary order and the Bank of France was forced to stop making payments to the public as a result of the Franco-Prussian War. In addition, silver coinage, mainly the 5 franc silver coin, was also limited by the Union. This arrangement continued until November 1878 in order to facilitate the closing of the mints of the Union and to encourage silver coinage, despite the resumption of the payments of the Bank of France on 1st January 1878. The closure of the mints of the Latin Monetary Union was the final breaking point of the monetary relations between silver and gold. After the closure of the mints, it may be assumed that such a policy-decision contributed to the stability of price movements and the monetary order.

The decline of the silver prices based on gold after 1873 not only affected the economies of the United States and Europe but also encouraged other economies of the world, particularly Asian nations and colonies using silver currencies for developing their own economies. For Britain, the situation of the currency systems in the East was rather important for the development of trade with these nations and colonies. However, the most important of all was the administrative management of British India, particularly the remittance operations between British India and London. Britain was always rather concerned with regard to the economic development of British India because of its efficient and peaceful administration. In 1876, the Select Committee was established in the Parliament and numerous people debated over the silver depression and its effects on the exchange rate between Britain and British India. However, although the Committee collected varied evidence and debated for a long while, it was not able to come to

any conclusions that would reliably contribute to the development of relations between Britain and British India[32]. The Committee provided six reasons for the decline of silver prices based on gold in its final report and emphasized the silver supply in the west of the United States as the most effective key reason. The mining of silver in the United States encouraged the monetary systems in Europe to change into a new single integrated monetary order during the 1870s and 1880s. In addition, the reduction in the demand for silver imports by British India also contributed towards the change in the European monetary system into a new monetary order. From 1878 onwards, certain officials of the Government of British India began to recommend converting the currency system of British India to the gold standard.

While Britain came under pressure from the Latin Monetary Union and British India with regard to silver problems, the Congress in the United States, which was influenced by silver lobbies, attempted to seek a remedy in a positive manner. In 1877, the Congress passed a bill that permitted free coinage. However, the President vetoed the bill. Although he decided to veto the bill, the Congress, in turn, passed the same bill under the legal process and made the bill into a law in the United States. It was called the Bland-Allison Act and called for a monthly coinage of between $2,000,000 and $4,000,000 in silver and regarded silver coins as legal tenders for any amount. The silver coinage was continued until 1890 and the total amount of silver coins under the Act was approximately $400,000,000.

The United States attempted to involve the international monetary order in the silver problems. The United States called on major nations, such as Britain, France etc., to hold an International Monetary Conference in Paris in 1878. Germany immediately decided not to accept the proposals of the United States. Britain also did not agree with the United States. In particular, Goschen, the British delegate, believed that Britain should not accept any changes in the monetary order[33]. The United States delegate had already realized the British intentions before the announcement of

[32] 'Report from the Select Committee on Depreciation of Silver', *British Parliamentary Papers*, 308, 1876.

[33] Goschen was not only the delegate of the first Conference but also the Chairman of the 1876 Select Committee. He realized the proposals of the United States for international bimetallism as 'a veritable utopia'. He believed that international bimetallism was a universal double monetary standard, and realized that international bimetallism was undesirable for the British monetary order. J.S. Nicholson, *A Treaties on Money and Essays on Monetary Problems*, second edition, London: Adam and C. Black, 1893.

her own insistence. The most important purpose of the delegate of the United States was not British monetary change, but to attempt to encourage the Latin Monetary Union to reopen the mints for the coinage of silver coins. Despite the recommendation of adopting international bimetallism, the delegates of the United States came up against opposition from the delegates of Belgian and France. Nonetheless, the conference of 1878 announced a consensus with regard to maintaining the monetary use of silver.

The United States persisted on obtaining a consensus among major nations on the silver problems. French delegates had also agreed with the United States and both nations signed a joint resolution calling for international monetary meetings. France emphasized that it was necessary for major nations to create a new international monetary order. In the discussion, the monetary use of silver was recommended not only by the United States but also by Russia and Austria-Hungary. The conference recognized that any substantial revival of the monetary use of silver among major nations depended on a change in the attitude of Britain and Germany. The delegates decided to focus upon the pressures on Britain and sought resolutions, which called for an increase in the British monetary use of silver.

Monetary use of silver could be encouraged in Britain through the Bank of England and the amount of monetary use of silver was a maximum of 20% permitted by the Bank Charter Act of 1844. The Director of the Bank of England had already decided several years ago that the dealings with silver had been realized as unwise during the decline of silver prices in the mid-1870s. The former Governor, Alfred Latham, suggested purchasing silver for monetary use; however, this was rejected by the Court and realized as inexpedient [34]. Further, the Bank of England was approached by other delegates such as Lowell through Cavendish. Lowell was anxious that there must be no change in Indian monetary arrangements. According to him, if the rupee was not to be based on silver, no monetary arrangements for silver could be established worldwide. He recommended that the Bank of England continue to keep silver in its reserve. However, the Bank of England did not agree with the recommendation. Several interested persons were of the opinion that Lowell's proposals were based on the instructions of the United States as well as his personal beliefs. However, the Chancellor of the Exchequer received confidential explanations with regard to the policies of the Bank of England regarding the

[34] J. Clapham, *The Bank of England*, vol.2, Cambridge: Cambridge University Press, 1970.

hoarding of silver. Consequently, the international monetary conference of 1881 was postponed to April 1882; however, it was not held again as the conveners were of the opinion that the conclusions were not yet sufficiently positive.

As part of their initiatives, Italian delegates issued proposals to restore several monetary uses to silver, although Italian notes continued to be non-convertible. Italy requested the Latin Monetary Union to restart the coinage of silver franc. This was undertaken in conjunction with the United States[35]. Germany was asked to continue to not sell silver in London for the next five years. On account of the requests by its neighbour, Germany had minted her own silver coins instead of selling silver in London. With respect to Britain, Italy insisted on extending the resolution of the first international monetary conference repeatedly. Italy expected that British India would maintain the free silver coinage and that Britain consumption of silver would increase as compared with earlier. However, the most important expectation of Italy was not only to improve the level of hoarding in the Bank of England bullion reserves in the form of silver to 20% but also extend the limit of the British silver coinage legal tender[36].

5, From International Bimetallism to the International Gold Standard

Although the first international monetary conference in Paris was not successful, if we had to compare several monetary systems, the British and Germany monetary policies were much affected by the various opinions concerning silver problems. In 1881, the British Bimetallist League was created and its head office was established in Manchester. The main purpose of the establishment was to reflect the benefits of cotton industries with regard to their Indian markets. The President of the League was H.H. Gibbs[37]. He was one of

[35] The United States raised the minimum monthly level of silver coinage under the Bland-Allison Act to $3,000,000.

[36] For further details of the effects of domestic monetary orders in Italy, please refer to the following book: M. Fratianni and F. Spinelli, *A Monetary History of Italy*, Cambridge: Cambridge University Press, 1997, chap.2.

[37] He was the Governor of the Bank of England during the second half of the 1870s and a British delegate to the International Monetary Conference in 1878. As of 1881, he served both as an important official of Britain and a partner of the Latin American London trading and banking house of H.H. Gibbs & Sons. When he decided to support bimetallism, it had a huge impact on the City and Whitehall. *The Double Standard* is a major published book authored by him. (H.H. Gibbs, *The Double Standard*, London: E.

the few members who not only supported bimetallism in Manchester but also promoted the reform of the tariff systems[38]. Although the Latin American London trading and banking house of H.H. Gibbs & Sons was affected undesirably by the decline in the silver prices based on gold, Gibbs' belief that deflation certainly had a desirable effect on traders, bankers etc. was formed earlier. He regarded the people in Manchester as earners who were committed by numerous foreign and domestic capitalists. He realized that Manchester had not been adversely affected by the decline in the silver prices based on gold. He also realized that the city, if anything, earned benefits from the silver problems through various financial operations. Like Gibbs, H.R. Grenfell[39], too, had changed his opinion in favour of bimetallism and was regarded as a traitor against Manchester. The League drew the support from the electorate of the states of the country from the agricultural sector. In addition, the league was also supported by the Lancashire Cotton Industries because the decline in the silver prices created an effective barrier against the increase in the exports of British manufactures and had provided Indian domestic manufactures and various products with a shield against foreign goods imported by nations of the gold standard. The merchants and bankers who were connected with the silver-using areas for their own interests felt that their commercial and financial benefits had suffered due to the decline in the silver prices based on gold; moreover, their investments and trade encountered increasingly serious impediments due to the decline in silver prices.

The fluctuations between gold and silver affected the exchange rates between Britain and the East. Indian exchange rates and her money supply were assisted by Council Bills. The exchange markets with respect to the East and silver-using areas in Latin America were not developed and exchange rates were subject to violent fluctuations between gold and silver[40]. British overseas investments in silver-using areas were prevented from

Wilson, 1881.)

[38] M.F. Daunton, "'Gentlemanly Capitalism" and British Industry, 1820–1914', *Past & Present*, No.122, February 1989.

[39] He was the Vice-President of the British Bimetallic League and was the Governor of the Bank of England when the international monetary conference was held in 1871. He had the concession to transact copper with South America and closed private relations to Landed Interest. It may be assumed that his own concession encouraged him to shift to bimetallism.

[40] F.H.H. King, *The History of the Hong Kong and Shanghai Banking Cooperation, vol.2, The Hong Kong Bank in Late Imperial China, 1864–1902*, Cambridge: Cambridge University Press, 1987.

the violent instability of the exchange rates. In addition, the fluctuation between gold and silver encouraged the silver-using areas to change their trading partners. The Indian cotton industry, mainly based in Bombay, had grown since the mid-1870s and its exports to other silver-using areas in Asia had grown. This industrial development severely damaged the interests of Lancashire with respect to its markets in India, China and the rest of the East. Exports from the silver-using areas benefited from unexpected returns from the violent decline in silver prices. Indian cotton exports and that of various grains, such as wheat and oil-seeds, from British India to Britain caused extensive damage to the British industrial capitalists and landlords.

During the long violent fluctuations of the mid-1880s, the states of the British bimetallist regime who expected a reflation in Britain, along with the protectionist regime, were regarded as suitable avoidance of the obstruction to British economic developments. Such monetary problems were debated in the Royal Commission on the Depression of Trade and Industry. However, its members were unable to recommend further proposals. On account of such a situation, the Royal Commission on Gold and Silver was established immediately.

The members of the Royal Commission comprised five bimetallists and six monometallists and were given many evidences by the 38 witnesses. Nine witnesses supported the case of the bimetallism and three witnesses supported the pro-bimetallists. Gibb was among the witnesses in the Royal Commission. His schemes for bimetallism were based on the French Law of 1803. The Law declared that the mint was opened for the coinage silver and gold, that the ratio between silver and gold was fixed and that all coins were certified as legal tender. Generally, the bimetallist case presented to the Commission was internally consistent.

The bimetallists were opposed to the eight monometallists, while the four monometallists emphasized the need for a change in international monetary orders. However, the monometallists did not obtain a consensus amongst themselves with regard to the evidence. The lack of coherence among the monometallists affected the monometallist members of the Commission. With only two members, the monometallists within the Commission came out in favour of international monetary arrangements for minting a greater number of silver coins. According to them, Britain had two roles in the international monetary order. One was that the Issue Department of the Bank of England would hold silver in its reserves and the other was that the Bank of England would issue fiduciary and

inconvertible small notes backed by silver. However, the political shift in favour of the increase in the British monetary use of silver provided the monometallists, particularly R. Giffen[41], serious warnings. However, needless to say, this political shift was motivated by the viewpoint of each person with regard to how he understood the Commission Report. Thinking seriously about the monetary problems under their confidences, they found the British monetary problems. One of these problems was with regard to British coinage, mainly the gold coin. In the 1880s, several types of gold coins were circulated in Britain and British people used them for transacting in their daily lives[42]. However, over half the gold coins under circulation weighed under the minimum legal weight[43].

The report of the Royal Commission encouraged the bimetallists. In addition, the Monetary Congress in 1889 provided the bimetallists with the opportunity to proclaim that their insistence was priority. The chairman of the Monetary Congress was Maguin, the Vice-President of the Bank of England, and the British and Indian representatives of the Monetary Congress were the secretaries of the Royal Commission[44]. The report of the Royal Commission also affected Goschen who had been a British monometallist and represented Britain in the International Monetary Conference in 1878. Although silver coins had been minted until 1887, the new silver coins were not well-accepted by the public and banks in Scotland[45]. Goschen received the Silver Deputation and proclaimed measures to encourage the further use of silver coins in Britain. One of the methods for encouraging the further use was paying the wages of the Governmental officials in silver. Although the government had shifted towards a bimetallist course through several political decisions, Goschen's measures in 1889 contributed to the re-minting of gold

41 R. Giffen *The Case against Bimetallism*, second edition, London: G. Bell, 1892. For greater detail on Giffen's perspective, please refer to the following book: F.W. Bain, *The Corner of Gold*, New York: Greenwood Press, 1968 (Originally published in 1893 by James Parker & Co.); C.B. Spahr, 'Giffen's Case against Bimetallism', *Political Science Quarterly*, vol.8, no.3, September 1893.

42 S. Nishimura, 'The Mechanism of the Supply of Money in the United Kingdom', in P.L. Cottrell and D.E. Moggridge (ed.), *Money and Power: Essays in Honour of L.S. Pressnell*, London: Macmillan, 1988.

43 L.S. Pressnell, 'Gold Reserves, Banking Reserves and the Banking Crisis of 1890', in C.R. Whittlesey and J.S.G. Wilson (ed.), *Essays in Money and Banking in Honour of R.S. Sayers*, Oxford: Clarendon Press, 1968.

44 The secretaries were officials of the Treasury. It appeared that in the 1880s the political and monetary decisions of Britain mainly depended upon the Treasury.

45 J. Clapham, *The Bank of England*, vol.2, Cambridge: Cambridge University Press, 1970.

coins with weights and fineness within legal measure. As a result, it may be stated that Goschen had committed to the gold standard. However, he continued to think the monetary role of silver in his effort to encourage the gold standard[46]. After the Baring Crisis, Goschen immediately proclaimed his plan of issuing fiduciary and inconvertible small notes. However, the Bank of England did not agree with his plan because of the opposition to the issue of small notes[47]. However, Goschen did not give up his proposals and continued to proclaim that the Bank of England must maintain 20% of the Issue Department's bullion reserves in silver.

Those who were concerned with silver enjoyed greater benefits in the United States. In 1890, the Sherman Silver Purchase Act was put into practice. The Act introduced a monthly purchase of 4,500,000 ounces of silver and was run legislatively until 1893. However, the international tendency was not in favour of the monetary use of silver in the first half of the 1890s. For example, Austria-Hungary adopted the gold standard in 1892 with inconvertible currencies.

6, The Decline of Silver Parties in the 1890s

Goschen's silver measures backed by the Sherman Act encouraged the bimetallists to call another international monetary conference. However, as soon as the conference began, it was rather evident that the delegates of major nations, such as Britain, Austria-Hungary, Germany, Sweden, Italy, Russia etc., except the United States, were against international bimetallism.

In 1893, the Sherman Act lapsed and British India declared the discontinuance of free silver coinage. In 1899, British India decided to regard sovereigns as legal tender. All this appeared to be inevitably leading towards the establishment of the international gold standard. However, the monetary debates in Britain reached their peak during the early 1890s. In the early 1890s, the prices of commodities also slumped rapidly and steadily. The difficulties faced in agriculture led the Royal Commission to investigate the difficulties in the manufacturing industries. These industries were regarded as the target of the bimetallists. Lancashire was also the major supporter of the bimetallists

[46] L.S. Pressnell, 'Gold Reserves, Banking Reserves and the Banking Crisis of 1890', in C.R. Whittlesey and J.S.G. Wilson (ed.), *Essays in Money and Banking in Honour of R.S. Sayers*, Oxford: Clarendon Press, 1968.

[47] J. Clapham, *The Bank of England*, vol.2, Cambridge: Cambridge University Press, 1970.

because the cotton industry had closed interests in the market of British India. By the 1890s, the most important problems with regard to silver were concerns for the interests of British India. In 1891, the government of British India requested permission from London to close the mints. It was emphasized by both the suspension of the sale of the Indian Council Bills and the introduction of import tariffs that were mainly backed by Lancashire [48]. As is known, bimetallists were supported by agricultural and industrial parties, mainly those of corn and cotton. In the early 1890s, the agricultural and industrial parties that supported the bimetallists still wielded considerable influence on the Government, which could not be overcome by the monometallists in the City.

However, it was apparent that the international monetary orders were leading towards a single metal integration. The Cabinet was unable to obtain a consensus on whether or not Britain maintained the adaptation of the gold standard. In this chaos, the Tories abandoned their silver policies and moved towards the reformation of the tariff, which was recommended by Chamberlain, a bimetallist[49].

Although Britain had still not reached a consensus yet with regard to her monetary order in the 1890s, several monetary parties in the United States had settled the disputes among themselves through the Presidential election of 1896[50]. While the debates on silver continued in the United States, the monetary questions pertaining to British India were dealt with in the Parliamentary Select Committees of 1893 and 1899. The core members of the Select Committees encouraged that the monetary order of British India should move towards the gold standard, similar to Britain [51]. Nonetheless, only the outbreak of the Boer War encouraged the revival of the bimetallists because a majority of the people were anxious that the supply of gold from South Africa would cease. However, this revival was

[48] E.H.H. Green, 'Rentiers versus Producers? The Political Economy of the Bimetallism Controversy c.1880–1898' *English Historical Review*, vol.103 no.408, July 1988.

[49] K. Kuwabara, *Igirisu Kanzeikaikakuundo no Shitekibunseki*[Historical Analysis of British Tariff Reform], Fukuoka: Kyushudaigaku shuppankai, 1999.

[50] M.G. Myers, *A Financial History of the United States*, New York: Columbia University Press, 1970; M. Friedman, *Money Mischief*, chap.5.

[51] Indian Currency Committee, 'Report of the Committee appointed to inquire into the Indian Currency', *British Parliamentary Papers*, C-7060, 1893; Indian Currency Committee, 'Report of the Committee appointed to inquire into the Indian Currency', *British Parliamentary Papers*, C-9390, 1899; J.M. Keynes, *Indian Currency and Finance*, London: Macmillan, 1913.

immediately and temporarily over[52].

In 1896 and 1897, Russia and Japan moved towards the gold standard, respectively. In 1900, the United States resumed the gold standard completely[53]. A majority of the Latin American nations had adopted the gold standard during the two decades before 1913. By the time World War I broke out, all major nations of the world, except China, had already moved towards the gold and the gold exchange standards. According to the world monetary orders of 1913, only Britain, Portugal and Bremen were on the gold standard in 1868[54].

7, Concluding Remarks

Numerous scholars have indicated the diversity of international monetary arrangements, which eventually moved towards the gold standard in the late nineteenth century[55]. The series of setbacks in monetary reforms were certainly not an accident. However, it is important that policy requirements stimulated serious monetary debates on both domestic and international fronts. A deeper understanding of the functional characteristics of bimetallism greatly influenced the direction of the international monetary order[56].

Statistics confirm that from the 1870s onwards Britain exhibited a greater variability in terms of the Bank Rate as compared with the discount rates of the central banks in the Continent. In France and Germany, central banks held higher reserves in the late nineteenth century, and disregarded the 'rules of the game' as a means to sustain these reserves[57]. The Continental tendency of holding large monetary reserves had numerous

[52] E.H.H. Green, '"Rentiers versus Producers?" The Political Economy of the Bimetallism Controversy c.1880–1898' *English Historical Review*, vol.103 no.408, July 1988.

[53] In fact, the United States had adopted the currency system based on gold since 1879. W.C. Michell, *Gold, Prices & Wages under the Greenback Standard*, New York: A.M. Kelley, 1966; M.G. Myers, *A Financial History of the United States*, New York: Columbia University Press, 1970.

[54] B. Eichengreen and M. Flandreau, 'The Geography of the Gold Standard', in J.B. de Macedo, B. Eichengreen and J. Reis (ed.), *Currency Convertibility: the Gold Standard and Beyond*, London: Routledge, 1996.

[55] R.G. Hawtrey, *The Gold Standard in Theory and Practice*, London: Longman, Green and Co. Ltd., 1927. Hawtrey suggested that Britain and the United States could create the gold standard through their experiences with inconvertible paper currencies.

[56] According to F.W. Fetter, the monetary orthodoxy of gold was established in Britain in 1875. F.W. Fetter, *Development of British Monetary Orthodoxy, 1797–1875*, Cambridge, Mass.: Harvard University Press, 1965.

[57] A.G. Ford, *Gold Standard, 1880–1914: Britain and Argentina*, Oxford: Clarendon Press, 1962, chap.2.

origins[58]. These reserves proved to be crucial for the Bank of England during the international monetary crises. The Bank of France lent £3,000,000 in gold at 3% during the Baring Crisis as a result of the approach by Goschen through Rothchilds[59]. The experiences of the Baring Crisis also reinforced the view of the Bank of England that it would need to use gold in a better manner in order to support the efficiency of Bank Rates[60]. During the two decades to 1913, the Bank Rate partially shielded the British economy against various interest rate fluctuations through the functioning of the gold reserves[61].

Throughout the several decades up to 1913, Britain dominated the world economy and Manchester enjoyed financial supremacy over other financial markets. This was the heyday of Britain and the British Empire. Under these circumstances, bimetallists believed that their campaign would undoubtedly succeed and lead British monetary arrangements to bimetallism. However, bimetallists failed to accurately decipher the opinions of the people of Manchester, who had clung to gold from the 1850s onwards. The City benefited from deflation during the second half of the nineteenth century, and a majority of bimetallists and their supporters in the form of pressure lobbies found their influences decline in the British society at large. Not only the Agricultural and Landed Interests but Lancashire industrial interests lost their influence as major economic interests relative to the City. Manchester also lost its dominant position that it had enjoyed in the mid-nineteenth century in the international economy.

As indicated above, the debates of bimetallists in Britain climaxed in the early 1890s. Although the Tories won the election of 1895 and the unrest surrounding the election caused unsettlement in Manchester, the focus of

[58] One was the monetary illusion of the shortage of gold. Others included the weakness of the French balance of payments and the lack of close linkages between the central and other domestic banks. If the change in the interest rate were to have desirable effects on industry and commerce, the central bank would have had to maintain stable interest rates.

[59] J. Clapham, *The Bank of England*, vol.2, Cambridge: Cambridge University Press, 1970.

[60] W. Bagehot, *Lombard Street: Description of the Money Market*, fourteenth edition, with an introduction for the new edition by H. Withers, London: John Murray, 1915. Bagehot, the editor of the Economist, insisted that the Bank of England should strengthen its reserves in gold through the several financial crises of the nineteenth century.

[61] R.S. Sayers, *Bank of England Operations 1890–1914*, London: P.S. King & Son Ltd., 1936; A.I. Bloomfield, *Monetary Policy under the International Gold Standard, 1880-1914*, New York: Arno Press, 1978 (reprinted of the 1959 edition published by the Federal Reserve Bank of New York).

public attention moved to tariff reforms rather than monetary reforms, because the latter would win more electoral votes in the future. As the availability of gold increased all over the world, debates on silver lost their sense of urgency. The production of gold doubled during the three decades to 1913 largely due to the rise of South Africa as a supplier of gold[62]. In 1886, gold was discovered in Witwatersrand and for several years, numerous mines began to operate and recorded a large amount of annual production[63]. There is no doubt that the arrival of new gold in the 1890s led the international monetary order towards the international gold standard.

Thus, in Europe and the United States, it was believed that silver had been displaced from the international monetary order. In fact, silver played an important role in international and regional dealings and contributed to the economic growth of several countries. The monetary order in the East depended far more on silver as compared with in Europe.

When silver depreciated, it had a similar effect on less developed countries of creating invisible tariff walls against imports from gold-using countries during the second half of the nineteenth century; in other words, silver-based countries benefited more from the depreciation of silver as compared with gold-based countries through the increase in exports and imports[64]. However, by the 1910s, countries of the East, except China and Hong Kong, decided to adopt the gold standard. A majority of scholars have attributed the cause of this to the administrative pressure on less developed countries, particularly those that were colonized. However, for European bankers and merchants, the fluctuation of silver had not been beneficial to their trade and investment. There is no doubt that this was an equally important factor that encouraged the European countries to change the currency system of their colonies to the gold standard.

By the 1910s, a majority of the countries in the East, except China and Hong Kong, adopted the gold standard. However, the gold standard thus created was not the same as the British one—it

[62] P. Cagan, *Determinants and Effects of Changes in the Stock of Money, 1875–1960*, New York: National Bureau of Economic Research, 1965.

[63] D.H. Houghton, 'Economic Development, 1865–1965', in M. Wilson and L. Thompson (eds.), *The Oxford History of South Africa, vol. II, South Africa, 1870–1966*, Oxford: Clarendon Press, 1971; R. Ally, *Gold & Empire: The Bank of England and South Africa's Gold Producers 1886–1926*, Johannesburg: Witwatersrand University Press, 1994, chap.1; C.H. Feinstein, *An Economic History of South Africa*, Cambridge: Cambridge University Press, 2005, chap.5.

[64] Exports of silver-based countries grew by 4% per annum, while those of gold-based countries grew at merely 1%.

was the gold exchange standard. As is well known, the gold exchange standard was regarded by certain people as the key policy for the spread of imperialism in less developed countries. Meanwhile, others insisted that the gold exchange standard distorted the economic progress in less developed countries. Finally, a majority of scholars concluded that the gold exchange standard did not bring any benefits to less developed countries. However, during the three and four decades up to 1913, intra-Asian trade grew rapidly and long-distance trade between Asian countries and mainly European countries also grew more rapidly than before[65]. If currency systems had such negative influences on Asian countries, why did the trade of Asian countries grow so rapidly?

As has been stated above, silver was expelled from international circulation due to the greater availability of gold worldwide. Nonetheless, silver-using areas survived until the 1930s, mainly in Asia. In the 1900s, although British India was by then on the gold exchange standard, a majority of Indian people continued to use silver coins for daily transactions. Thus, British India was regarded as a silver-using area. China, Hong Kong and several regions of South and Southeast Asia were also regarded as silver-using areas. In other words, the role of silver as money was not lost in Asia. In British India, the Government Rupee was the legal tender and its value was linked to, and measured by, the pound-sterling. In other words, the Government Rupee assumed the role of enabling the penetration of sterling as the measure of value in the rural economies of India. For a long time, various types of currency systems had existed in each region. There was no success with respect to the integration of the Indian currency system into a single measure of value before the mid-nineteenth century. For the first time in Indian monetary history, the circulation of the Government Rupee encouraged various currency regimes to be integrated under a single measure of value. Therefore, the Government Rupee played the role of a currency, the value of which was linked to pound-sterling, and its increased circulation contributed to the integration of the currency system.

By the 1900s, silver was expelled from the monetary order in Europe as a result of the greater availability of gold. However, money in the form of silver survived the growth of the international economy and played the critical role of substituting gold in Asia. Further, this function of silver contributed to the promotion of the international gold standard in Asia. Thus, it may be argued that gold and silver were both

[65] K. Sugihara, *Ajia-kan Boeki no Keisei to Kozo* <Patterns and Development of Intra-Asian Trade>, Kyoto: Mineruva shobou, 1996.

indispensable players in the integration of international monetary arrangements in this period.

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The Problems for Diffusion of Location Based Services in Rural Areas

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Abstract The progress and diffusion of ICT enabled various information services. Location based service, it is kinds of information services, has attracted attention in recent years.

Since Location based service is composed of several kinds of platforms, the diffusion of location based services may be hampered in rural areas which have a tendency to be insufficient in platforms.

In this study, we examine the problems for diffusion of location based services in rural areas by several case studies in Japan. Especially, we focus on relationship between information granularity of platforms and trustworthiness of location based services.

In conclusion, In order to diffuse location based services in rural areas, reducing cost of platform, setting adequate information granularity and encouraging users to offer information are important.

Keyword Location based service; Platform; Information granularity; Motivation

1. Introduction

The progress and price reduction of ICT bring about development of communication platform, and it is eliminating digital divide gradually. Following the diffusion of PC, the spread of portable devices, by which we can compute and communicate at anytime and anywhere, is also progressing. The increase of user of PC and portable devices boosts the number of information services and brings various services. Abundant and diverse information services lead to improving user's convenience and increasing the number of users. Such a virtuous circle is advancing at present.

The diffusion of PC and portable devices has created the change of people and business. Consider searching for example. To search something, many people do not look in dictionary or book but use computer search engine at first. Moreover, there are computer search engines which customize the results according to not only search word but people's attributes.

Location information is one of user's attributes and it has received a lot of attention in recent years. The diffusion of portable devices and the progress of platform development enable people to use information services at various places. As a result, importance of location information, which indicates the place where people use service from, becomes higher than ever before. Location based service is the area on which many businesses are now focusing because providing customized information based on user's location information raises a user's satisfaction.

However, provision of location based service in rural areas is not sufficient at present. There is a possibility of not providing the service in the future if intrinsic characters of location based service cause this situation.

2. Location Based Service

Location based service is one of information service. In this study, information service is defined as the service which provides processed information as output in respond to user's input information including request, query, purpose, favor, and so on. The effectiveness of information service depends on the extent of fit between user's purpose and processed information as output. The information as output is created from a combination of information processing capability and information available to service provider. The available information can be divided into two groups, one is user's input information for receiving service, and the other is accumulated information in service provider [1]. Information as output is composed of two parts identified by source of value which information contains. One part is that its value can be increased by customization according to user's input information and the other part is not. Proportion of two parts depends on user's purpose.

Location based service is the information service which can be realized or whose value can be increased by inputting user's location information. On the location based service, inputting user's location information makes accuracy of customization higher, and consequently, value of information as output also becomes higher. Recently, because of the progress and diffusion of ICT, acquisition and input of location information becomes easier, and many companies start a lot of location based services.

For a full understanding of location based service, it is useful to classify information which is handled by location based service. “Geographical information” is the name of place or latitude and longitude, which are processed to be handled in information system. Geographical information platform provides the functions of mutual converting this information, plotting a location on map, measuring the distance between locations, and so on. “Location information” is a kind of geographical information and it indicates the place where user and/or object at present. Location information platform provides the function of acquiring and sending location information. The information which does not include geographical information is defined as “general information”. Processed by geographical information platform, the general information containing the words which indicate a specific place is converted to “ge-

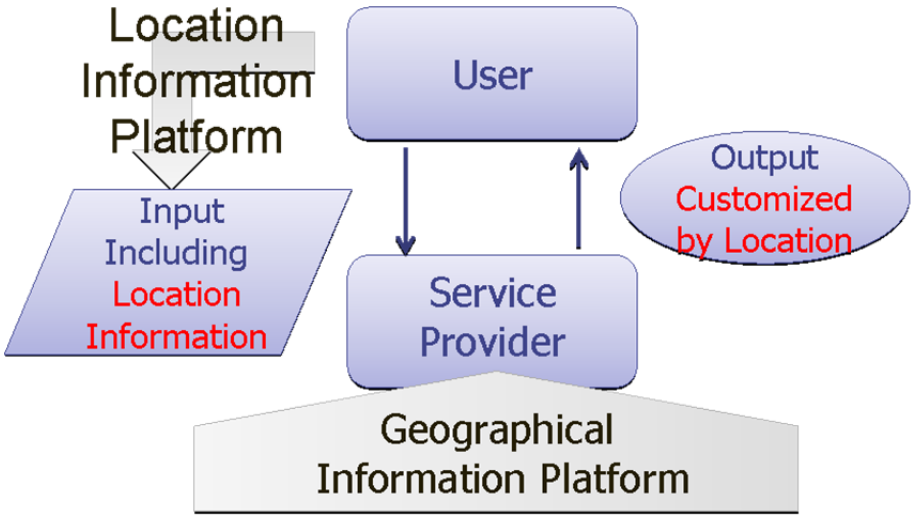

Figure 1 Components of Location Based Service with Two Types of Platforms

ographically tagged information". Location based service, in other words, is the service providing the geographically tagged information which is customized by using location information of user, and that service is based on both geographical information platform and location information platform (See Figure 1)

3. Three Types of Acquisition Methods of Location Information

Although there are many types of acquisition methods of location information [2], three methods are generally used; global positioning system (GPS), cell tower triangulation (CTT), and Wi-Fi positioning system (WPS).

For acquiring location information as latitude and longitude, GPS uses the satellites launched and managed by the government of United States of America. To use GPS, however, governmental permission is not required and only GPS receiver is needed.

CTT utilizes the electric waves from cell towers built and maintained by each cellular phone carriers for acquiring location information. Users of CTT need to know precise locations of many cell towers. Since it is difficult to grasp these locations except for cellular phone carriers that built them and have database about them, acquiring location information by CTT is limited to cellular phone carriers, or it needs cooperation of each them.

WPS is the method to acquire location information by utilizing electric waves from Wi-Fi routers. In contrast to GPS satellites and cell towers, it is easy and cheap to install Wi-Fi routers individually. As a result, Wi-Fi routers exist almost everywhere. However, there are no companies which can automatically grasp precise locations of large proportion of Wi-Fi routers when they are installed. It means that location information platform using WPS requires gathering location information of Wi-Fi routers and building database.

Compared with three methods, only GPS needs dedicated hardware (GPS receiver device or chip) and two other methods are applications of hardware for communicating and do not need additional hardware. Moreover, since power consumption of GPS is large, it is rare to use continuously when included in a portable device. It takes tens of seconds to grasp positions of satellites if GPS is used intermittently. CTT and WPS need database of location information about cell towers

	GPS	CTT	WPS
Hardware	Require (Receiver)	--	--
Database	--	Require (Cell Tower)	Require (Wi-Fi AP)
Accuracy	Very high	Depend on Density	Depend on Density
Coverage	Everywhere (Open Sky)	Near Cell Tower	Near AP

Table 1 Three Acquiring Methods of Location Information

or Wi-Fi routers although GPS can be used without such database. And accuracy of the two methods depends on the density of cell towers or routers used to acquire location information.

In Japan, although use of GPS as car navigation system had begun from early 1990s, first GPS equipped cellular phone was launched at end of 2001. On the other hand, service of providing location information by CTT started from July 2000. As for WPS, API of PlaceEngine, the WPS developed by Sony Computer Science Laboratories [3], was opened at December 2006 and the company licensing PlaceEngine launched operations since July 2007. Henceforth, advanced users and developers came to use PlaceEngine as location information platform. Diffusion of WPS to ordinary users, however, probably began since 2008 when Apple started to provide location information through their cellular phone and PDA.

In terms of use in rural areas, GPS has highest availability among three methods because it can be used on everywhere under open sky. The diffusion of GPS, however, depends on the progress of price reduction and power saving technology. Although CTT is available in most rural areas, it can be used only through cellular phone. Availability of WPS is lowest among three methods. Nevertheless, it attracts attention because coverage area of WPS is expanding as the number of Wi-Fi routers grows.

4. Wi-Fi Positioning System's Coverage Area in Japan

Skyhook Wireless, Inc., provider of location information platform using WPS to Apple's cellular phone and PDA, is gathering location information of Wi-Fi routers by hiring drivers who drive and scan Wi-Fi electric waves. In addition to it, Skyhook is also appealing to users for registering location information of each Wi-Fi routers.

Nowadays, Skyhook is expanding coverage area in Japan and it can sufficiently provide its services in and around Tokyo. As contrasted with the situation of Tokyo, in most local cities and rural areas, Skyhook covers very narrow area or does not cover at all. It is reasonable to suppose that less population and commercial value of local cities and rural areas make Skyhook's priority of service coverage area lower.

On the other hand, it is noteworthy that there are local cities with low population that have relatively wide coverage area. The reason of these exceptions may be because active users in these cities register nearby Wi-Fi routers to Skyhook's database.

As mentioned above, using of PlaceEngine started earlier than Skyhook's service in Japan. PlaceEngine is mainly gathering location information of Wi-Fi routers through registration by users. Unlike Skyhook, PlaceEngine has the architecture which improves user's motivation by announcing ranking of users who register location information of Wi-Fi routers around them.

However, the tendency of coverage area of PlaceEngine is quite similar to Skyhook's one; there are narrow coverage areas in local cities and rural areas although they provide sufficient services in and around big cities such as Tokyo. It may be considered that this similarity is due to relative lack of PlaceEngine's user. In almost all case, it is necessary to install PlaceEngine additionally. Conversely, the users of PlaceEngine are so committed as to pay additional cost and they may be more active than Skyhook users. On the other side of the coin, the number of PlaceEngine users may be smaller than

the users of Skyhook which is pre-installed in Apple's product.

Skyhook and PlaceEngine are building each databases about same location information independently, and they do not share these information at the present moment. Consequently, the users of one service may be able to acquire location information at the place where the users of another service can not. If both services share their databases or use same system registering location information of Wi-Fi routers, their coverage areas will become broader and expand at a faster pace than ever before.

5. Current Situation of Location Based Service in Japan

In Japan, various kinds of location based services have been provided since 2000 when provision of location information by a cellular phone was started, and major users of the services enjoy them on cellular phone in this time.

According to statistical survey about cellular phone in 2009 [4], 56.3% of respondents of the survey uses the cellular phone with GPS function. Nevertheless, it is only 22.6% which actually uses the GPS function, and CTT is more used than GPS for inputting location information.

Another survey about intention to use of location based service in 2008 [5] shows many respondents are using now or have intention to use the service about navigation (parcel delivery, map, weather news) and the service about shopping (shop locator, coupon). Although many respondents answered that they have intention to use the service aimed to maintain safety and security (emergency call, watching children and elder people), they do not have strong intention to use the entertainment service (finding friend, game, blog and SNS, chat, life log).

In spite of these results, the number of users participating games which uses location information through cellular phone is increasing recently.

One of the most popular game using location information is "Colony na seikatsu Plus" and it has 1 million players at April 2010. The players of this game can gain points according to distance of moving. In addition, there are original items that players can gain only by shopping at real store, and these items are promoting users' move to rural areas.

Second example of popular games using location information is "Keitai kunitori gassen". The number of players is around 400,000 at February 2010. In this game, players gain the cyber area corresponding to the registering location information through cellular phone. Similar to "Colony na seikatsu Plus", to promote players' movement in real world, "Keitai kunitori gassen" implements various events in which players can gain special items by moving to specific place.

These games are operated by using location information through cellular phone. The acquisition method of location information depends on the model of cellular phone. The difference in the acquisition method affects the accuracy of location information. Moreover, the accuracy of location information also changes with cellular phone carrier.

6. Three Types of Strategies to Deal with Different Accuracy

Accuracy of location information is related to acquisition method of location information and information granularity of location information platform. In this study, Information granularity means the unit of handling information in systems and/or services. For example, two loca-

tions (A and B) can be considered same location in some location based service while they are distinguished in other location based service (See Figure 2). In this case, Information granularity of the former system or service is coarse while the latter's one is fine.

If low accurate location information is processed by fine information granularity, the output cannot be trustworthy. Therefore, setting adequate level of information granularity is very important for location based service.

It is difficult to provide users having different accuracy of location information with one common service. There are three types of strategies to deal with different accuracy.

First strategy is to provide one service to limited users who have adequate level of accuracy. In this strategy, because the service provider cut users which cannot be expected enough profit to develop and operate for them, profit ratio of the service is high although market size is limited.

Second strategy is to provide separated services to each level of accuracy. Compared with first strategy, the market size in total is enlarged although developing and operating several services make profit ratio lower.

Third strategy is to provide one common service to users who have different accuracy by unifying information granularity of the service. In this strategy the service provider set original rules for converting location information into specific level of accuracy for unifying information granularity. Because one common service is provided to each user who have different level of accuracy of location information, cost of development and operating is small and market size can be larger than first strategy. The information granularity and the level of the service, however, are determined by the lowest accuracy of location information of users whom service provider targets.

"Keitai kunitori gassen" is example of third strategy. Provided to each user of cellular phone carriers by separated systems, game rules of "Keitai kunitori gassen" is common among each systems. Although the number of cyber areas in this game was 300 till 2007, it was increased to 600 in 2008. While this 600 areas is based on Japanese traditional district and is familiar to Japanese, Former 300 areas was based on area code of "open i area".

Open i area is the function of acquiring location information provided by NTT docomo which is the largest cellular phone carrier in Japan. Using open i area as location information platform, user's location information is acquired by CTT, and all i mode users can acquire it even

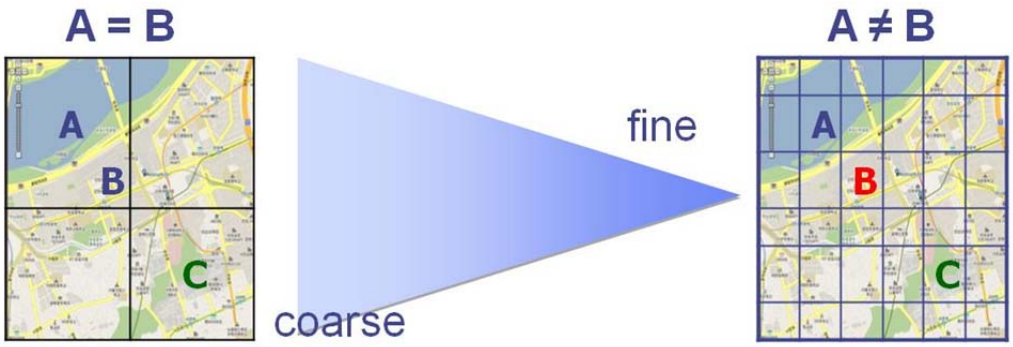

Figure 2 Information Granularity

without GPS. Until 2007, Open i area provided location information as “area code” only. In area code of open i area, Japan was divided to about 500 areas and each area was assigned number. At that time, each area was information granularity of open i area and this the coarsest granularity among Japanese cellular phone carriers. Given this level of granularity, pinpoint level or even block level navigation cannot be provided. Especially, because area code was coarser in rural area than urban area, the location based service which can be provided in rural area was limited to something like weather news.

In 2007, however, open i area started provision of location information as longitude and latitude and service providers can use finer information granularity for their location based service than before. Nevertheless, block level navigation cannot be provided now in many rural areas because the accuracy of CTT depends on density of nearby cell towers.

7. Trustworthiness and Information Granularity

There are some relationships among accuracy of user’s location information, information granularity of system, and level of location based service. Accuracy of user’s location information depends on device and location information platform. For service providers targeting the users with different accuracy, it is necessary to adjust the assumed accuracy of location information to the lowest one.

Information granularity is affected by geographical information platform which service providers use, and it must exceed assumed accuracy of location information. Moreover, Information granularity of system decides the maximum level of service (See left column of Figure 3).

If level of accuracy is lower than level of information granularity and/or level of service, trustworthiness of the service becomes low (See right column of Figure 3). That is, both Accuracy of user’s location information and information granularity of system decide the level of the service which can be provided. For example, the service pinpointing location of your child needs high accuracy of location information and finest information granularity. With low accuracy and/or coarse granularity like area code of open i area, it is impossible to provide such service.

Also in the service actually operating, this problem about trustworthiness sometimes occurs. There is an application and service called "Bump!" which is available at iPhone and android device. By using

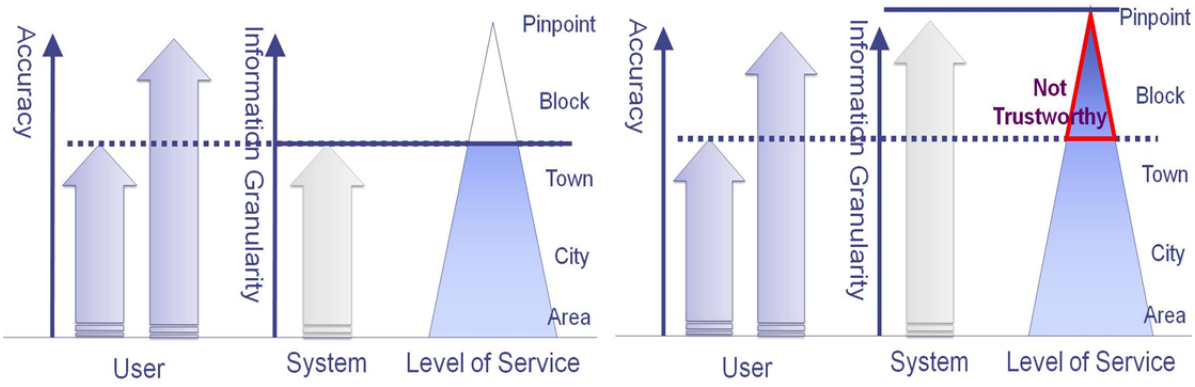

Figure 3 Accuracy, Information Granularity and Level of Service

this, users can transfer information only by bumping their devices each other. "Bump!" distinguishes the user by location information and timing of bumping. When many users use this application simultaneously in the narrow range (such as in same room), it cannot distinguish the pair of information transfer, and may try to connect to wrong user.

Generally, user's purpose of location based service is to gain the information which is customized by location information. With not enough accurate location information and coarse information granularity, the service may provide untrustworthy or misfit information. On the other hand, the system with accurate location information and fine granularity can provide the information which fit for user's purpose. It means fine information granularity makes mismatch decrease.

Fine information granularity, however, may decrease the availability of information fitting for user's purpose. When information granularity is coarser, it becomes difficult for users of service to find the information fitting for their purpose even if they input their location information. Conversely, when information granularity is too fine, the number of the geographically tagged information which fit the location information inputted by user may decrease.

The information provided by location based service is the customized information and it is originally gathered and registered by a certain means. Some services may gather and register information by oneself as early Skyhook did, and some services, as PlaceEngine does, may mainly use the information registered by users.

It is possible that the service provider which gathers and registers information by oneself cannot satisfy users because of shortage of information. Therefore, in location based services with fine information granularity, it is important to be offered information by users, that is, to motivate users to offer information.

According to the study of social tagging systems [6], there are two motivations; personal information management and resource sharing. It brings improvement in motivation of user to form the community in which offering information promotes resource sharing among users like blog or SNS. Also, offering information by user may be promoted by fueling competitive spirit as in the registrant ranking of PlaceEngine or some kind of games.

On the other hand, it is considered that offering location information by users causes problems about privacy. According to the survey mentioned before, there is little intention to use the entertainment service such as SNS or game if they require offering their location information. Users need some kind of merit in exchange for offering information, especially, their location information.

Promoting information offering by users is possible not only by improvement of motivation but by reduction of required burden. For example, facilitating acquiring and input of location information reduce input burden for user. Economic burden can be reduced by providing environment including geographical and location information platform with cheap cost. The function of anonymizing or securing privacy information may make user's psychological burden lower. These measures can reduce user's burden and increase the number of users and offering information.

8. Conclusion

Location based service is applicable not only to activate exchange inside the area,

but to bring customers from the outside of the area by providing the information customized in the specific purpose.

In the rural areas where location information platform is not developed, however, location based service does not diffuse and the pace of growing user is very slow. Especially, WPS does not work sufficiently for its low density. CTT has not enough accuracy for providing even block level service. This causes a vicious circle that shortage of user hampers development of location information platform.

Even though location information platform was sufficient, same result will occur if burden of using the platform and location based service is heavy. It is important for diffusion of location based service to keep cost of using platform and service lower. For reduction of these costs, promotion of shared use of the existing platform is effective. Especially about WPS, sharing database among WPS providers may be effective.

It is also important to set adequate information granularity. Information granularity specifies the level of the service which can be provided. To provide various and trustworthy services, fine information granularity is required.

In addition, the purpose of using location based service is to gain valuable information. Value of information as output depends on both accuracy of customization and amount of information which provider of location based service can use. To increase amount of information, the service provider needs to encourage users to offer information. In order to gather more information, the architectures encouraging users to offer information is required. And there are two types of approaches; improving motivation and reducing burdens. For the diffusion of location based service in rural areas, it is necessary to fulfill these requirements.

Acknowledgment

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An Approach of Enhancing Dependability in the System with the Perspective of System Architecture

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Abstract

Dependability is one of the high demands in every automatic system. It is one of the prime properties in a system. A system's performance can be evaluated with the existence of this property in the system. There are many approaches in inducing it into the system. This paper addresses the role of architecture in enhancing the dependability in the system. We propose architecture and show the significance of it in dependability. We identify the basic features of dependability and calculate them. The features of architecture are shown with the relevant development diagrams, use the Markov Chain and model it with SHARPE tools.

Keywords: Dependability, Architecture, Availability, Reliability, Downtime

1. Introduction:

The use of automated system is getting increased very rapidly. More and more people are involved in using such systems for their daily life activities. At the same time people expectation from such systems is also increasing. People expectations vary from one system to another. A simple system like vending machine to complex system like medical equipments, people expect the proper behavior of the system. Proper behavior of the system means system should provide the required functions at the required time with required features. In other words, the system should be trustworthy in using it. Trust can be achieved in a system if the users believe that the system is dependable.

Dependability is the degree of trust. There are many attributes in systems that collectively make the system high dependability.

Architecture is one of the approaches in getting high dependability in the system. Architecture is the structure that leads to the solution. It is a blue-print that represents the entire system in details. There are various types of architectures now-a-days. The architectures such as pipe and filter architecture, layer architecture, object oriented architecture, black-board architecture, event-based architecture are very popular in software industry. Each of these architectures has some set of merits and also some set of demerits. There are no good or bad architectures. More appropriately, we can say that architecture is suitable for one system whereas it is unsuitable for other system. Architecture is suitable if it can solve the system problem effectively and if not it is unsuitable. The nature and types of problem determines the types of architecture. Architecture is also classified based upon the tier, like two-tier architectures or three-tier architecture.

Suitability and unsuitability of the architecture depends upon the characteristics that it posses within it. Architecture should have enough strong features or attributes which should be considered as best parameters in selecting it. Architectures attributes are classified into two categories, as: functional attributes and non-functional attributes. Functional attributes determines the capability of the system to produce overall goal or output of the system where as non-functional attributes determines the suitability or unsuitability of particular architectural for particular problems. There are many types of non-functional attributes but in this paper we consider dependability as a prime non-functional attributes and its supporting attributes. Supporting attributes are availability, unavailability, downtime and reliability etc.

There are many systems that do not provide services to the users whenever it is required. The services are unavailable or system goes down whenever it is needed. These types of system behavior have made a big frustration to the users' community and also to those groups who are involved in making or designing these systems. Especially there are many frustration from e-business, e-commerce and e-governance system to the users. There are many cases in which users have to wait for a long time to get the services from the automated land registration system, tax payment system, electricity payment system.

These systems are not reliable enough to convince the users to use it. In fact, the e-commerce, e-business and e-governance systems should operate 24/7/365 pattern.

There are number of reasons behind the abnormalities of the system. There may be because of security perspective like DDoS attack, System attack, application attack etc but in this paper we try to address the issues of core dependable attributes with the proper principle of architecture.

In order to increase the level of trust in a system we categorized the paper in many sections. We start the introductory part in Section 1 and mention the related works in Section 2. We propose the three tier architecture and use state chart diagram and sequence diagram for better understanding of the architecture in Section 3. We use the CTMC (Continuous Time Markov Chain) model to analysis the architecture in Section 4 and corresponding results are given in Section 5. Finally, we conclude this paper with the conclusion and future works in Section 6 and Section 7 respectively.

2. Related Works:

There are many ongoing researches in favor of dependability. Kishor Trivedi and Ranjits Vasireddy [2] have used Markov model to obtain maximum availability in critical systems. They have divided the entire system into different sub-systems and tried to addresses individually. Daniel Barbara, Hector-Garcia Molina, and Annemarie Spauster[2] from the Princeton University tried to get availability of a system through dynamic vote reassignment system. Different architectural patterns are used to enhance the modifiability of system by Felix Bachmann and his team [3] at Carnegie Mellon University, USA. There are many works and researches are done at Duke University and Carnegie Mellon University, USA. Despite the many works in the area of dependability, a very less contribution has been made through the architect perspective on dependability. So, we propose the novice architecture to address the issues of dependability.

3. Propose Architecture:

After reviewing many papers and going through different approaches in making system trustworthy we try the architectural pattern to increase the level of trustworthy in a system. In our approach we try to make clear difference between system attributes like reliability and availability. Reliability and availability look same but they are not. Reliability of a system can be measured in the time frame or time duration in which the specified services are available where as availability can be measured in the degree of providing service at any instance of the time. A high reliability does not provide always high availability and system with high availability can be less reliable. These two features have very core differences in the context of system development and because of these issues. We address both features in a system.

In order to address these above scenarios, we have proposed the following architecture given in Figure 1.

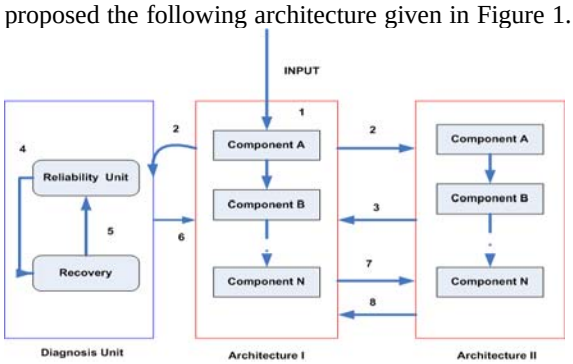

Figure 1: Proposed Architecture

The architecture in Figure 1 has three main components. They are as: *architecture I, architecture II and diagnosis unit.* Each of these main components has well defined sub-components. These sub-components are independent and has pre-defined individual task. The overall reliability of the system is the collective reliability of all components. The component can be failure in two scenarios, one while executing the application program and another while communicating between the components. Such behavior of components can be specified in terms of their reliabilities or failure rates.

The architecture I take the input. The input gets checked before execution by first sub-component "A". If the input has some defects then instead of executing it by sub-component "A", then it forwards it to another component i.e. diagnosis unit. At the same time, the architecture I initiate architecture II to take care for another set of inputs. A special attention is given in second time to improve the quality of inputs and assume that it does not contain any defects. While in architecture II, if any components and connector i.e. interfaces encounter the fault then it forwards it to the recovery unit to get recovered.

Once architecture I get the repaired entity from diagnosis unit then it asks the architecture II to forward the charge back to it and go to sleeping stage. Now, architecture I takes the care of every application and architecture II will be in standby mode. The architecture II will be activated again if first architecture encounters problem again. The architecture II is assumed to be ready to support architecture I.

3.1 Diagnosis Unit

In diagnosis unit, there are two sub-components i.e. *reliability unit* and *recovery unit*. Reliability unit receives the defect from any architecture. Reliability unit has the capability of differentiating the nature of faults. It generally handles three types of faults. They are as follows:

a. Input _Fault
b. Component _ Fault
c. Interface _ Fault or Connector Fault

Input _ Fault is the fault in the set of inputs to the architecture. Data inconsistency and format inconsistency could be the resource of input fault. The Component_ Fault is generated when the component cannot execute the applications and generate abnormal output. Like architecture has component and connecter, our architecture also has the combination of components and connectors [Interface] Interface are the connection between the components. The output of one component is fed as input of another component. If there is the change in output of one component while feeding to another component as input then it is the example of Interface _ Fault. *Expert system* is used in diagnosis unit. The expert system in diagnosis unit examines each fault, and compares it with the set of knowledge in the knowledge base. As per the matching with the knowledge in the knowledge base, it finds the nature of the fault and equivalent solution. Knowledge base and reasoning engine are two main units in expert system.

In our case, the list of statements related to different types of faults is kept in term of knowledge in knowledge base. These statements are manipulated with inference engine to identify the types of faults. The faults with its type are forwarded to the recovery unit.

The recovery unit recovers the fault as per the type and gives the correct entity to the reliability unit. It again checks this entity before forwarding back to the architecture. This is the double check for the solution.

3.2 State Chart Diagram

The Figure 2 represents the state chart diagram of the architecture. State chart diagram shows the number of states in which the system goes during its life cycle. The state chart diagram of above architecture is given below.

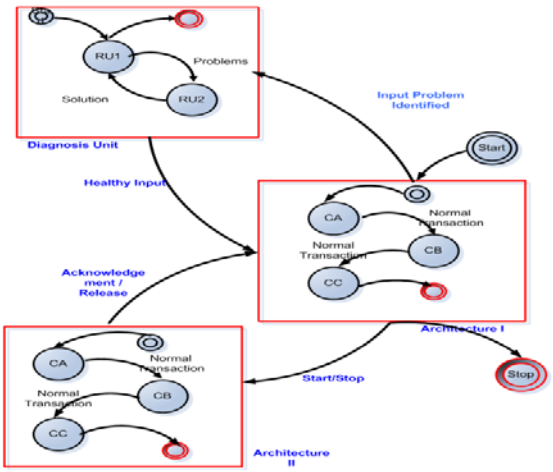

Figure 2: State Chart Diagram of Propose Architecture

As per the proposed architectures there are three main components. The initial state begins from Architecture I. The state of architecture changes from Architecture I to Diagnosis unit and Architecture II as it encounters the problem and start/stop transaction respectively. The state of Architecture II changes into state Architecture I with the transaction Acknowledgement/Release. The state diagnosis unit changes to Architecture I with the transaction "Healthy Input"

There are three sub components in Architecture I, The component state depends upon the position of sub components. This means if component A is active, it shows the Architecture I is in state of component A. Under the normal transaction, the states of Architecture I switch from one sub component to another sub component. Similarly same approach is applied in Architecture II.

In Diagnosis unit, there are two main sub components. They are as RU1 and RU2. The unit changes its state as it reads the input from environment. The transaction called "problem" changes its state from RU1 to RU2 and "solution" changes from RU2 to RU1.

3.3 Sequence Diagram

The main activity of the proposed architecture is shown with the sequence diagram below in figure 3.

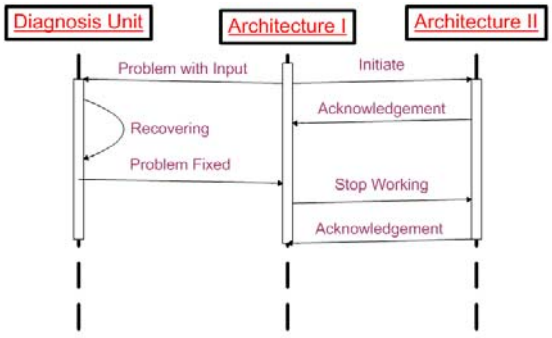

Figure 3: Sequence Diagram of Propose Architecture

In the Figure 3, there are three components arranged in x-axis. The architecture I initiates the architecture II and diagnosis unit with the message "initiate" and "problem with input". The diagnosis unit takes some time in recovering the problem and after this it sends the message "Problem fixed" to architecture I.
The architecture II receives the message "Initiate" from architecture I and it gives the message "Acknowledgement" back to architecture I. After some span of time, when architecture I receives the message" Problem fixed" from diagnosis unit then it sends "stop working" to architecture II because there is no need of architecture II to be active. After getting this final message, the architecture II stops its working with sending message "Acknowledgement" back to architecture I.

4. Analysis of Architecture:

In order to analyze the architectures in depth, we re-draw the above state chart diagram into modified state diagram we use the SHARPE as a simulation and modeling tools for evaluating our propose architecture.

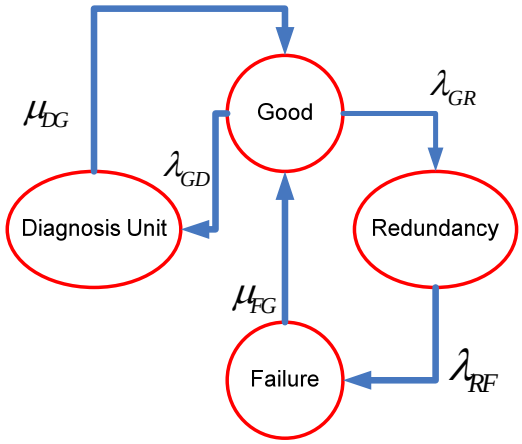

Figure 4: State Diagram

The Figure 4 is the working state diagram of our proposed architecture. It has four states, i.e. *Good*, *Redundancy*, *Diagnosis Unit*, and *Failure*. The system provides service when it is in good state. If it encounters problem then it moves to the diagnosis unit and also to redundancy state. Diagnosis state does diagnosis the problem. Redundancy is used for backup task.
The standard parameters are listed in Table 1 below with their descriptions.

Table1: Parameters used in State Diagram

Parameters	Descriptions
λ_{GR}	Redundancy Rate
λ_{RF}	Failure Rate
λ_{GD}	Fault Detection Rate
μ_{DG}	Recovery Rate from Diagnosis Unit
μ_{FG}	Recovery Rate from Failure State

The stationary probability of each state is given in Table 2.

Probability	Description
π_G	Probability of being in state Good
π_R	Probability of being in state Redundancy
π_F	Probability of being in state Failure
π_D	Probability of being in state Diagnosis

The state diagram in Figure 4 explains with the Markov model. As per the Markov model, the number of in links is/are equal to number of out links. Then we have the following equation for every state in state diagram.

State: Good

$$\pi_G\lambda_{GR} + \pi_G\lambda_{GD} = \pi_D\mu_{DG} + \pi_F\mu_{FG} \text{ -----(1)}$$

State: Diagnosis

$$\pi_D\mu_{DG} = \pi_G\lambda_{GD}$$

$$\pi_D = \left(\frac{\lambda_{GD}}{\mu_{DG}}\right)\pi_G \text{ ------(2)}$$

State: Redundancy

$$\pi_R\lambda_{RF} = \pi_G\lambda_{GR}$$

$$\pi_R = \left(\frac{\lambda_{GR}}{\lambda_{RF}}\right)\pi_G \text{ ------(3)}$$

State: Failure

$$\pi_F \mu_{FG} = \pi_R \lambda_{RF}$$

$$\pi_F = \left(\frac{\lambda_{RF}}{\mu_{FG}}\right)\pi_R \text{ ----(4)}$$

Equating equation (3) and equation (4), we get,

$$\pi_F = \left(\frac{\lambda_{GR}}{\mu_{FG}}\right)\pi_G \text{ ------(5)}$$

Combining balance equation:

$$\pi_G + \pi_R + \pi_F + \pi_D = 1 \text{ ------(6)}$$

Put the values of equation (2),(3) and (5) in equation (6), we get ,

$$\pi_G + \left(\frac{\lambda_{GD}}{\mu_{DG}}\right)\pi_G + \left(\frac{\lambda_{GR}}{\lambda_{RF}}\right)\pi_G + \left(\frac{\lambda_{GR}}{\mu_{FG}}\right)\pi_G = 1$$

Now,

In order to be in Good State,

$$\pi_G = \left[1 + \left(\frac{\lambda_{GD}}{\mu_{DG}}\right) + \left(\frac{\lambda_{GR}}{\lambda_{RF}}\right) + \left(\frac{\lambda_{GR}}{\mu_{FG}}\right)\right]^{-1} \text{ -----(7)}$$

The following values are assumed and assigned on above parameters as per the nature of system architectures.

Table 3: System Operation Parameters Values

System Operation Parameters	Values
λ_{GR}	0.40
λ_{RF}	0.50
λ_{GD}	0.45
μ_{FG}	0.60
μ_{DG}	0.60

With the values given in Table 3 and the above equations, we get the results using SHARPE tools. We examined our approach by SHARPE (Symbolic Hierarchical Automated Reliability and Performance Evaluator), is a well known package [6] in the field of reliability, availability and per formability. It is possible to use different kinds of models hierarchically for different physical or abstract levels of the system and to use different kinds of models to validate each other's results. Steady-state and transient computations are available in the tool. SHARPE allows its users to construct and analyze dependability, performance and per formability models. It gives users direct and complete access to the model types without making any assumptions about an application domain. So for our proposed approach's validity we use this tool.

5. Results:

With the help of above available and obtained data, we have calculated the equivalent values of dependable attributes. They are as follows:

Availability

It is the degree in which the system provides the service or services are available for the users. The *availability* can be calculated as:

Availability = 1- Unavailability----[8]

Our proposed architecture will be unavailable when it is in failure state. Hence, availability can be achieved with above expression with following equation.

$$Availability = 1 - \left[\frac{\lambda_{GR}}{\mu_{FG}} x\pi_G\right] \text{-----[9]}$$

Let's put the values from Table 3 and equation (7), we get initial availability as :

Availability=0.792

This availability is obtained when the fault detection rate λ_{GD} is 0.45. If we increase this rate the corresponding values of availability will be increased, unavailability and downtime will be decreased. The corresponding values are given below as per our simulation result.

Table 4: Result of Simulation

Rate	Availability	Un-Availability	Downtime [Sec]
0.45	0.792	0.207	108000
0.55	0.802	0.197	103000
0.70	0.810	0.183	96400
0.75	0.820	0.179	94600
0.85	0.830	0.171	90200
0.95	0.840	0.160	86500

Analysis on Result with Graphs:

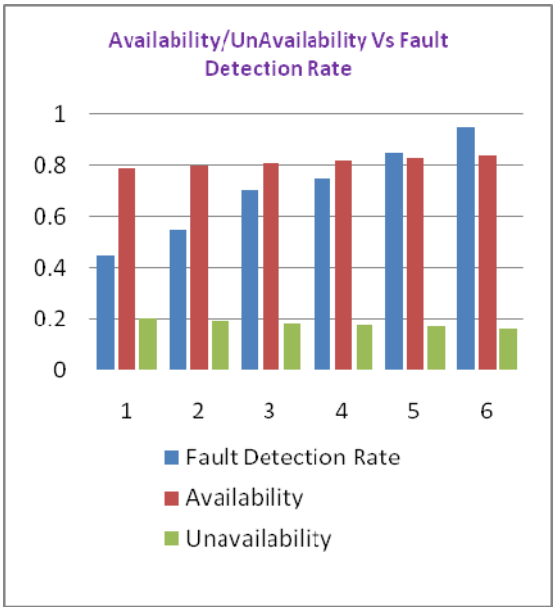

Figure 5: Availability/Unavailability

The obtained result is represented with the help of graphs as given in Figure 5 and Figure 6. These graphs are obtained as per the values in Table 4. The trends of above graph in figure 5, show that as per the rate of fault detection increases the corresponding availability of the system increases and unavailability decreases.

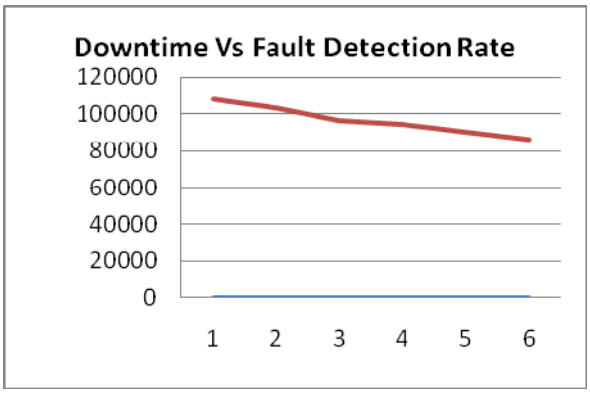

Figure 6: Downtime

The above graph in Figure 6 shows the trend of downtime. The slope of figure is going down indicating less downtime of a system. It is getting reduced because of increase in fault detection rate. This is the desirable properties of the propose architecture.

6. Conclusion

The number of users and volume of using automated system is going up and still it is in increasing trends. The services of any system should be available for maximum time. Availability of any system should be high. Downtime should be very low. It is not possible to achieve very low downtime in every system because of its high cost and high effort. No downtime is only relevant for mission critical system like medical equipments, satellite system, air transportation etc. If availability and down time can be controlled then we can be assured on system dependability. These attributes can be obtained from our proposed solution.

The proposed architecture has followed the basic principles of architecture. Our proposed architecture has a set of sub-units in diagnosis unit. The fault is analyzed with the help of expert system. Expert system takes the advantages of knowledge base to identify the faults. The combination of Expert system into architecture has shown the better system performance. This feature has given the strength to accommodate any identified new types of faults and its solution. This has made high maintainability in the architectures.

7. Future Works:

The other parameters like reliability, cost, and interoperability will be obtained .The ratio of availability and others parameters can be increased rapidly with some modification in proposed architectures. This architecture will be generic in nature where the issues of interoperability will be addressed. This work will continue to achieve five 9's properties in the system, especially for complex system.

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Young People's Behavior and Consciousness for Online Shops

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Abstract B to C market in Japan has been expanding as developing ICT infrastructure. It has been one of the most important channels for the shops and company. A lot of shops sell the goods at online shops, and many local governments support the shops. All online shops, however, do not go well in business. Many of online shops face hard business environment because of the rack of understanding the consumer. In order to make effective sales strategies, it is significant to clarify consumer behavior and consciousness of online shops.

We research consumer behavior of online shops at 5 universities in the urban and rural area. In this paper, we show consumer behavior and consciousness of online shops. From our research, although many students utilize online shops' web site, they have the inertia for real store in purchasing. They find out different conveniences and inconveniences to online shops for each goods. Students in different university or region have different reason for utilizing online shops. We also mention the difference according to their gender. These findings will also give suggestions for constructing sales strategies of online shops.

Keyword Consumer Behavior; Online Shops; Region; Inertia for Real Shops

1. Introduction

Most of us have been utilizing the Internet every day. When we access the Internet, we may utilize broad band environment in most city and town in Japan. We can utilize e-mails and access the Internet with mobile phone. The users of the Internet are not limited for the young people or some specialists. Almost all generations may utilize the Internet, although young people's Internet diffusion rate is higher than elders. Utilizing the Internet has been common for us.

Under such environment of ICT, we can consider Electronic Commerce as one of representative of ITeS (IT enabled Services). B to C (Business to Consumer) market in Japan has been expanding as developing ICT infrastructure. We can purchase most goods at online shops in these days. A lot of company and shops have been selling the goods at online shops. As the online shops diffused, many local governments come to expect B to C market as the means of economic revitalization, and support the company and shops.

All online shops do not go well in business. Many online shops face hard business environment. One reason is that the rack of understanding the consumer. In order to expand online shops market or make effective sales strategies of online shops, it is significant to survey the consumers' behavior and consciousness for the market, including potential consumers. As young people utilize the Internet and the mobile phone most in all the generations, the research of the behavior and consciousness for online shops should be important for indicating the direction of future online shops.

Consumers may have different behavior of online shops according to the area where they live in. For example, consumers who live in urban area may have dif-

ferent behavior from consumers who live in rural area. Online shops' managers want to know the structure of their market for their business. Clarifying the market structure or consumer behavior of online shops could give the significant suggestion for them. It may also help the local governments that support online shops.

The purpose of this study is to show the young people's behavior and consciousness of the online shops. We research consumer behavior of online shops at 5 universities in the urban and rural area. In this paper, we show consumer behavior and consciousness of online shops. We indicate their utilize degree of online shops, the allocation of online shops in their consumption, behavior and consciousness for each goods. Then we show the difference between the urban and rural consumer behavior. We also mention the difference according to their gender.

2. Background

2.1. ICT and B to C environment in Japan

The number of the Internet users in Japan has been increasing and almost all people may utilize the Internet. White Paper of Japanese ICT reports such environment as follows. "The number of Internet users reached 94.08 million people as of the end of 2009, an increase of 3.17 million people from 2008 (year-on-year increase of 3.5%), with an Internet penetration rate of 78.0% (a 2.7 percentage point increase from the previous year). With respect to terminals for Internet use, users of mobile terminals increased by 5.04 million people from the end of 2008, reaching 80.1 million people. The number of PC users increased by 25.9 million people, reaching 85.14 million people." The number of both users reached 64.92 million people [1]. As the recent diffusion of smartphone indicates, utilizing mobile terminals has been common in Japan. Most people, however, utilize both devices properly according to their necessaries.

The B to C market in Japan was worth 6.1 trillion yen in 2008, up 13.9% from a year ago. The EC ratio, an indicator to measure the expansion of EC, increased 0.27 points from the previous year to reach 1.79% [2]. Another report shows that 53.6% people have experience of utilizing B to C [3]. B to C has been common for people and the important part of consumer market.

2.2. Related Researches

There are some reports about consumer behavior of online shops. JDMA (The Japan Direct Marketing Association) reports the state of consumer's use of direct marketing on the Internet. It surveys the 1080 people's state and view in Kanto area, who utilized the direct marketing on the Internet in 2009. It reports that about 60% of the respondents utilize the direct marketing on the Internet 1-3 times per month, and about 70% of them purchase goods or services through the Internet less than 10,000 yen per month. The goods which are bought most from B to C market are book/magazine. And they often purchase food/beverage (excluding liquor) or cloths/shoes [4]. Thus we could recognize B to C as common channel for general consumers' purchasing.

The survey on ICT Utilization reports the reasons of purchasing goods via the Internet. Many people point out following reasons: reducing restrictions of time, eliminating moving costs, easiness to compare goods, availabilities for rare goods, and easiness to compare prices [3].

Some reports also show many people utilize B to C for various goods and services. Almost all researches are specia-

lizing in use of online shops, and there are many respondents. Some of them have various questions, and their results are meaningful for online shops. Its respondents, however, are limited to people who have already been utilizing the online shops, or who are familiar with the Internet and have high possibilities of utilizing the online shops.

In order to expand online shops market or make effective sales strategies of online shops, it is significant to survey the user's behavior and consciousness for the market, including potential users.

3. Outline of University Students' Utilization of Online Shops

3.1. Respondents of our Research

Our research held Sep. to Oct. in 2009 at 5 universities. The respondents are 1806 students who are the members of social science faculties. Table 1 shows respondents of our research.

The compositions of each university students are shown in table 1. Ehime Univ., Matsuyama Univ. and Okayama Univ. of Science are located non-urban area or rural area. Alternatively Osaka International Univ. and Kanagawa Univ. are located in urban areas. Thus 35% of respondents are urban students, the others are non-urban students.

Their grade compositions among all respondents are 1st (27%), 2nd (36%), 3rd (24%), 4th (10%), and others (3%). Female respondents are 41%, and male are 52%. The composition of respondents does not have big deviation in a grade and gender, although there are relatively few 4th grade students.

Table 1. Respondents of Research

1806 Students	
Univ. [1]	Ehime Univ. (33%) Matsuyama Univ. (26%) Okayama Univ. of Science (6%) Osaka International Univ. (21%) Kanagawa Univ. (14%)
Grade	1st. (27%), 2nd. (36%), 3rd. (24%), 4th. (10%), Others (3%)
Gender	Female (41%), Male (52%)

Almost all respondents utilize the Interne. 98% of all respondents utilize the Internet[2] at least once a day via PC and/or mobile phone. Utilization of the Internet might be quite common for them. Figure 1 shows the terminals which students utilize in accessing the Internet. Over 60% of students utilize the mobile phone several times in a day in accessing the Internet, and about 75% of students utilize the device at least once a day. Alternatively 32% of students utilize PC several times in a day for the purpose, and 59% of students utilize at least once a day. With respect to terminals, 77% of students utilize both PC and mobile phone in accessing the Internet. They use mobile phone basically as the terminals for accessing the Internet. As Figure 2 shows, they use PC for more complex usage like searching goods through the Internet[3]. We can guess that they utilize mobile phone for simple or passive use like reading news. They might also utilize PC for active use like purchasing goods or services.

[1] As Ehime Univ. and Matsuyama Univ. adjoin, both universities have almost same geographical feature.

[2] Our research defines that E-mail is not included in the utilization of the Internet.

[3] If the smart phone diffuses among students in near future, this result can be changed.

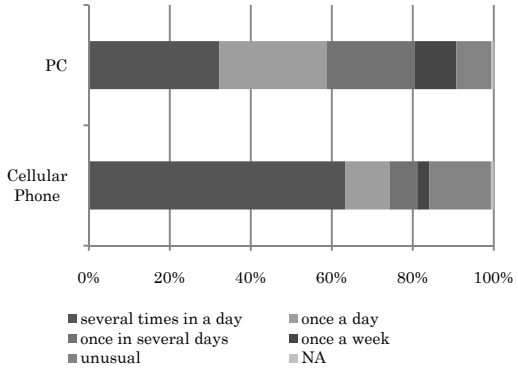


Figure 1. Terminals for Utilizing the Internet

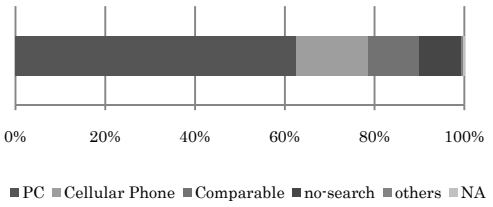


Figure 2. Terminals for searching goods through the Internet

3.2. The Students State of Utilizing Online Shops

As many researches mentioned, online shops have been common channel of purchasing goods. Our research also shows similar result. 55% of students utilize online shops within one year. As Figure 3 shows, 67% of all students see the online shops' web site in one month.

Only 16% of all students, however, purchase the goods at online shops in one month. Figure 4 shows the frequency of purchasing at online shops. As the other students purchase some goods, most of them utilize "real" shops. While most of them utilize online shops' web sites for searching or for just looking, a few of them utilize online shops as the channel of purchasing. This means that they do not purchase the goods frequently at online shops.

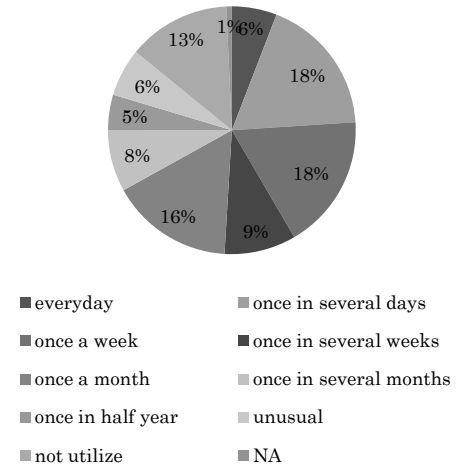


Figure 3. Frequency of accessing online shops web site

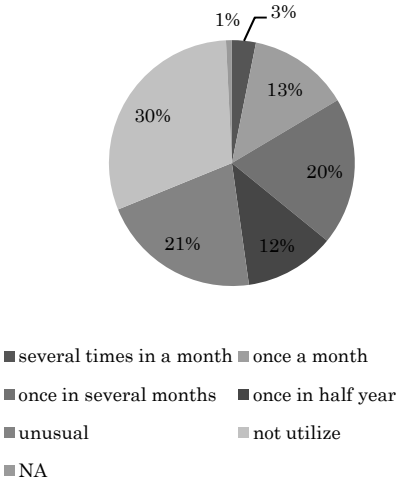


Figure 4. Frequency of purchasing at online shops

3.3. The Students Behavior of Purchasing goods at online shops

To find significance of online shops as a channel of purchasing, we examine the relation between their budget and the amount of payment for online shops. Figure 5 shows students' monthly budget. Most of them use 1000-3000 yen, 5000 yen, or 10000 yen in one month at online shops.

Figure 6 shows students' monthly

payment for online shops within their budget. About half of students use 0-10% of their budgets at online shops in one month, and about quarter students use 10-20%. Though many students utilize online shops, they feel uneasy to purchase at online shops. In other words, they have the "inertia" for real store in purchasing.

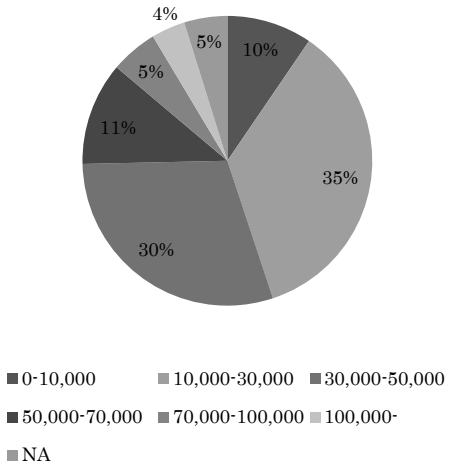


Figure 5. Students' monthly budget (Yen)

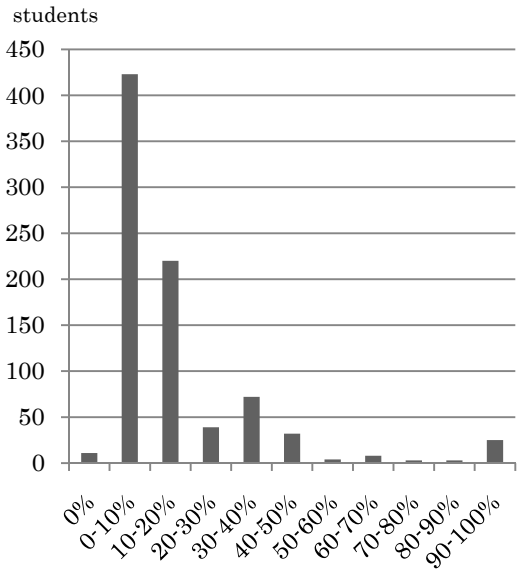


Figure 6. Students' monthly payment for online shops within their budget

3.4. Utilization Online shops and Real shops Individually

From the difference of frequencies between accessing online shops and purchasing at online shops, there are the possibilities of utilizing online shops and real shops individually for each purpose. Figure 7 shows the state of utilization online shops and real shops individually. Notations in the figure show the "place" where students search the information of the goods and where students purchase the goods finally[4]. 57% students refer the goods with the Internet. Only 28% students, however, purchase the goods at online shops directly after referring them with the Internet. 67% of students purchase the goods at real shops regardless of the means to gather the information.

From the viewpoint of convenience, the behavior is not reasonable. If they refer with the Internet, they can easily purchase the goods at online shops or via the Internet. They actually tend to purchase the goods at "real" shops. They may have the inertia for real shops.

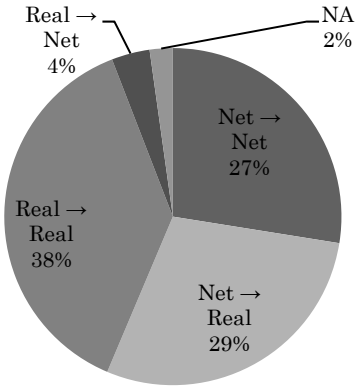


Figure 7. Utilizing online shops and real shops individually

[4] For example, notation of "Net -> Real" shows that the person searches the information of the goods with the Internet and purchases it at real shops finally.

4. The Feature of Utilizing Online Shops

4.1. The State of Utilizing Online Shops for each goods

The reasons that students purchase or do not purchase the goods at online shops give the important suggestions for online shops. Students reply the factors of utilizing online shops for each 11 goods with multiple answer style.

Figure 8 shows the number of students who did/did not purchase each goods within a year at online shops (excluding online auction). The bar of each goods in figure 8 indicates the number of students who purchased the goods within one year. Each bar is classified by the use rate of the online shops in purchasing the goods. For example, 0% of each bar indicates the number of students who purchase the goods from real shops only.

48% of purchasers of book and 42% of purchasers of cloths utilize online shops at least once. Comparatively many students utilize online shops in purchasing games or shoes. Most students, however, do not purchase foods and health food at online shops.

They may utilize online shops for the purchasing "their own" necessaries. The major online malls, such as "Amazon.com" or "Rakuten Ichiba", or the "fashion specialized" online malls, such as "ZOZOTOWN", may be promoting their utilization of online shops. They may utilize online malls for purchasing some specific goods, although purchasing the goods at online shops is not so common for students.

Those who utilize online shops may be heavy users, although a few students purchase sports goods or health foods at online shops. Once utilizing online shops, people can feel those advantages more than other goods.

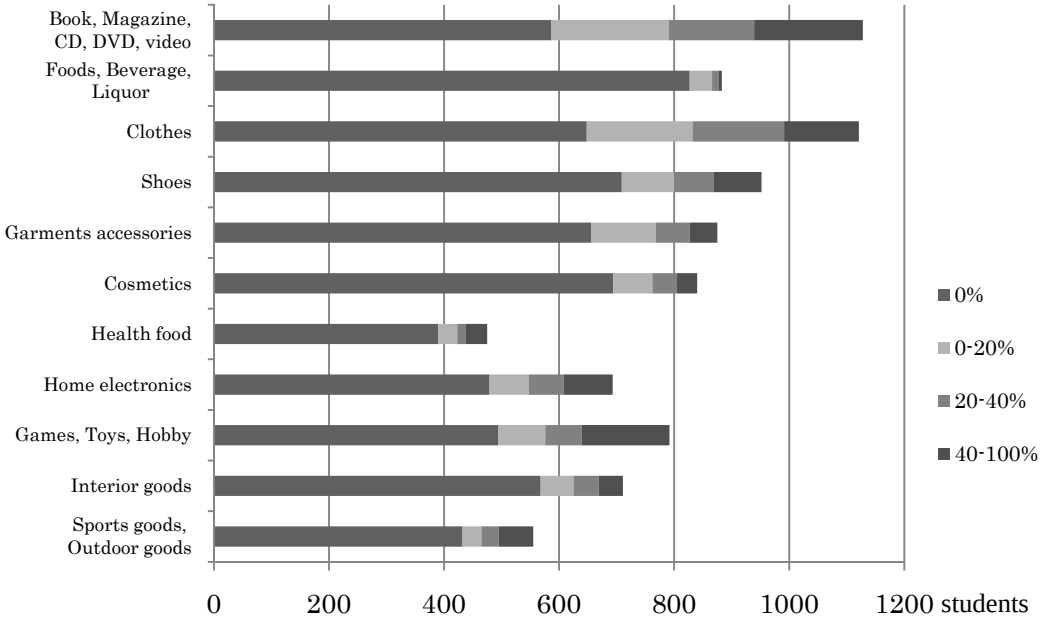


Figure 8. Utilizing online shops for each goods

4.2. The Reason for Utilizing Online Shops

For the development of online shops, it is important to clarify the reason for utilizing online shops. The reason suggests the strategies of management to online shops. Figure 9 shows the reason for utilizing online shops. Concerning the reason for utilizing online shops, 31% of all replies point out price factor, and it is largest factor. Second largest factor is "availability at near real shops", that is they cannot purchase the goods at near real shops easily. 26% of all replies point out this factor. These results show that the factors originate goods are also important at online shops, although the price factor is important. 15% of replies point out the factor of "easiness to use", and 11% indicate the factor of "can purchase anytime". These factors are often mentioned as the technical advantage of online shops. The factors of goods themselves are more important than technical advantage of online shops.

Of course price is one of the most important factors for consumer's decision. As the consumers can easily compare price of goods in the Internet, price competition environment has become more severe. Even if at price comparison cite, price is not unique factor of consumer's decision making [5]. The non-price factor, quality of the goods themselves, affects consumer's behavior at online shops strongly.

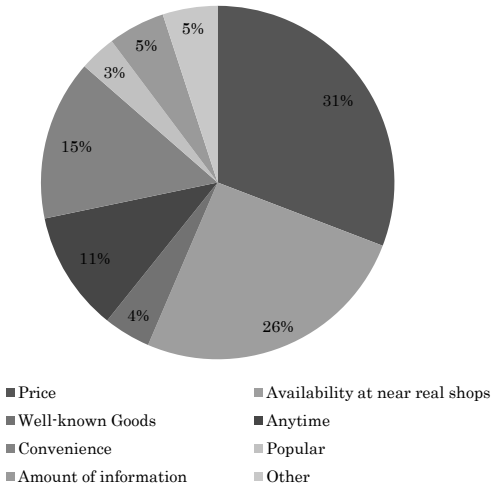


Figure 9. The reason for utilizing online shops

To show the feature of utilizing online shops for each goods comprehensively, we can apply correspondence analysis. Figure 10 shows the relationship among each goods or each factor[5]. We can explain the vertical axis as necessaries, bigger value indicates luxury. We can also explain the horizontal axis as goods' substitution, bigger value indicates low substitution.

Figure 10 shows that "Availability at near real shops", "can purchase anytime" and "Convenience" are the main factors of utilizing online shops for garments, garments accessories and books/DVD. Students estimate technical advantage of online shops high. These goods often become one-off as these goods have high necessaries and low substitution for students. Online shops can utilize its technical advantages. For health foods and cosmetics, "popular" and "well-known goods" are main factors. This shows that these goods' consumers require both factor of fashion and safety as these goods affect health directly. Home electronics are located near the factor of "amount of information" and "price". Since the goods are relatively expensive, students need not only price but the information about the goods for making better decision. Sports goods and games are located near the factor of price. As these goods have small variation of quality among deferent shops, students make decision of purchasing with only price factor.

[5] We should pay attention that each result has small correlation ratio.

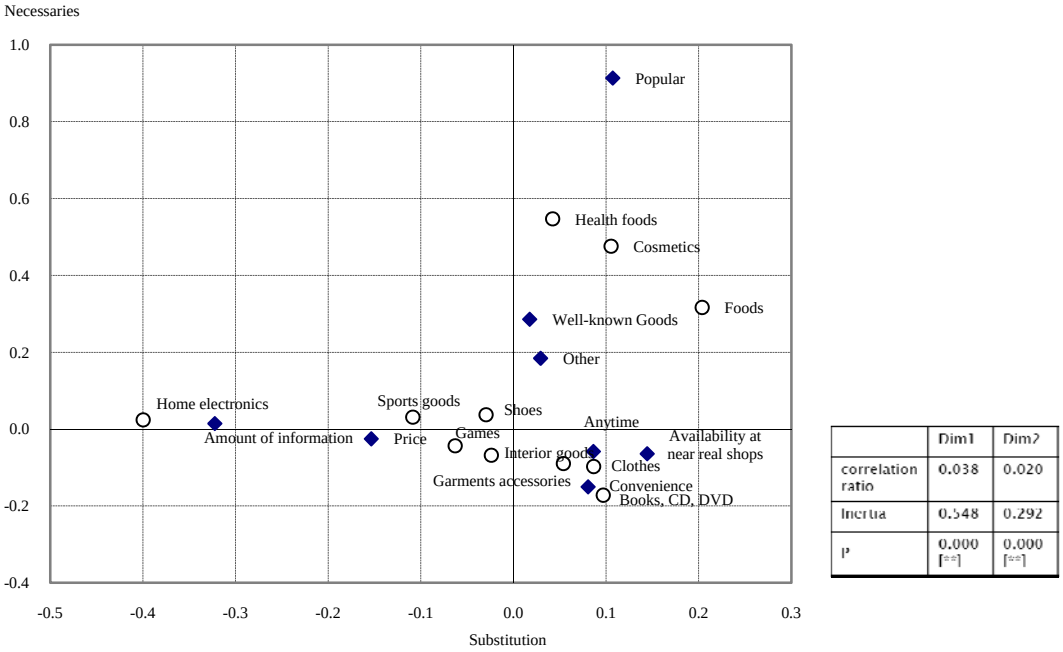


Figure 10. Reraltionship between each goods and reason for utilizing online shops

4.3. The Reason for disuse Online Shops

Concerning the reason that students do not utilizing online shops, the biggest reason is that real shops are sufficient for purchasing. Figure 11 shows the reason for disuse online shops. 33% of all replies point out this factor. This result also shows the importance of goods. The sale at online shops itself cannot become the reason to purchase even if it has technical advantage. This shows students have inertia for real shops. Thus manager of online shops has to differentiate their goods with others. The factor originated from goods is considered more important than the anxiety about leaking personal information or unreliable of online shops by students. This also shows its importance.

Second factor is the demand of confirming real goods. 28% of all replies point out this factor. Especially for clothes, shoes, garments accessories, home electronics, and interior goods, this factor is pointed out most. They can ease the issue by showing the rich and clear information of the goods, although this factor is technical and essential weak point of online shop.

We can apply correspondence analysis to show the feature of disuse online shops. Figure 12 shows the relationship among each goods or each factor which does not utilize online shops. We can explain the

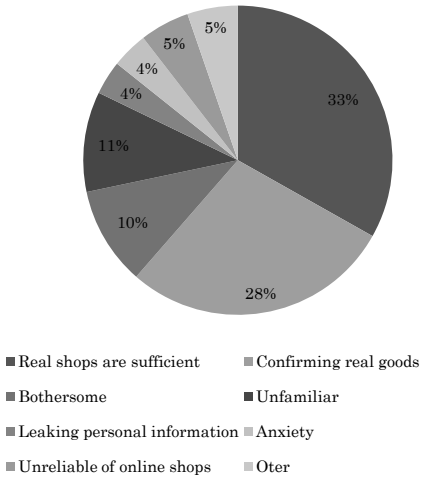
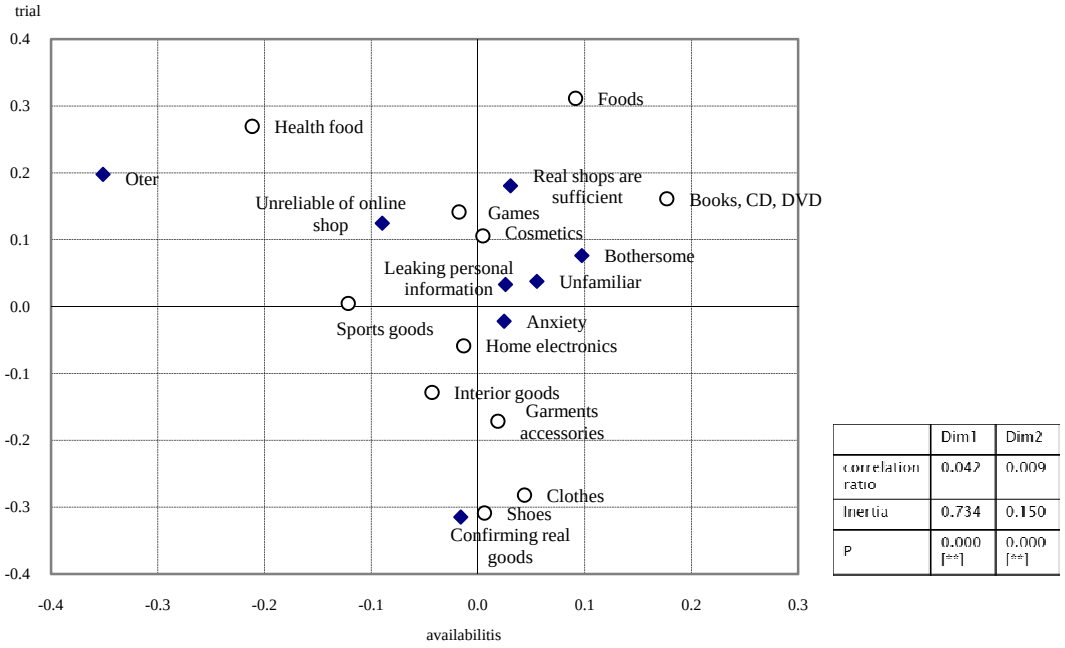


Figure 11. The reason for disusing online shops



	Dim1	Dim2
correlation ratio	0.042	0.009
Inertia	0.734	0.150
P	0.000 [**]	0.000 [**]

Figure 12. Reraltionship between each goods and reason for disusing online shops

vertical axis as “trial”, smaller value indicates demanding trial. We can also explain the horizontal axis as goods’ availabilities at near real shops.

Students do not utilize online shops from two reasons. One reason originates in the technical factor of online shops. Unfamiliar, anxiety for fraud or leaking personal information are near the origin. Bothersome for procedure is also near the origin. These mean that many replies point out these factors. In other words, these factors are common to online shops. These are the problems about technology. ICT can ease in the future. Another factor originates from goods themselves. Shoes and clothes locate near “the demand of confirming real goods”. This is the goods’ essential feature and weak point of online shops. This problem can ease with improvement business models. For example, the business model that the online shop sends some deferent sized clothes and consumer returned other sized clothes can ease this problem. If this problem is eliminated, the advantages of online shops become stronger.

5. The Difference of Behavior and Consciousness between Women and Men

We mentioned about the reason that students utilize online shops, or they do not utilize online shops in former section. The gender difference may exist in the behavior or consciousness. The difference based their properties suggests online shops more efficient strategies.

Figure 13 shows the gender difference of each reason for utilizing online shops[6]. For online shops, women pay more attention to the popularity than men. Men value the amount of information higher than women. If the online shops sells the goods for men, the web site should give a lot of information of the goods. If the online shops’ main customers are women, it should enrich the latest information and utilize “word of mouth”.

Figure 14 shows the gender difference of each reason for disusing online shops.

[6] Figure 13 and 14 are adjusted by each number of respondents.

Women strongly hope to confirm real goods than men. The online shops cannot let their customers confirm the goods essentially. They can try to reduce the customers' time, effort and cost of returning goods. Women also fear leaking their personal information in utilizing online shops. Women are more sensitive to the security of the online shops or the Internet. It is required not only the progress of security technology but serving intelligible information for customers.

The gender is not independent of the reasons of utilizing/disusing online shops[7]. In other words, there may be difference of the behavior or consciousness between women and men for online shops.

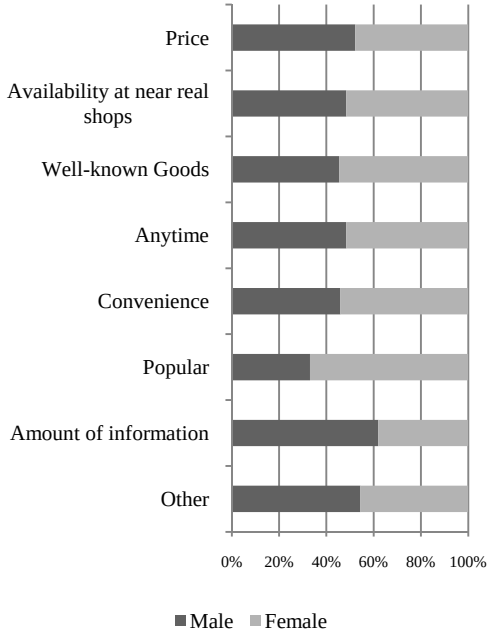


Figure 13. Gender difference of each reason for utilizing online shops

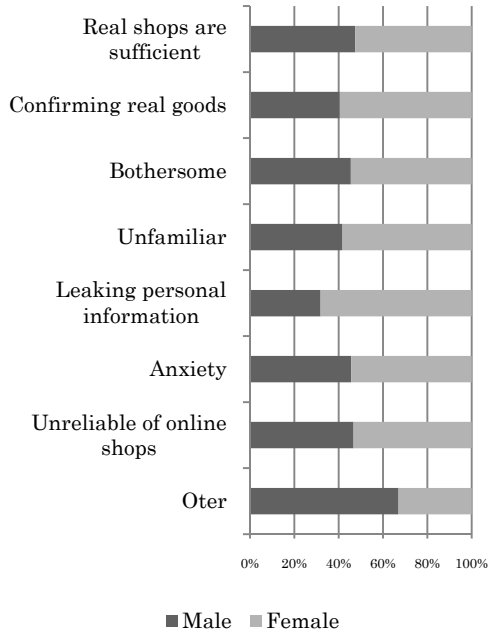


Figure 14. Gender difference of each reason for disusing online shops

6. The Difference of Behavior and Consciousness Between Urban and Rural

Each consumer who lives in urban area and rural area may have different behavior of online shops. From this research, we can guess the hypothesis is true to an extent. The consciousness of utilizing online shops has difference between each university students, although actual behavior of both students is similar.

Figure 15 shows the relationship among each university students and each factor for utilizing online shops. We can explain the vertical axis as "rural-urban", bigger value indicates rural area. We can also explain the horizontal axis as difference of university. Concerning about the vertical axis, Ehime Univ. and Matsuyama Univ. show almost same value, and the factor of "availability at near real shops" is plotted same side. Other universities are plotted opposite side. For most goods, the both universities' differences of rep-

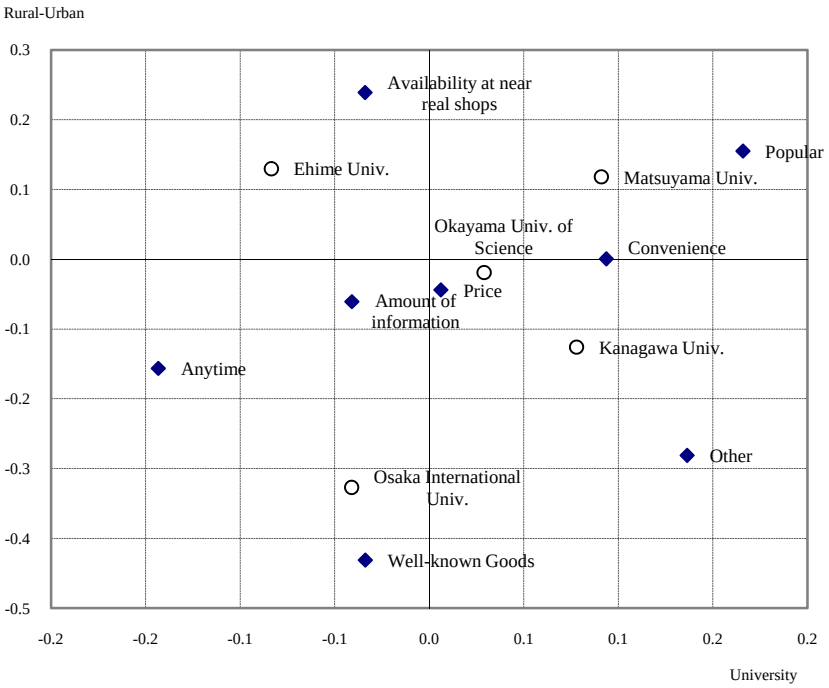
[7] The results are statistically significant. (1% significance level)

lies for the factors are not statistically significant. Thus both universities in Ehime Pref. are similar and different from the others. One of the biggest reasons that students in both universities utilize online shops is they cannot easily purchase at near real shops.

Differences of each university's replies for the price factor are not statistically significant for almost all goods (excluding clothes and games). For the factor "availability at near real shops", however, differences of each university's replies are statistically significant for books, clothes, shoes, garments accessories, cosmetics, and games. In other words, the difference among universities or region may not exist in the price factor, and can exist in the factor of goods' availability.

Some reasons that students do not purchase at online shops have differences among universities. Difference of each university's replies for "real shops are sufficient" and "demand of confirming real goods" are statistically significant for almost all goods. Difference of each university's replies for "unfamiliar", "anxiety for leaking personal information", "anxiety for fraud", and "unreliable of online shops", however, are not statistically significant. The factors related real shops may have differences of universities or region. The factors related technologies of online shops may be common for all universities or region.

For some goods, each university students have different consciousness from other students. The features or environment of the region may affect their consciousness for online shops. For example, transportation system, the amount of real shops and lifestyle are different among regions. They may have the influence on consumer behavior for online shops. This result may support to change marketing strategies for urban and rural customer.



	Dim1	Dim2
correlation ratio	0.031	0.005
Inertia	0.716	0.135
P	0.000 |**|	0.000 |**|

Figure 15. Reraltionship between reason for utiizing online shops and Univ.

7. Conclusions and discussions

This paper shows the students behavior and consciousness of online shops. Our research has some findings. Most of them do not purchase the goods at online shops directly, although many students utilize online shops' web site. They may have the inertia for real store in purchasing. Purchasing the goods at online shops actually is not so common for students. But they may utilize online shops for purchasing some specific goods.

They find out different conveniences and inconveniences to online shops for each goods. Of course, price is one of the most important factors for utilizing online shops. The features of the goods, however, are important as well even if at online shops.

Students of different university or region have different reasons for utilizing online shops. We can guess there are some factors of region or environment in consumer's decision making for utilizing online shops. Differences of transportation system or the amount of real shops may affect their behavior and consciousness.

We also show the difference of the behavior and consciousness between women and men. For online shops, women pay more attention to the popularity than men. Men value the amount of information higher than women. Women also strongly hope to confirm real goods than men. Women may be more sensitive to the security of the online shops or the Internet.

The features of each goods suggest more effective way of online shops business. It gives the suggestion for the business and policy making to point out the difference of behavior and consciousness between rural and urban consumers. This result may support to change marketing strategies for urban or rural. This work remains some problems. These are extension of respondents' layer or analysis of relationship between some factors. They are our future plan.

Acknowledgement

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The Evaluation of M-Commerce Interface on Smart Phone in Thailand
– Differences in Age and Education Background –

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Abstract This study aims to determine the effect of demographic characteristics of university students and middle-age people on their evaluation of using M-commerce application interface. The interfaces of M-commerce application in Thailand are provided on text-based and graphic-based application on smart phones. The evaluation is based on usefulness, intention to use, and risk perception. The result of statistical analysis using 120 samples reveal that there is significant difference in age and intention to use graphic-based application interface and there is significant difference in education background and risk perception of using text-based application interface.

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Keyword M-Commerce, Interface, Smart Phone, Demographic Characteristics, Education Background, Thailand

1. Introduction

Nowadays, the mobile phone has become one of the most important devices in communicating among people. The mobile technology also has been developing very fast. It can be seen that the mobile phone is used not only as a phone but also as a compact computer which we can take around everywhere with us, especially when we can connect the Internet from the mobile phone.

There are many useful applications on mobile phone at present. These help we manage our daily life easier. For Thailand, M-commerce service has been introduced into the business. The distinguish M-commerce in Thailand is mPay from Advanced Info Service (AIS) [1] and True Money from True Corporation (TRUE) [2]. Both mPay and True Money are the services that could be done through the mobile phone by using the applicable application, for example paying for telephone bills, booking for movie ticket, and paying bills. These two telecom service provider, AIS and TRUE, have a different unique selling point. AIS is well known for excellent services but TRUE is remarkable on serving right to the consumer's need or TRUE CONVERGENCE. However, this service is not yet well established in Thailand. Therefore, the user interface of M-commerce application on both providers and the effect of users' demographic characteristics on their evaluation of three aspects which are usefulness, intention to use and perceived risk are studied. This study will be immense beneficially to the consumer and the M-commerce service provider both in and out of Thailand. Since these M-commerce applications from two service providers, AIS and TRUE, are different in term of the user interface styles, therefore the study of both interfaces based on user's perspective is interesting. In this paper, the effect of user interface of M-commerce applications toward ease of use is studied.

mPay application's interface is a graphic based. It has graphic icons to represent each service as shown in the Figure 1.

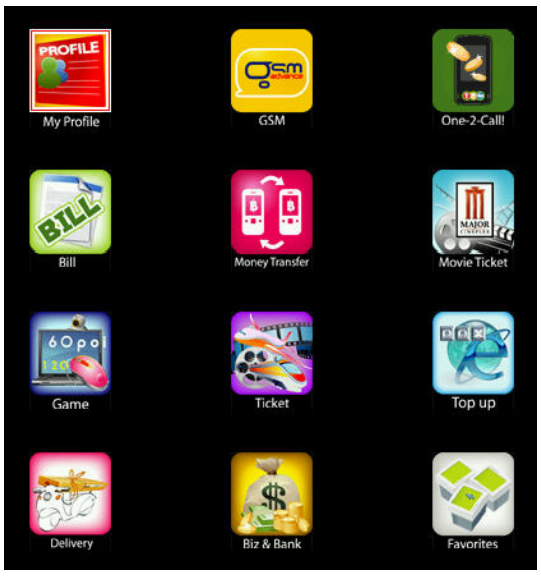

Figure 1. mPay application's interface

True Money application is text-based, that uses concise words, brief messages, and abbreviations for each menu as shown in Figure 2.

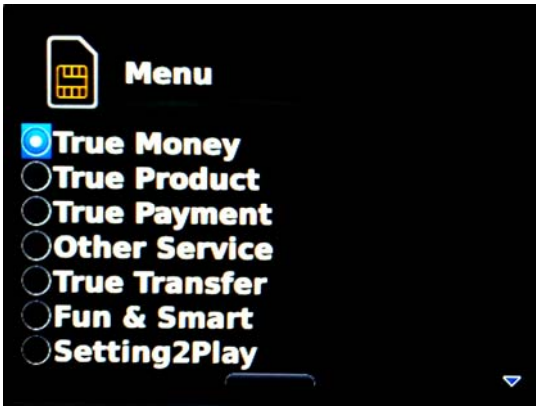

Figure 2. True Money application's interfaces

2. Literature review

Ngai and Gunasekaran studied on a review for mobile commerce research and applications showed that the mobile phone has added tremendous value to the business industry [3]. With high-ended technology, the mobile is getting smaller but the speed is getting faster including more spaces to compile data. However, the mobile's monitor itself still needs to keep redesign to serve the business structure better. The business structure today is very adaptable. It has to have least steps to work on for the consumer. Therefore, the consumer will feel rather comfortable to do the business on it. Next, timing is another issue. The consumer would like to be able to shop anywhere and anytime. The popular one at this moment is E-commerce because it response to this structure very well. Fasanghari and Roudsari focused on the model for E-commerce Customer Satisfaction Evaluation and the result shows that the consumer satisfaction measurement for using electronic commerce (EC) is very important and rather to do it [4]. There are numerous factors that we have to keep in mind for example consumer's concern, web design, and safety of website, information accuracy and reliability. The business that accentuates on customer satisfactory and wants to increase the business channel has applied this mobile technology with the EC. It has transformed to be the new business structure "Mobile Commerce" (M-commerce) or EC on the mobile phone. It has such a big impact on the business today. The mobile phone has become a key market in digital commerce, especially in M-commerce. Lately, it has become a popular business model in many countries such as Japan and South Korea. Merritt has pointed out that mobile technology continues to grow with endless possibilities [5]. It provides an effective and efficient ways to conduct business in variety of sectors, such as in financial transactions. In developed countries, the advance mobile phones help improve and increase the payment applications and lead to the development of new peer-to-peer services. We can see the examples from many pilot programs partnered by the financial institutions and wireless service providers. One important factor for this technology is user interface (UI).

Tsai and Chen focused on generating user interface for mobile phone devices using template-based approach and generic software framework and the conclusion confirm that the design of the UI has become even more crucial in the market today [6]. Besides, providing the ease of usage to general consumers, the well designed UI can give consumers the impression of the brand/device which is often used to judge their purchasing decision. In addition, its design plays an important part during the development of software. Brown pointed out that the criteria that most of people use to measure the quality user interface is easy to learn [7]. The user interface should be considered as a foremost in the design process. The basic goal for the interface designers should be ease of procedure for the first-time user. If any user interface can help users to perform their tasks step by step easily, it means design of user interface is successful. Susy et al. studied on user interface for mobile phone devices using template-based approach and generic software framework [8]. They concluded that that user interface (UI) affects consumer's perspective or decisions in buying mobile device. Users prefer the simple program when using application on mobile phone. They want an easy to use application. Keng, et al. focused on Perceived Usefulness, Perceived Ease of Use, and User Acceptant of Information Technology and the result show that if we wanted to provide added value and benefits to customers, we have to focus on six fundamental purposes (maximize convenience, maximize efficiency, ensure security, ensure privacy, ensure product/service quality, and minimize cost) which use to measure products and services of M-commerce [9]. These six purposes can be classified into the components of M-commerce work system which are product and services, business processes, information, and technologies. In term of technology, there are many tasks to do to make customers satisfy such as increase connection speed of mobile commerce, ensure ease of search, maximize ease of use, and improve input and output interface design.

3. Methodology

3.1 Data collection

In this research, 120 participants are asked to fill out questionnaires. Participants are equally divided into two groups. They are asked to perform one of three tasks on either mPay or True Money. Three common tasks between mPay and True Money are (1) depositing money into a pre-paid phone, (2) transferring money to a phone that uses the same E-money service and (3) buying products using E-money such as an international calling card or a cash card. After a task is finished, they are asked to fill out the questionnaire. However, two of questionnaires were invalid. Therefore, only 118 questionnaires will be analyzed. The demographic data of respondents are show in table 3.1. More than 70% of participants are female. Around 50% of participants are university students whose ages are 18-22 years old. More than 70% of participants use internet on computer every day. And more than 50% have experience on using internet on mobile phone. Table 1 shows demographic data of respondents.

Questionnaire is divided into three sections. The first section is demographic characteristics of participants, the second section is the technology background of the participant and the third is participants' attitude toward E-money application. In the third section, there are five parts: (1) To measure the ease of use of application (2) the usefulness of application (3) intention to use the application (4) the suitable interface of application and (5) the perceived risk. Each part contains ten questions each which are 50 questions in total. All questions are applied from the research papers of [10]-[16]. The participants are requested to evaluate the level of their agreement with each scale item on a four points likert scale from (1) Disagree, (2) Somewhat Disagree, (3) Somewhat Agree, (4) Agree. We use ease of use and user interface questions to conduct the first study and usefulness, intention to use, perceived risk and user interface questions for the second study.

Table 1. Demographic data of respondents

Category	Percentage (%)
Gender:	
- Male	33.1%
- Female	66.9%
Age:	
- 18-22	51.7%
- 23-30	18.6%
- 31-45	29.7%
Frequency of using internet on computer:	
- Never	5.9%
- Less than once a week	3.4%
- 2-3 times a week	7.6%
- More than 3 times a week	11.9%
- Everyday	71.2%
Frequency of using internet on mobile phone:	
- Never	41.5%
- Less than once a week	11.0%
- 2-3 times a week	10.2%
- More than 3 times a week	8.5%
- Everyday	28.8%

3.2 Test of Statistical Significance

The compare means method is used to test the significant age difference and education background difference in usefulness, intention to use and perceived risk of using m-commerce application interface.

We use the results of compare means to describe the difference between two groups which are university students and middle age people. The two interested factors we considered are age and education background (art and science majors). We will use only perspective of university students for the last factor.

First, we want to know if the different age will affect the perspective about user interface which affects other factors: usefulness, intention to use and perceived of risk or not.

Lastly, the education background factor, only data of university students will be used. We want to know if the different education background (In this case, art and science is two type of majors) will make students think differently about the usability of these two applications or not.

4. Analysis Result

4.1 Impact of Users' Age on Usefulness

Hypothesis:

μS = The average of usefulness for university students

μM = The average of usefulness for middle-age people

Research Hypothesis 1: μS ≠ μM: There is significant age difference in usefulness of using m-commerce application interface

For mPay application, the Levene's Test for Equality of Variances shows that F ratio (0.237) is not significant (p = 0.628), the two variances are not significantly different; that is the two variances are approximately equal. So the equal variances were assumed with t-value of -0.135 and 57 degree of freedom. The p-value is 0.893 which is greater than 0.05 significant level and the calculated t−value -0.135 does not exceed the table t−value 1.960. Therefore, the null hypothesis could not be rejected and the two means (μS and μM) is not statistically significantly different from zero at the 5% level of significance. Thus, there is no significant age difference in usefulness (See Table 2).

Table 2. Results of Compare Means for Age when using mPay application (Usefulness)

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Equal variances assumed	0.237	.628	-.135	57	.893	-.561400	.490485
Equal variances not assumed			-.135	56.9	.893	-.561004	.490088

Correspondingly, True Money application, the Levene's Test for Equality of Variances shows that F ratio (3.780) is not significant (p = 0.057), the two variances are not significantly different; that is the two variances are approximately equal. So the equal variances were assumed with t−value of -0.986 and 57 degree of freedom. The p−value is 0.337 which is greater than 0.05 significant level and the calculated t−value -0.986 does not exceed the table t−value 1.960. Therefore, the null hypothesis could not be rejected and the two means (μS and μM) is not statistically significantly different from zero at the 5% level of significance. Thus, there is no significant age difference in usefulness (See Table 3).

Table 3. Results of Compare Means for Age when using True Money application (Usefulness)

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Equal variances assumed	3.780	.057	-.986	57	.337	-.774858	.269855
Equal variance not assumed			-9.51	47.7	.346	-.786463	.281460

From Table 2 and 3, the age does not have any effect on the usefulness of using the interface. They agree on the issue that both mPay and True Money have helped them manage their tasks much easier and faster. The older ones would say that the application helps them manage their day-to-day life while the college students would like to use it if they have to manage those tasks.

4.2 Impact of Users' Age on Intention to Use

Research Hypothesis 2: There is significant age difference in intention to use m-commerce application interface

For mPay application, the Levene's Test for Equality of Variances shows that F ratio (4.459) is significant (p = 0.039), the two variances are significantly different; that is the two variances are unequal. So the unequal variances were assumed with t-value of -4.480 and 50.662 degree of freedom. The p-value is 0.000 which is not greater than 0.05 significant level and the calculated t-value -4.480 exceed the table t-value 1.960. Therefore, the null hypothesis could be rejected and the two means (μS and μM) is statistically significantly different from zero at the 5% level of significance. Thus, there is significant age difference in intention to use (See Table 4).

On the contrary, True Money application, the Levene's Test for

Equality of Variances shows that F ratio (0.650) is not significant (p = 0.423), the two variances are not significantly different; that is the two variances are approximately equal. So the equal variances were assumed with t-value of -1.023 and 57 degree of freedom. The p-value is 0.311 which is greater than 0.05 significant level and the calculated t-value -1.023 does not exceed the table t-value 1.960. Therefore, the null hypothesis could not be rejected and the two means (μS and μM) is not statistically significantly different from zero at the 5% level of significance. Thus, there is no significant age difference in intention to use (See Table 5).

Table 4. Results of Compare Means for Age when using mPay application (Intention to Use)

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Equal variances assumed	4.459	0.039	-4.45	57	.000	-1.46026	-.553945
Equal variances not assumed			-4.48	50.66	.000	-1.45848	-.555726

Table 5. Results of Compare Means for Age when using True Money application (Intention to Use)

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Equal variances assumed	.650	.423	-1.02	57	.311	-.788472	.255254
Equal variances not assumed			-1.02	56.97	.308	-.785192	.251974

From the usage intention of True Money in Table 5, both participants share the same kind of thought on the tendency of continue using it and not continue using it. Although we think that the text-based should attract more adult than the student, the result has shown differently. They are about the same.

On the contrary, the result of mPay from Table 4 has shown the students are very likely to go for graphic-based application. Therefore, there is the tendency for them to continue using it. But the adults are not fond of the icon. They think that the icon is not working very well; they are too small and having an ambiguous meaning. But the students think differently, they think the icons have communicate the meaning well. Even though some icon might not have an obvious meaning, it is quite easy to guess any way. Therefore, the adult group tends to shine away from keep using it.

4.3 Impact of Users' Age on Perceived Risk

Research Hypothesis 3: There is significant age difference in perceived risk of using m-commerce application interface

For mPay application, the Levene's Test for Equality of Variances shows that F ratio (1.079) is not significant (p = 0.303), the two variances are not significantly different; that is the two variances are approximately equal. So the equal variances were assumed with t-value of -0.1235 and 57 degree of freedom. The p-value is 0.222 which is greater than 0.05 significant level and the calculated t-value -0.1235 does not exceed the table t-value 1.960. Therefore, the null hypothesis could not be rejected and the two means (μS and μM) is not statistically significantly different from zero at the 5% level of significance. Thus, there is no significant age difference in perceived risk (See Table 6).

Table 6. Results of Compare Means for Age when using mPay application (Perceived Risk)

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Equal variances assumed	1.079	.303	-.123	57	.222	-.839219	.199042
Equal variances not assumed			-.123	53.28	.224	-.842076	.201899

Similarly, True Money application, the Levene's Test for Equality of Variances shows that F ratio (2.123) is not significant (p = 0.151), the two variances are not significantly different; that is the two variances are approximately equal. So the equal variances were assumed with t-value of -0.761 and 57 degree of freedom. The p-value is 0.450 which is greater than 0.05 significant level and the calculated t-value -0.761 does not exceed the table t-value 1.960. Therefore, the null hypothesis could not be rejected and the two means (μS and μM) is not statistically significantly different from zero at the 5% level of significance. Thus, there is no significant age difference in perceived risk (See Table 7).

From Table 6 and 7, both groups agree on the risk of using both applications. They think that since the E-money is concerned on money issue, there always have some risks involve. But when we observe from all 3 tasks that they have performed, we can see that if the amount of money is not too high when they are doing their shopping, they are willing to ignore the risk.

Table 7. Results of Compare Means for Age when using True Money application (Perceived Risk)

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Equal variances assumed	2.123	.151	-.761	57	.450	-.723028	.324930
Equal variances not assumed			-.750	49.62	.457	-.732565	.334468

4.4 Impact of Users' Education Background on Usefulness

Hypothesis:

μS = The average of usefulness for art students

μM = The average of usefulness for science students

Research Hypothesis 4: μS ≠ μM: There is significant education background difference in usefulness of using m-commerce

application interface

For mPay application, the Levene's Test for Equality of Variances shows that F ratio (0.065) is not significant (p = 0.800), the two variances are not significantly different; that is the two variances are approximately equal. So the equal variances were assumed with t-value of -0.496 and 28 degree of freedom. The p-value is 0.624 which is greater than 0.05 significant level and the calculated t-value -0.496 does not exceed the table t-value 1.960. Therefore, the null hypothesis could not be rejected and the two means (μS and μM) is not statistically significantly different from zero at the 5% level of significance. Thus, there is no significant education background difference in usefulness (Table 8).

Correspondingly, True Money application, the Levene's Test for Equality of Variances shows that F ratio (0.242) is not significant (p = 0.626), the two variances are not significantly different; that is the two variances are approximately equal. So the equal variances were assumed with t-value of -0.658 and 29 degree of freedom. The p-value is 0.337 which is greater than 0.05 significant level and the calculated t-value -0.658 does not exceed the table t-value 1.960. Therefore, the null hypothesis could not be rejected and the two means (μS and μM) is not statistically significantly different from zero at the 5% level of significance. Thus, there is no significant education background difference in usefulness (Table 9).

Table 8. Results of Compare Means for Education Background when using mPay application (Usefulness)

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Equal variances assumed	0.065	.800	-.496	28	.624	-1.00606	.613
Equal variances not assumed			-.520	24.10	.608	-.974226	.582

Table 9. Results of Compare Means for Education Background when using True Money application (Usefulness)

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Equal variances assumed	.242	.626	-.658	29	.516	-.802588	.411998
Equal variances not assumed			-.655	28.17	.518	-.805486	.414896

For the usefulness issue, the students from both majors assent on how the application responds to their day-to-day needs. Although they still can't earn the living yet which will not allow them to pay too much money, the application has the menus for student, for example, movie, there is the function to check for the started time.

4.5 Impact of Users' Education Background on Intention to Use

Research Hypothesis 5: μS ≠ μM: There is significant education background difference in intention to use m-commerce application interface

For mPay application, the Levene's Test for Equality of Variances shows that F ratio (2.416) is not significant (p = 0.131), the two variances are not significantly different; that is the two variances are approximately equal. So the equal variances were assumed with t-value of -0.787 and 28 degree of freedom. The p-value is 0.438 which is greater than 0.05 significant level and the calculated t-value -0.787 does not exceed the table t-value 1.960. Therefore, the null hypothesis could not be rejected and the two means (μS and μM) is not statistically significantly different from zero at the 5% level of significance. Thus, there is no significant education background difference in intention to use (See Table 10).

Table 10. Results of Compare Means for Education Background when using mPay application (Intention to use)

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Equal variances assumed	2.416	.131	-.787	28	.438	-.490448	1.102
Equal variances not assumed			-.735	17.07	.472	-.571792	1.183

Identically, True Money application, the Levene's Test for Equality of Variances shows that F ratio (1.271) is not significant (p = 0.269), the two variances are not significantly different; that is the two variances are approximately equal. So the equal variances were assumed with t-value of -0.593 and 29 degree of freedom. The p value is 0.558 which is greater than 0.05 significant level and the calculated t-value -0.593 does not exceed the table t-value 1.960. Therefore, the null hypothesis could not be rejected and the two means (μS and μM) is not statistically significantly different from zero at the 5% level of significance. Thus, there is no significant education background difference in intention to use (See Table 11).

Table 11. Results of Compare Means for Education Background when using True Money application (Intention to use)

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Equal variances assumed	1.271	.269	-.593	29	.558	-1.0117	.556940
Equal variances not assumed			-.588	26.73	.561	-1.0205	.565788

From table 10 and 11, the students from both majors share the same common ground on the intention to use. They are having the tendency to use mPay or True Money in the future. Even the group that has the negative responds and not willing to use the application, it still does not show that being in different fields has any effects on making the decision to use the application.

4.6 Impact of Users' Education Background on Perceived Risk

Research Hypothesis 6: μS ≠ μM: There is significant education background difference in risk perception of using m-commerce application interface

For mPay application, the Levene's Test for Equality of Variances shows that F ratio (0.584) is not significant (p = 0.451), the two variances are not significantly different; that is the two variances are approximately equal. So the equal variances were assumed with t-value of -0.154 and 28 degree of freedom. The p-value is 0.879 which is greater than 0.05 significant level and the calculated t-value -0.154 does not exceed the table t-value 1.960. Therefore, the null hypothesis could not be rejected and the two means (μS and μM) is not statistically significantly different from zero at the 5% level of significance. Thus, there is no significant education background difference in perceived risk (See Table 12).

Table 12. Results of Compare Means for Education Background when using mPay application (Perceived risk)

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Equal variances assumed	.584	.451	-.154	28	.879	-.742787	.638
Equal variances not assumed			-.160	23.36	.874	-.724335	.620

Identically, True Money application, the Levene's Test for Equality of Variances shows that F ratio (0.332) is not significant (p = 0.569), the two variances are not significantly different; that is the two variances are approximately equal. So the equal variances were assumed with t-value of -2.686 and 29 degree of freedom. The p-value is 0.012 which is not greater than 0.05 significant level and the calculated t-value -2.686 exceed the table t-value 1.960. Therefore, the null hypothesis could be rejected and the two means (μS and μM) is statistically significantly different from zero at the 5% level of significance. Thus, there is significant education background difference in perceived risk (See Table 13).

Table 13. Results of Compare Means for Education Background when using True Money application (Perceived risk)

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Equal variances assumed	.332	.569	-2.68	29	.012	-1.322221	.178983
Equal variances not assumed			-2.66	26.64	.013	-1.328895	.172309

From the table 12 and 13, the students who use mPay from both majors have shared the same perception on the perceived risk. Although they are worry about taking the chance on money issue, the interface on mPay is graphic-based which helps them lessen their concern. However, the students from sciences who use True Money think that the text-based interface of True Money looks good and reliable. They do think about the risk but believe in the application. Mean while, the student from arts feel that the application does not look safe enough because it is full with texts, and they do not want to take any chance to do the transaction that involves high volume of money, for example paying bill for the household, because they cannot see the picture how the money would be paid and how they can trust that they already have paid for the bill. Moreover from the table, the task that the students have tried involves only small amount of money, they might feel that the risk that they might have to take is insignificant.

Table 14 Summary of Compare Means on Graphic-based Interface (mPay)

Differences in	Age	Education background
Usefulness	Non-significance	Non-significance
Intention to use	Significance	Non-significance
Perceived risk	Non-significance	Non-significance

Table 15 Summary of Compare Means on Text-based Interface (True Money)

Differences in	Age	Education background
Usefulness	Non-significance	Non-significance
Intention to use	Non-significance	Non-significance
Perceived risk	Non-significance	Significance

5. Conclusion

In this research, the effect of users' demographic characteristics and education background on the evaluation of M-commerce application interface on the smart phone in Thailand is studied. The interfaces of M-commerce application in Thailand are provided on text-based and graphic-based application on smart phones. The evaluation is based on usefulness, intention to use, and risk perception. Text-based interface in True Money application can be applied with every mobile phone. However, graphic-based interface in mPay application is limited to a mobile phone that has java 2.0.

120 Participants including university students and middle age people were asked to use M-commerce application. These two applications share common tasks but the design approaches are different. The result of statistical analysis using 120 samples reveal that there is significant difference in age and intention to use graphic-based application interface and there is significant difference in education background and risk perception of using text-based application interface (See Table 14 and 15).

These findings help M-commerce venders to understand which demographic characteristics of users affect their usage intention and risk perception when using M-commerce application via the smart phone. If a company wants to develop the M-commerce application on mobile phones, the important factors include the language, and layout/icon design. There should be some explanation under the menus or icons that explain the functionality. They should choose suitable size of font or icon that is comfortable for users to read. Classifying tasks by using color will make users feel good and confident when using the application.

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FROM THE CONFERNCE

In this part, presentation slides from the conference are reproduced.

The presentations from *The Third Workshop on IT Enabled Services (ITeS 2010)* are included. The entire program of the Workshop is shown as follows. The presentation in **BOLD** are reproduced.

The Third Workshop on IT-enalbed Services

Thursday July 22 and Friday July 23

JW Marriot, Seoul
19-3 Banpo-dong Seocho-gu
Seoul, 137-040 South Korea

Session 1: Trust and IteS – Thursday July 22, 15:30-17:00, Meeting Room 1C (3rd floor)
Session Chair: Hitoshi Okada

A Dynamic Trust Estimation Method for 'Persona' from the Human Relationship of Social Web - Social Web and Trust by the Rating of a Persona's Active Audience - by Shigeichiro Yamasaki

Disaster Recovery for System Architecture using Cloud Computing
by Manish Pokharel, Jong Sou Park

Web-based experiment to analyze norms of reputation making - How to evaluate actions with a opponent having a bad reputation
by Takahisa Suzuki, Tetsuro Kobayashi

Session 2: ITeS and Payment – Friday July 23, 13:30-15:00, Meeting Room 1C (3rd floor)

Session Chair: Shiro Uesugi

A New Design of ATM Interface for Banking Services in Thailand
by Nagul Cooharojananone, Kamonwan Taohai, Suphakant Phimoltares

An electronic money system as substitutes for banknote
by Kinoshita Hirotsugu, Kudo Mamoru, Morizumi Tetsuya, Suzuki Kazuhiro

The Study on Consumer Behavior of Online Shops
Takashi Okamoto

Session 3: ITeS and infrastructure – Friday July 23, 15:30-17:00, Meeting Room 1C (3rd floor)

Session Chair: Shiro Uesugi

The Problems for Diffusion of Location Based Services in Rural Areas
Hidenobu Sai

An analysis of IPTV competition model
Masashi Ueda, Yunju Chen, Yousin Park

Transforming the Interactive Response System to a Cloud Voting Service
Yu-Hui Tao

A Dynamic Trust Estimation Method for 'Persona' from the Human Relationship of Social Web

- Social Web and Trust by the Rating of a Persona's Active Audience -

Shigeichiro Yamasaki
Kinki University

The Purpose of this Research

- is to propose 'PersonaRank' method
- 'PersonaRank' is an Imitation of Google 'PageRank'
- We regard a person as a source of information over the social web based applications

Example of an imaginary application of "PersonaRank"

A Twitter application for book review

Anyone can post the book review as a post of twitter

"PersonaRank"

Trust estimation rating as book reviewers

"PersonaRank" and its imaginary applications

"PersonaRank"

Trust estimation ratings of reviewers

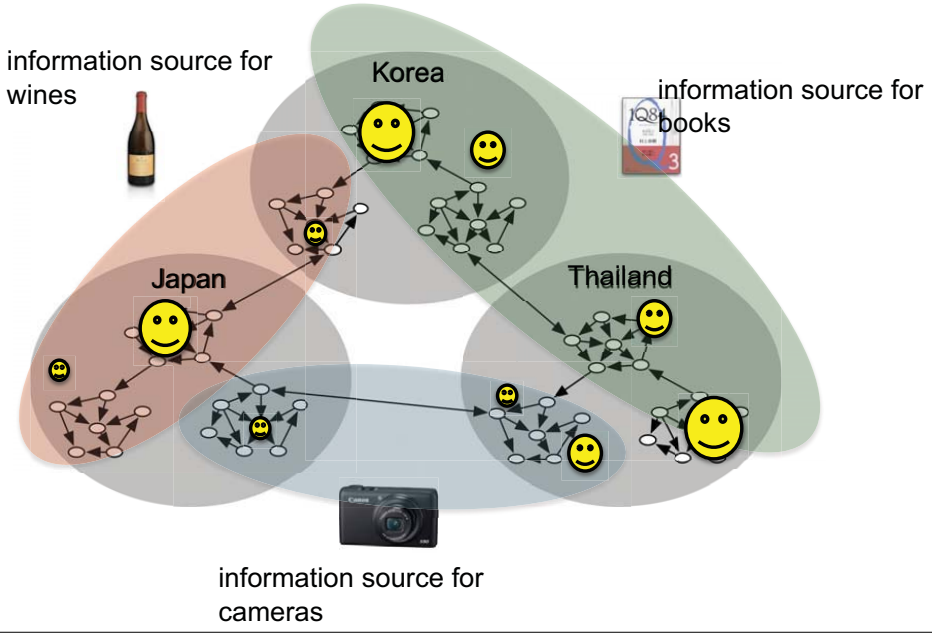
"PersonaRank" and its imaginary applications

"PersonaRank"

Trust estimation
ratings of reviewers

The Ultimate Purpose of this Research

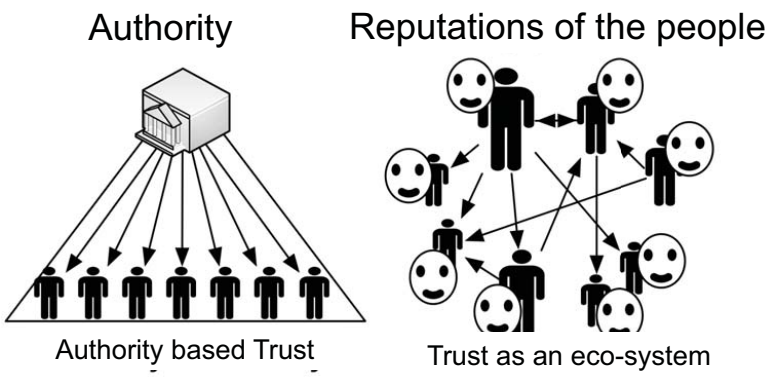
International trust infrastructure
for the sources of information over the social web



Two types of trust infrastructures

- I don't mention about 'what trust is'
- 'PersonaRank' is an eco-system type of trust infrastructure
- Our (intuitive) notion of 'Trust' of a persona is not perpetual but sensitive to the reputation of the people

  'PersonaRank' is always dynamically modified to reflect the reputation of the people

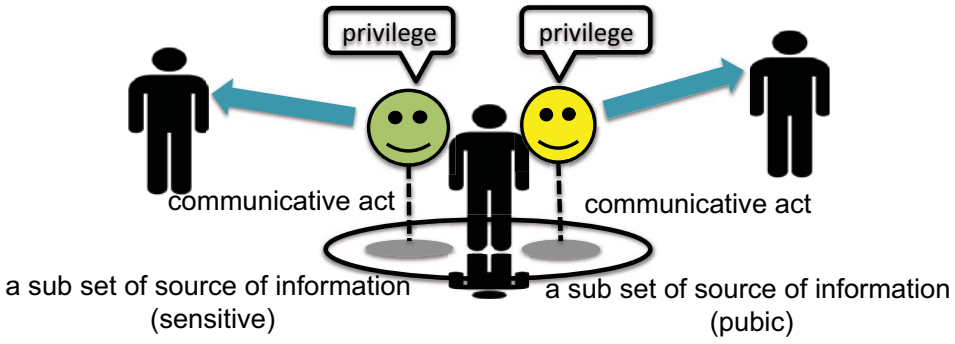


Our notion of 'Persona'

- We consider a 'person' in cyber space to be a source of information
- Every communicative act of a person

  is required some privilege to do the action in some application

  and its result causes some information flow
- 'Persona' is a symbol for a sub set of source of information of a person and a privilege

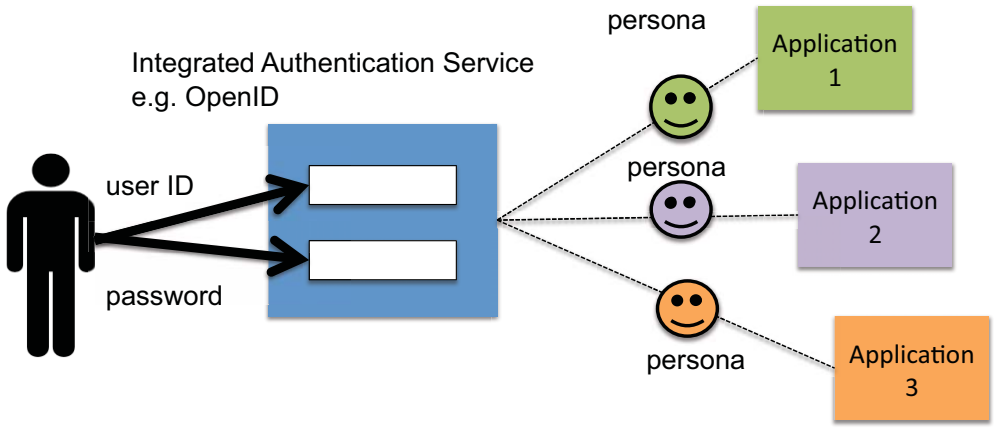


Persona and Single Sign on

■ Single sign on system

Login only once and automatically logged in multiple applications

Persona are required for the SS



Example of Single Sign on (1)

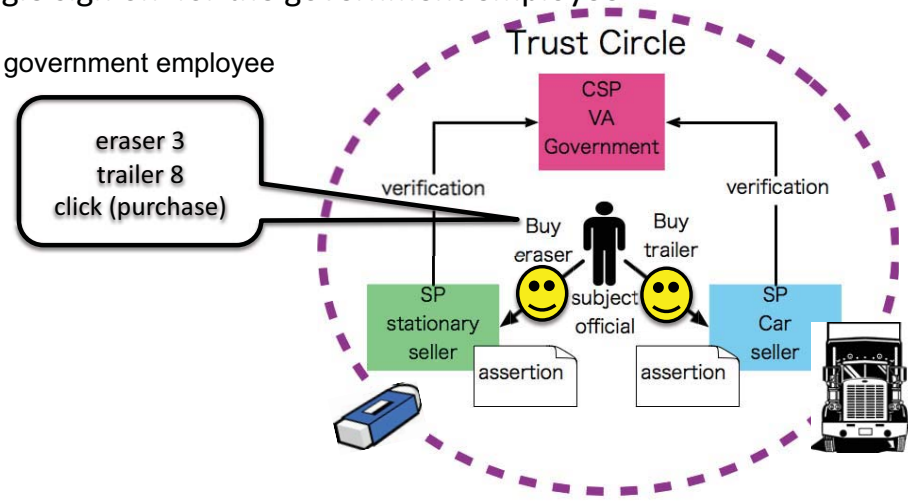
Authority-Centric model

Out of scope of this research

■ SAML

Catch phrase of SAML is "From erasers to trailers"

single sign on for the government employee



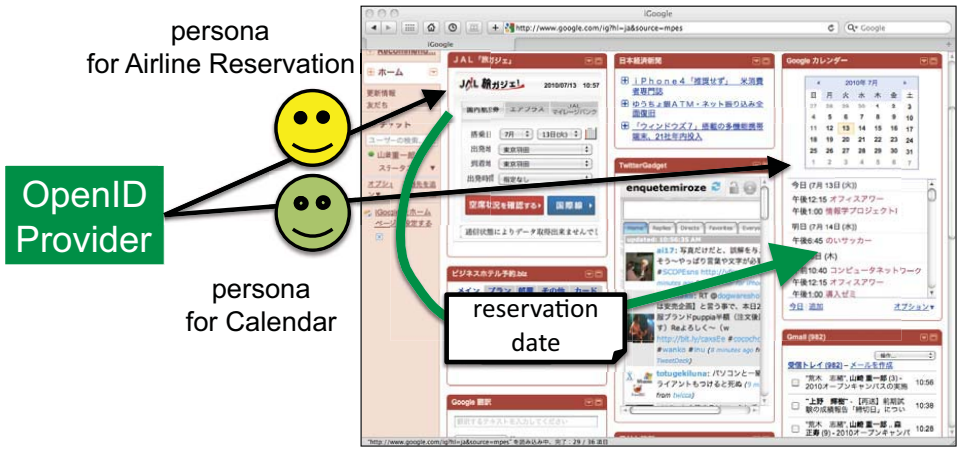
Example of Single Sign on (2)

User-Centric model

- iGoogle Gadgets
  - Automatic Login to the multiple web applications
  - Every gadgets are personalized after single login automatically

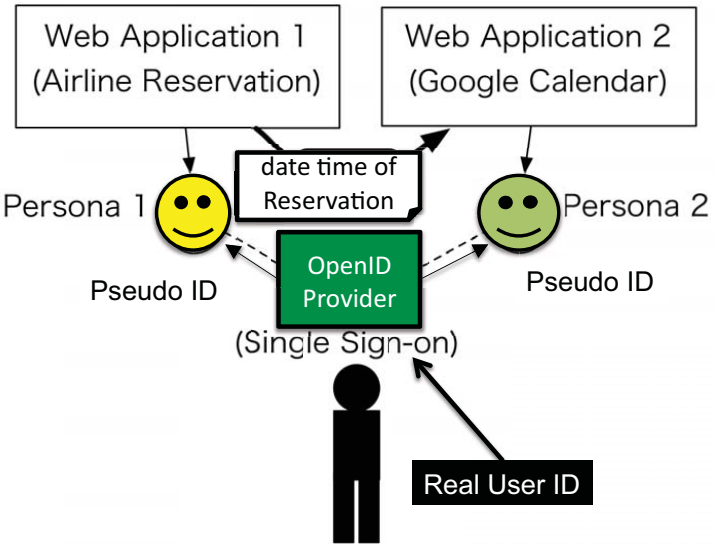
Inter Gadget cooperation with Persona

- Cross web site cooperation with private data control
  - 'I can control MY information with my personas'
- Web application can not unify the personas



'Persona' is a pseudo-identity

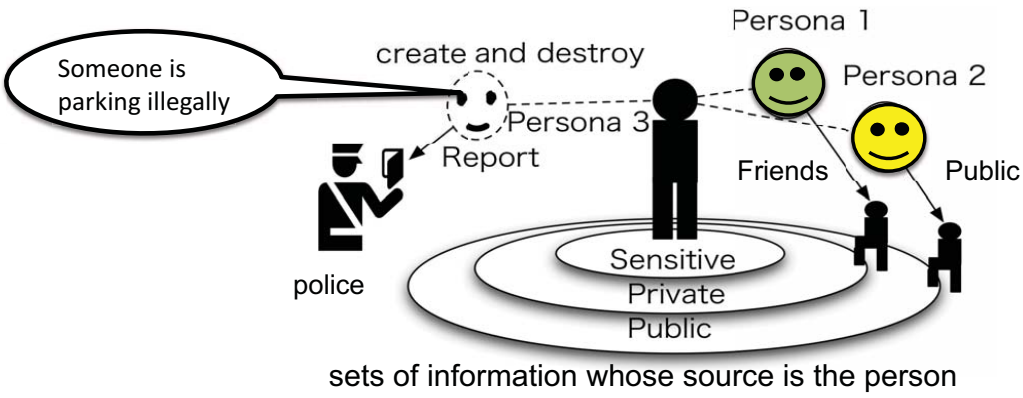
'Persona' hides the real identity from the applications
But each Persona has its stable identity and take its responsibility (Persona is not an anonymity)



Persona and Privacy

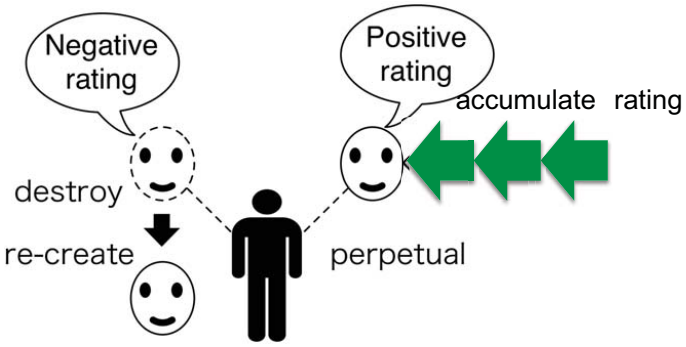
- A Persona is a symbol for a set of information the source of which is the owner person
- A persona defines the range of personal information disclosed with it
- Some personas are disposable

  e.g. reporting for the police



The Ratings for the Persona

- A Persona who has positive rating is valuable
  - Such persona will be kept to accumulate more positive rating
- A Persona who has negative rating will be destroyed and will be re-created as a flesh persona
- Negative rating is not work well

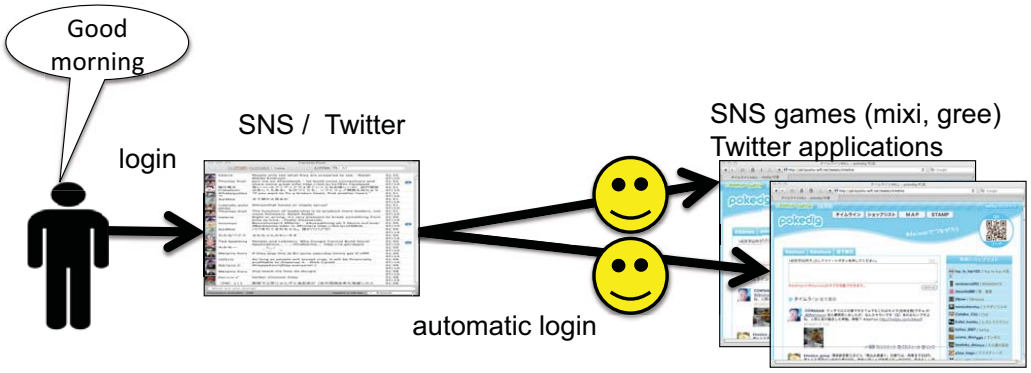


Example of Single Sign on (3)

User-Centric model

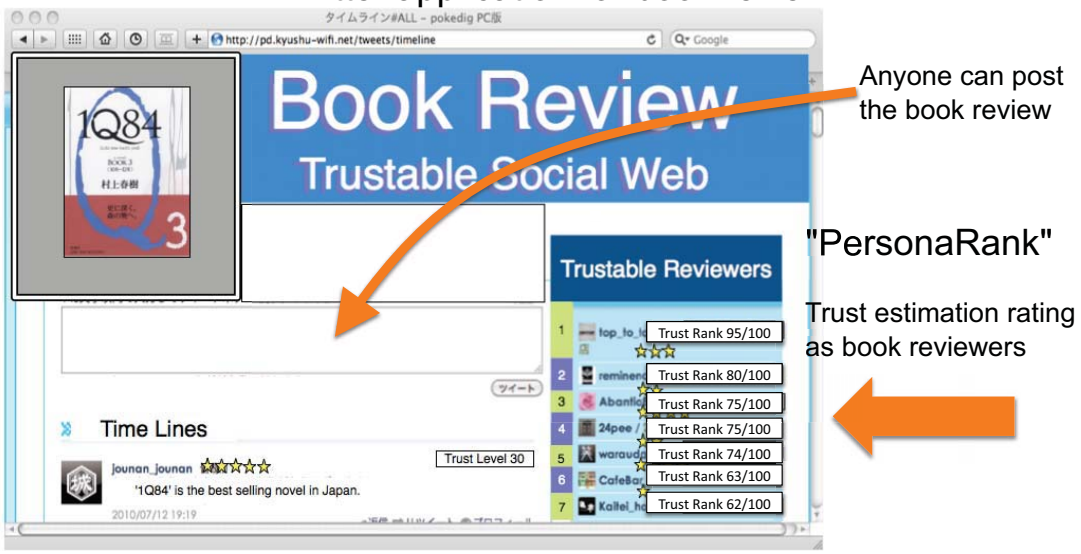
The target of this research

- Automatic login to Social Web Applications
  - Login once in the morning to Twitter or SNS
  - then automatically logged in many another related social applications



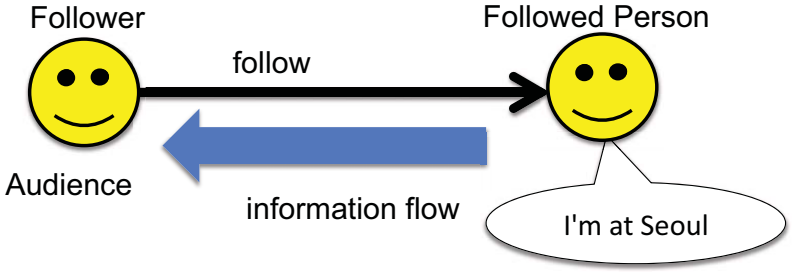
Example of an imaginary application of "PersonaRank"

A Twitter application for book review



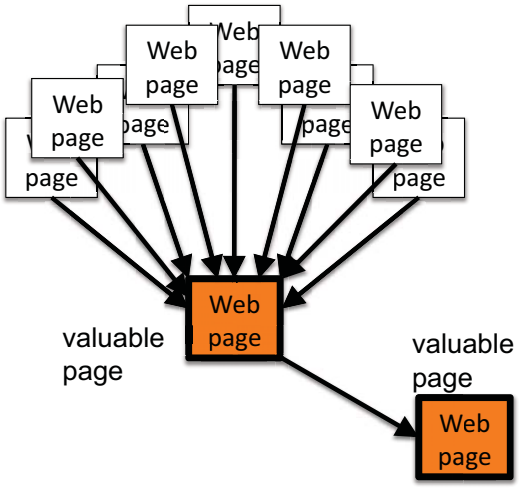
Social web and Rating of Persona

- Following relationship of Twitter
  - follower is an audience of the followed person
- Following Relationship can be regarded as a recommendation
  - Because the followed person is worth to follow as a source of information



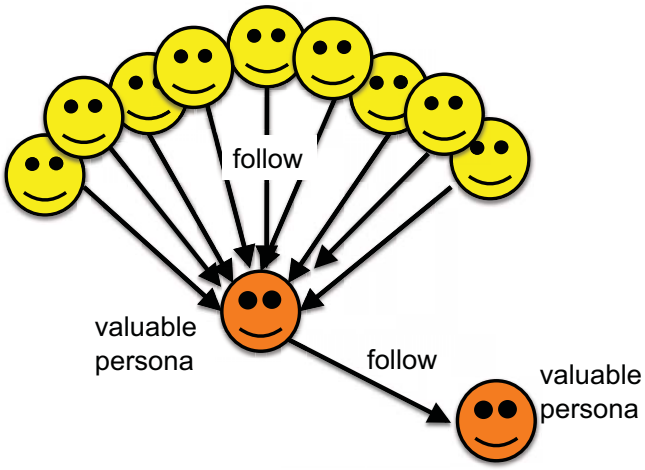
Google PageRank

- Hyper Links as a recommendation of a web page
- A Valuable page is linked by many valuable pages
  * Recursive and transitive definition



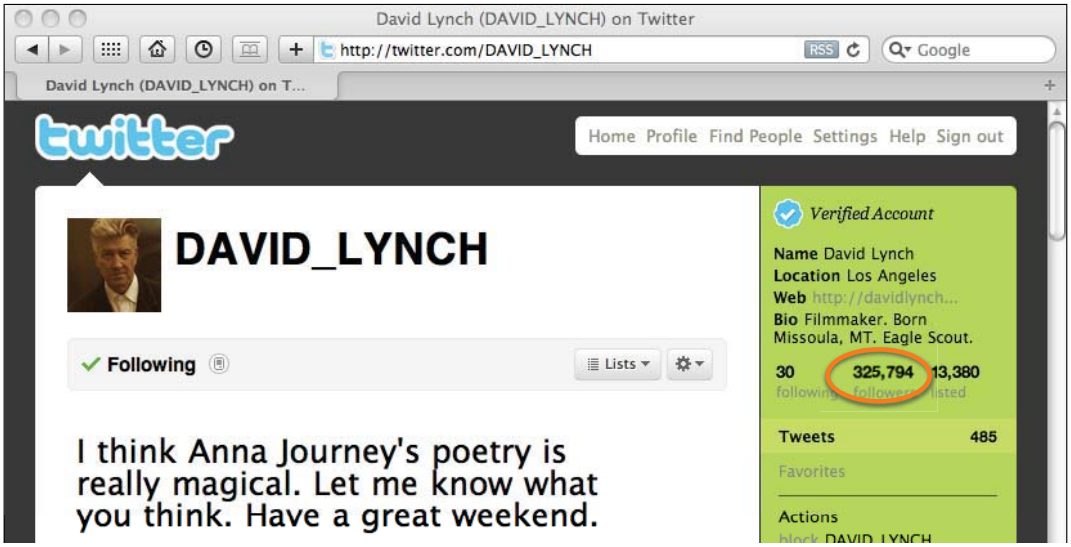
Our 'PersonaRank'

- Following relation as a recommendation
- A Valuable Persona is followed by many valuable Persona
  *Recursive and transitive definition



Following relation as a recommendation

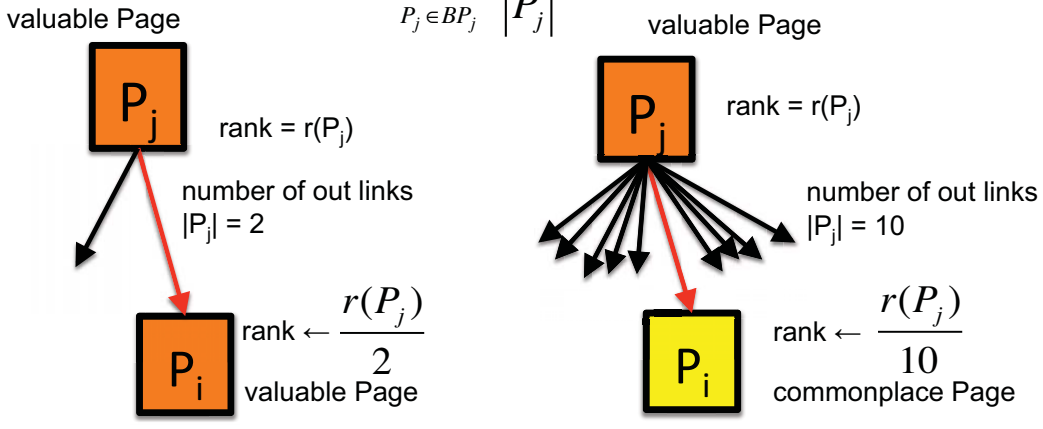
- David Lynch has 325,794 followers



Google PageRank

- The rating of the linked page is decided by the number of out links

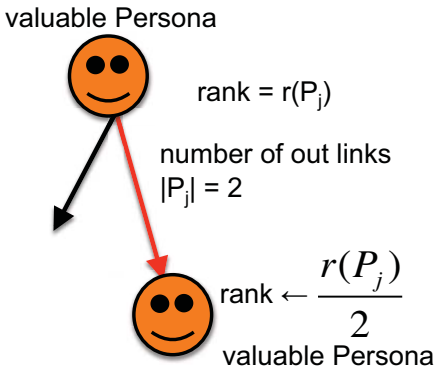
$$r(P_i) = \sum_{P_j \in BP_j} \frac{r(P_j)}{|P_j|}$$

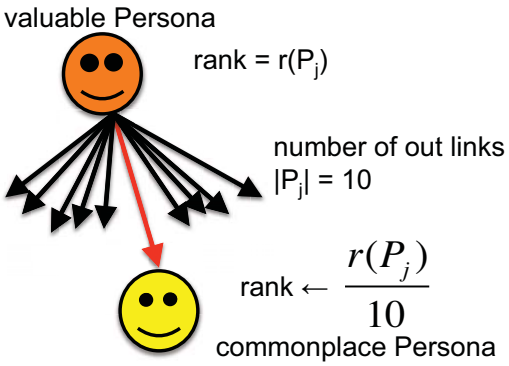


Our 'PersonaRank'

- The rating of the followed persona is decided by the number of following personas of the follower

$$r(P_i) = \sum_{P_j \in FollowersP_j} \frac{r(P_j)}{|P_j|}$$

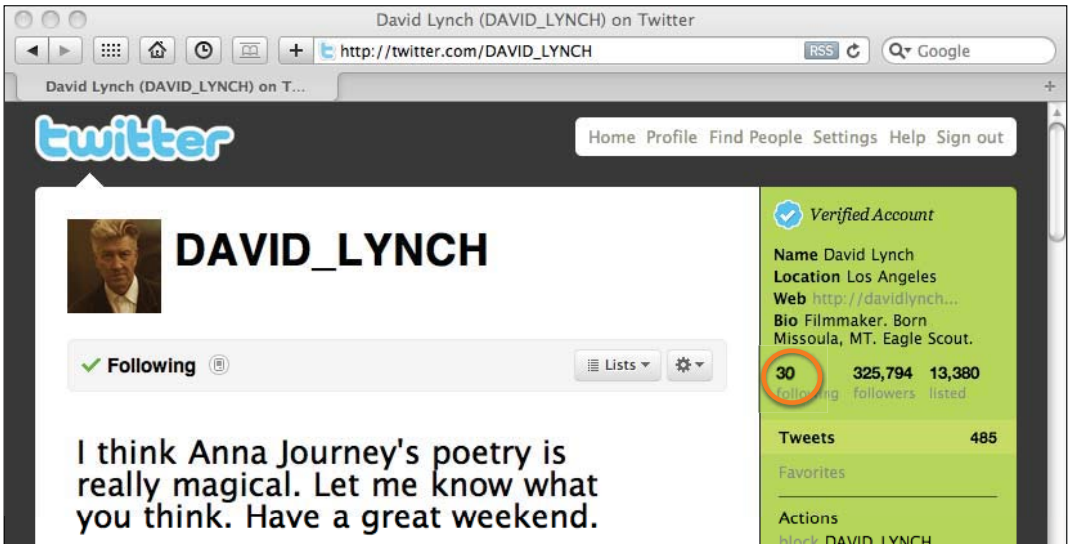




Following relation as a recommendation

- David Lynch follows only 30 people

  We assume that the followed person will be valuable



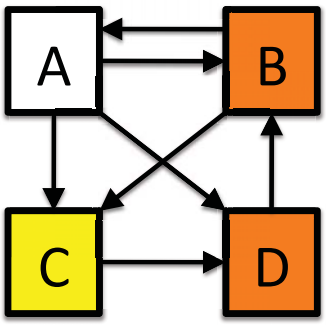
Iterative Procedure of Google PageRank

- Initial condition

  for every page: rank = 1/n

$$r_{k+1}(P_i) = \sum_{P_j \in BP_j} \frac{r_k(P_j)}{|P_j|}$$

4 pages



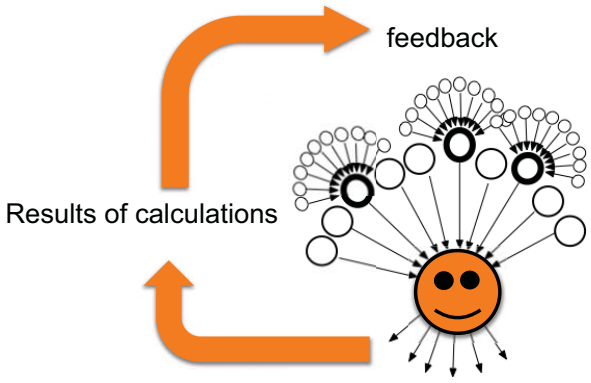
r_0(A)=1/4, r_0(B)=1/4, r_0(C)=1/4, r_0(D)=1/4
r_1(A)=1/8, r_1(B)=1/3, r_1(C)=5/24, r_1(D)=1/3
r_2(A)=1/6, r_2(B)=9/24, r_2(C)=5/24, r_2(D)=9/24

Ranking No. 1:B, D, No. 3 : C, No. 4: A

Iterative Procedure of 'PersonaRank'

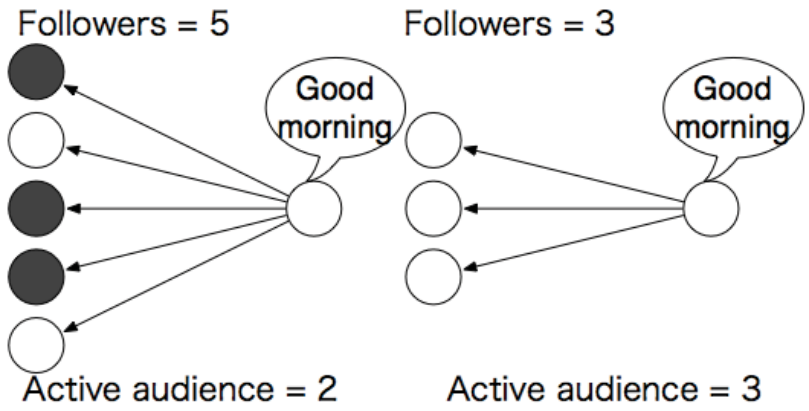
$$r_{k+1}(P_i) = \sum_{P_j \in FollowersP_i} \frac{r_k(P_j)}{|P_j|}$$

- The total population of Twitter in the world is about 100,000,000 (2010)
- But we assume the Initial value is not 1/100,000,000



Active Audience

- The number of follower is not the actual number of the audience



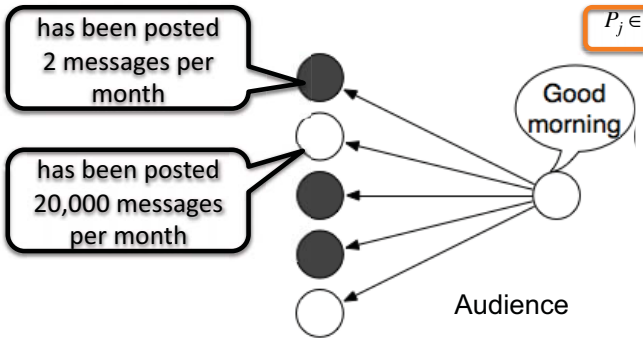
What is the Active Audience (1)

- Number of posted messages assumption

  We assume that an active audience may be an active talker

ActiveFollower(P_j) : a set of followers whose post is more than N/month

$$r_{k+1}(P_i) = \sum_{P_j \in ActiveFollowersP_i} \frac{r_k(P_j)}{|P_j|}$$



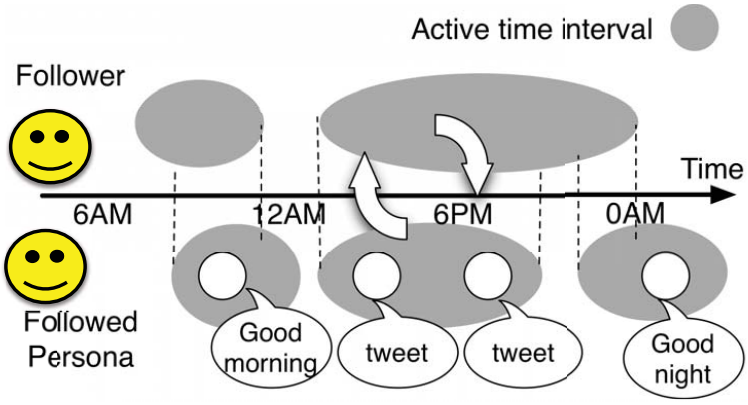
What is the Active Audience (2)

- Similarity of life style as to time

  when wake up, when sleep, when login, when logout

- Active Audience

  and his / her followed person must logged in simultaneously



A measure of the similarity of lifestyle

- Collaborative filtering technologies

  frequency of a persona's post according to the time

  similarity is measured by a distance between them

Followed persona

Time Interval (UTC Time)	P1	P2	P3	P4	P5	P6
<0, Monday >	12	0	5	7	0	0
<1 ,Monday >	3	0	12	1	0	0
<2,Monday >	0	4	9	0	23	12
...						
<23,Monday >	0	9	5	0	1	1
<0, Tuesday >	5	0	15	6	0	0
...						

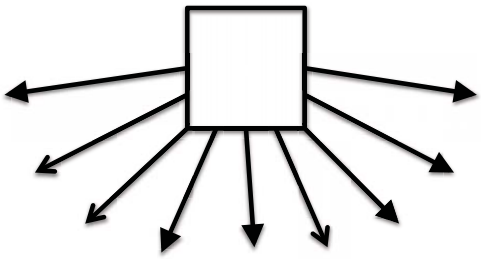
$$p(x,y)=\frac{\sum_{i=1}^{n}(x_i-\bar{x})(y-\bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i-\bar{x})^2}\sqrt{\sum_{i=1}^{n}(y_i-\bar{y})^2}}$$

Pearson correlation coefficient

$$Dist(P_i,P_j)=1-\frac{p(P_i,P_j)+1}{2}$$

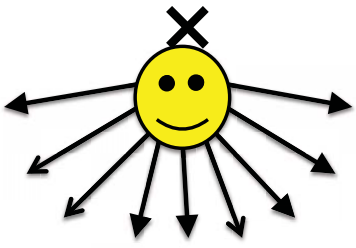
Hub node

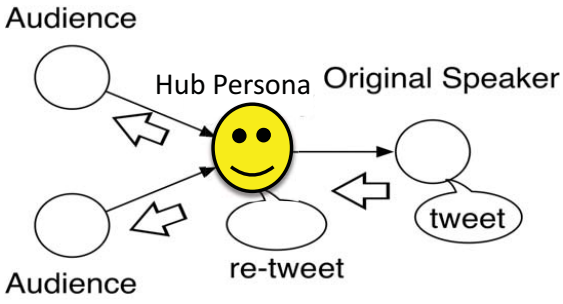
- Hub node in the Web pages
  - A page that has many out links
  - Such page itself is not valuable but it can be a important site in terms of information propagation
  - Google PageRank does not add any points to the hub node
  - But some page ranking system evaluates hub node



Hub Persona and re-tweeting

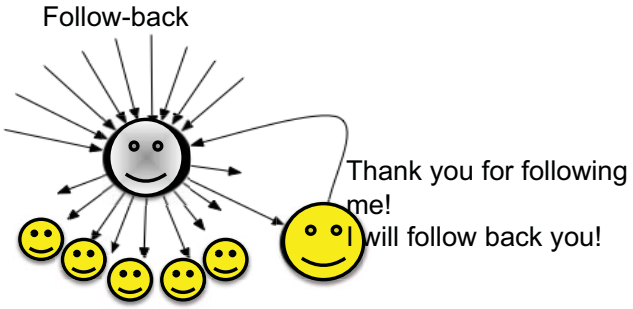
- A Persona who follows many persona is useless for information propagation
- Hub Persona:
  - A persona who Re-tweeting frequently
  - *Hub persona's rating as an active audience is waited according to the whose re-tweeting frequency





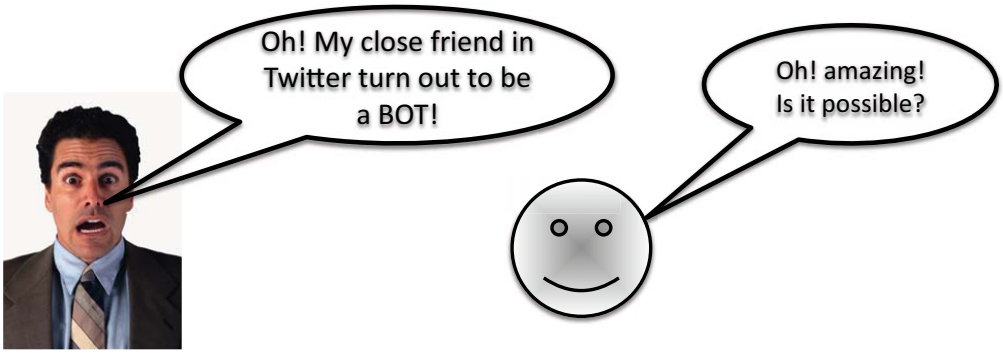
Follow-Back BOT Problem

- A 'BOT' means a software robot
- Follow-Back BOT
  - A BOT who follows many people at random
  - Many People tend to follow-back to the person who follow them
  - As a result, such BOT become to get a lot of followers



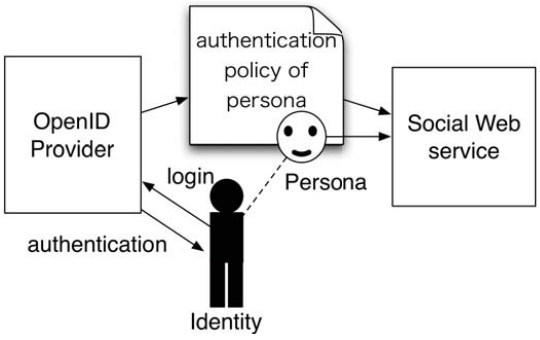
Imitated Human BOT problem

- Turing Test
  - To distinguish a BOT from human is very hard problem
  - There are many clever and sophisticated imitated human BOTs in Twitter



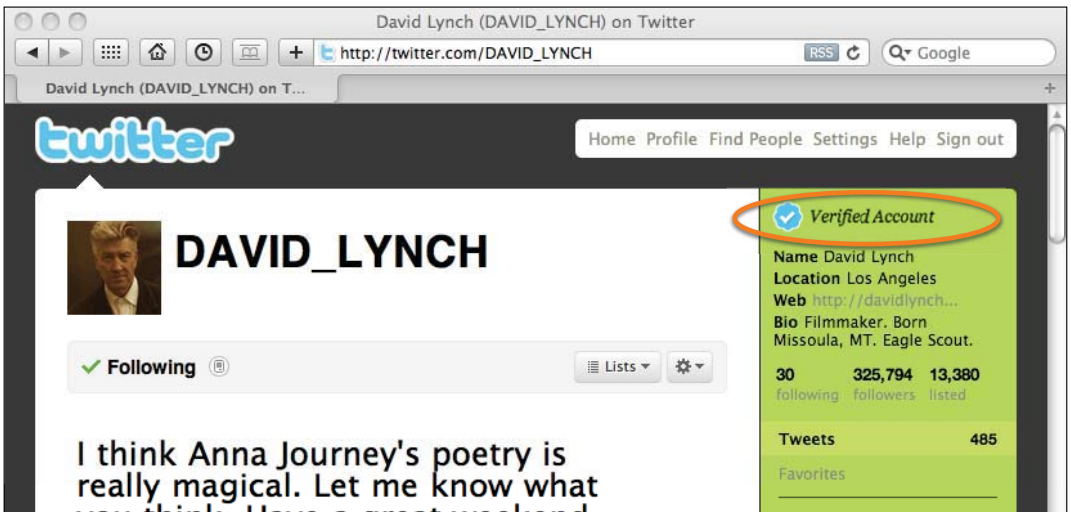
Authentication Policy checking for the persona

- One pragmatic way to distinguish a BOT from a human is to use some authentication system
- PAPE: (OpenID Provider Authentication Policy Extension 1.0)
  - A part of OpenID protocol for the authentication policy confirmation
  - At present, Twitter does not support such kinds of authentication policy confirmation API



Verified Account of Twitter

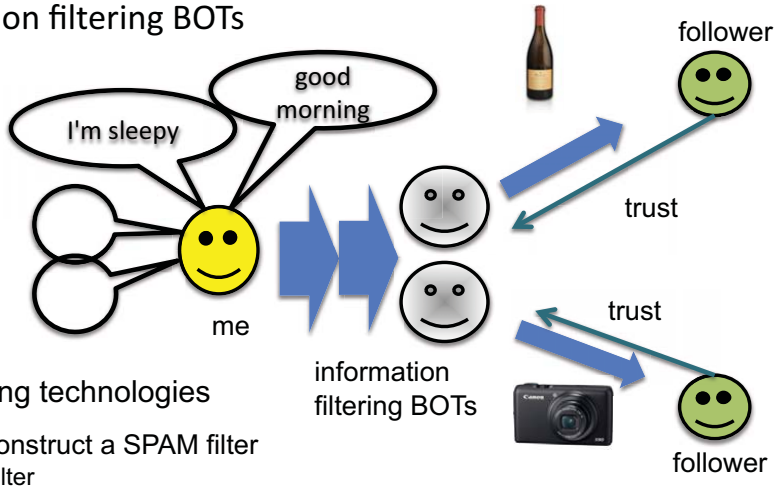
- Twitter supports "Verified Account"
  - this information can be obtained via twitter API



Trusted BOT

- We can trust the authorized BOT
- Persona as a personal BOT

  We can be more trustable for the audience if we use the information filtering BOTs



Document Filtering technologies

A popular way to construct a SPAM filter
e.g. Bayesian Filter
Messages are filtered by learned conditions

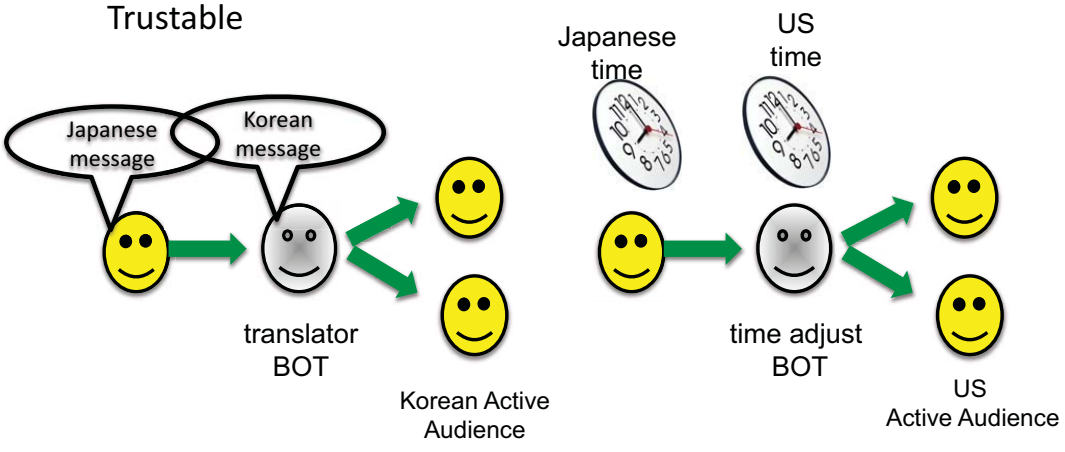
Trustable BOT and Active Audience

- barrier of language

  Trustable translation BOTs will enhance the active audience

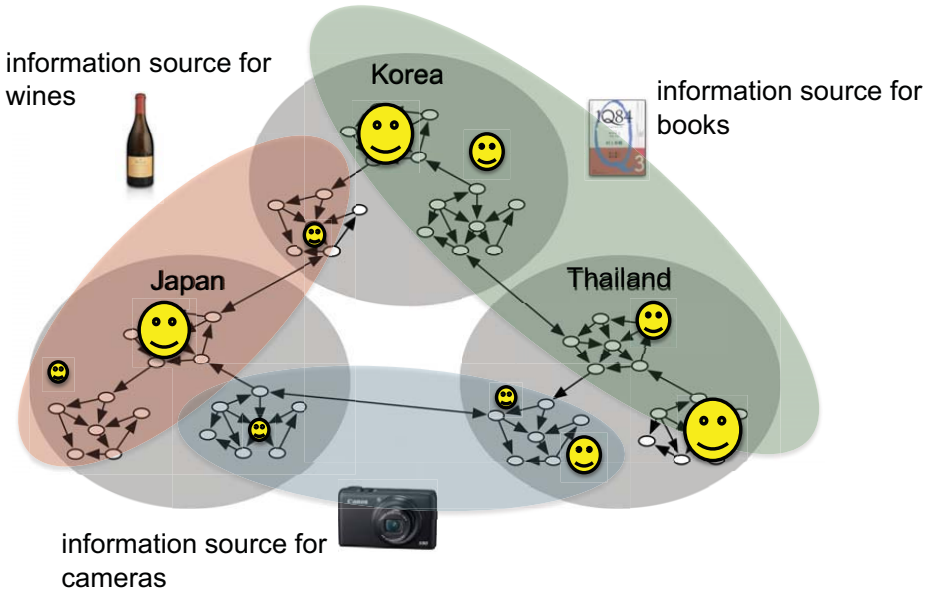
- barrier of life time

  Trustable



The Ultimate Purpose of this Research

International trust infrastructure for the sources of information



Experimentations and Implementations

- Now In progress
- joint researchers are welcome!

conclusion

- This research is in progress
- I didn't mention about what TRUST is

  because I don't understand it well yet
- Social Webs are evolving now

  I hope my research become something worth to the NEXT GENERATION social webs

Disaster Recovery for System Architecture using Cloud Computing

Manish Pokharel
NS Lab
Korea Aerospace University
July 22, 2010

Contents

- Introduction
- Problems in Existing System
- Proposed Solution: DRP with Cloud Computing
- Analysis
- Results
- Conclusion

Introduction

- A System Architecture [SA] plays the leading role in ICT based organization to achieve the mission of organization.
- As other architectures, it also has set of components and the relationship (connectors) among the components.
- It has pre-defined life cycle that determines the duration of the system in which it should provide the services continuously.
- It means system should survive throughout its defined life time.
- *Unfortunately*, a system comes across to many hurdles during its life time. ----*Disaster*

Continue…

- Disaster is unexpected events in a system during its life time.
- These events are natural as well as human made.
- The earthquake, flood, volcano, Tsunami are natural disaster where as terrorist attack like 9/11, 7/7 are human made disaster.
- The recent earthquake in Haiti, Chili has drawn significant attention of experts around the world.
- Both types of disaster costs huge volume of data and information.

Continue…

- Such events are not expected but we have to be careful about our recovery plan from such events.
- Here, We try to make system architecture more effective on *disaster recovery capability with the approach of cloud computing*.
- Cloud computing is new paradigm in computing area in which every features can be provided as a service.
- Service is provided or accepted between service provider and service users as per the *Service Level Agreement*(SLA).

Problems in Existing System

- ***Facts of Traditional Disaster Recovery Plan(TDRP)***
  - In most of the traditional DRP's system, multiple replication of a same system is made and placed into different geographic location as a copy of primary system.
  - If disaster happens in primary location then the secondary location will provide the information.

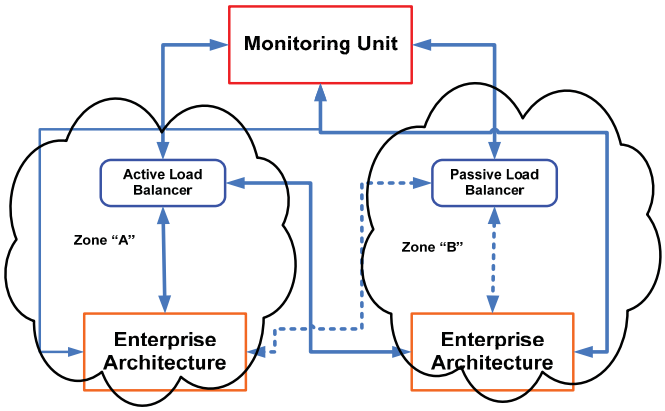
Continue…

- ***Drawbacks of Traditional Disaster Recovery Plan***
  - In both approaches (online and offline), both systems should be in upstate (Operating State) throughout its life time and at a same time it consumes double energy.
  - Energy like power, electricity is required in both places and cost of infrastructure, human resources are also required in both places.
  - There is a need to manage the cost like set up cost, operating cost, maintaining cost, human resource cost, building cost in two places that means if it costs US $ 100,000 at one place then in order to manage both places it costs US$ 200,000

Continue…

- **Identified Problems in Existing System**
- High cost.
- Loss of energy.
- Undesirable downtime
- Underutilization of infrastructure.
- Low reliability and availability

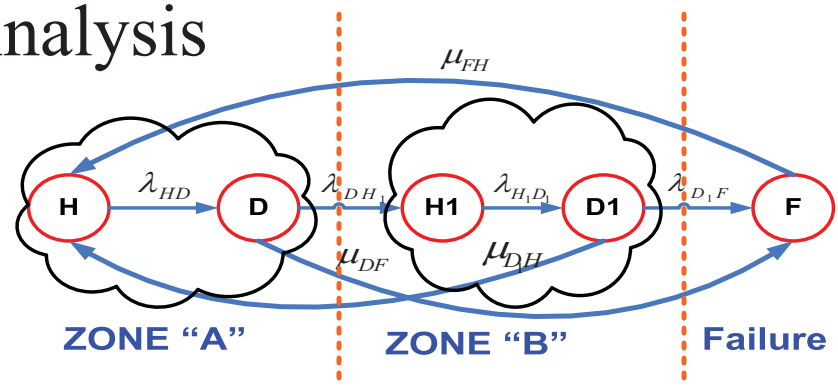
Disaster Recovery Plan With Cloud Computing



Assumptions

- The Zone A has assumed to provide service for 5000 hours i.e. MTTF (Mean Time to Failure).
- It takes 5 hours to repair in case of permanent failure i.e. MTTR (Mean Time to Repair) is 5 hours.
- The intermittent failure MTTF is 1000 hours and its MTTR is 5 minutes. This repaired is done in Zone B.

Analysis

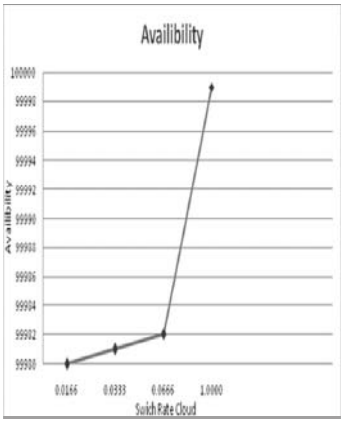


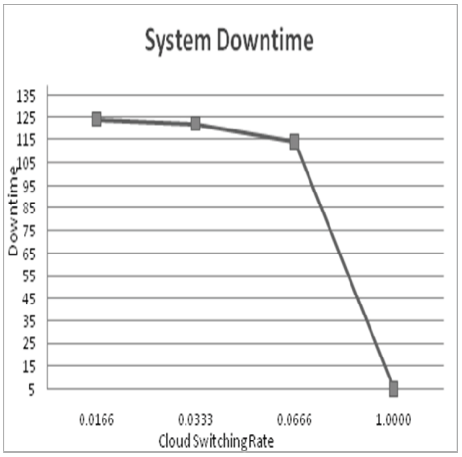
$$\pi_H = \left[1 + \frac{\lambda_{HD}}{\lambda_{DH_1} + \mu_{DF}} + \frac{\lambda_{DH_1}.\lambda_{HD}}{\lambda_{H_1D_1}\left(\lambda_{DH_1} + \mu_{DF}\right)} + \frac{\lambda_{DH_1}.\lambda_{HD}}{\left(\lambda_{D_1F} + \mu_{D_1H}\right).\left(\lambda_{DH_1} + \mu_{DF}\right)} + \left\{ \frac{\lambda_{DH_1}.\lambda_{HD}.\lambda_{D_1F}}{\left(\lambda_{D_1F} + \mu_{D_1H}\right).\left(\lambda_{DH_1} + \mu_{DF}\right)} + \frac{\lambda_{HD}.\mu_{DF}}{\left(\lambda_{DH_1} + \mu_{DF}\right)} \right\} \right]^{-1}$$

Results Conclusion

- Availability : 0.999806
- Survivability: 0.999640
- Downtime: 2 hours 07 minutes/year

Results





Conclusion

- The cloud-based disaster recovery plan has been proposed.
- We achieved high availability, high survivability and low unavailability and low downtime with very less cost.
- Cloud computing system does not only provide the low cost features but also promotes the service provider to concentrate on quality of service rather than its maintenance work.
- Our approached has given the hope for the developing countries to start the cloud-based disaster recovery for their SA because of cost effective.
- This gives us the better dependability on the system

Thank you very much!!!

If you have any suggestion/queries,
Please knock me through:
manish@kau.ac.kr/manishpokharel@gmail.com

Web-based experiment to analyze norms of reputation

How to evaluate actions with an opponent having a bad reputation

Takahisa Suzuki
(The Graduate University for Advanced Studies, Japan)
Tetsuro Kobayashi
(National Institute of Informatics, Japan)

Survey vs. Experiment

- Survey
  - Random sampling
    - Representative sample
  - To measure only correlation
- Experiment (compare between conditions)
  - Low level of external validity
    - In academic experiments, subjects are only students
  - To measure causal relationship

⇒Into web-based

2

Web-based Survey vs. Web based Experiment

- Web-based survey
  - – Advantage
    - low cost
  - – Disadvantage
    - sampling bias

Fatal

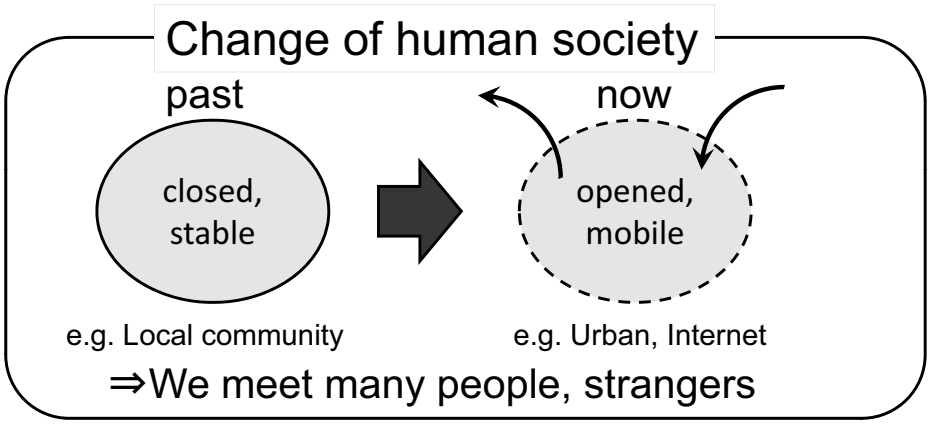
- Web-based experiment
  - – Advantage
    - diverse subjects
    - Ease of condition assignment (e.g. Random assignment)

High level of external validity

⇒to analyze norms of reputation making

3

Issue



◆How to judge their trustworthiness?

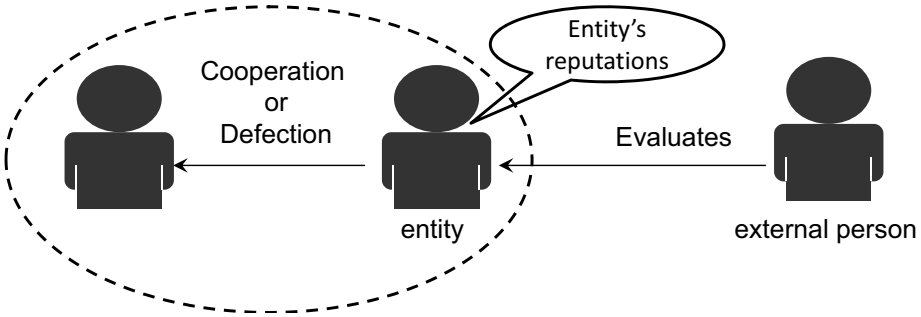
◆How to select whom I interact with?

⇒Reputations support you

4

Reputation

- "*the current assessment of an entity's desirability as established by some external person or group of persons*" (Standifird ,2001)
- External persons evaluates entity's actions
  - (e.g. cooperate or defect)



5

Studies of reputation

- A lot of theoretical studies
  - Reputations foster cooperation

- Short of empirical studies
  - Especially reputation making

⇒In practice, how reputations are used?

6

How reputation is made

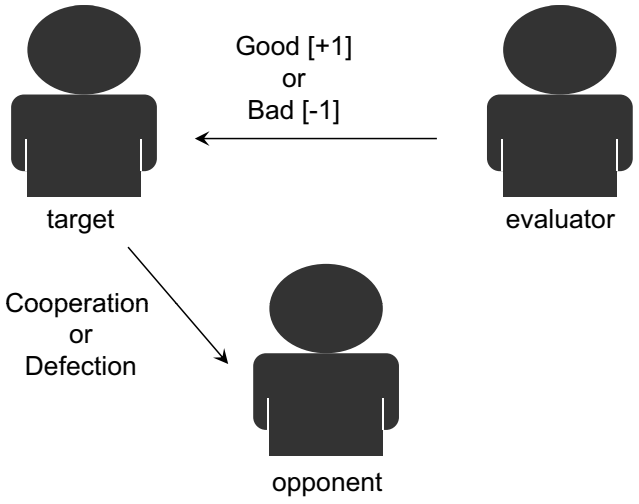
- Norms of reputation making

1. taking into account only first order information
   - "what kind of action"
2. taking into account also second order information
   - "against whom"

7

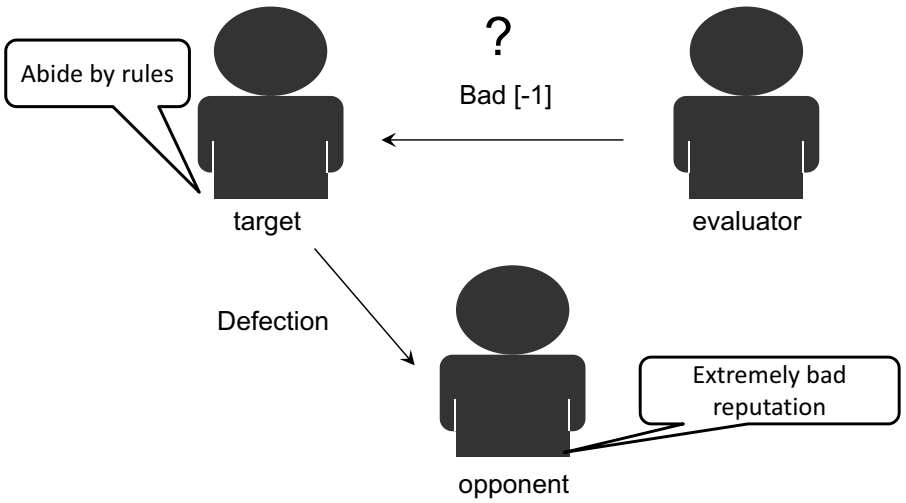
First order information

- The evaluator considers only "what kind of action"



8

Problem of First order

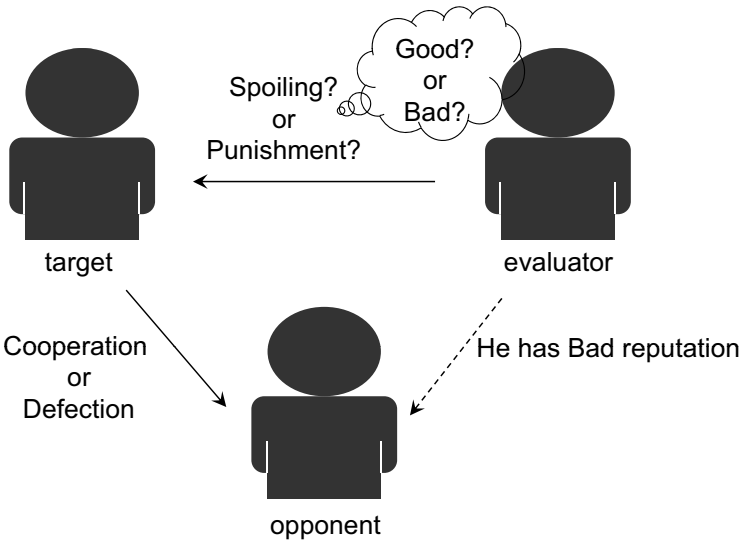


9

- Target is really worthy of bad reputation ?

Second order information

- The evaluator also considers “against whom”



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One order or Second order

- Theoretically, first order pointed out insufficiency
  - To foster cooperation, need one and second order
- In practice
  - Does people take into account as far as second order?
  - How to evaluate Second order information?

    →More complex mechanism?

⇒Web-based experiment in order to clarify either norm is used

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Experiment to compare 4 conditions

- To compare how evaluate four actions
  1. Cooperation[First order](C)
  2. Cooperate against having bad reputation [Second order](CtoB)
  3. Defection [First order](D)
  4. Defect against having bad reputation [Second order](DtoB)

1. Subjects read the scenarios representing a condition
2. Subjects assess a target character

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Scenario sample

- Condition CtoB, nightshiftstory
- *"Mr. Tanaka and Mr. Suzuki are colleagues in same department of a firm. In this department, there is rotation of the nightshift.*

Someday, Mr. Tanaka ask Mr. Suzuki for substitute nightshift because Mr. Tanaka want to go to show a singer.

Although Mr. Suzuki is very tired, Mr. Suzuki accept Mr. Tanaka's offer. "

→Mr. Tanaka has no reputation

→Mr. Suzuki accept Mr. Tanaka's offer

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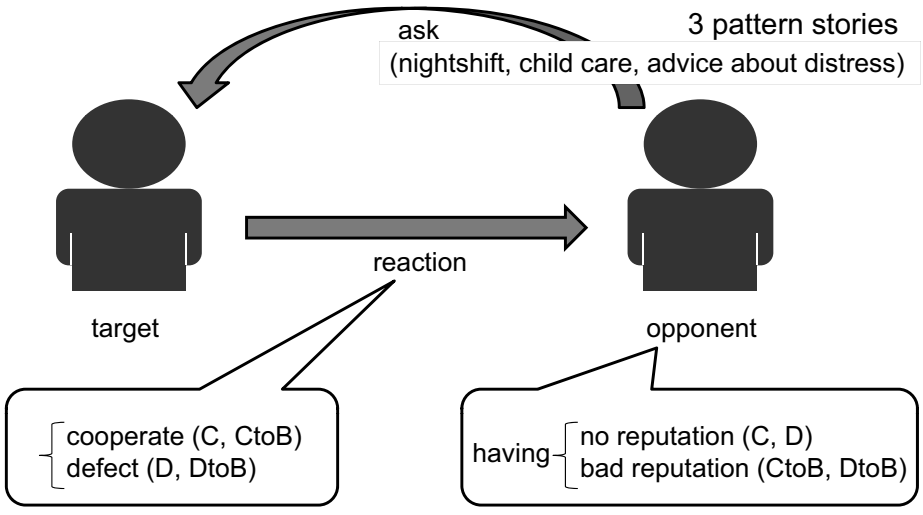
Contents of a scenario



4 (=2 × 2) conditions

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Web-based experiment design

- Subjects assigned a condition randomly
  - 904 subjects reads scenarios (3 stories)
- Assess by four criteria
  - trustworthiness, understandability, familiarity, goodwill
  - Evaluation is sum of 4 criteria
- open-ended questionnaire

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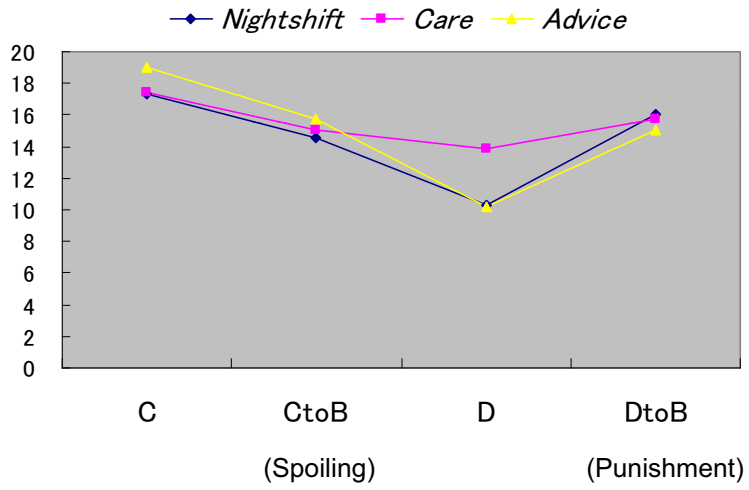
Evaluation score of each condition



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Result of evaluation score

- Difference between C and CtoB, D and DtoB
  - Statistically significant

⇒Subjects was take into account Second order information

→Conventional binary norm is insufficiency

- Evaluation: C > CtoB = DtoB > D

  ⇒imply multi-dimensional evaluation

  - interpersonal perception has three axes[Hayashi, 1978]
    - intimacy, social desirableness, dynamism

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Analysis of open-ended answer

- Analysis to reveal existence of two-dimension
  - intimacy, social desirableness
- Method
  1. morphological analysis
  2. extract evaluation words
     - Matching dictionary of evaluative expressions
  3. classify evaluation words either
     - One coder, manually
       - positive or negative
       - intimacy or social desirableness

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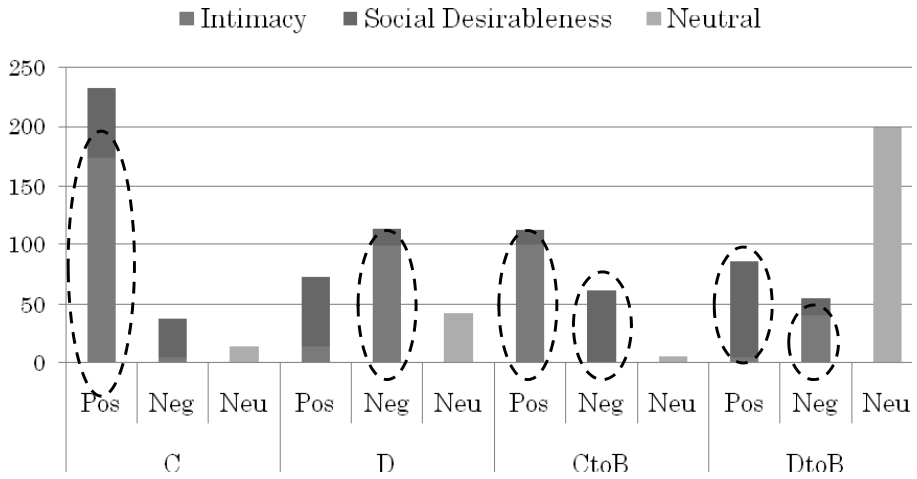
Count of evaluation words



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Result of text analysis

- About First order information
  - Evaluated in terms of intimacy
- About Second order information
  - Evaluated in terms of social desirableness

→Evaluation considering Second order information is consisted of two-dimensions

⇒Reputation should be consisted of multi-dimensions

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Result of experiment

- Norms of reputation making is complex
  - at least, need two-dimensional mechanism
  - Present reputation system (e.g. online auction site)
    = intuitive one-dimensional
  - In the future, comprehensive mechanism is needed

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Conclusion

- Web-based experiments enable us to collect the data
  ⇒ Experiment reveal causal relationship , not correlation
  - useful for a certain empirical study
  - without web-based, high cost and biased objects
  - random assignment enable us to compare conditions

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Thank you

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A New Design of ATM Interface for Banking Services in Thailand

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Kamonwan Taohai
Suphakant Phimoltares
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Chulalongkorn University, Thailand

1

Outline

- **Introduction**
- **Related Work**
- **Methodology**
- **Results**
- **Conclusion**

2

INTRODUCTION

- Problem
  - An ATM menu is complicate
  - The users have different attitude of using ATM banking.
  - An ATM interface has limitations on interface screen and buttons.

3

INTRODUCTION

- Objective
  - To compare main functions of ATM banking services of five banks in Thailand.
  - To design a new interface for ATM banking services that is suitable for people in various occupations in Thailand.

4

Related Work

[Lynne, 2003]	Studied the various user-centered design techniques to involve the future users of an ATM for illiterate persons, and reports the results of applying the techniques to a group of six Dutch functional illiterate persons.
[Zajicek et al., 2004]	Evaluated the use of ATMs by older people and to understand why some older people prefer not to use ATMs and what problems face the age users. From all of these studies, it appears that each user group has at least some different requirements and difficulties with using ATMs.
[Tarakanov, 2005]	Studied an overview of the user-centered, work-focused biometric verification of the ATM user interface. This methodologies were adopted in these laboratory and field based studies

5

Methodology

- Choosing the method to evaluate usability
- designing the new interface system
- testing of the new design ATM interface by a sample set of 105 people representative of the five different principal occupations, and thus experiences, within Thailand

6

Methodology

- A new design interface was created from the reported analysis of the advantages and disadvantages of existing ATM interfaces [1].
- Seven tasks of a bank were employed for comparison

7

Methodology

- From the five popular bank's existing ATM interfaces, the most effective was selected to compare against the newly designed interface.
- The buttons layout and the hierarchical menu structure were similar to the actual ATM interface

8

Usability Evaluation

Usability Criteria	Measurements
Effectiveness	- Percentage of tasks accomplished - The number of clicks to complete the task
Efficiency	- Time to complete the task - Average difference between actual number of clicks and the minimum number of clicks to complete the task
Satisfaction	- Rating scale for user's satisfaction with functions and characteristics

9

Comparison between the Number of Key clicks

Seven Popular Tasks	Number of Clicks to Complete the Task	
	Existing ATM	New ATM
1. Withdrawal	13	11
2. Statement Inquiry	7	6
3. Transfer	25	24
4. Mobile Top-Up	23	23
5. Credit Card Payment	25	23
6. Electric Bill Payment	28	23
7. Insurance Payment	25	23

10

New Design Approach

- The following details show the menu design:
  - **Touch Screen**: Easier to use than other input devices and it saves time in the process
  - **New Keypad**: To improve access to the keypad button for faster entry and to help recovery from any mistake in the previous entry.
  - **New Main Menu**: The location of each button was based on the frequency of usage. The most frequent task and the second most frequent task are located on the top-right and top-left respectively.

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An Example of a New Design Keypad

- "Clear" button for clearing data.
- "Return Card" button for returning a card.
- "Return to main menu" button for go back to the main menu.
- "Back" Button for returning to a previous page.

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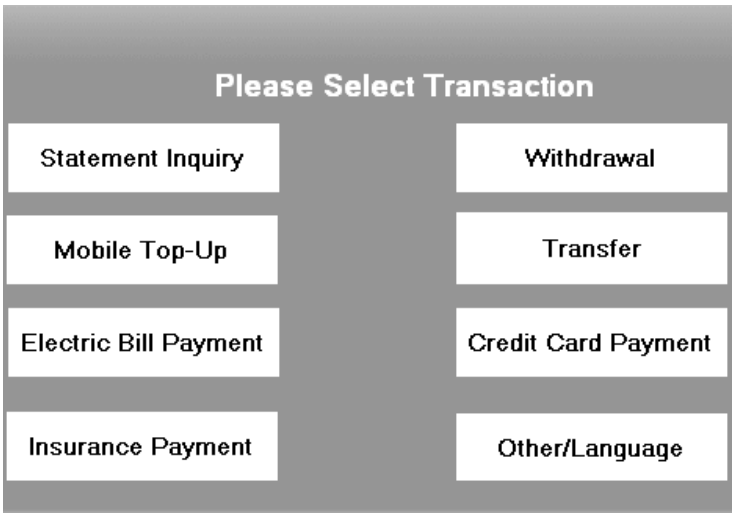
An example of a new design main menu



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New Menu Approach

- **Step Indicator Button**: The buttons indicating the total number of steps to complete and the current step. The user also can go back to the previous step allowing mistake removal as opposed to restarting. Step indicator buttons are on every page.
- **Logo**: The logo can be displayed within a small area on the left side of a page, along with symbols representing the desired logo of each company in service.
- **Two steps per one page**: In some processes, two steps will be put on the same screen. The next step appears on the screen automatically when the user finishes the first step

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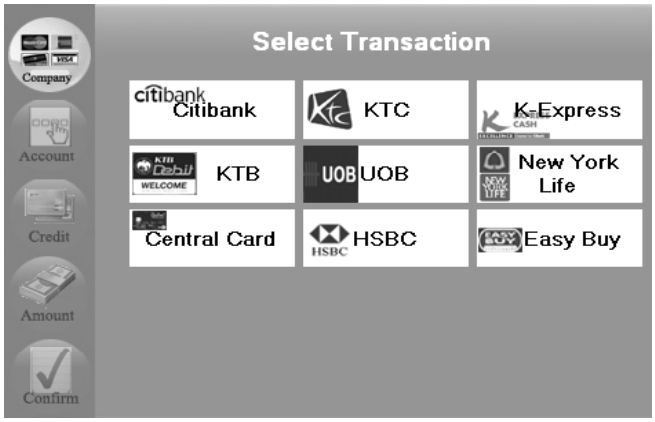
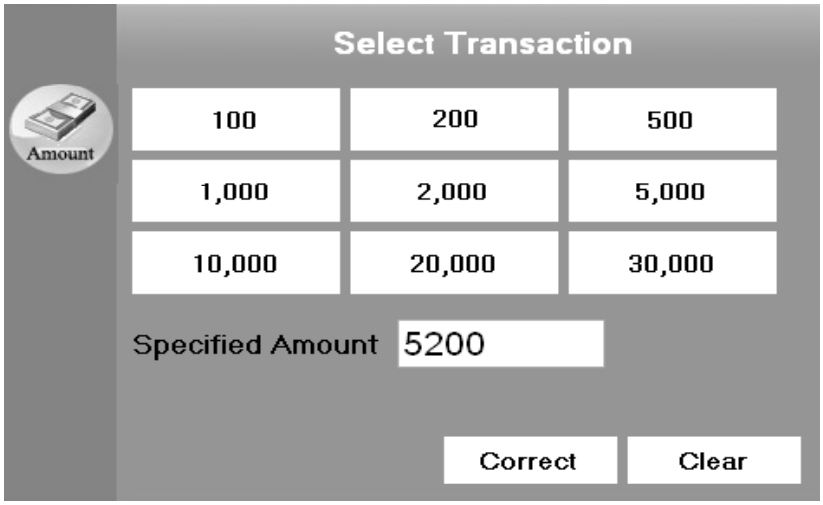
Logo



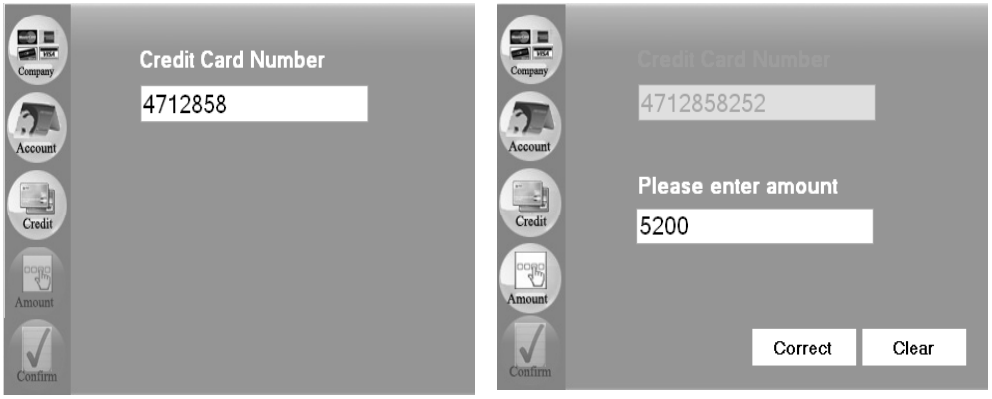
15

Multiple functions per a page



16

Multiple steps per a page



17

56

Usability Testing

- **Participants:** A total of 105 participants were divided into five groups based upon their occupation. The participants are also categorized by aging from 16 – 25, 26 - 35 and >36 years old, respectively.
- **Questionnaire:** A total of 21 questions were created. The first part focused on the user's background, including gender, age range, and occupation, whilst the second part enquired about aspects of the user's satisfaction with the ATM banking interface. The survey used a 5-point Likert scales: strongly agree, agree, neutral, disagree and strongly disagree. The average time each participant spent on the questionnaire was 30 ± 5 minutes (range of 25 - 35).
- **Procedure:** Each participant randomly choose one of the seven tasks and then performed the task on the simulator. If they could not finish the task on the first time, they must continuously perform it until the task is completed. Finally, the participant completes the questionnaire.

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Result

Measured parameters	Task														Average of seven tasks		Avg. Diff.
	Withdraw		Statement Inquiry		Transfer		Mobile Top-Up		Credit Card Payment		Electric Bill Payment		Insurance Payment				
	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	
Success Rate (%)	80	100	86.6	100	73.3	86.7	60	86.7	66.6	80	53.3	80	53.3	80	67.6	87.6	20
Average Number of Clicks	21.1	11.9	9.8	7.2	44.4	26.3	31.1	26.7	49.8	29.6	34.5	24.7	38.6	27.2	32.8	21.9	10.9
Time to Complete the task (seconds)	57.1	25.2	32.1	19.1	44.4	44.4	81.4	53.3	80.2	58.9	96.0	50.8	96.5	78.4	69.7	47.2	22.5
Error Rate (%)	0.3	0.0	0.9	0.2	0.2	0.0	0.1	0.1	0.4	0.2	0.3	0.0	0.3	0.1	0.36	0.09	0.27

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Result

Measured parameters	Task									
	Students		Employees		Government		Agriculturists		Merchants	
	Old	New	Old	New	Old	New	Old	New	Old	New
- Success Rate (%)	76.1	90.4	80.9	95.2	71.4	95.2	61.9	76.1	52.3	80.9
- Average Number of Clicks	28.6	20.8	27.7	20.2	30.4	20.7	31.1	22.0	40.1	25.9
- Time to Complete the task (sec)	64.4	48.8	48.5	33.1	61.4	48.5	89.8	53.1	96.0	53.9
- Error	6.5	1.5	5.6	0.8	5.9	0.8	6.4	2.7	8.8	4.0
- Satisfaction score (0 - 5)	4.2	4.5	4.1	4.8	4.4	4.8	4.1	4.7	3.9	4.3

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Conclusion

- We proposed a new design for ATM interfaces in Thailand, based upon the seven most frequently used transactions by ATM machines.
- The new design interface improves the effectiveness, efficiency and satisfaction of usability.
- This research can be useful for designers of ATM interfaces and other related fields.
- An appropriately designed icon in each function Swill help the illiterate group.

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Thank you for your attention

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An electronic money system as substitute for banknotes

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MORIZUMI Tetsuya
Toyo Networks & System Integration Co.,Ltd.
Engineering Management Division
Samukawa-machi, Koza-gun,Kanagawa 253-0198,Japan

Content

- Background
- Purpose
- Electronic money
  - Categories, Requirements, Functions
- Outline of proposed method
  - Structure of the electronic money
  - Payment transaction, Required conditions
- Protocols
  - Registration, Payment, Issue, Scrapping

Backgrounds

- Electronic cash has been developed as settlement system to support Internet commerce and enable people to pay money over the Internet securely .
- However, various problems have occurred in trying to store the value of electronic money.
- Many types of electronic money has been recorded on IC cards and several functions are depended on the physical tamperness.
- Furthermore, appropriate measures are required to counter illegal usage and alternation or forgery of money, the same as for paper money.

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Backgrounds

- Combining the anonymity of cash and the convenience of electronic payment enables electronic money to be illegally used.
- The control of the cash flow by the financial administration authorities must be considered if we replace the paper cash with the electronic cash.
- The central bank coordinates the quantity of currency to be printed and coordinates money supply so that inflation does not occur.

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Purpose

- In this system, the central bank issues the money and its value is not need to stored on user's hardware such as IC cards.
- Money and a user are linked by public key cryptography. Moreover, the database of the central bank is not a bank account, but manages the value of the issued cash.
- Also, the user can possess the cash anonymously.
- Furthermore, the central bank can control the money supply.
- Banknotes must be untraceable.
- We developed electronic money with discrete logarithms.
- Thus, transactions are less traceable than those in our previous study.

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Conventional electronic cash

- The electronic cash systems are categorized from several viewpoints.
- We discuss the desirable type of electronic cash.

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Categories: Hardware classifying

- Electronic money stored in IC cards :
  - The value of money is put onto an IC card.
  - The security of the system is guaranteed by how physically tamper-proof the IC card is.
- Electronic money on the network :
  - The security of the system is guaranteed by crypt systems and the certification agent.
- Hybrid :
  - This system combines the IC cards and network and thus has merits of both.

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Categories: Hardware classifying

One of which is hardware classifying the electronic money.

- Electronic money stored in IC cards :
  - The value of money is put onto an IC card.
  - The security of the system is guaranteed by how physically tamper-proof the IC card is.
- Electronic money on the network :
  - The security of the system is guaranteed by crypt systems and the certification agent.
- Hybrid :

A method that does not depend on an IC card is desirable from the viewpoint of flexibility of settlement and forgery prevention.

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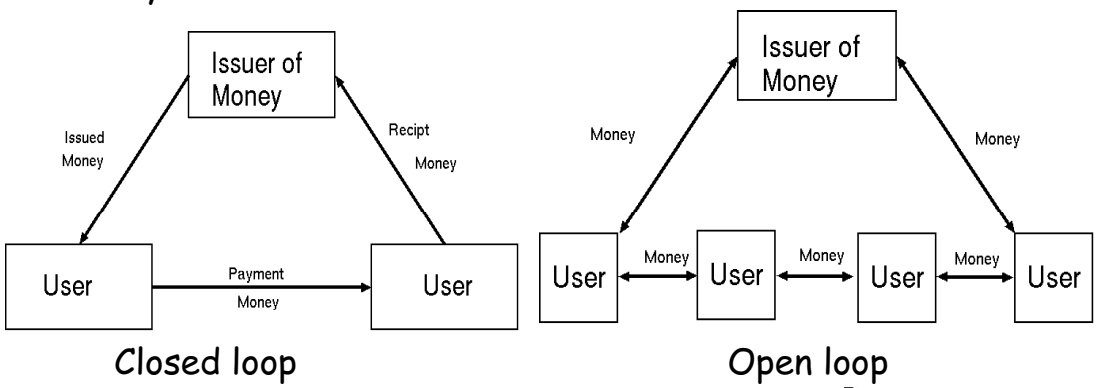
Category:Currency of the cash flow

Closed loop :

- The recipient of the money cannot transfer it to a third party.
- The received money must be returned to its issuer.

Open loop :

- The money is transferred between users one after another.



Kinoshita Lab. Jul 25, 2010 (9)

Category: Currency of the cash flow

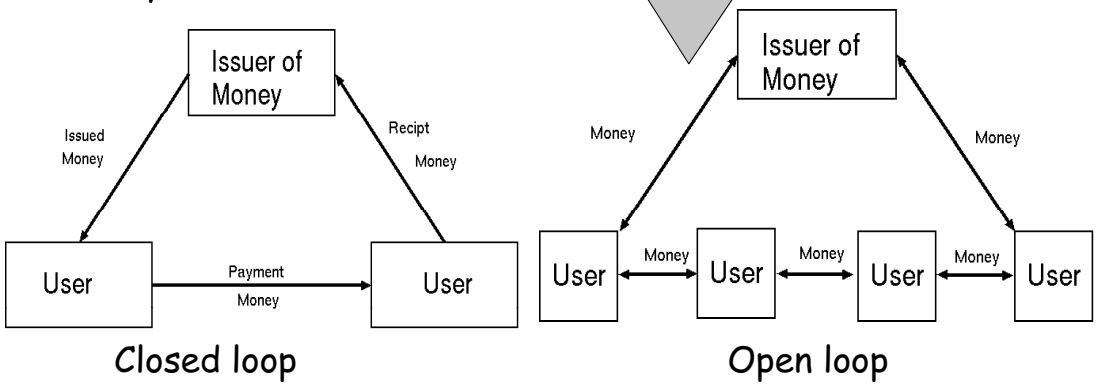
Closed loop :

- The re… party.
- The re…

Open loop :

- The money is transferred between user… after another.

We consider that open loop type is desired for control of quantity of the currency and protection of user's privacy



Kinoshita Lab. Jul 25, 2010 (10)

Category: Timing of the settlement

The next viewpoint is the timing in which the settlement is completed.

Pay later :

- The settlement is completed after a transaction, such as when using a credit card.

Pay now :

- The settlement is completed immediately, such as when using cash and debit cards .

Pay before :

- The settlement is completed before a transaction, such as when using a prepaid card.

Category: Timing of the settlement

- With the typical prepaid card, the money is moved from a bank account to an IC card and taken to a store to pay for goods.
- Credit cards reduce the amount of money handled and lost purchasing opportunities.
- However, it is easy to store customer information and follow the flow of money.
- In other words, anonymity is low.
- For this reason, the electronic money settlements must finish immediately.

Requirement for electronic money

There are some desirable conditions in which to implement an electronic money system.

1) Independence : The electronic money is not physical, so it can be sent through a network.

2) Safety : Coping and forgery are prohibited.

3) Anonymity and untraceability:

- The users and records of transaction must not be identified.
- The flow of money cannot be traced.
- The privacy of users must be protected.

Example: Information must be protected about who shopped at which store or which two companies traded.

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Requirement for electronic money

4) Off-line usage :

- The payment process does not need on-line communication with a third party to check the validity of the money.

This requirement will not always be necessary on the future ubiquitous networks.

5) Negotiability and currency :

- The electronic money does not return to its issuer immediately but circulates among users.

6) Division :

- The face value of money can be divided when users use it.

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Functions of money

Functions of money are to standardize, exchange, and store value.

Physical money (such as coins, checks, and bills) has three fundamental functions.

- Information : Money must show its value.
  - Electronic money does this easily.
- Evidence : Must has to show the validity of its issuer.
  - This can be done with a digital signature.
- Symbol : This shows who can use the value of money.
  - For example, whoever possesses a bill can use its value in exchange for something or give it to someone else.
  - The symbolic function implies that who can use the value of the money.

Functions of money

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  - The symbolic function implies that who can use the value of the money.

- The symbolic function is important to prevent duplicate reuse of money.

Concept of the system

- Current electronic money systems have some problems.
- Most electronic money is issued by a company or a bank in the forms of, for example, a prepaid card or a local currency.
- From the viewpoint of controlling the money supply and payment security, these electronic money systems are suitable for small settlements.

Thus, it is hard to replace these kinds of money with cash.

Concept of the system

- Privacy and anonymity are guaranteed by using an anonymous communication channel.(SAINT2008)
- Furthermore, this system does not use any account or identification number of user.
  - Thus the system cannot trace the transactions of the user.
- Symbol, evidence, and information are separated to prevent the same electronic money being reused.
  - The information is stored in the database controlled by the central bank.
  - Digital signatures are used as evidence.
  - The descriptor calculated by discrete logarithms is used as the symbol.

Outline of proposed method

A. Structure of the electronic money

B. Payment transaction

C. Required conditions

Structure of the electronic money

Let Sx be an amount of money in 64bits and let Rx be a random number in 448bits.

Sx: (signed 64bit) Rx:(448bit)

$$M_x = f(S_x, R_x) = 2^{448} S_x + R_x \qquad (1)$$

A descriptor Dx of the electronic money x that is stored in the database is described as

$$D_x = g^{M_x} \bmod n \qquad (2)$$

- Where g is a primitive root of modulo n.
- g and n are public information of the system.

Structure of the electronic money

Let Sx be an amount of m

a random number in 448bits.

Sx: (signed 64bit) Rx:(448bit)

Random number prevents the reduction from descriptor to amount of money

$$M_x = f(S_x, R_x) = 2^{448} S_x + R_x \quad (1)$$

A descriptor Dx of the electronic money x that is stored in the database is descr

Nobody can calculate Mx from Dx.

$$D_x = g^{M_x} \bmod n \quad (2)$$

- Where g is root of modulo n
- g

Stored Dx ensures the amount of money has not been changed after previous transaction.

Payment transaction

- The payment from the electronic money A to another form of money B is described.
- Before transaction, all money is represented as

$$M_{A1} = f(S_{A1}, R_{A1}), M_{B1} = f(S_{B1}, R_{B1}) \quad (3)$$

- The information stored in the database before a transaction is

$$D_{A1} = g^{M_{A1}} \bmod n, D_{B1} = g^{M_{B1}} \bmod n. \quad (4)$$

- An amount of money S and a random number R are used for a payment transaction.

Payment transaction

- The amounts of money and the random numbers of all entities change to become

$$S_{A2} = S_{A1} - S,\ R_{A2} = R_{A1} - R \quad (5)$$

$$S_{B2} = S_{B1} \square S,\ R_{B2} = R_{B1} \square R \quad (6)$$

This means the payment value and the amounts of money are kept in secret for any third party.

- Thus, the equation

$$g^{M_{A1}} g^{M_{B1}} = g^{M_{A2}} g^{M_{B2}} \bmod n \quad (7)$$

is satisfied.

This equation ensures the amount of values of each money is not changed after transaction

- The electronic money after transaction become

$$M_{A2} = f \square S_{A2}, R_{A2} \square, M_{B2} = f \square S_{B2}, R_{B2} \square \quad (8)$$

Payment transaction

- The information stored in the database after transaction is denoted as

$$D_{A2} = g^{M_{A2}} \bmod n,\ D_{B2} = g^{M_{B2}} \bmod n. \quad (9)$$

- The database system check the validity of the transaction using the equation.

$$g^{M_{A1}} g^{M_{B1}} = g^{M_{A2}} g^{M_{B2}} \bmod n \quad (10)$$

Required conditions

1) The remaining money should be greater than or equal to zero after payment transaction.

2) No user can change the amount of money without valid transaction.

   - This condition is satisfied because the descriptors that have the database signature are required at the transaction.

3) No user can change the sum of money of entities at the transaction. $g^{M_{A1}} g^{M_{B1}} = g^{M_{A2}} g^{M_{B2}} \bmod n$

   - This condition is satisfied by equation

4) The database cannot obtain the individual amount of money. This condition is satisfied by equation $D_x = g^{M_x} \bmod n$

Required conditions

5) The database cannot obtain the amount of each payment.

   - For this condition a random number R is used.

- The descriptors of all money before and after transaction are represented as

$$D_{A1} = g^{M_{A1}} \bmod n,\ D_{A2} = g^{M_{A2}} \bmod n. \qquad (11)$$

$$D_{A2} / D_{A1} = g^{M_{A2} - M_{A1}} = g^{S} \bmod n, \qquad (12)$$

will not be disclosed without random number.

- Generally, S is impossible to calculate.

6) Anonymity for the database and users is kept.

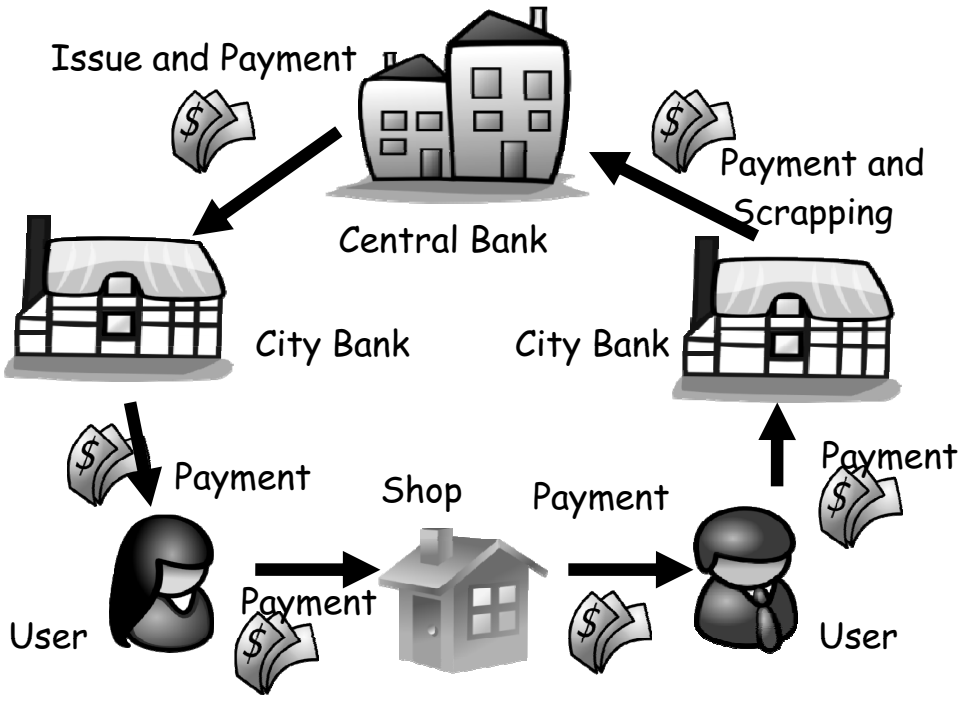
   - An anonymous communication system is required for this.

Protocols

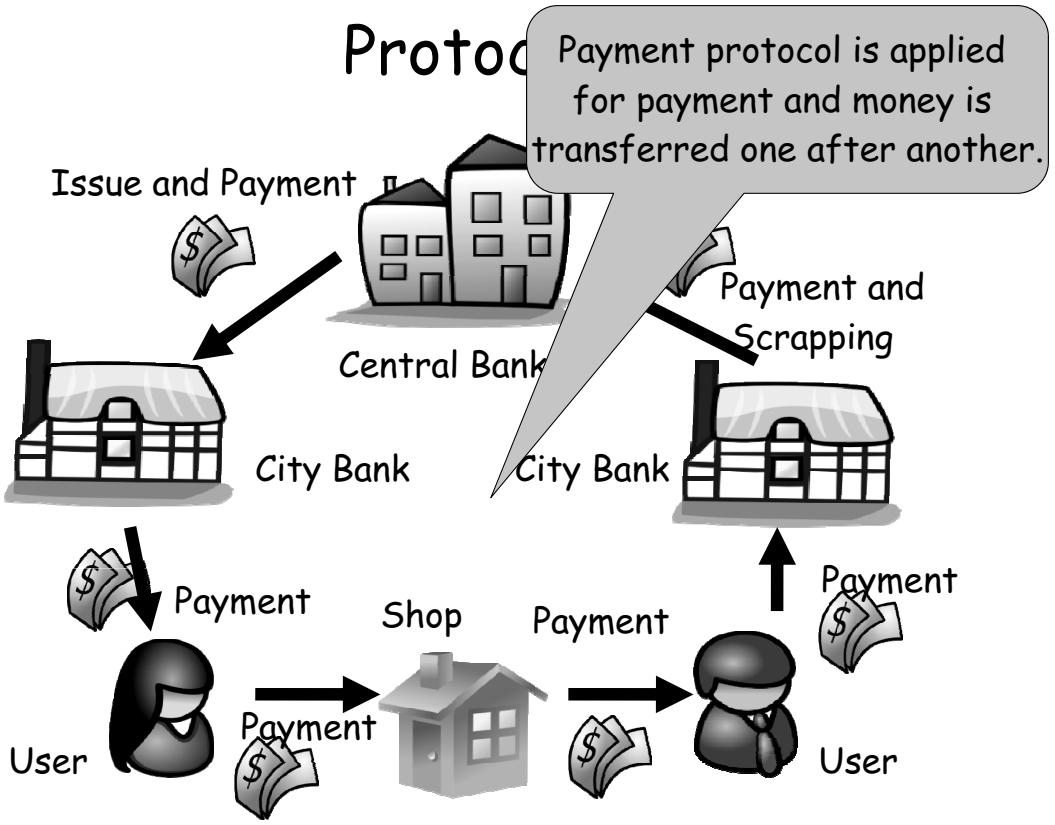
- Registration
  - Money is issued by a registration protocol.
- Payment
  - Payment is executed by payment protocol.
- Issue
- Scrapping

KU Kinoshita Lab. Jul 25, 2010 (27)

Protocols

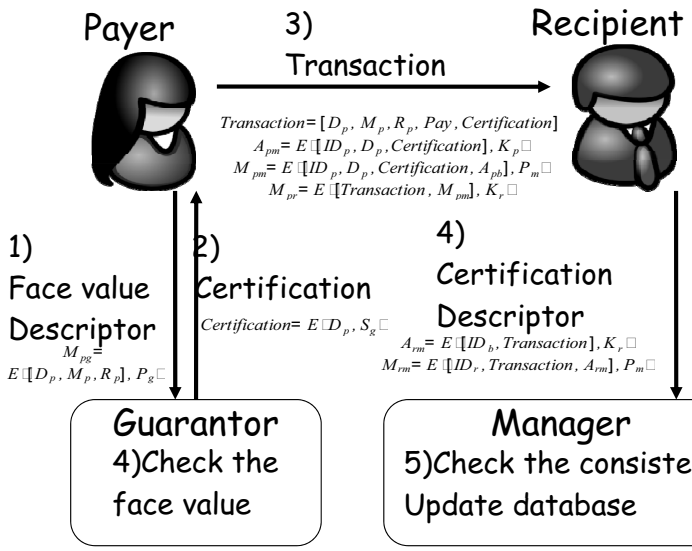


KU Kinoshita Lab. Jul 25, 2010 (28)



Kinoshita Lab. Jul 25, 2010 (29)

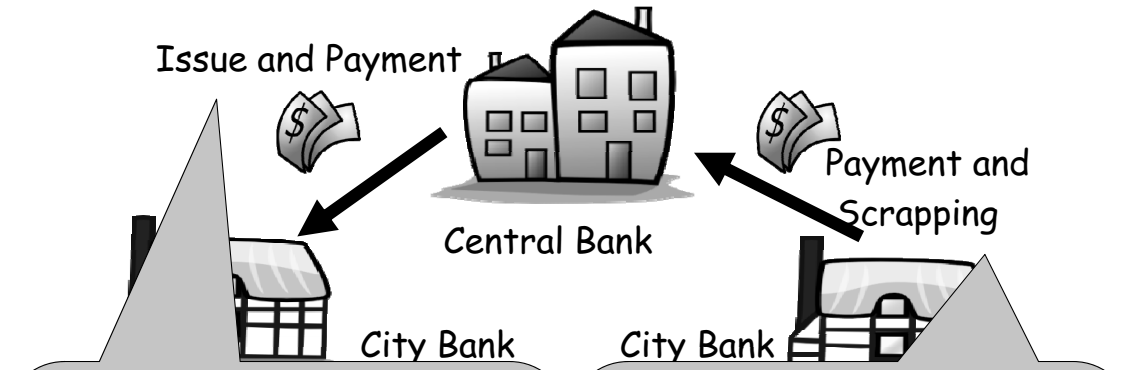
Payment Protocol



- The participants in this protocol are the payer and the recipient.
- This protocol explains how payer pays some money to the recipient.

Kinoshita Lab. Jul 25, 2010 (30)

Protocols



- At this stage, the central bank issues new electronic money.
- The central bank pays the money using payment protocol.
- Normally, the user is a city bank in this case.

- Only the central bank can scrap the money to control the flow of money.
- The scrapping is achieved by deleting money's data from the database.

KU Kinoshita Lab. Jul 25, 2010 (31)

Conclusion

- We studied the conditions needed to develop an electronic money system as a substitute for banknotes and then developed an electronic money system that has discrete logarithms.
- As the amounts paid are protected from third parties, transactions are harder to trace than those in our previous study.
- For future work, we will study implementing this system on a real network and evaluate its efficiency.
- Preventing illegal remittance is another challenge for the electronic payment system.

KU Kinoshita Lab. Jul 25, 2010 (32)

The Study on Consumer Behavior of Online Shops

SAINT2010
July 23, 2010
Seoul, KOREA

Takashi OKAMOTO
Faculty of Law and Letters
Ehime University, Japan

Table of Contents

Background of this work

1. B to C Market
   - 53.6% of people have purchased goods from the online shops (MIC, 2009)
   - Market size is 6.1 trillion yen in 2008 (METI , 2009)
     - up 13.9% from a year ago
   - B to C is one of the representative of ITeS
   - B to C has great potential to revitalize
     - It could ease geographical or capital disadvantages

The small and medium enterprises or rural merchants expect B to C as means of revitalization

Online Shops in Japan

- 47% of enterprises in B to C market are retailers in Japan
- Online shops' sales are comparatively small
  - The sales of about 80% of online shops are under 30 million yen / year (METI, 2010)
- 46% of online shops operate at a loss (Nikkei MJ, 2010)
  - Only 32% of online shops are in black
- Many merchants of online shops require knowledge of business

They require consumer behavior of online shops

Consumer Behavior of Online Shops (JDMA's Research)

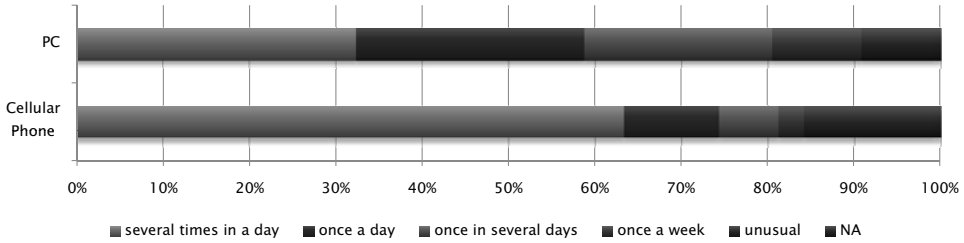
- 60% utilize online shops 1-3 times / month.
- 68.5% purchase at online shops less than 10,000 yen / month.
  - Book/Magazine, food/beverage(excluding liquor), miscellaneous goods
- We can recognize B to C as common channel for general consumers' purchasing.
- However they purchase the goods quite frequently from real shops rather than online shops.
- Online shops' users tend to complete purchasing within Internet
- Most reasons of utilizing online shops are technical advantages of ICT or online shops.

Respondents of Our Research

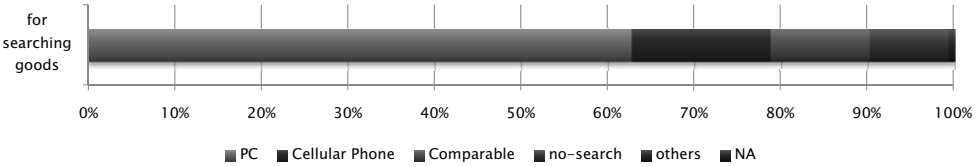
1806 Students	
Ehime Univ.(33%) Matsuyama Univ.(26%) Okayama Univ. of Science(6%)	Rural Area
Osaka International Univ.(21%) Kanagawa Univ.(14%)	Urban Area
Grade: 1st.(27%), 2nd.(36%), 3rd.(24%), 4th.(10%), others(3%)	
Female(41%), Male(52%)	
98% utilize the Internet	
55% purchased goods from online shops within one year	

Terminals for Utilizing Internet (excluding e-mail use)

77% of students utilize both PC and Cellular Phone



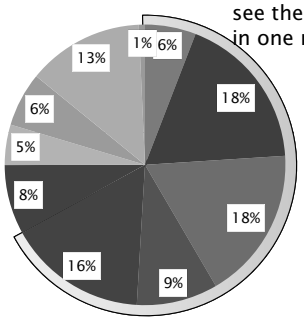
Terminals for accessing Internet



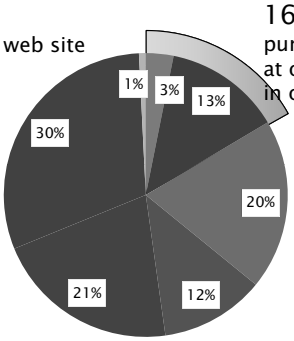
Terminals for searching goods by Internet

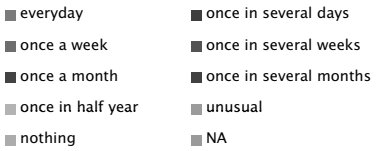
Utilization of Online Shops

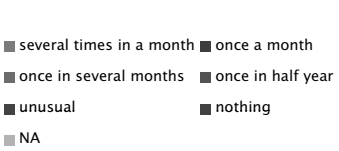
67%:
see the online shop web site in one month



16%:
purchase the goods at online shop in one month

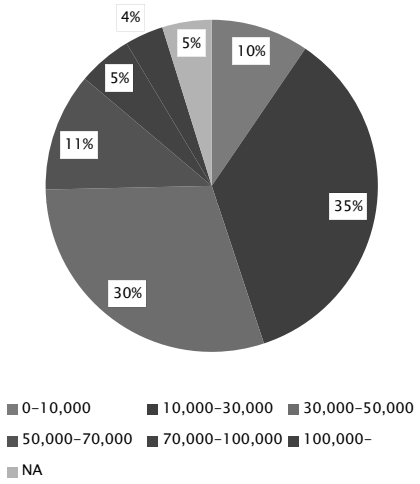




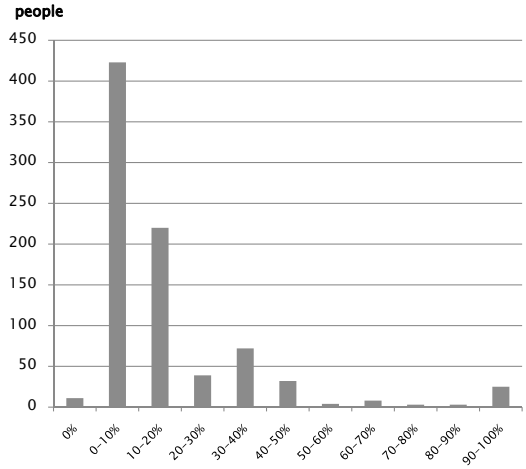


See Online shop web sites **Purchase from online shop web sites**

Students' monthly Budget, their Payment for online shops

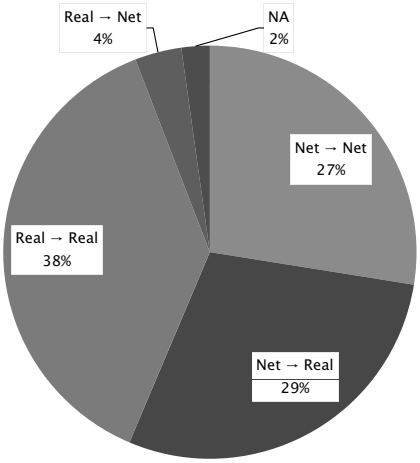


Students' monthly budget (Yen)



Students' monthly payment for online shops within their budget (%)

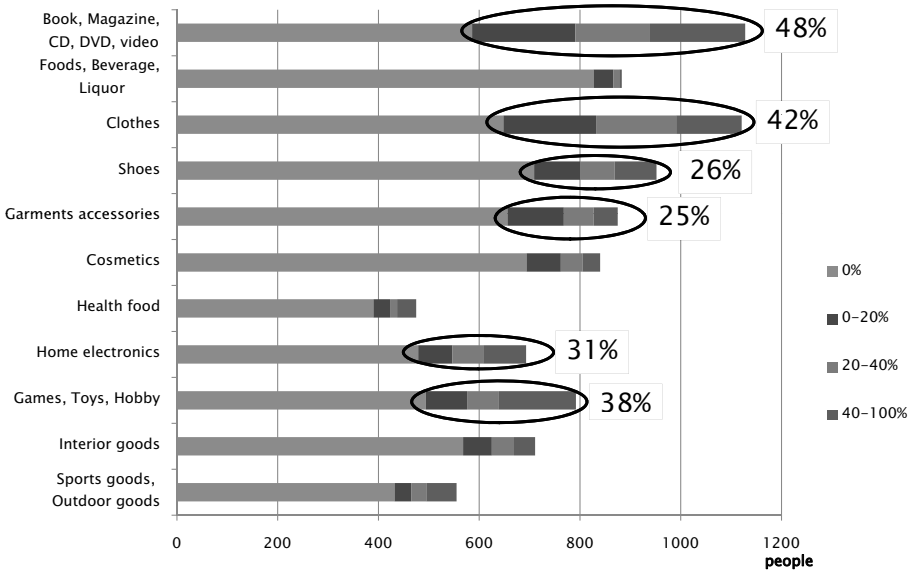
Online Shops or Real Shops



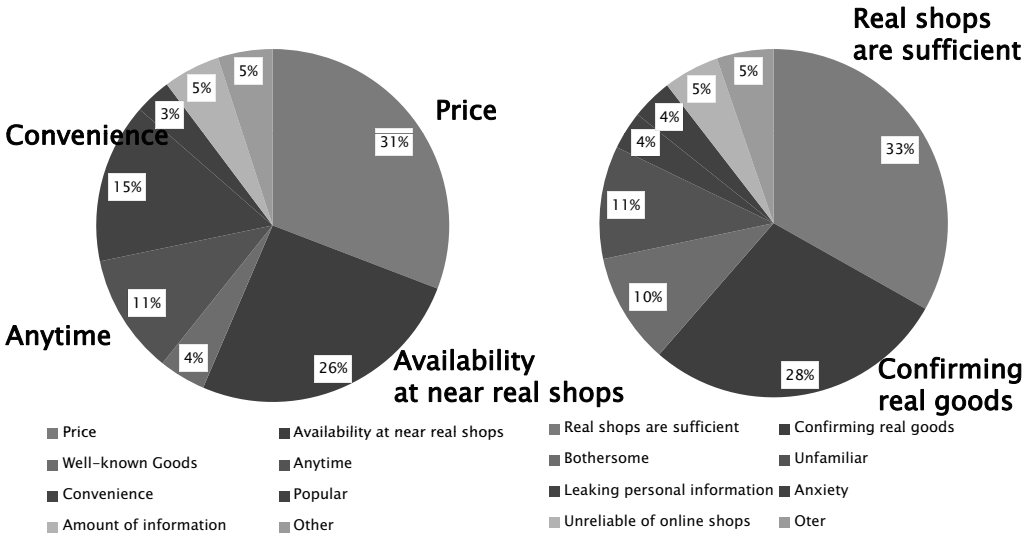
- Only 27% students purchase the goods at online shops directly after referring them with the Internet.
- Students actually tend to purchase the goods at "real" shops.
  - They may have the inertia for "real".

where do students look for the goods' information
where do students purchase the goods finally

Utilizing Online Shops: in purchasing each goods

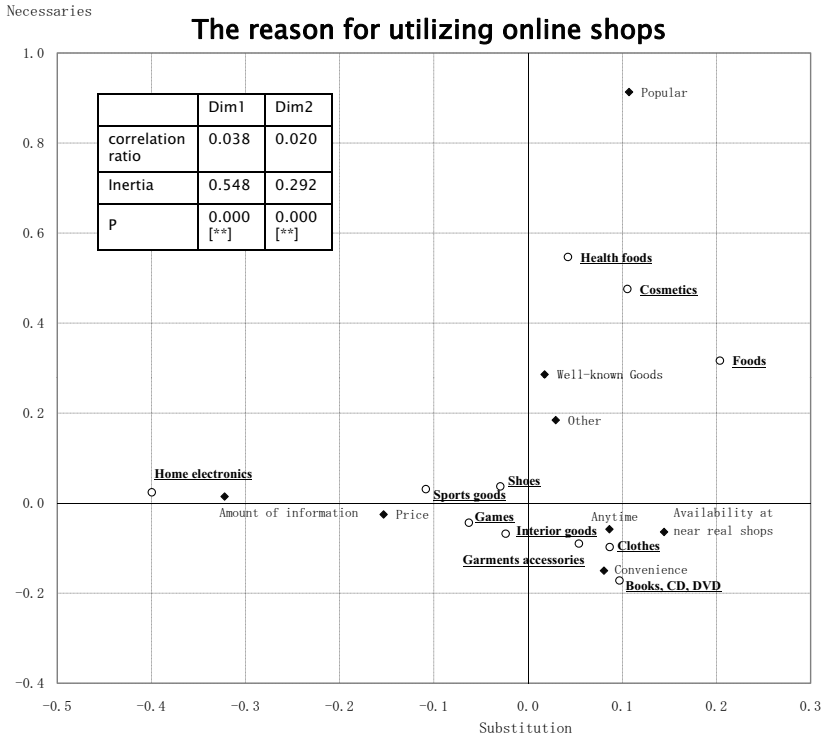


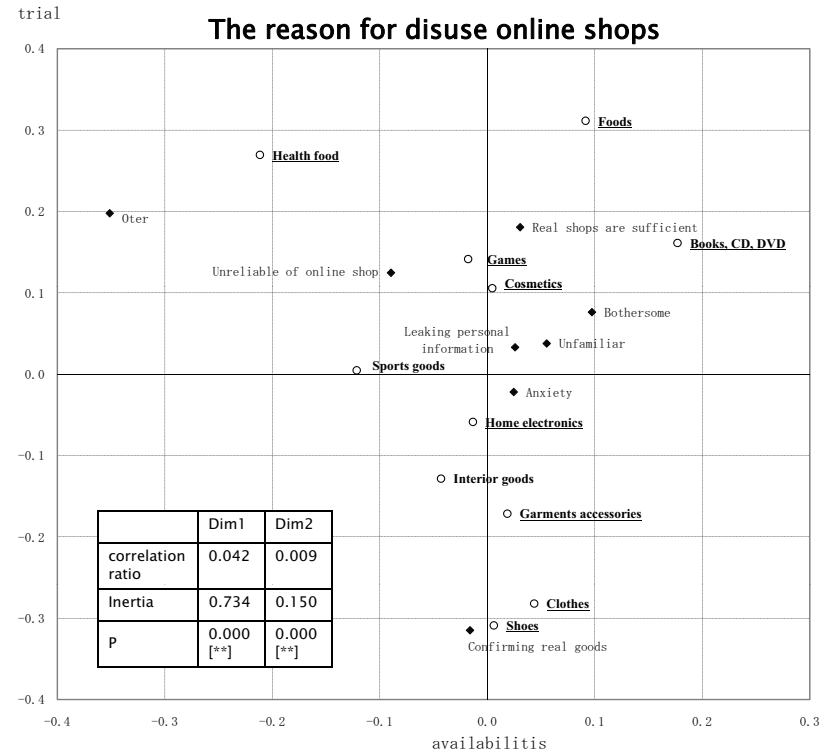
The Reason for Utilizing Online Shops

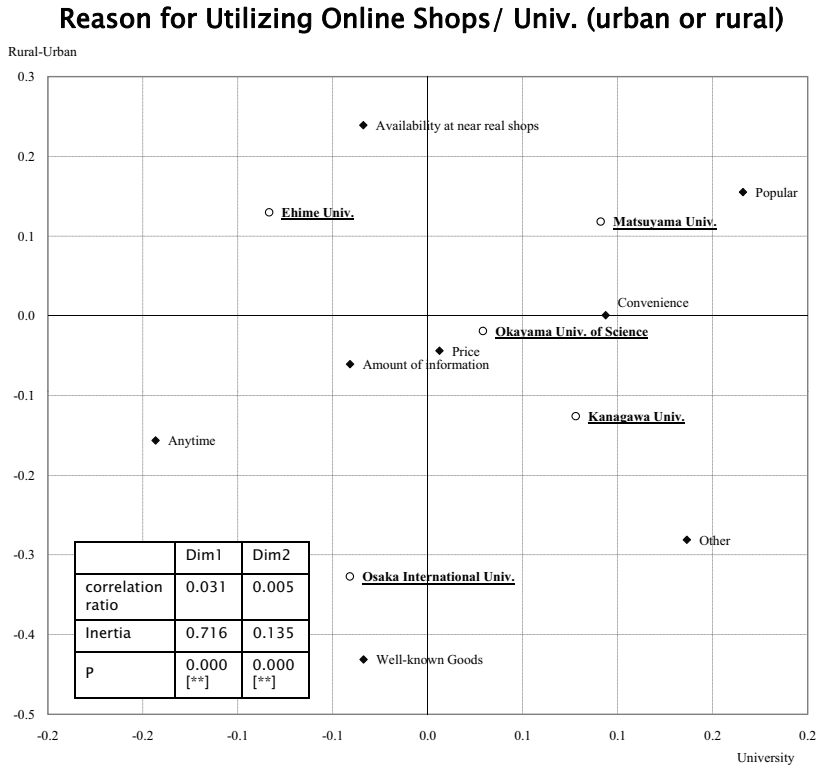


The reason for utilizing online shops

The reason for disuse online shops


The reason for utilizing online shops
Necessaries
Substitution
Dim1 Dim2
correlation ratio 0.038 0.020
Inertia 0.548 0.292
P 0.000 [**] 0.000 [**]
Popular
Health foods
Cosmetics
Foods
Well-known Goods
Other
Home electronics
Shoes
Sports goods
Amount of information
Price
Games
Interior goods
Anytime
Availability at near real shops
Clothes
Garments accessories
Convenience
Books, CD, DVD


The reason for disuse online shops
trial
availabilitis
Dim1 Dim2
correlation ratio 0.042 0.009
Inertia 0.734 0.150
P 0.000 [**] 0.000 [**]
Foods
Health food
Oter
Real shops are sufficient
Books, CD, DVD
Games
Unreliable of online shop
Cosmetics
Bothersome
Leaking personal information
Unfamiliar
Sports goods
Anxiety
Home electronics
Interior goods
Garments accessories
Clothes
Shoes
Confirming real goods



Each university students and online shops

- Difference among universities
  - "Real shops are Sufficient" and "Demand of confirming real goods"
    - are statistically significant for almost all goods
  - "Unfamiliar", "anxiety for leaking personal information",・・・
    - are not statistically significant
- The factors related real shops
  - difference of universities or region
- The factors related technologies
  - common for all universities or region

Summary and Future Plan

- Although many students utilize online shop web site, most of them do not purchase the goods at online shops directly.
  - They may have "Inertia" for real store in purchasing.
- The features of the goods are important as well as price even if at online shops.
- Students in different region have different reasons for utilizing online shops.
  - The feature of each goods suggest more effective way of online shops business.

Thank you very much for your attentions

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An Analysis of IPTV Competition Model

Yunju Chen, Masashi Ueda,
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@ITeS, SAINT 2010

NII
National Institute of Informatics

Today's agenda

1. Framework of Analytical Model for IPTV
2. Areal Studies
3. Model Analysis
4. Conclusions

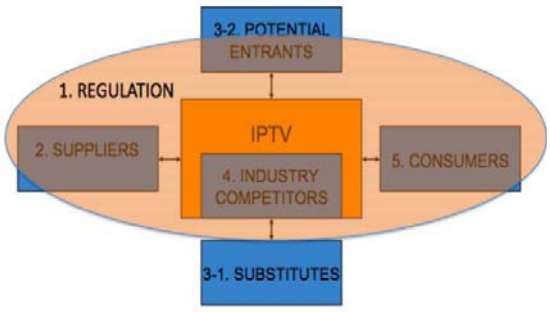
1

1. Framework of Analytical Model for IPTV

- Porter's five-force model (1979) is based upon 'perfect competition market', not regulated market like telecommunication related market.
- We add some factors on it in order to revile the condition for IPTV market. We summarise factors (1. Regulation, 2. Suppliers, 3-1. Substitute Services, 3-2. Potential Entrants, 4. Competition, 5. Consumers).

2

1.1 Five Force Model for IPTV



- Based on 5 force model
- We add regulatory factor
- We need to know about dynamics of the business conditions

3

Our Proposed IPTV Diffusion Factors

FACTORS			POSITIVE (+)	NEGATIVE (-)
1	Regulation	Copy right law requirements	Easy	Hard
		License/Service requirements	Easy	Hard
2	Suppliers	Bargaining power of major	Equal condition	Strong
		Terrestrial broadcaster	Weak	Strong
3-1	Substitute Services	Cable/Satellite	Weak	Strong
		Rental video shop	Weak	Strong
		Sharing/Free service	Rare	Common
3-2	Potential Entrants	Entrant requirements	Hard	Easy
4	Competition	# of company	Many	Few
		Discount competition	Weak	Strong
5	Consumers	Price sensitive	No	Yes
		Integrated model	Can	Never

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IPTV Competitive Condition at the end of 2008

FACTORS		Orange	Chunghwa	KT	NTT	acTVila	Verizon/ AT&T
1	Regulation	+	+	+	+	+	+
		+	+	+	+	+	-/+
2	Suppliers	+	-	-	-	+	+
		+	+	-	-	-	+
3-1	Substitute Services	+	-	+	o	o	-
		+	+	+	-	-	o
		+	o	-	-	-	o
3-2	Potential Entrants	+	+	+	-	+	+
4	Competition	-	+	+	-	+	+
		-	+	-	o	-	+
5	Consumers	+	+	-	-	-	+
		+	-	+	-	+	+

5

2. Areal Studies

- In East Asian area we can compare some good samples: Taiwan, South Korea, and Japan. All of them introduce IPTV in the context of an introduction of media conversance service.

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Top IPTV Subscribers (Unit: ten thousand)

		2009 1Q
1	France	637
2	USA	415
3	China	285
4	Korea	145
5	Hong Kong	114
6	Germany	89
7	Japan	79
8	Italy	78
9	Spain	71
10	Taiwan	69

Source: MRI (www.mri.co.jp)

		2009 Q1	2010 Q1
1	France	707	902
2	USA	417	607
3	China	285	575
4	Korea	145	258
5	Japan	134	186
6	Germany	74	152
7	Hong Kong	114	117
8	Russia	70	112
9	Italy	79	83
10	Spain	71	83

Source: Point Topic (www.point-topic.com)

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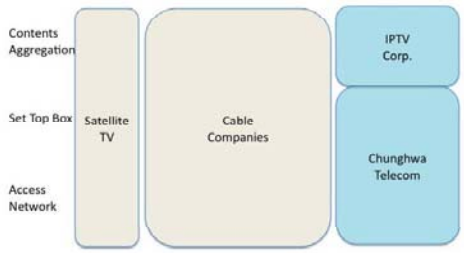
2.1 Taiwanese case



- Cable diffusion rate is high and cable companies enclose their contents.
- Telecom company must not provide IPTV service by themselves.
- Euro

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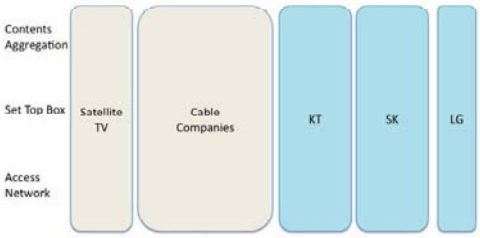
2.2 South Korean Case



- Cable diffusion rate is also high and cable companies enclose their contents.
- Terrestrial broadcasting is popular.
- IPTV service is integrated with access provider.
- North American

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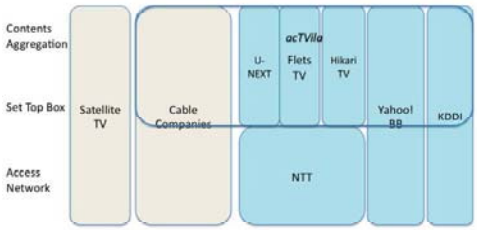
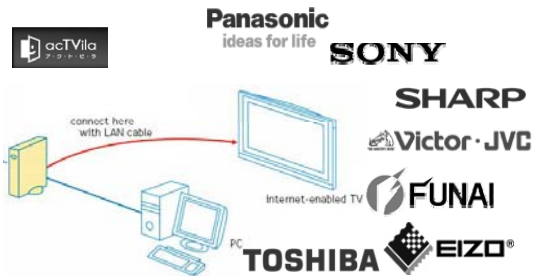
2.3 Japanese case



- Only NTT must not provide IPTV service by themselves.
- Independent providers: acTVila.



Source: acTVila

Standard		Service		Samples
Wireless	RF	HD		TDTV
		Satellite		CS/BS DTV
		Mobile		Mobile DTV
Wired		Cable		J:COM, JCN, eo Hikari TV, Flets TV
	IP	multicast		Hikari TV, BBTV, On Demand TV, J:COM On Demand
		VOD	unicast	Hikari TV, U- NEXT, BBTV, Hikari Plus TV, Theatre at home
			Internet	Yahoo! Doga, Second NTV etc.
			IPv6 closed NW	Flets Square, BBTV, Hikari Plus TV, On Demand TV

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3. Model Analysis

- We made component model for IPTV based upon Three countries competitive situation.
- In our model patterns of competition is divide into THREE; single platform, integrated multi platform, and hybrid multi platform.

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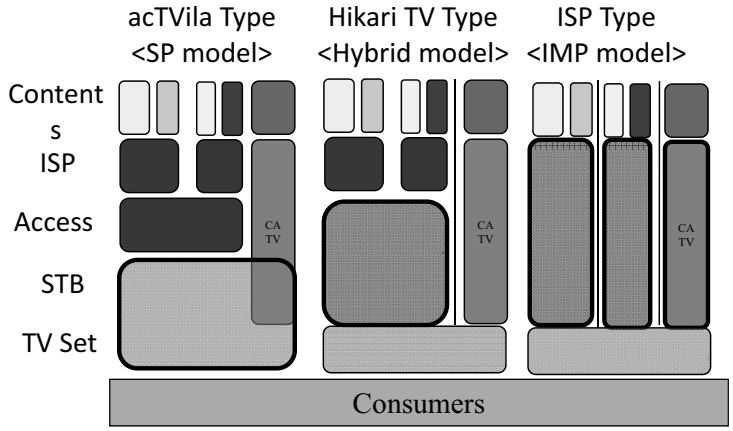
3.1 IPTV models

- For contents holder and consumers Single Platform (acTVila Type) is better than Integrated Multi Platform (ISP Type).



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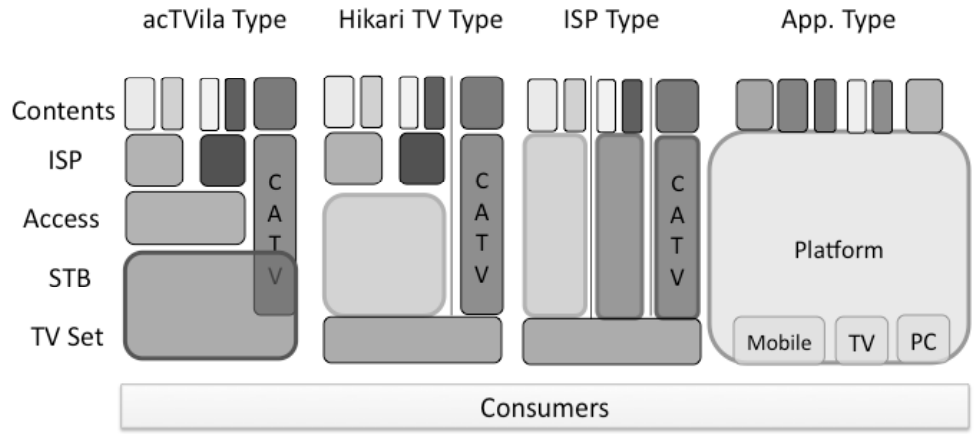
3.2 How about Apple or Google?

- Theoretically App. Type has same conformation with ISP Type.



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4. Conclusions

- We had a comparative area study of Taiwan, Korea, and Japan.
- We made component models based upon following research.
- We calculate the utility of each entities in every models.
- And we found a negative correlation between number of platform and utility for consumers or contents providers.

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Thank you for your attentions!

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National Institute of Informatics

TRANSFORMING THE INTERACTIVE RESPONSE SYSTEM TO A CLOUD VOTING SERVICE

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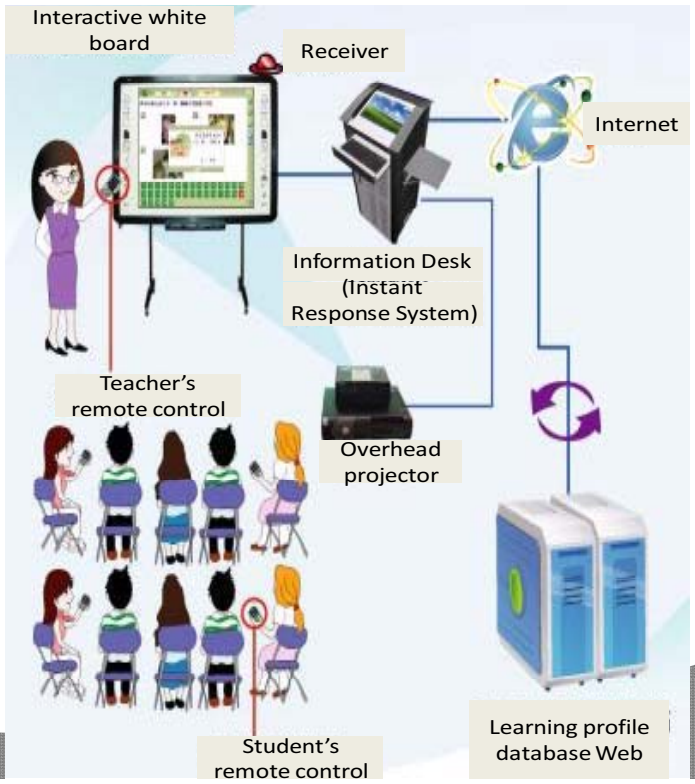


What is an Interactive Response System?

Motivation

- IRS is increasingly used in school teaching, business training, or game show activities
- The applications of IRS facility is still limited by its physical location due to specialized equipments

Opportunity

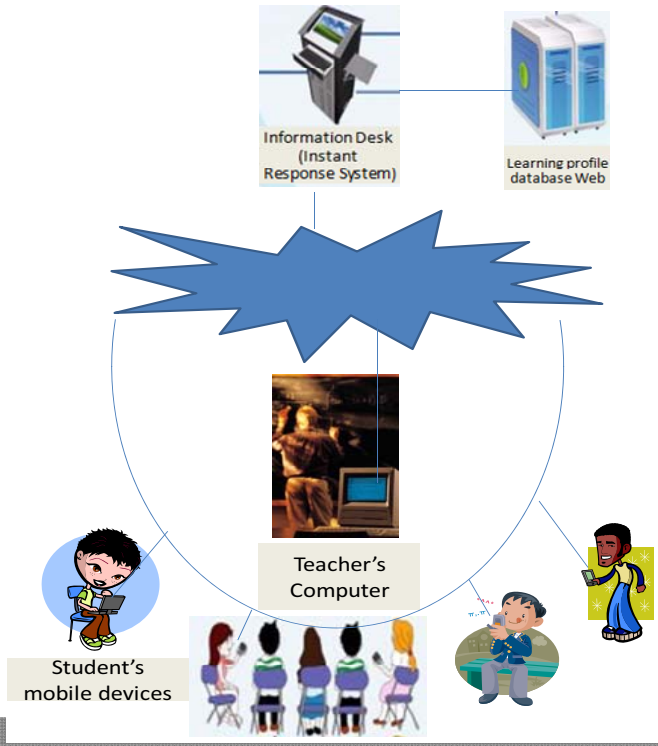
ITeS

Internet TeS

Internet Te IRS S

Internet Te Voting S

ITeVS



Cloud Voting System

Justification for this transformation

- Kay and LeSage (2009) reviewd IRS papers
  - Including four other review papers
  - 13 thirteen benefits and 12 challenges

- Issues related to this study
  - An extra burden for the teachers to operate and debug in classrooms
  - Some schools require the students to buy or rent a clicker - neither convenient nor cheap
  - Usually infrared-based - not very reliable but either infrared or RFID-based devices, questions are limited to true-or-false or multiple-choice types
  - Many servers and receivers are installed in fixed locations - not portable to general classrooms or other locations

Fesibility?

- Japan – immediately ready for it
- Nowadays, in many countries
  - almost every one above 15 years old has a cell phone
  - many students and working professionals have notebook computers
  - and some professionals have PDAs
  - Meanwhile, Wifi/WiMax and 3G networks are common in developed countries as well as some developing countries.

Business Model - general

- Any company who can provide such a service with fees.
- The infrastructure and the voting system can be self-developed or outsourced since it requires no challenging technologies and capabilities to implement.
- The most critical element will be the profit model related to marketing and pricing such services to schools, business organizations and general public.

Business Model - promotion

- To IRS adopters and those potential users who
  - wanted to but could not afford
  - did not have such needs
  - did not such thing exist before
- A successful marketing campaign will enabled more adopters by creating a much larger market:
  - 金蘭 soy-bean sauce marketing campaign in Taiwan twenty years ago, which created a new tradition for Taiwanese to barbecue during the Mid-Autumn Festival eve
  - marketing campaign by the department stores for making Taiwanese to celebrate Christmas instead of Memorizing the Constitution Day in Taiwan on December 25th

Business Model - pricing

- To be attracted , the pricing strategies need to be flexible enough to accommodate variety of users with different needs.
- School
  - school-level, unit-level or individual-level license to capture the potential users with affordable fees
  - for different usage patterns, the pricing can distinguish flat rate, frequency of usage, time frame of usage (such as one semester per year), pay per use, and so on
- Business corporations or general public can be as flexible as seen in the school example

Business Model – potential competitors

- Two local IRS vendors
- Brand-name notebook companies such as ACER in Taiwan
- Telecommunication companies such as the largest ChungHwa Telecom in Taiwan
- Web portal companies such as Yahoo or Google
- high-tech OEM companies who want participates in the cloud computing marketing, such as FaxConn or Quanta corporations

Special recommended occasion – public events

Whether it is large or small and indoor or outdoor, audience voting has becoming a trend.

For examples, new-year countdown shows, concert performances, political gatherings, or governmental-held events usually last hours with large crowd of audience, occasional audience interactions

Activities through this cloud voting service with their own cell phones definitely create an innovative and entertaining atmosphere.