

## From the Editor

It is a great pleasure to deliver to you the second 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 second volume is following up the first volume. The main topic is IT-enabled Services, or in short, ITeS. As the second volume, this issue intends to include those topics which cover more future looking researched and recent development of ITeS.

This volume 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 together with selected papers from such presentations.

In the first section, the first paper, “Knowledge Management and Innovation Performance in SMEs” is contributed by Dr. Maria R LEE (Shih Chien University) and Dr. Yi-Chen LAN (University of Western Sydney). This paper illustrates how SMEs deals with Knowledge Management (KM) issues. They conducted survey in incubator tenants in Taiwan. After careful statistical analysis they found the fact that enhancing KM capacity clearly improves SME’s innovative performance. Also they found web content that pertain “customer service”, “Communication mechanism” and “market mechanism” enhance the innovation performance of SMEs.

The second paper, “KFS of the Online Diet Service - Analysis and proposal for application diverted from the educational support system using mobile phone - ” is contributed by Dr. Hidenobu SAI (Faculty of Law and Letters, Ehime University). He brings our interests on AMOS – a system which he and his colleague developed and have deployed in class settings. In this paper, he discusses new application of AMOS in monitoring diet service using mobile phones. This is a typical application of ITeS because his research clearly illustrates that one system can be effectively converted to another service application once it is established. One of the strengths of ITeS can be found its applicability. His research provides clear evidence about it.

The third paper, “Electronic Commerce for Revitalizing Rural Economy - Application of B to C and Regional Brand - ” is contributed by Dr. Takashi OKAMOTO (Faculty of Law and Letters, Ehime University). His research is covering a very important and potentially very fruitful field – rural development by utilizing IT. His research starts from the analysis about Electronic Commerce (EC) as part of ITeS. He discusses about the strength and weakness about EC in relation to regional constraints. Through

case studies that he takes from Shikoku, he stresses the important role of Branding. His research illustrates how ITeS can be utilized in promoting Branding hence improve regional economies.

The second part of this Journal consists of the reproductions of presentation slides from the conferences. The 2<sup>nd</sup> ITeS Workshop was held as a session in SAINT 2009 (The 9th Annual International Symposium on Applications and the Internet) held in Bellevue WA, USA on July 20-24. This is a follow up of the 1<sup>st</sup> Workshop held in Turuku in July 2008. The Workshop was made up from 2 sessions – “Key Uses of ITeS in Business Practices” and “Application in Public Policy and Political Aspects of ITeS.” Each session included four presentations. This issue of the Journal contains some of the presentations from the Workshop. The presentations taken from the Workshop are selected from the view point of contributions to envisage the future of ITeS. Kinoshita et. al. discusses the application of DRM technique in financial securitization, Kamogawa et. al. presents new idea about how EA can contribute to enhance business value and Shoji illustrates policy of contemporary Japanese telecommunication MVNO.

The reprints from the conference also include some outstanding research presentations from The 4th Africa-Asia-Australasia Regional Conference. Okamoto discusses application of ITeS in improving Comprehensive Private Consignment of Public Policy and Orito illustrates Japan’s Mobile Marketing.

Thusly, this edition of Journal is made out of collections of up-to-date research. The editor would like to express sincere thank to the contributors of papers and the presenters in the Workshop who make this happen.

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This Publication is made possible  
by the Grant of Matsuyama University’s  
“Chiiki Kenkyu Senta Purojekuto  
(地域研究センタープロジェクト/Regional Study Center Project) 2008-2010”

# Knowledge Management and Innovation Performance in SMEs

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**Abstract** Organizations have long acknowledged that knowledge management (KM) is an important tool for gaining competitive advantage. Research has shown that knowledge is managed differently in small to medium-sized enterprises (SMEs) as opposed to large or multinational corporations. However, there is still relatively limited understanding of how knowledge management functions in the SME environment, particularly the way in which it contributes to innovation performance. The aim of the current research is to better understand the relationship between knowledge management and innovation performance of SMEs. The study focuses specifically on the Internet marketing environment of incubator tenants in Taiwan. The concept of absorptive capacity provides the theoretical basis for knowledge management's contribution to innovation performance. Five types of knowledge management capability – acquisition, conversion, application, sharing and protection – are examined for their influence on innovation performance. Two types of absorptive capacity - individual recognition and knowledge accumulation - are also tested. Results clearly support the conclusion that knowledge management capability and absorptive capacity strengthen innovation performance. The results also suggest that new start-ups can enhance their innovation performance by utilizing web content pertaining to “customer service”, “communication mechanism” and “market mechanism”.

**Keyword** knowledge management capabilities, absorptive capacity, innovation performance, small and medium-sized enterprises (SMEs), incubation center, incubator

## 1. Introduction

Drucker (1954) asserts that the three most important elements of value creation in today's enterprises are science, entrepreneurship and innovation. In this new landscape, knowledge has become the fifth factor of production, along with land, labor, capital and entrepreneurship. In the knowledge economy, the ability to manage intellectual assets has become the most important competency, one that promotes knowledge accumulation, transfer and creation. Leveraging knowledge is critical, both at the enterprise and national levels, and is the most important driving force behind competitiveness and economic growth. While it has long been acknowledged that knowledge management (KM) is an important tool for gaining competitive

advantage (Corso et al 2002), research has shown that knowledge is managed differently in SMEs than it is in other types of organizations (Sparrow 2001; Wong and Radcliffe 2000). However, there is still relatively limited understanding of knowledge management in SMEs, particularly the way in which it contributes to innovation performance.

In Taiwan, SMEs comprise up to 97.63% of all enterprises (National Statistics Republic of China (Taiwan), 2007). The SME's Office in the Department of Economic Affairs is developing and promoting an innovation and incubation platform to enhance the competitiveness of SMEs through the cooperation of industries, government, academic institutes and research institutes. Recent trends in e-business have radically

altered organizational structures and the way business is conducted among the various stakeholders along the supply chain. Such changes necessitate the need to manage knowledge assets more effectively, and to leverage technologies that enable collaboration and knowledge sharing. Often times, it also requires significant adjustments to organizational culture in order to enable the capacity to learn and the assimilation of new knowledge. The need for better KM practices is critical in SMEs, who are often constrained due to economic considerations and slow to adopt new information technology. It is believed that more research is needed to determine how Taiwan's SMEs should adapt KM practice in this new e-business environment. Further exploration is also needed to establish the role that absorptive capacity, the underlying propensity to assimilate new knowledge, plays in facilitating SMEs' innovation performance.

The aim of this research is to provide greater insight into the relationship between knowledge management and innovation performance of SMEs' internet marketing environment, specifically among incubator tenants in Taiwan. The content of this paper is organized as follows: section 2 introduces the theoretical concepts which form the foundation of the study, including knowledge management, innovation performance and absorptive capacity. In section 3, the methodological framework for the study is introduced and the hypotheses introduced. In section 4 the results are presented and in section 5 we conclude our work, present limitations of the study, and suggest future research directions.

## **2. Theoretical concepts**

### **2.1. Knowledge management in SMEs**

Organizations have long acknowledged that knowledge management is an important tool for gaining competitive advantage and improving performance (Denning, 2006; Griffith, Malhotra, and Neal, 2003). The study of knowledge and its multidisciplinary in nature and has been approached from many perspectives (Lopez et al 2004). As an organizational strategy, KM is often implemented in a formal manner in large corporations (Handzic, 2004) requiring substantial allocations of the corporate Information and Communications Technology (ICT) budget. The greater economies of scale and continuity afforded by such enterprises enable KM to be exploited to its maximum extent (Thorpe et al., 2005). Most SMEs, however, generally overlook KM in their strategic plan. There are various reasons for such negligence, including budget constraints, shortage of dedicated human resources, rapid change of personnel, lack of understanding the processes involved in KM, failure to realize the complexity and different types of knowledge, lack of anticipated delivery and recognition of the immediate benefit of implementing appropriate KM systems (Nunes et al, 2006; Desouze and Awazu 2006).

Knowledge in SMEs often derives from the experiences and associated tacit knowledge of one or more individuals (Carson and Gilmore 2001; Wong and Radcliffe 2000). SMEs rely heavily on individual know-how, in particular that of the owner/entrepreneur who plays an important role in sharing knowledge with employees (Wiklund and Shepherd 2003; Zhou, Tan and Uhlaner 2007). In addition, approximately 80% of SMEs state that knowledge is shared via face-to-face

communication (Zhou, Tan and Uhlaner 2007). While undoubtedly tacit knowledge is the most important and challenging aspect of KM, there are other facets should be considered in establishing a working definition of knowledge management capability. Nonaka and Takeuchi (1995) propose the following essential components: (1) Knowledge acquisition - the search for knowledge and the improvement the efficiency of new knowledge achievement. It also includes the integration and recreation of existing knowledge of organizations and business partners to create new knowledge, (2) Knowledge conversion - to make data usable and easy to find. It includes the organization, integration and formation of knowledge in order to convert tacit knowledge into usable knowledge, (3) Knowledge application - composed of effective storage system and easy searching engine. (4) Knowledge sharing - sharing knowledge with outside also helps enterprises in areas of knowledge-updating, problem-solving and decision-making, (5) Knowledge protection – deals with security issues, since knowledge is a strategic resource and is a competitive factor of knowledge-based enterprises. A balanced combination of management support, technology and organizational structural factors is necessary for successful knowledge management program implementation in SMEs (Chan and Chao 2008).

## **2.2. Absorptive capacity**

Absorptive capacity is a firm's ability to value new external knowledge, assimilate it and apply it to commercial products (Cohen and Levinthal (1989, 1990). It is essential skills for organizations to learn and share

organizational memories to create value (Senge 1992). Absorptive capacity ensures understanding and utilization of the new technological knowledge in specific areas and detailed assessment of newly introduced knowledge. This helps in predicting future technological developments, guides R&D investment and commercialization of new products and services.

In larger firms, absorptive capacity is often measured by the level of investment in research and development (Cohn and Levinthal, 1994). However, this is inappropriate in the context of SMEs, given the relatively limited amount of R&D funds that occur in such enterprises. Cohen and Levinthal (1990) propose a theory of absorptive capacity that focuses on a smaller scale such as an individual recognition. Those factors affecting the development of individual absorptive capacity include: (1) accumulation of related knowledge, (2) diversity of background knowledge, (3) diligence, and (4) utilization of individual absorptive capability. The performance of individual knowledge include: (1) memorization of new knowledge, (2) acquisition of new knowledge, (3) utilization of new knowledge and (4) creation of ideas. We adopt the theory and focus on the development and utilization of individual absorptive capacity to link factors of existing related knowledge.

## **2.3. Innovative performance**

The concept of innovation was first proposed by economist Joseph Schumpeter (Schumpeter, 1934), who defined it from an economic perspective: "...to reorganize existing production factors, alter their industrial functions to meet market demand and create benefits." Betz (1993) defines innovative performance as "product innovation",

“process innovation” and “service innovation” whereas others categorize innovative performance as “technology innovation” and “management innovation” (Evan, 1966; Knight, 1967). In this study, we focus primarily on three aspects of innovation, product innovative performance, technological innovation performance and management innovation performance. Product innovative performance refers to the introduction of new products or services according to the demand of the outside consumer market (Knight, 1967). In the present study, product innovative performance refers to the performance evaluation of product-improving capabilities. Technology, an important part of innovation, can be divided into new-tech products, new-tech production programs and new-tech services (Betz 1993). In this study, we focus on the performance evaluation of technology-improving capabilities. Management innovation in this study refers to the performance evaluation of management-improving capabilities. Management innovation affects business structure and management programs. It is directly linked to business management and indirectly affects basic tasks and activities of the business (Daft, Sormuen and Parks, 1988).

### 3. Research framework and hypotheses

In this study, we propose that (1) knowledge management capability and absorptive capacity activities and processes can contribute to the innovative performance of a firm; (2) internet marketing tools utilize and provide an adaptable direction for SMEs; (3) knowledge management capability and absorptive capacity have a positive effect

on the three aspects of innovative performance - product, technology and management - and provide an innovation goal for each. A research framework summarizing these propositions is presented in Figure 1.

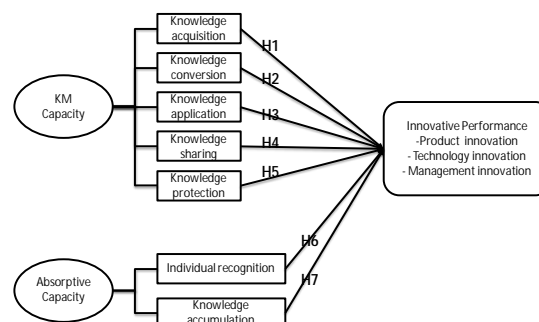


Figure 1: Research framework

#### 3.1. Knowledge management and innovative performance

Yumin, Gunasekaran and Mavondo (1999) studied the relationship between innovation factors and performance, and found that performance is closely related to management innovation, technological innovation and product innovation. In a business performance study focusing on knowledge management of American enterprises, Andrew, Arvind and Albert, (2001) found that knowledge management has a positive impact on business performance. The present study further examines the efficacies of these knowledge management capabilities over innovative performance. Five hypotheses relating to knowledge management capability are tested. They are:

[H1] Knowledge acquisition capability significantly affects innovative performance.

[H2] Knowledge convention capability significantly affects innovative performance.

[H3] Knowledge application capability significantly affects innovative performance.

[H4] Knowledge sharing capability

significantly affects innovative performance.

[H5] Knowledge protection capability significantly affects innovative performance.

### **3.2. Absorptive capacity and innovative performance**

Zahra and George, (2002) state that upgrading technology will improve core competitiveness, creates new capabilities, and in turn to create new products. Cohen and Levinthal, (1990) claim that the new products will be easier developed if outside knowledge meets inside business demand.

Triapsas (1997) identifies two key factors that make business more competitive: one is the identification and integration capabilities of outside knowledge. The relationship between knowledge absorptive capacity and innovative performance can be understood through a popular Japanese metaphor, which equates the roots of a tree to absorptive capacity and the trunk to technological capability. In order to make the tree vigorous and fruitful, attention should be focused on the root, which absorbs nutrition and water (Giget, 1988; Adler, 1989). In a similar fashion, internal business processes need to be nurtured so that the development cycle can be shortened and the development of new products accelerated. The current study posits that the absorptive capacity of a business can affect innovative performance.

Hypothesis 6 and 7 are based on two factors: (1) individual recognition and (2) knowledge accumulation activities. These two hypotheses are:

[H6] Employees' individual recognition significantly affects innovative performance.

[H7] Knowledge accumulation

significantly affects innovation performance.

### **3.3. Sample and data collection**

The subjects in this study are SMEs in Taiwan, mainly those that are tenants in Innovation Incubation Centers of universities throughout the nation. These Innovation Incubation Centers were built by the Department of Economic Affairs since 1996 to encourage public and private institutions to invest in incubation industries. It integrates the expertise and resource advantages of universities, corporate, private properties and other business and industry units. At present, nearly 100 SMEs have been established in these Innovation Incubation Centers. This study focuses mainly on Innovation Incubation Centers in tertiary institutions rather than those in foundations or in government organizations.

A survey was administered to individuals in a total of 20 Innovation Incubation Centers of tertiary institutions in Taipei City, Taipei County, and Taoyuan County. Since we were unable to field test the remaining areas of central and southern Taiwan due to the long distance and limited resources, an online survey was implemented to collect data from these areas.

### **3.4. Questionnaire design**

The survey questions were divided into four sections : (1) basic information about the SMEs, (2) categorization of the internet based applications utilized by the organization, including individual mechanisms, customer service, communication mechanisms, promotion and marketing mechanisms; (3) the primary study, consisting of questions dealing with (a) knowledge management capability (i.e. knowledge acquisition, knowledge conversion, knowledge application, knowledge sharing, and

knowledge protection), (b) absorptive capacity (i.e. employees' individual recognition and knowledge accumulation activities in organizations), (c) innovative performance (i.e. innovation performance of products, technological innovation, and management innovation performance), (4) respondents demographic information.

The first part of the questionnaire obtains basic information about the SMEs (background, industry sector, date founded, number of employees, number of years the company's website has been in existence, the website type and the degree to which it is internationalized). The second part drills deeper into the SME's website applications and the strategy used to develop its basic services and functions, specifically in regard to online marketing. The third part is the main section of this study and is composed of three key categories – knowledge management capability, absorptive capacity and innovation performance. Each key category is further divided into a number of variables with associated questions that are measured using a five-point Likert scale ("1" refers to "Strongly Disagree" and "5" refers to "Strongly Agree"). The fourth part contains demographic questions.

#### 4. Results and discussions

Three data analysis methods are used to analyze the results.

(1) Descriptive statistics. According to the samples including the company's basic information and the web site application contents, we use the sample size, percentage and cumulative percentage to distributions.

(2) Reliability and validity analysis. Concerning the reliability and validity of main content of this study including the knowledge management capability,

absorptive capacity and innovation performance, together with the application contents of website. Cronbach's  $\alpha$  values are used to verify the reliability standards. Variable factor analysis is achieved using the Kaiser-Meyer-Olkin measure of sample (KMO) and factor load quantity to test validation of each variable.

(3) Correlation analysis. We use Pearson correlation analysis to examine the correlation of all the variables utilized in this study and test the significant standard of the variables.

(4) Regression analysis. A single regression analysis is adapted to test the effect of the five dimensions of "knowledge management capability" among with the two levels of "absorption capacity" on the three types of "innovation performance" to verify the assumptions made in this study. Furthermore, hierarchical regression is also adapted to supplement the statistical interpretation of regression analysis of "knowledge management capability" on "innovation performance".

##### 4.1. Statistical samples

Sample size is calculated for a desired certainty degree of 90% according to the following formula (Whitten, Bentley and Dittman, 2000):

$$\text{sample size} = 0.25 * (\text{certainty factor/acceptable error})^2$$

According to the certainty degree and certainty factor above, if desired certainty degree is 90%, sample size (SS) should be calculated as follow:

$$SS = 0.25 \times (1.645/0.1)^2 = 68$$

In the statistics, 0.25 in the formula can be replaced by  $p(1-p)$ , the new formula to calculate SS is:

$$SS = p(1-p)(1.645/0.1)^2 = 0.1(1-0.1)(1.645/0.1)^2 = 25$$

If the desired certainty degree is 90%



and certainty factor 1.645, the above formula indicates that an appropriate sample size is 68 or 25, both of which are met with our sample size of 63 SMEs.

#### 4.2. Declarative statistical analysis and Internet applications

Table 1 displays the profile information of the SMEs who participated in this study. Among the industry categories in the sample, IT software companies accounted for the majority at 23.8%. The majority of the companies (44%) have been in existence for 1 to 3 years. 34.9% of the companies have 4~6 employees and 25.4% have 7~10 employees.

Table 1. Participant's profile

Organization by Business Sector	Frequency	Percentage
IT (software)	15	23.8
IT (hardware)	9	14.3
Digital Contents	7	11.1
Design	4	6.3
Others	28	44.4
Organization by years		
Less 1 year	4	6.3
1~3 year	28	44.4
4~6 year	13	20.6
7~10 year	6	9.5
More than 11 years	12	19
Organization by employee size		
< 3	9	14.3
4~6	22	34.9
7~10	16	25.4
11~15	1	1.6
> 16	15	23.8

Table 2 provides information about the websites of the sampled SMEs. 36.5% of respondents have had their websites for 1-3 years. 25.4% have only had their websites for less than 1 year. As for Internet utilization, 33.3% used the web to trade with the customers directly and 31.7% for a company web site. It is interesting to note that the vast majority of SMEs sampled, were not designed for international viewers, i.e. 82% indicated that their websites were catered for local viewers only.

In the application content of the websites, sample data in each category

has similar distribution on "customization" and "marketing". There are more than 50% but less than 70% companies use "customization", and 30%~40% companies use "marketing". Among all the categories, the most used application is "e-mail" in "customer service", and 93.7% companies are using e-mail as their marketing tool, showing that e-mail has become a very common marketing tool in this information age. Following that is "links to respond", which takes 70%; however, the applications of "chatting room" and "mutual evaluation of users" in "communication mechanism" cover the least samples, making less than 20%, indicating these two applications are not temporary trend. The "user evaluation of product" and "recommended system" are also making very low proportion, only above 20%.

Table 2. Categorization of Internet applications

	Frequency	Percentage
Internet built by years		
< 1 year	16	25.4
1~3 year	23	36.5
4~6 year	12	19
7~10 year	4	6.3
> 11 year	8	12.7
Internet utilization by types		
Direct trade with customers	21	33.3
Company web	20	31.7
Internet Service	7	11.1
Content Provider	6	9.5
Total Solution provider	4	6.3
Portal	3	4.7
Social Network Services	1	1.5
Internet middleware	1	1.5
Web site internalization		
Local websites	52	82.5
International website	9	14.3
Branch	2	3.2

As for Internet marketing, this study proposed five sections of web content including "individual mechanisms", "customer service", "communication mechanism", "marketing mechanism" and "marketing mix". The statistics result shows that Internet marketing has not been applied by SMEs generally. 90% of them use "Email" as a marketing tool but the utilization rate of other tools is only 50%. This seems to indicate that most of the SMEs sampled in incubation centers are just start ups and that there is still much space for them to develop Internet marketing applications. In the knowledge economy, the effective use of e-business strategies has become a critical competency that can allow SMEs to become better known and promote their products and services more effectively.

Under today's circumstances, making full use of "personal mechanism" will be a great marketing strategy because of the rise of personal awareness among consumers; they want unique, distinctive products or services more than before. We suggest that SMEs, apply the Internet marketing tools as much as possible. They can increase the "customer service", "communication mechanism", "marketing mechanisms" or other marketing mix to better develop their businesses.

#### 4.3. Analysis of reliability and validity

A summary of major measurement constructs and items for knowledge management, absorptive capacity and innovation performance is shown in Table 3. Results of reliability and validity analysis shows that the Cronbach's  $\alpha$  values of dimensions used in this study all reach as high as 0.8, which determines this study has acceptable reliability. In validity, the questionnaire is designed according to related literature (Chan and Chao 2008; Desouza and Awazu, 2006;

Kim, 1998). Similarly, based on previous studies in the literature, the present study has considerable theoretical basic and content validity (Andrew, Arvind and Albert, 2001; Cohen and Levinthal, 1990; Corso, et al, 2002; Griffith, Molhotra and Neal, 2003).

Table 3. Reliability and validity of major constructs

Constructs	Measurement Items	Cronbach's $\alpha$ value
Knowledge Management Capacity	Knowledge acquisition	0.871
	Knowledge transfer	0.947
	Knowledge utilization	0.947
	Knowledge sharing	0.936
Absorptive Capacity	Knowledge protection	0.922
	Staff background and experience	0.906
	Organizing knowledge accumulation	0.942
Innovation Performance	Product innovation performance	0.919
	Technological innovation performance	0.897
	Performance management	0.946

From the experimental results, SMEs benefit from acquiring knowledge management capabilities within the organization and by introducing external or internal knowledge and then transforming it into powerful tools for business operations. Furthermore, knowledge sharing and protection may make knowledge more influential in their organizations. Recruiting employees with the requisite practical experiences can lead to the development of value-added abilities within the in-house staff. SMEs can nurture absorptive capacity by enhancing knowledge accumulation activities. As a result, more progress will be made on innovation performance relating to products, technology or management.

#### 4.4. Correlation Analysis

Correlation analysis is used to analyze the correlation between two factors in statistics. The Pearson product-moment correlation analysis is the most commonly used statistical analysis method to derive inter-scale correlation coefficients. We use \*\* to represent correlation between variables when significant level is less than 0.01 (two-tailed test). The results of this study show that the correlation matrix of all variables reaches significant correlation levels. A summary of the correlation of the dimensions is shown in Table 4.

From the correlation analysis results, we can see that when SMEs apply “knowledge management capability” and “absorptive capacity” at the same time, the impact of “knowledge management capability” on “innovation performance” is not significant. That is, the impact of “absorptive capacity” is relatively higher than “knowledge management capability”. In short, SMEs should employ suitable and proper employees and organize activities to improve their knowledge capacities so as to effectively stimulate

the creativity of staff and then enhance “innovation performance”, rather than introduce useful knowledge to develop its ability.

In addition, although “knowledge management capability” has less impact on “innovation performance” than “absorptive capacity”, the improvement of “knowledge management capability” can effectively enhance “management innovation performance”, which means if SMEs adopt useful “knowledge” they can improve the management of their capabilities. This might include the ability to effectively plan for future development, to adjust each sector’s work, to integrate the point of views among all the sectors, and to make their staff effectively play their role and maintain good communication. Hence, if SMEs have some management problems, they can not only develop their “absorptive capacity” but also “knowledge management capability” to resolve problems.

Table 4. Correlation analysis

	KA	KT	KU	KS	KP	BE	AK	PI	TI	PM
Knowledge acquisition (KA)	1									
Knowledge transfer (KT)	0.841**	1								
Knowledge utilization (KU)	0.812**	0.896**	1							
Knowledge sharing (KS)	0.738**	0.869**	0.892**	1						
Knowledge protection (KP)	0.558**	0.602**	0.682**	0.626**	1					
Background and experience (BE)	0.641**	0.808**	0.811**	0.780**	0.680**	1				
Accumulated knowledge (AK)	0.703**	0.761**	0.844**	0.828**	0.710**	0.860*	1			
Product innovation (PI)	0.628**	0.715**	0.757**	0.698**	0.626**	0.777*	0.818**	1		
Technological innovation (TI)	0.583**	0.692**	0.705**	0.670**	0.636**	0.782*	0.790**	0.820**	1	
Performance management (PM)	0.610**	0.782**	0.806**	0.772**	0.630**	0.806*	0.817**	0.770**	0.871**	1

\*\* represents  $p < 0.01$

#### 4.5. Regression Analysis

(A) Relationship between knowledge management capacity and innovation performance

We use regression analysis to determine signification of the correlation between the single independent variable “knowledge management capacity”, including “knowledge acquisition”, “knowledge conversion”, “knowledge applying/utilization”, “knowledge sharing” and “knowledge protection”, and the dependent variable “innovation performance” (product innovation performance, technological innovation performance, and management innovation performance). We establish hypotheses [H1] to [H5], respectively, to verify the 5 dimensions of “knowledge management capacity” on “innovation performance”. In order to make sure there is no multicollinearity between variables, we exam the multicollinearity between variables using VIF (Variance Inflation Factor). The VIF value of variable less than 10 shows no multicollinearity. And in this study, all VIF values are less than 10, indicating no multicollinearity exists.

From the regression analysis table (Appendix A), the average  $\beta$  values of [H1]–[H5] range between 0.6 and 0.7, and are positive, meaning that the 5 dimensions of “knowledge management capacity” all have positive relationship. Based on t value with significance of 0.000, we could see that all results have significant impact on “product innovation performance”. Regarding the impacts on “technological innovation performance” of different “knowledge management capacity”,  $\beta$  values of test [H1]–[H5] range 0.583 ~ 0.705 for the positive, with the t value and significance of 0.000, significant impacts also could be seen. In the “knowledge management capacity”

and “management innovation performance” analysis,  $\beta$  values are also positive, ranging 0.6 ~ 0.8, with t value and significance of 0.000, we could see that “knowledge management capacity” and “management innovation performance” has positive relationship. So we can conclude the hypotheses [H1]–[H5] are supported.

(B) Relationship between absorptive capacity and innovation performance

In the study of relation between “absorptive capacity” and “innovation performance”, We also apply regression analysis to explore the significance of the relationship between independent variable “absorptive capacity”, including “professional background and experience of staff capacity” and “organizations to promote knowledge accumulation of activity”, and dependent variable “innovation performance” (performance of product innovation, technological innovation, performance, management innovation and performance).

From the regression analysis table (Appendix A), the  $\beta$  values of two dimensions in absorptive capacity to the innovation performance range between 0.7~0.9, both positive. With t value and significance of the results presented, we could confirm that [H6] and [H7] are supported.

#### 5. Conclusions

The purpose of this research was to identify the relationship between knowledge management and innovation performance of SMEs specifically among incubator tenants in Taiwan. The principal business competency studied in this research was the adoption and operation of Internet marketing. Key concepts, including knowledge management, innovation performance and absorptive

capacity were examined. A conceptual framework was introduced and hypotheses tested.

Results suggest that “knowledge management capability” and “absorptive capacity” can enhance “innovation performance”. The implications are that knowledge management capabilities should be transferred into practical ability after knowledge acquisition through personal or organizational learning. In this way practical knowledge will be applied in everyday life and shared. Some unique knowledge needs to be protected. The development of absorptive capacity through recruiting professional employees with relevant background and experience or through education and training can strengthen absorptive capacity of employees. With this type of knowledge assimilation, SMEs’ innovation performance on products, technology and management can be upgraded. The improvement of performance will determine the effectiveness of products and services, and provide a competitive advantage followed by company growth, an increase in revenue, market share and profitability.

Improving innovation performance helps to build competitive advantages. Along with the company's growth, there will be increased revenue, market share and profitability. We suggest that SMEs should employ employees with appropriate knowledge and skilled equipped and organize activities to improve their knowledge capacities so as to effectively stimulate the creativity of staff and then enhance “innovation performance”. As for the application of the web applications, we suggest that SMEs to the extent apply developing their Internet marketing capability. They can increase the “customer service”, “communication mechanism”, “marketing

mechanisms” or other marketing mix to get a better development and greater benefits from the cutting edge information and communications technology. This would also provide customers with more value-added services.

In future studies we recommend a further investigation through interviews with representatives from industry and academia to determine if there are other factors, which might have an impact on organizational innovation and efficiency and to expand upon our research model. Further research and analysis need to be conducted in measuring knowledge management capabilities, knowledge absorptive capacity, innovation efficiency, and various knowledge management infrastructures. In the measurement of business performance, market share or revenue growth rate indicators could also be included in the analysis to provide more objective data.

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## Appendix A. Regression Analysis

	Hypothetic content			$\beta$ value	T value	Verification result
H1-1	Knowledge management capacity	knowledge acquisition	→product innovation performance	0.628	6.297***	Support
H1-2			→technological innovation performance	0.583	5.605***	Support
H1-3			→management innovation performance	0.610	6.010***	Support
H2-1		knowledge transfer	→product innovation performance	0.715	7.990***	Support
H2-2			→technological innovation performance	0.692	7.480***	Support
H2-3			→management innovation performance	0.782	9.800***	Support
H3-1		knowledge applying	→product innovation performance	0.757	9.047***	Support
H3-2			→technological innovation performance	0.705	7.771***	Support
H3-3			→management innovation performance	0.806	10.564***	Support
H4-1		knowledge sharing	→product innovation performance	0.698	7.610***	Support
H4-2			→technological innovation performance	0.670	7.057***	Support
H4-3			→management innovation performance	0.772	9.498***	Support
H5-1		Knowledge protection	→product innovation performance	0.626	6.263***	Support
H5-2			→technological innovation performance	0.636	6.431***	Support
H3-3			→management innovation performance	0.630	6.342***	Support
H6-1	Absorptive capability	Individual recognition	→product innovation performance	0.777	9.641***	support
H6-2			→technological innovation performance	0.782	9.795***	Support
H6-3			→management innovation performance	0.806	10.651	Support
H7-1		Knowledge accumulation of activity	→product innovation performance	0.818	11.105***	Support
H7-2			→technological innovation performance	0.790	10.071***	Support
H7-3			→management innovation performance	0.817	11.060***	Support

# KFS of the Online Diet Service

## — Analysis and proposal for application diverted from the educational support system using mobile phone —

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**Abstract** We are developing and employing the educational support system which eases burden of registering attendance and issuing questionnaire for teachers using mobile phone. The feature of this system is to collect, accumulate, and distribute information anytime and anywhere.

As application of this system, we are developing the online diet service for the obese students. Although the features of both are similar, the purposes of the students who use services are different. Therefore, it is necessary to add the new elements for improving the effectiveness of the online diet service.

In this study, we examine the required elements by comparison with Japan and U.S. online diet services. One of key factor for success is customization and there are two approaches for customization. One approach is “computer oriented” customization and the other is “human oriented”. The former can easily enlarge the scale of the service, while the accuracy of customization is limited. The latter can provide much customized services at the expense of employment costs.

**Keyword** Online Diet Service, Mobile Phone, Motivation, Input Burden

### 1. Introduction

Some classes in Japanese universities, especially those in the social sciences, are well attended, and it is not uncommon to have over 300 students in one lecture hall. Registering attendance and issuing questionnaire places a heavy burdens teacher on the teachers of these classes. To make these tasks easier, teachers often use educational support systems, some of which use mobile phone as interface. Our research group is developing and employing such a system, named “AIMOS”.

We newly intend to apply this system in the medical and healthcare fields. We created the system for an experimental trial, called “AIMOS-M” in this study, by converting some contents inside AIMOS. And we examined its effect on the lifestyle habits of obese students through diet and exercise monitoring and found some

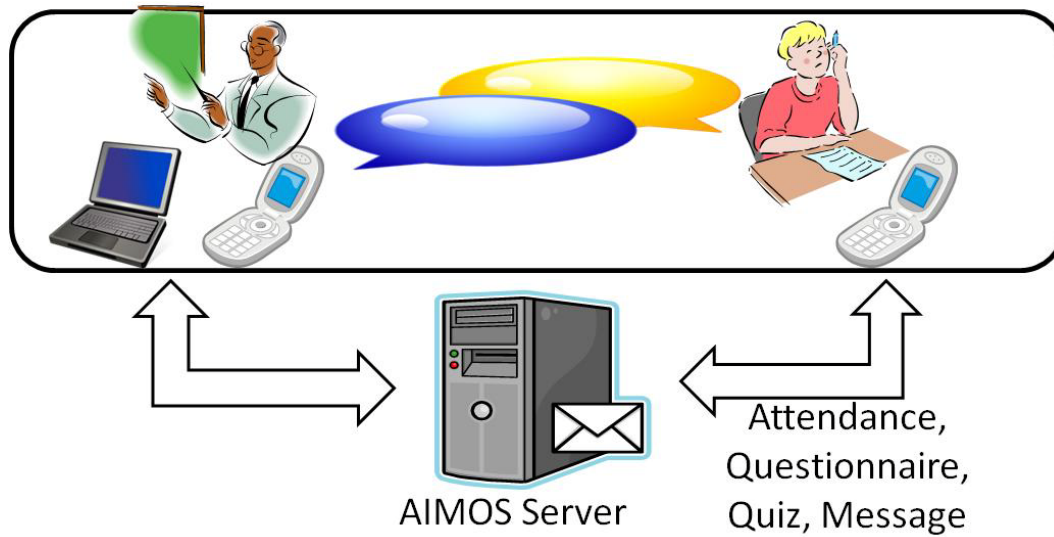
problems.

The purpose of this study was to identify additional elements to improve the effectiveness of AIMOS-M as a system for changing lifestyle habits. To do so, we compared AIMOS-M to commercial online diet services in the United States and Japan.

### 2. AIMOS: an educational support system using mobile phones

AIMOS is the educational support system we developing and employing. One of development concepts of this system is to support the creation of class space based on real-time interactive communication with low introduction and maintenance costs. To reduce the investment in equipment, AIMOS uses the mail function of mobile phone as one of its interfaces because almost all students have





**Figure 1 Configuration of AIMOS**

and can use a mobile phone anytime, anywhere (Fukushige et al., 2008; Maeda et al., 2006, 2008).

The configuration of AIMOS appears in Figure 1. The basic functions of AIMOS are attendance registration, questionnaire, quiz, message distribution. In most cases, teacher or university office staff activates a specific function through a PC or mobile phone, and then AIMOS sends the relevant mail to the students. If required, students reply by mail to AIMOS, and, depending on the type of messages, AIMOS then automatically replies or accumulates the result. The result of some types of questionnaire or quiz can be shown as a number or graph using simple operations.

AIMOS was launched 2004 and has been upgraded several times. The usability of AIMOS, as determined by user questionnaires, has thus been improving year by year (Okamoto, 2006).

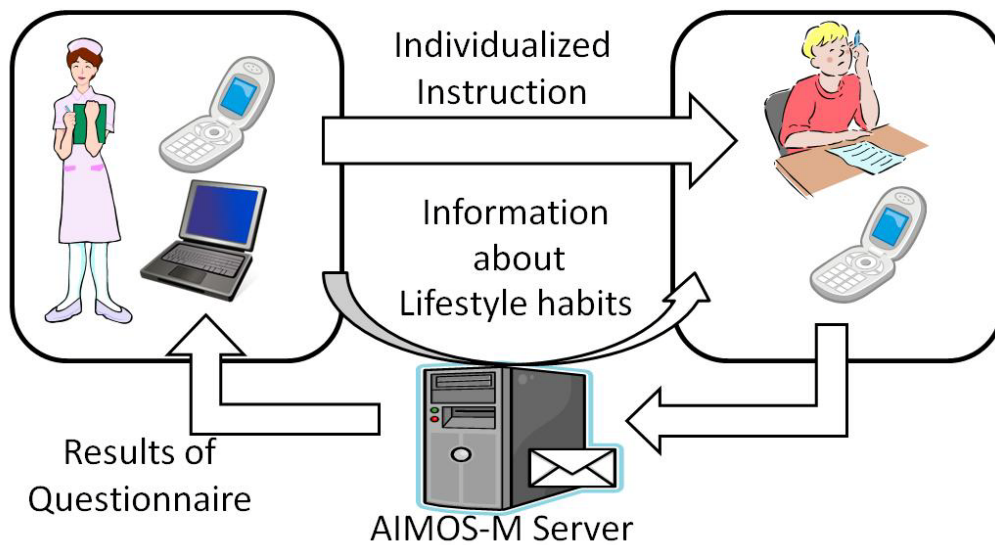
### **3. AIMOS-M: the application of AIMOS to medical and healthcare fields**

One of the features of AIMOS is to be

able to collect, accumulate, process and distribute information anytime and anywhere at low cost using a mobile phone as its interface. As such, this technology would be useful and effective in many other fields.

Previously, we proposed the use of AIMOS in a broad range of applications in the medical and healthcare fields (Fukushige, 2008). Although several different applications were proposed, these presented some institutional and practical problems that were difficult to resolve immediately.

To avoid these problems and conduct an experimental trial as soon as possible, we examined the use of AIMOS in changing the lifestyle habits of obese students through diet and exercise monitoring. For this trial, which took place in 2008-2009 (first period, 3 months) and 2009 (second period, 3 months), we created AIMOS-M by adapting the standard AIMOS, and worked closely with the Hannan University public health nurse.



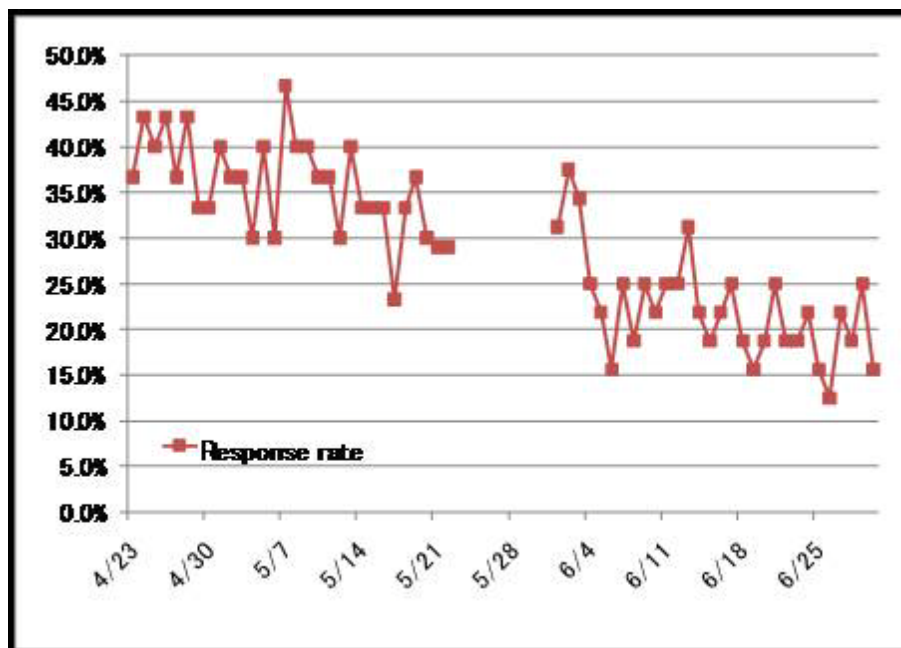
**Figure 2 Configuration of AIMOS-M**

The configuration of AIMOS-M appears in Figure 2. There were three parts to this experimental trial. The first and most important part was the daily questionnaires on the students' food intake, physical activity, and lifestyle habits. These questionnaires were sent and received through the AIMOS's questionnaire function via mail. The second part was the provision of information via the AIMOS message distribution function.

The third part of the trial was individualized instruction directed to students when the health nurse deemed it necessary.

Although the trial did appear to have positive effects on student lifestyle habits, as evidenced by weight loss in two of the 14 participants over a 1-month period, this trial also revealed some problems with AIMOS-M.

Most critical problem is that many par-



**Figure 3 Response rate at second period of trial**

ticipants tend to lose their motivation to continue to use AIMOS-M. The response rate of daily questionnaire at second period of trial appears in Figure 3. It shows that the return rate is falling down as a day passes.

#### 4. The reason of low motivation at trial of AIMOS-M

The problem of low motivation of AIMOS-M, as discovered during the course of our experimental trial, fell within two broad areas.

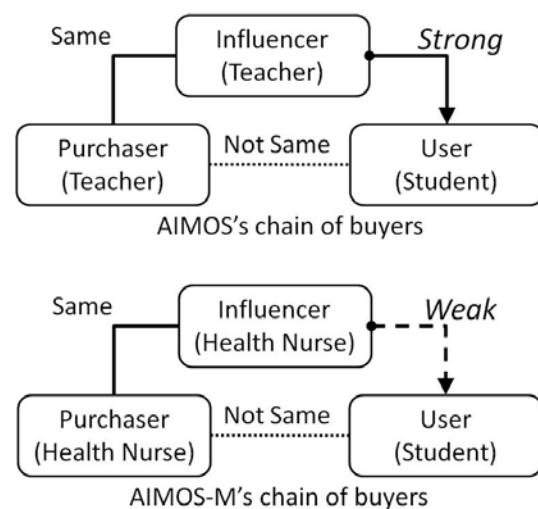
The first are concerned the input burden for students. Input burden can be defined as ‘degree of trouble in inputting information’. Input burden consists of two parts. The one is amount, frequency, and content of required information for receiving service. During the trial, students were asked to answer 10 written questions every day, including questions about total food intake. Inputting all this information using a mobile phone keyboard require time and effort. Another part of input burden is types of device to input inform. Especially for some language like Japanese, the difference in input device enlarges input device. In Japanese language, these are two types of character, ‘kana’ and ‘kanji’. Kana is phonogram, and inputting one kana needs from one to ten strokes in using mobile phone keyboard, although from one to three strokes in using PC keyboard. On the other hand, kanji is ideogram, and inputting kanji needs kana-kanji conversion. Mobile phone’s capability of kana-kanji conversion is poorer than PC’s. Therefore inputting Japanese by mobile phone enlarges input burden.

The second problem area was related to the attitude of the students. In “chain of buyers” framework, as detailed in *Blue Ocean Strategy* (Kim and Mauborgne, 2005), there are three different player

groups involved in the buying decision. Applying this framework to this trial, “user” is the person who use service, and “purchaser” is the people who decide to buy service. And in this study, “influencer” is not equal to original “influencer” in Blue Ocean Strategy. “Influencer” is the person who has influence to both user and purchaser. And degree of influencer’s influence varies from weak to strong. It means that it is important not only who has influence but how much influence.

From the perspective of this framework, the “purchaser” of AIMOS is the teacher or university that has a responsibility for the lecture, and “user” is the student that takes lecture. The teacher or university is also an “influencer” and has a very strong influence on the students. In our experimental trial of AIMOS-M, the “user” was the student participating in the trial, and both the “purchaser” and “influencer” was the health nurse. The nurse had weak influence to the students did not realize the necessity of changing lifestyle habits, therefore, many students had low motivation.

It seems quite probable that the moti-



**Figure 4 Chain of buyers of AIMOS and AIMOS-M**

vation of these students would increase if they noticed some positive effect related to the use of AIMOS-M. However, the combination of heavy input burden and low motivation likely led the students to stop using AIMOS-M before they could observe any positive effects.

### 5. eDiets.Com: one of the most well-known online diet services in the United States

In this experimental trial, the purpose of participants is to change their lifestyle habits and thus lose weight. There are various types of diet services designed to achieve the same purpose, some of which use ICT and provide their service online. These online services have some differences in composition and the elements that they consider important.

The most well-known commercial online diet service in the United States is eDiets.Com, which provides both online and offline services. In terms of online services, it provides customized meal and fitness plans and professional advice by nutritionists and dietitians for additional cost, and promotes communities in which clients may participate. In terms of offline services, they offer meal delivery plans for additional cost. Clients can

combine online and offline services, or use the online services only.

One of the features of eDiets.Com is the possibility of customizing (personalizing) meal and fitness plan based on a personal profile that client completes upon subscription. eDiets.Com can recommend some plans to suit their taste and purpose, and these plans can be customized further by the client. This customization of services is facilitated using computers and databases, and it appears that eDiets.Com has sufficient capacity to handle a large number of clients. Therefore, there is less possibility that an increase in the number of clients would cause stoppage of services because of lack of staff.

We also analyzed eDiets.Com from the perspectives of input burden and motivation. The basis of the whole eDiets.Com program is the personal profile entered when a client first subscribes. eDiets.Com can then provide the basic service without additional information, such as a daily record of food intake. Therefore, we consider the input burden of eDiets.Com to be relatively light. From the viewpoint of the chain of buyers framework, the eDiets.Com client is both the “user” and the “purchaser”. Thus, the motivation of

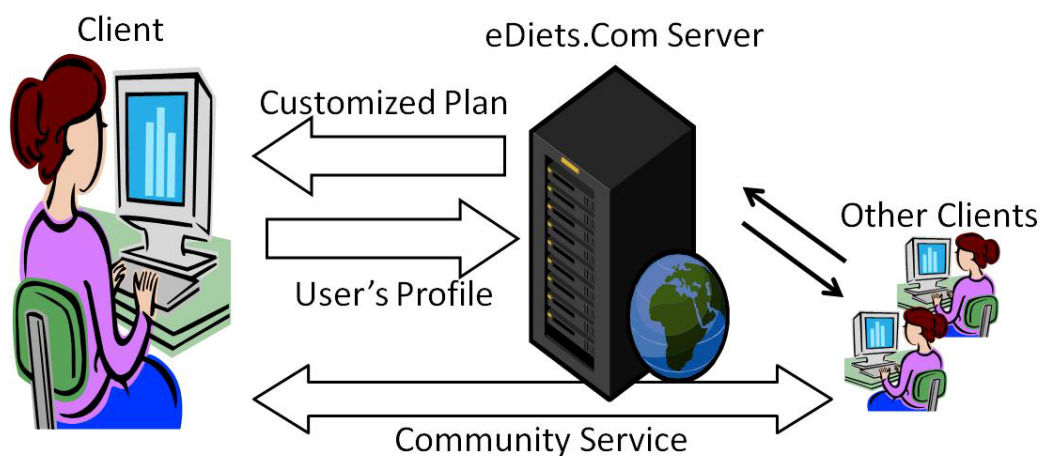


Figure 5 Information flow of eDiets.com at online

eDiets.Com clients is high at least at the start.

Tsai and Wadden (2005) conducted a systematic review of commercial weight loss programs in the U.S. and selected eDiets.Com as their example of an internet-based weight loss program. They stated that the result of eDiets.Com in 2001-2002 was no higher than another offline weight loss program. This may be due to the lack of feedback related to clients' actions and results, and the reduction of motivation caused by the lack of feedback. To solve these problems, eDiets.Com offers professional advice at additional cost. And promoting communities contributes to maintaining and increasing motivation of clients.

**6. D-Clinica: a diet service provided locally in Japan**

D-Clinica is a commercial diet service provided by "Healthy Planet", a company based in Japan. Unlike eDiets.Com, D-Clinica combines online and offline services and does not offer online service only. Therefore, the provision of D-Clinica services to a person who lives

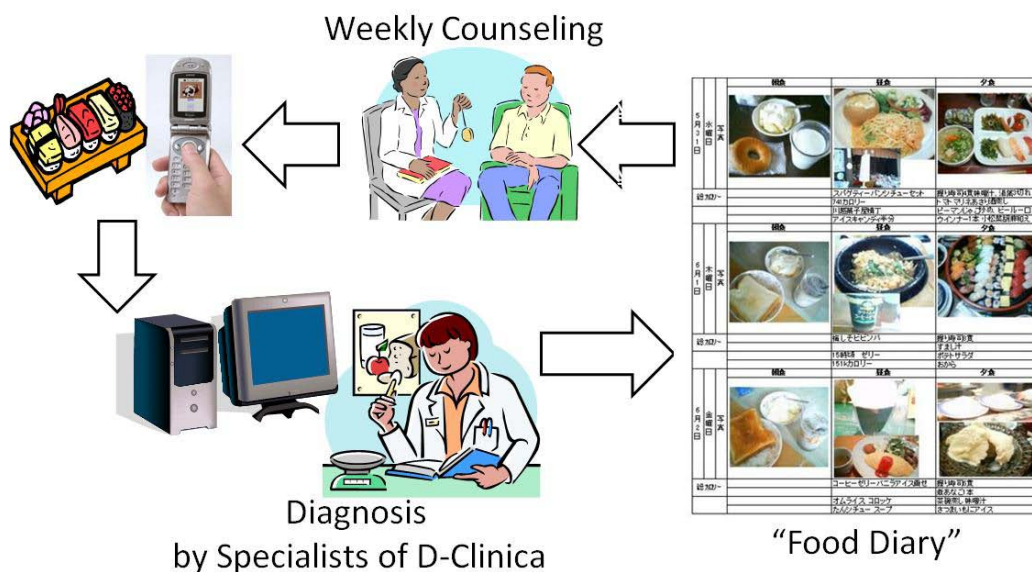
faraway from Matsuyama City, where Healthy Planet has its office, is difficult.

D-Clinica includes the following services: diagnosis of food intake by mobile phone, analysis of physical activity using multifunctional pedometer, face-to-face counseling once a week, and instructional meetings regarding foods that have adequate calories and nutrition.

One of the features of the D-Clinica is the diagnosis of food intake by mobile phone. Figure 6 shows process of the diagnosis. In this diagnosis, clients take pictures of their daily food intake with the camera function of their mobile phones and send these pictures along with messages to the nutritionists at Healthy Planet. The nutritionists then analyze these pictures and messages to create "food diary", which is a weekly report of each client's food intake.

In addition to the food diary, specialists at Healthy Planet use physical activity reports recorded by the multifunctional pedometer to provide clients advice regarding lifestyle habits during face-to-face counseling sessions.

D-Clinica services are provided by



**Figure 6 Process of D-Clinica's diagnosis**

specialists and continually customized with the condition and needs of their clients. With prevailing ICT at present time, this customization of services is neither automated nor computer supported, one specialist can handle approximately 10 clients, for which reason the D-Clinica program is more expensive than that of eDiets.Com.

As in AIMOS-M, the input all of food intake is essential for D-Clinica. However, due to the combination of the mobile phone camera function and face-to-face counseling, the input burden for D-Clinica client is much less than that associated with AIMOS-M. In addition, similar to eDiets.Com, the client is both the “user” and “purchaser.” Furthermore, periodic counseling and feedback by the specialist tend to maintain the clients’ motivation and inspire them.

### 7. Conclusion: KFS of online diet service and additional elements for AIMOS-M

Our trial using AIMOS-M revealed problems regarding input burden and motivation. Based on a comparative analysis with established programs, we found the

eDiets.Com program reduces input burden by limiting the number and frequency of inputs, and maintains and increases motivation through promoting communities. In contrast, D-Clinica, requires food intake reporting as AIMOS-M, but uses the camera function of the mobile phone to reduce the input burden. D-Clinica also offers customized services provided by specialist to maintain and increase motivation.

Takahashi and Arimoto formulate 6C framework for anti-obesity business (Takahashi and Arimoto, 2009). 6C means Content, Charge, Contact, Continue, Cycle and Cluster. In these elements, content, it means meal and exercise plan, effects result of diet directly. However, there are little differences among background principles of various contents. Rather, KFS of diet service is not content itself but to continue to use content, that is, to maintain and increase motivation.

Comparison with these online diet services indicates that we should consider ways to maintain and increase the motivation of using AIMOS-M by reducing the input burden and/or customize content. However, before deciding what specific

	AIMOS-M	eDiets.Com	D-Clinica
Initial Motivation	Low (Purchaser ≠ User)	High (Purchaser = User)	High (Purchaser = User)
Input Burden	Heavy (Mobile Phone & Daily)	Light (PC & First Subscription)	Heavy (Camera + Offline & Daily)
Influencer	Weak	? (Online & Community)	Strong (Feedback by Specialists)
Customization	Nothing & Cheap	Computer & Cheap	Human & Expensive
Motivation to Continue	Low	High?	High

Table 1 Comparison with three online diet services

functions to implement, we should decide whether AIMOS-M should be “computer oriented” like eDiets.Com or “human oriented” like D-Clinica.

Selection of the “computer oriented” approach requires reducing the number of questions and changing the questionnaire from written questions to closed or multiple-choice questions. This would reduce the input burden and enable automated or computer-supported customization of services. The key factor for success in this case is the design of effective questions and responses. In addition, promoting communities is effective for maintaining students’ motivation.

In the “human oriented” approach, it would be useful to reduce the input burden and maintain motivation using the camera function of mobile phone and providing feedback, as in the D-Clinica program. However analyzing food intake from pictures and sending advice requires the cooperation of a specialist and increases the cost.

One of the development concepts of the original AIMOS, predecessor of AIMOS-M, was the cost of introduction and maintenance. Following this philosophy, AIMOS-M should be developed using the computer oriented” approach, and the feedback and individualized instruction by specialists should be conducted using the message distribution function.

### **Acknowledgment**

This paper is based on the author’s presentations, “The Problems of the On-line Diet Service diverted from the Educational Supporting Service using Mobile Phone” at International Telecommunications Society 4th Africa-Asia-Australasia Regional Conference and “KSF analysis of online diet service” at National Conference of JASMIN 2009 Autumn at Prefectural University of Hi-

roshima.

This research was partially supported by the Ministry of Education, Science, Sports and Culture, Japan; Grant-in-Aid for Scientific Research (A), 19201032, 2007. Part of this study is also supported and collaborated by medical office of Hannan University, HUMANSTAGE CHAIN Co., Ltd., and ARTSTAFF Co., Ltd. The author greatly appreciates those.

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# Electronic Commerce for Revitalizing Rural Economy — Application of B to C and Regional Brand —

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**Abstract** B to C, one of the representative of ITeS, is considered as the means to revitalize rural economy. There are some cases where B to C business models is used by rural corporations and rural stores. B to C provides great potential of business for rural stores. At the same time, it has the limit in the view point of differentiation of stores and transportation cost of goods. In this paper, four cases are shown in order to illustrate the success factors for rural B to C implementations. They suggest four features about B to C in order to revitalize rural economy. That is, branding, collaboration of rural stores, means for advertising medium, and possibility of strengthening buying power. Then we enhance branding to regional brand in B to C market, and suggest “virtual regional brand”. This study would be helpful when we use B to C as the means of revitalizing rural economy.

**Keyword** Electronic Commerce, B to C, Rural Economy, Online Shop, Regional Brand

## 1. Introduction

EC (Electronic Commerce) is considered as one of the representative of ITeS (IT enabled Services) under the Web2.0 environment. Before Web2.0 is present, EC was a luxury to limited large corporations, which have access to the ICT (Information and Communication Technology) infrastructure and capacity to build EC systems.

Under Web2.0 environment, however, both access to the ICT and the initial cost dramatically declined. As the consequence, EC has been gradually penetrated to both small to tiny scale industries and geographically disadvantaged localities such as Shikoku. In line with this trend, EC is considered to be one of the major ways of business transactions in future. Among all EC activities, B to C (Business to Consumer) transaction is the most remarkably expanding one.

At the same time, economic divide between the urban and rural raise attention and B to C is considered as the means to

revitalize rural economy. There are some cases where B to C business models is used by rural corporations and rural stores. Some of these cases are now indicating some degree of success over the internet stores.

In this paper, B to C business models observed in rural business environment is considered in the context of ITeS. Four cases are shown in order to illustrate the success factors for rural B to C implementations. These are all the cases of Ehime prefecture, rural area in Japan. First case is about the using rural information for B to C. Second is about the coordination of rural stores. Third is about the use of B to C as means for advertising medium. Last one is about possibility of strengthening buyer's bargaining power. By looking at the cases, the paper shows four features of B to C from a view point of revitalizing rural economy. Then we enhance branding to regional brand in B to C market.

## 2. Background

### 2.1. The Status of the Japanese B to C Market

In Japan, the Internet utilization has been common these days. MIC (Ministry of Internal Affairs and Communications) reports the status of the Internet utilization. The number of Internet users reached 90.91 million people as of the end of 2008, an increase of 2.8 million people from 2007. The Internet penetration rate in Japan is 75.3% at the end of 2008, 2.3% point increase from the previous year [1]. Fig.1 shows the changes in

the number of Internet users and the penetration rate.

B to C market in Japan has been expanding as developing ICT infrastructure. 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%. Table 1 shows the changes in Japan's B to C market size and EC ratio in these years [3]. As the table shows, B to C has been common for people and the important part of consumer market.

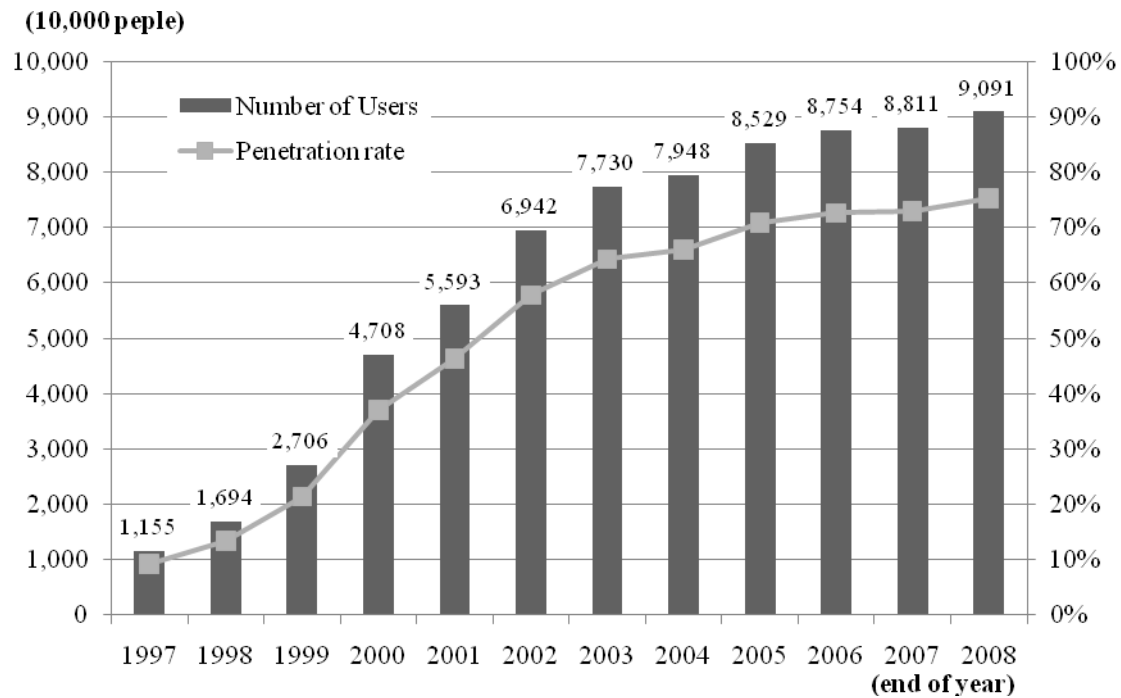


Fig.1: Change in the number of Internet users and the penetration rate [2]

Table 1: Changes in Japan's B to C market size and EC ratio [3]

	2006	2007	2008 (Change from 2007)
Market size	4.4 trillion yen	5.3 trillion yen	6.1 trillion yen (+13.9%)
EC ratio	1.3%	1.5%	1.8% (+0.3points)

Some reports also show many people utilize B to C for various goods and services. 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 2008. [4] It reports that 60% of the respondents utilize the direct marketing on the Internet 1-3 times per month, 90% of them purchase goods or services through the Internet less than 30,000 yen per month. The goods which are bought most from B to C market are book/magazine. And they often buy food/beverage (except liquor) or miscellaneous goods. Thus we could recognize B to C as common channel for general consumers' purchasing.

## 2.2. Economic Status in Japan

On the other hand, Japan has other serious economic problem. That is economic divide between the urban and the rural. There are some indicates of Japanese economic divide. Table 2 shows income per capita in FY2007 [5]. There is about one million yen difference between income per capita of the Kanto area and the Kyushu area. The trend of Japanese population shows similar status. Although the population of urban area is increasing, the population of rural area is decreasing [6]. From these data or status, concentration of economy to Kanto area, that is urban area, has been progressing.

The rural area has geographical disadvantage. The rural area is far from the area that a lot of people live in. Its market scale is relatively small. Thus rural economy faces hard environment, and we need revitalization of rural economy. Almost all the rural area is good for living and has good regional resources. But they are not economically richer than urban area. Indeed economic status is not all,

but we have to give suggestion to revitalize rural economy. B to C has possibility to become one of the most effective tools for rural area.

**Table 2: Income per capita, FY2007 [5]**

	Income per capita: FY2007 (¥1,000)
Hokkaido Tohoku	2,540
Kanto	3,477
Chubu	3,308
Kinki	2,967
Chugoku	2,867
Shikoku	2,519
Kyushu	2,468

## 3. B to C, its Possibility and Limit

Internet has been said to have the characteristic of eliminating disadvantage of physical location. In this context, B to C has three features. It ease geographical disadvantage. It expands scale of market. It provides equal competition environment both in urban and rural. In B to C market, the store location and size are not important. Therefore, B to C has great potential to revitalize rural industries when utilize this characteristic in such as business as contents production and deliver over the internet -- or, delivery of virtual (digital) goods over the internet.

In case of "real" products, however, the stage of delivery becomes the bottleneck. In B to C process, the process of marketing, purchasing transactions, and settling payments are just as the same as virtual (digital) goods. At the stage of delivery, the transportation cost cannot be eliminated, and it often costs more when the seller is in rural area. At the same time, the consumers usually use search engines

and sort facilities of price comparison site, which usually include transportation costs in the total cost, the rural merchants are usually placed in the inferior positions. Unless they compete in different arena, such as branding, the price competition works against the rural vendors.

Although B to C market has great potential for revitalizing rural economy, it leads rural merchants to tough competition environment. This is because more differentiation of “real” merchandize is necessary in B to C market in the internet.

#### **4. Four Typical Cases in rural context**

There are many cases where a rural store tackles B to C. This section shows four typical cases in Ehime Prefecture, which locates rural area in Japan and far from urban area. These examples give suggestion when we use B to C as a means of local activation.

##### **4.1. “Haiku Poem Koshien” Memorial Event**

Matsuyama city, prefectural city of Ehime prefecture, is famous for a Haiku poem. Moreover, the high school student’s haiku poem contest “Haiku poem Koshien” held in Matsuyama is recognized widely in Japan.

Under such a background, about 20 stores, which have been tackling B to C in Matsuyama and its surrounding area, carried out “Haiku poem Koshien” memorial event. It has been carried out every year since 2006. For the memory events, the stores made the common web site and each store put the goods on the web site, and sold them. Some stores sold their products at a special price, others prepared goods only for the events. Each store put the common banner of the memory event on its own web site, thus the common web site and the each store’s

web site linked interactively. At the same time, they introduced this memorial event by using the e-mail for its own customer.

They provided much information about the area in the common web site, such as explanation of “Haiku poem Koshien” and sightseeing guidance of Matsuyama. Some of stores carried out the original sales promotions related to a Haiku poem, and they put the information about the rural area on their own web site.

##### **4.2. Local Online Mall**

There are various online malls on the internet, and some of them manage for the stores belonging to the specific area or type of industry. In many cases, their scale are comparatively small, differ from the major online mall, such as “Amazon”, “Yahoo!”, and “Rakuten Ichiba”.

The “Matsuyama special select market” is one of the online malls in rural areas. All stores which join the online mall have their own real store in Matsuyama city and are small to tiny stores. This situation shows the purpose of establishment of this online mall. That is, the online mall provides them the opportunity to tackle B to C easily, even though they are rural small-scaled stores, and do not have the know-how about EC.

This online mall tries to support a tie-up and collaboration among stores in its mall. The company which manages the mall coordinated three small stores, a Japanese sweets store, an egg store treating the egg of a silky fowl and a store treating paulownia boxes, and they developed the high-value-added new Japanese sweets, “gold tart”, luxury rolled sponge cake with bean jam. Specifically, the Japanese sweets store made sweets, which was made from the egg of the silky fowl of an egg store, put into the paulownia box of a box store, and sold on the mall. After the trial, the online mall

coordinated farmer and sweets store, and developed new sweets.

They have not considered to cooperate with other stores, although they all exist in the same area and have fine goods. They didn't have the experience of gathering management resources, developing the new product, and selling on the internet. The coordination of the online mall makes this case possible.

#### **4.3. A rural Bakery and B to C**

A business in Imabari city sells bread and a cake on the Internet. For management efforts, such as developing attractive goods, making beautiful and intelligible website, mail magazine, kind customer correspondence, etc., its sales are getting larger and larger and the store becomes the superior one in the major online mall, Rakuten Ichiba.

Mass media, such as television and magazine, report the goods and the store repeatedly. These articles improve the store's recognition in the market and a lot of new customers buy the goods. Of course, mass media report the information of the store without charge. As a result, mass media's reports are free advertisement media.

The store sells their goods to consumer. It is just B to C. A corporation, it was looking for the cake store, knew the reputation of the store through the internet, ask the store about its goods directly, outside B to C, made the continuous contract of ordering cakes. That is, B to C on the Internet connects with B to B in the real world, although the store did not assume corporation as its customer. From the viewpoint of management, this expansion of the business becomes risk dispersion of the store.

#### **4.4. Bag Store in Rural Area**

The manager of the bag store in Uwajima city tackles B to C for expansion of

a new market because of hard economic conditions of the city. The sales of the store on the internet are becoming large gradually as a result of management efforts. Concerning sales, at present, the sales from the shop in real world is larger than the one on the internet. It is very significant from the viewpoint of store management to gain many new customers live in other area, such as Tokyo and Osaka, far from Uwajima.

Furthermore, after opening the store on the internet, it could sell bags of the famous brand, which have not been sold at the store in real world. As the real store is located in rural areas, customer population for the store is small. It is guessed that the store have no dealings with the broker of the brand. That is, B to C made it possible for the rural store to sell the famous brand bags.

## **5. Analysis and Findings from the Cases**

### **5.1. Branding and Regional Brand**

In the first case, Haiku Poem Contest memorial event, stores on the internet try to differentiate their goods from other by adding the special "flavor" of "locality". In order to avoid price competition, of course, stores have to make their goods more attractive. In that case, adding regional information to stores differentiate qualitatively. Linking real world information to virtual world will create "uniqueness" in B to C market. Internet can add rich information to goods easily, and it's also the advantage of the internet. Internet is a great media to deliver the background information about the rural products and its region itself.

Moreover, if stores share the same geographical feather, they may create a certain "Regional Brand". Regional brand relates a local image and goods, such as

nature, history, and culture, and produces the differentiated value. As a result, it produces competitive advantage in a market [7].

### **5.2. Coordination of Small Business**

The case of the online mall of the local area shows that the Internet makes collaboration of local small-scale stores easy. It is considered that the main purpose of an online mall for the store is expansions of a market. Since it has led to the market in the world through the Internet even if it is a local online mall, there will be a potential customer all over the world theoretically. Local online malls are greatly inferior to major online malls in the field of attracting consumers, however. Thus it is not expectable that a market is expanded greatly.

As the case shows, collaboration of the stores in a local online mall is more effective and practical. It would be the main purpose of using a local online mall. Collaboration of small-scale stores on the internet is easier than in the real world. Many customers can be attracted their stores, if stores cooperate on the Internet, hammer out attractive plans and make qualitative differentiation. As a result, a local online mall becomes attractive. Such a virtuous circle could be produced.

Entrance barrier of B to C market in general is lower than real one. Therefore, rural small businesses have opportunities to enter the market. There are plenty of information exchange and business matching over the internet, and furthermore its cost is very low. Therefore, multiple small stores can collaborate and develop new products. It is easy to collaborate with small businesses over the internet.

Concerning of the mediator, the company or organization which manages a local online mall would coordinate stores.

In economical revitalization in rural areas, public support plays an important role in many cases. Considering this viewpoint, ICT become more effective tool for rural revitalization if public sectors support the soft side of a local online mall, such as collaborating stores.

### **5.3. B to C as Advertising Media and Expanding tool for B to B**

Recognition of the business is one of the most important factors for successful businesses. For rural industries, recognition from the market is often less than the competitors in the urban. Because of its expensiveness, small businesses hardly use traditional advertising media. Stores on B to C market are exposed to the same situation. This may sound contradict to the common belief about the technological advantage of the use of the internet and EC. It should diminish the geographical and scale disadvantage. Since there are too much stores in B to C market, the store is hardly distinguished from others by the technological advantage.

The previous baker's case suggests the solution of the problem. Generally B to C is both the market and the source of income for merchants. At the same time, B to C realized a unique side-effect beyond sales activities. That is, B to C activities improves the recognition of the store in the market.

Continuing to maintain B to C activities in the rural context, the act of B to C itself triggered attention of mass media or large industry outside of the rural area. Concerning of mass media, stores on B to C market are frequently reported by the mass media. This is because media news often depend its news source on internet researches. Mass media still has great influence of recognizing the store in the market, although Web2.0 environment would change the situation in the near

future.

Likewise, corporations nowadays use internet searches to find business partners. Thus, B to C that originally intended for sales activities to consumers, sometimes results in B to B activities.

In conclusion, the long lasting B to C activities itself may work as advertising media. B to C activities provide unique advertising opportunities to small or rural businesses.

#### **5.4. Strengthening Buyer's Bargaining Power**

Because of the scale of market, rural merchants often face limit to the access certain kinds of merchandize -- especially to the brand controlled merchandize. But the previous case of bag store shows that lasting B to C activities removes the limit.

Although expansion of a market is important, of course, expanding the supplier of goods is also important by using the internet. B to C dramatically increases potential customers, expands the market to worldwide. At the same time, lasting B to C activities provide opportunities to trade with new suppliers. B to C improve the variety of the store's goods, makes the store more attractive. As the result, B to C has fine influence to the sister store in the real world, produces a virtuous circle.

In conclusion, B to C can work to strengthen buyer's bargaining power [8] of rural merchants.

### **6. Regional Brand and B to C Market**

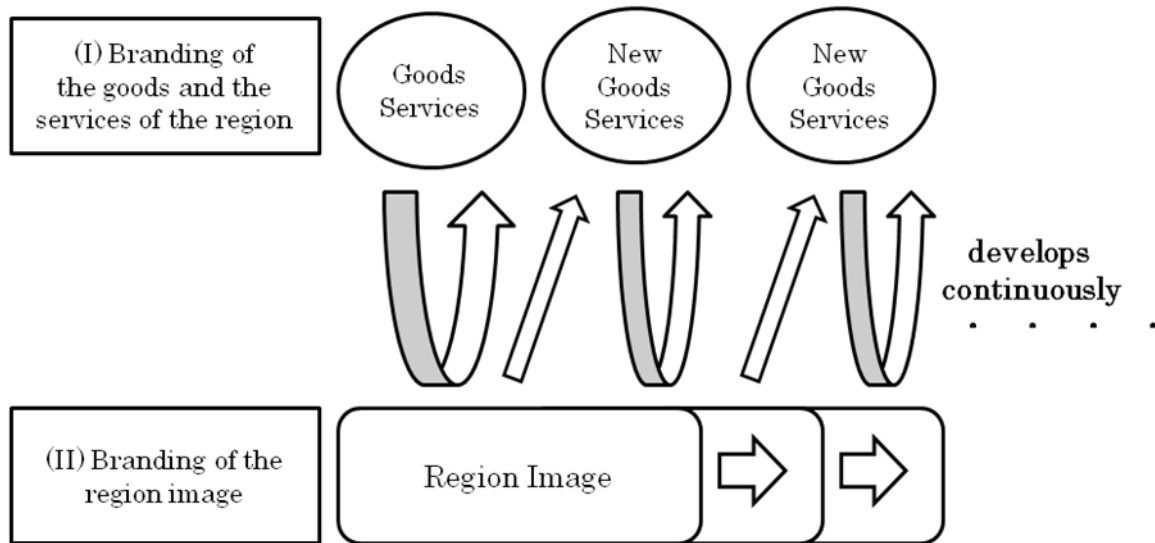
B to C has great potential to revitalize rural economy. However the transportation cost exposes rural shops to the geographical disadvantage even in B to C

market. This is because rural merchants have to make their goods more differentiated. There would be many tools or possibilities for differentiation. As mentioned previously, regional brand can become the effective tool to differentiate rural goods or services in B to C market.

#### **6.1. Concept of Regional Brand**

The same concept as "Regional Brand" is called "Local Brand", "Community Brand", or "Place Marketing" [9]. Regional brand relates the local image and local goods or services, and produces the differentiated value and the competitive advantages in the market.

It consists of two brands, micro and macro. Micro is products brand, the brand of products which used the feature of the area. Macro is regional brand, branding region where the product exists. Enhancing only one brand is useless. Both brands have to be enhanced simultaneously. Branding of the goods or the services of the region relates and enhances the region image. Branding of the region image increase the value of the goods or services, and creates new goods or services. Then the new goods or services enhance its region image. Both develop continuously. Fig.2 shows the concept of regional brand and its developing process [10].



**Fig 2: The Concept of Regional Brand [10]**

The purpose of regional brand is to attain the continuous revitalization of regional economy. It is connecting branding of their goods or services and branding of regional image, producing a virtuous circle, and getting the fund and talented people outside the area. This purpose is economical richness. Another purpose of regional brand is non-economical one. That is mental richness. For example, improvement in residents' satisfaction is the purpose. This paper mainly pays attention to economical purpose.

From Aoki's study [11], the concept of regional brands consist of the "regional resource brand" and the "umbrella brand". Fig.3 shows the process of regional brands construction. First, each regional resource which can be branded is selected. They utilize the "regionality". Regionality is the base or background of brand

construction. And then they are branded. Second, the area finds the regionality from regional resources, makes it core of brand, and builds "umbrella brand". The regionality is the nature, history, culture, tradition, etc., and they originate in the area. Third, umbrella brand will develop regional resource brand's value. Fourth, regional economy and the area itself are revitalized by the "regional resource brand". Each regional resource brand brings economical value to the area. And when regional brands are established and the competitive power of each regional resource brand increases, revitalization of regional economy realized. These produce a virtuous circle.



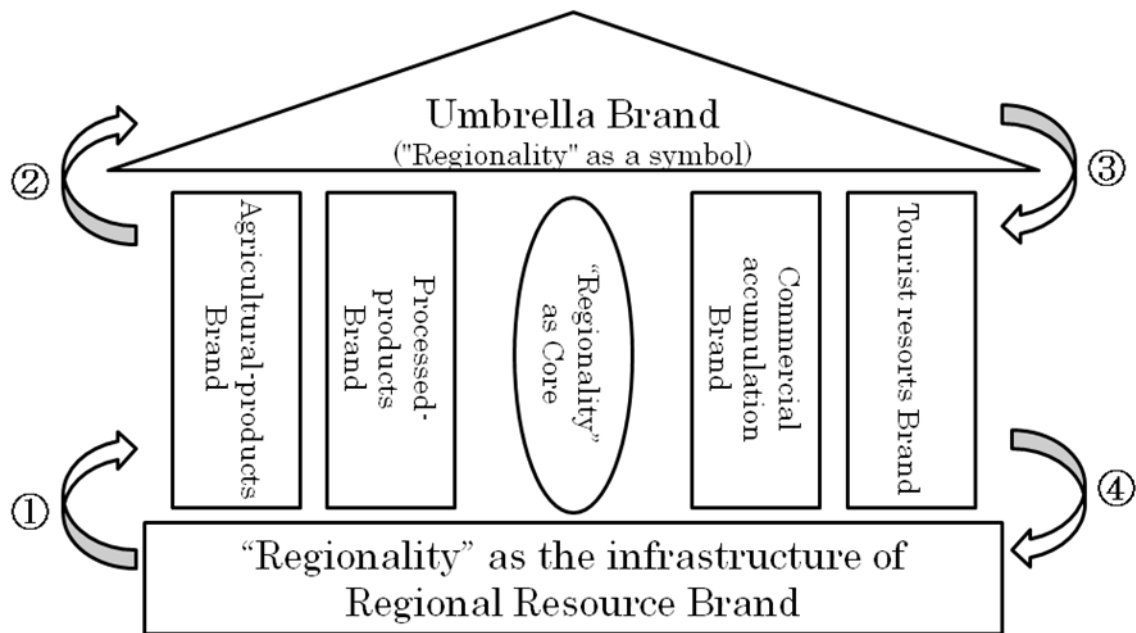


Fig 3: “Regional Resource Brand” and “Umbrella Brand” [11]

## 6.2. Application Regional Brand for B to C Market

Concerning B to C, the regional brand has three possibilities, or steps. First is using the existing regional brand in the real world in B to C (Phase 1). Second is creating the new and unique regional brand in B to C market, which is created by the stores of the same area (Phase 2). Third is, it’s an expansive idea, creating the new and unique regional brand in B to C market regardless of a geographical place (Phase 3).

Phase 1 is using the existing regional brand in the real world for B to C market. If stores in B to C market share the same geographical feature, they may use the “regional brand”. In this phase, regional brand which has already existed in real world is used for a store in B to C market as a tool of differentiation. The purpose is to sell goods related to the regional resource brand. B to C is one of the market channels for regional brand. Regional brand in the real world is used in the B to

C market.

There are many cases of phase 1. The case about Imabari towel is one of the typical one. Imabari city is the rural city of Japan, and one of the most famous towels producing place in Japan. But these days, Imabari towel industry faces hard economic environment. “Imabari Towel Boutique<sup>1</sup>” is the online shop of Imabari towel. It sells 5million-10million yen per month, and might be successful online shop. The net shop utilizes “Imabari Towel Brand”, regional brand in real world, for differentiating its online shop from others. However B to C is only positioned as one channel of Imabari towel. Fig 4 shows the concept of this case.

<sup>1</sup> Joint public-private sector of Imabari city manages the online shop.



Existing Regional Brand  
(Real World)



“Imabari Towel Boutique”  
(B to C)

**Fig 4: Case of Phase 1, Imabari Towel**

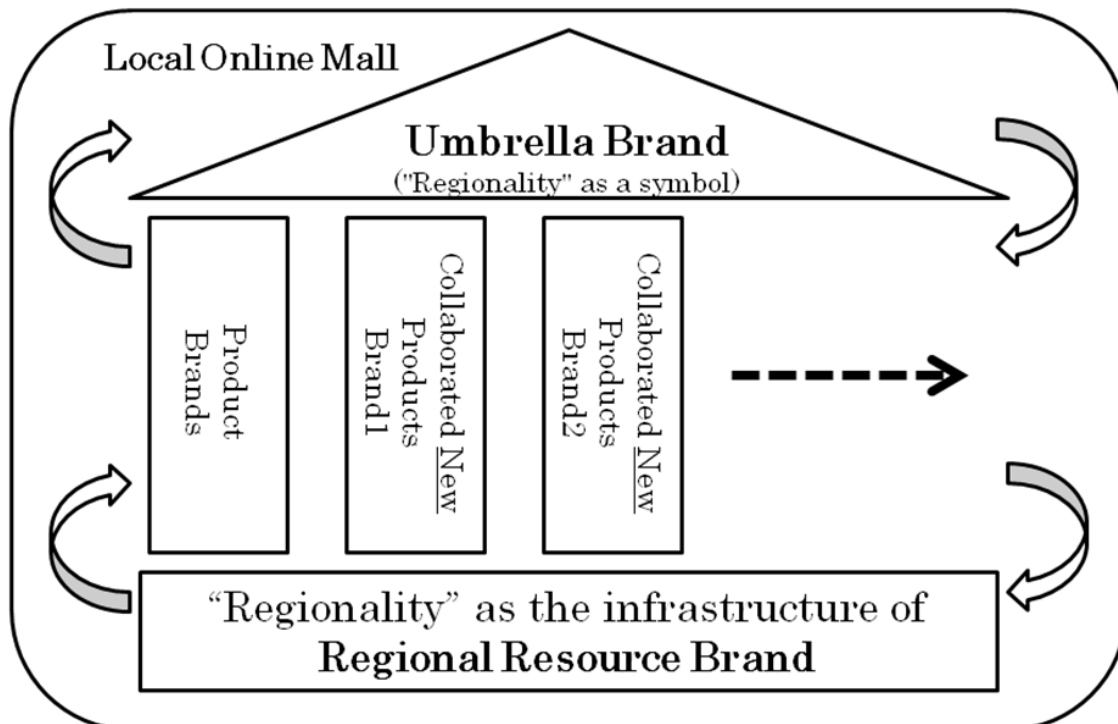
Phase 2 is creating the new and unique regional brand in B to C market. Businesses or merchants in B to C market can create new products. Then they might create the new regional resource brand by utilizing the new products, and create the new umbrella brand. So there is the possibility of creating the new and unique regional brand in B to C market. For rural small business, however, it may be hard to create new products alone. In many cases, there are a lot of resources in rural area. Thus if multiple rural small business can collaborate, differentiated new products will be developed.

But the problem of coordination arises. Moreover the organizing or control of the new regional brand in B to C market is difficult problem. This regional brand is probably created by the businesses or stores in the same area. Local online mall, as discussed section 5.2, could play the role of the organization and control.

Local online mall has the possibility of coordinating rural small businesses. As the previous case shows, collaboration of the stores is more effective and practical.

Coordinating rural small businesses would become one of the biggest purposes of the online mall. Collaboration of rural small stores over the internet is easier than in the real world. Utilizing coordinating function of local online mall, rural small businesses can develop new products.

Using the new products, local online mall might create the new regional resource brand with regionality. And local online mall could develop the new umbrella brand. Umbrella brand will develop regional resource brand's value, regional resource brands will revitalize rural area. Revitalization strengthens regionality. These produce a virtuous circle. In many cases of regional brand, one company or organization cannot manage from construction to control of the brand consistently. This is one of the big problems of the regional brand. Local online mall could make strategy of regional brand, and control regional resource brands and umbrella brand. Fig 5 shows the concept of phase 3 and the role of online mall, modified Aoki's concept.



**Fig 5: Regional Brand and B to C, Phase 2 (modified Aoki's concept [11])**

Phase 3 is creating the new and unique regional brand in B to C market regardless of a geographical place. For creating new products and developing new regional resource brands, the businesses of inside and outside the region could collaborate. Moreover the regionality itself may not be related to a geographical place. It's, as it were, the "Virtual Regional Brand". The region or area has to make branding strategies and control the brand for revitalizing its economy. Fig 6 shows the concept of phase 3.

The phase 3 is hardly realized in the real world. However in the case of B to C market, it could be realized with the Internet and ICT. It is often difficult for small-scale company to create its own brand in the real world. Therefore, regional brand on B to C is useful for regional revitalization.

## 7. Conclusion

In this paper, the potentials of B to C

are discussed in the context of ITeS means to revitalize rural economy. Through four cases, it suggests four features about B to C. They would be helpful when we use B to C as the means of revitalizing rural economy. Then we enhance branding to regional brand in B to C market, and suggest "Virtual Regional Brand". For solving the coordination problem, utilizing online mall can be one solution.

Rural small to tiny stores may utilize B to C to expand their scope of business. Even in the B to C market, transportation costs will adversely affect and the businesses are placed in the inferior position. However, using the most of the characteristic of the internet, adding value and quality differentiation is possible. Revitalization of the rural economy requires revitalization of rural small industries and small to tiny stores. B to C can be the useful means to accomplish this revitalization.

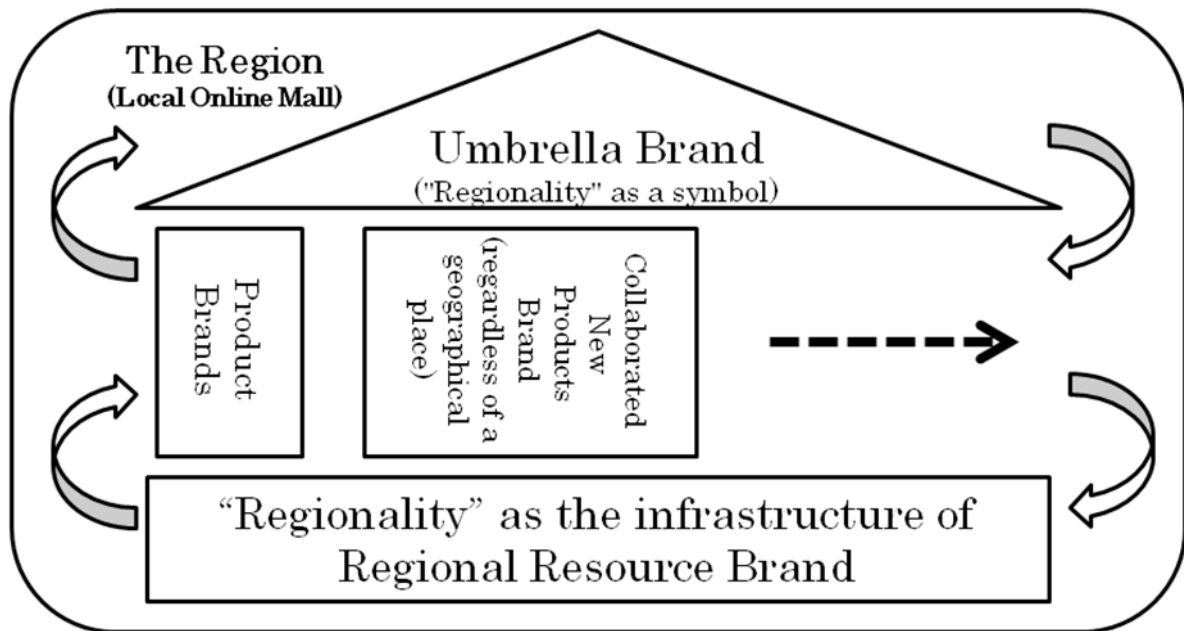


Fig 6: Regional Brand and B to C, Phase 3 (modified Aoki's concept [11])

#### Acknowledgement

This research was supported in part by Grant-in-Aid for Young Scientists (B) (19730252) from the Japan Society for the Promotion of Science.

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## FROM THE CONFERENCE

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

Firstly, the presentations from The Second Workshop on IT Enabled Services (ITeS 2009) are included. The entire program of the Workshop is shown as follows. The presentation in **BOLD** are reproduced.

### The Second Workshop on IT Enabled Services (ITeS 2009)

#### Session 1: Key Uses of ITeS in Business Practices

10:30-12:00 – Regency Ballroom E

Session Chair: Hitoshi Okada (National Institute of Informatics, Japan)

#### **Financial Securitization with Digital Rights Management System Hirotsugu Kinoshita, Tetsuya Morizumi, and Kazuhiro Suzuki**

A System for Search, Access Restriction, and Agents in the Clouds

Tetsuya Morizumi, Kazuhiro Suzuki, and Hirotsugu Kinoshita

#### **Enterprise Architecture Creates Business Value Takaaki Kamogawa and Hitoshi Okada**

IT-Enabled Survey and Its Problems: Analyses of an Australian Internet Poll

Memiko Ootsuki, Tetsuro Kobayashi, and Noboru Sonehara

#### Session 2: Application in Public Policy and Political Aspects of ITeS

13:30-15:00 – Regency Ballroom E

Session Chair: Shiro Uesugi (Matsuyama University, Japan)

Information Sharing System for Maintenance of Sewage Facilities

Takashi Okamoto

Business Models for IPTV Service: Integrated or Platform?

Yousin Park, Yunju Chen, and Masashi Ueda

#### **Evaluation of the Competition Policy to Encourage MVNO System in Japan**

**Yuki Shoji**

A Study on How Technological Innovation Affected the 2008 U.S. Presidential Election:  
Young Voters' Participation and Obama's Victory

Shoko Kiyohara

# Financial securitization with digital rights management system

KINOSHITA Hirotosugu  
Kanagawa University

MORIZUMI Tetsuya  
Toyo Networks & System Integration Co.,Ltd.

SUZUKI Kazuhiro  
Kanagawa University

 Kanagawa Univ. Kinoshita Lab. Jul 21, 2009 (1)

## INTRODUCTION

- Subprime mortgage crisis is a serious financial problem.
- The financial securities of the subprime lending are issued by using the structured finance.
- Problems caused by the complexities of the structured finance are:

The securitization of the assets

Distribution of the securities

The protection of the private information among transactions of securities

Uncertainty of the securities that which debts are included the securities

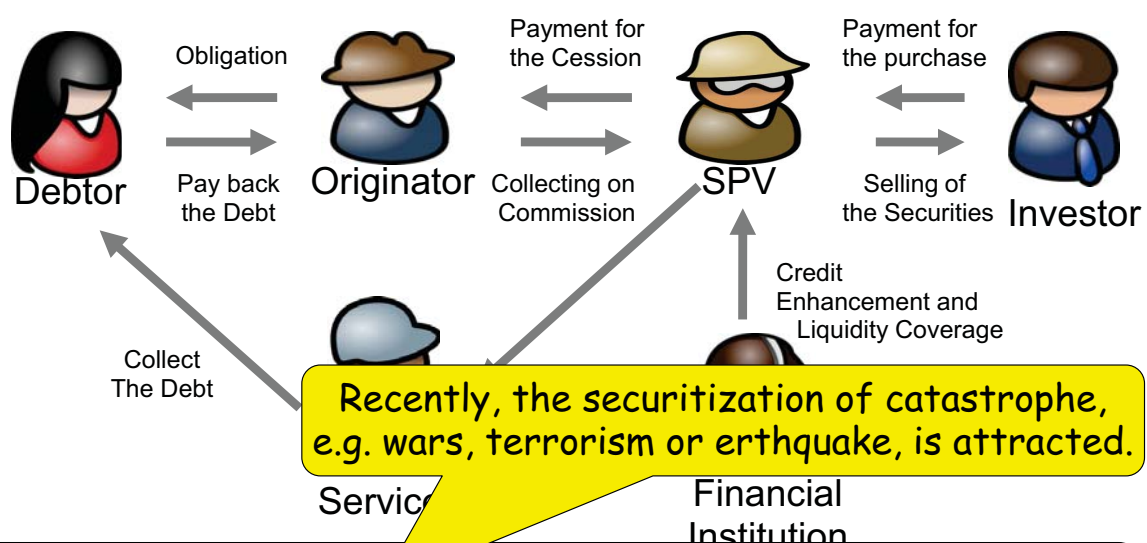
 Kanagawa Univ. Kinoshita Lab. Jul 21, 2009 (2)

# Purpose

- The information capsule for the copyright management could be used to the securitization and its concurrency.
- A method of the securitization with the information capsule which includes mobile agents is proposed.
- By applying this method to the system that a investor could check the uncertainty of the own securities.
- For example which obligation is contained or how to estimate the value of the securities.

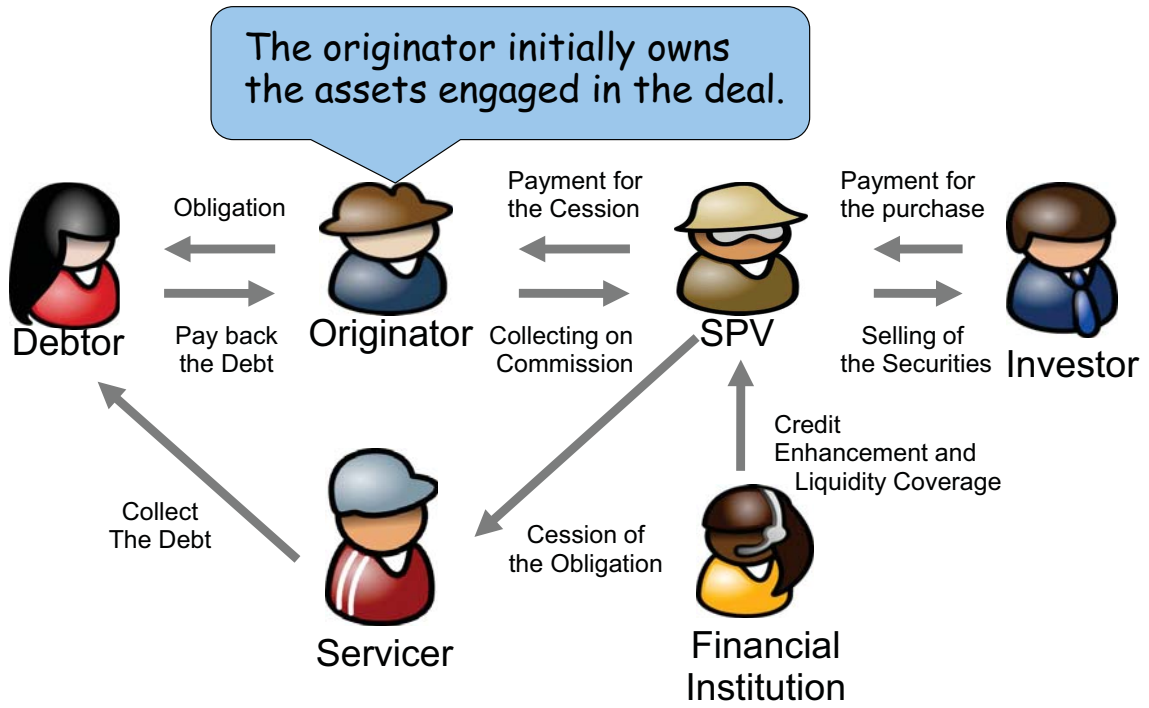
Kanagawa Univ. Kinoshita Lab. Jul 21, 2009 (3)

## The entities who appeared in securitization

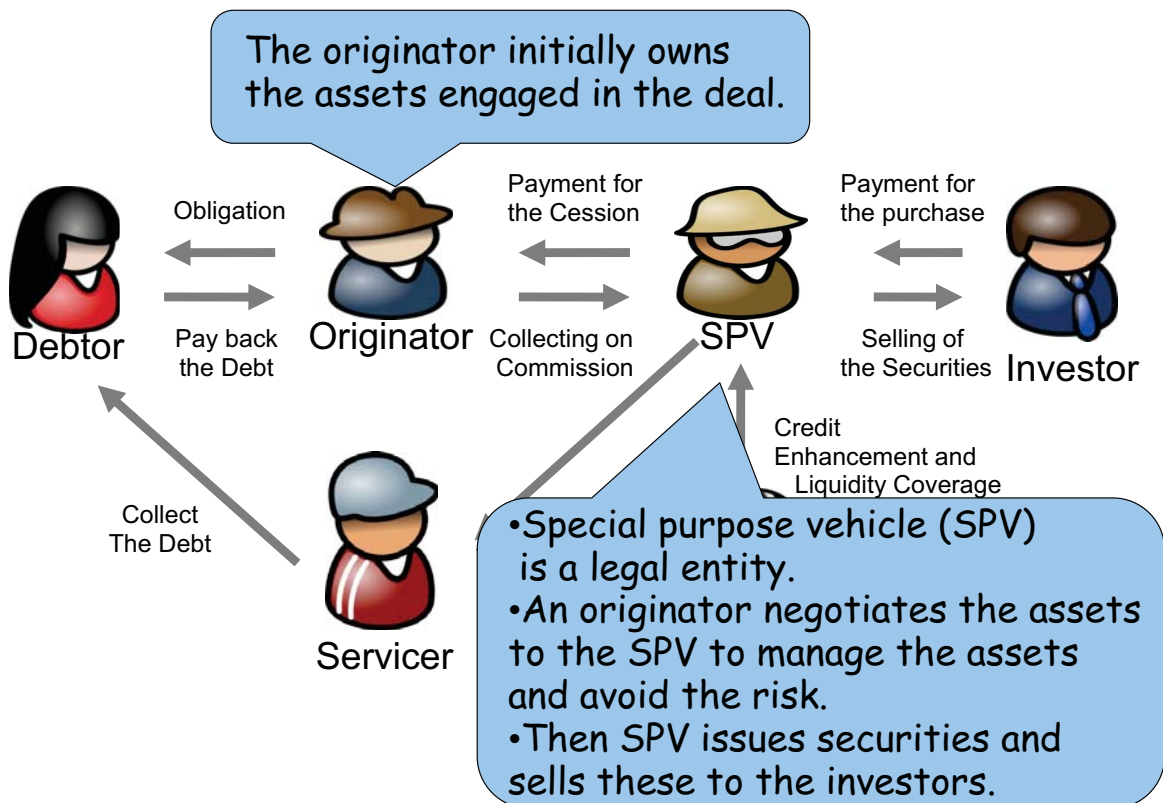


Recently, the securitization of catastrophe, e.g. wars, terrorism or earthquake, is attracted.

- The securitization is a structured finance process.
- The cash flow from loan, obligation or mortgage backed security of the debtors producing financial assets are securitized.

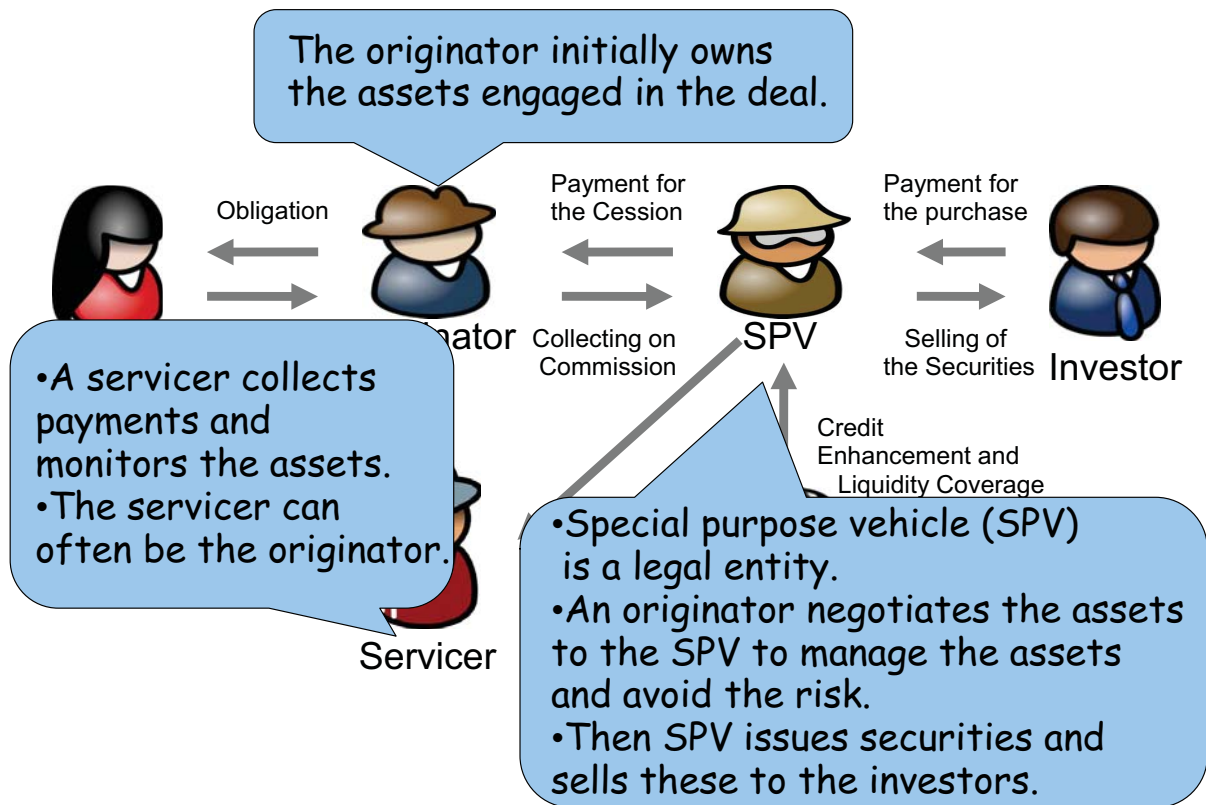


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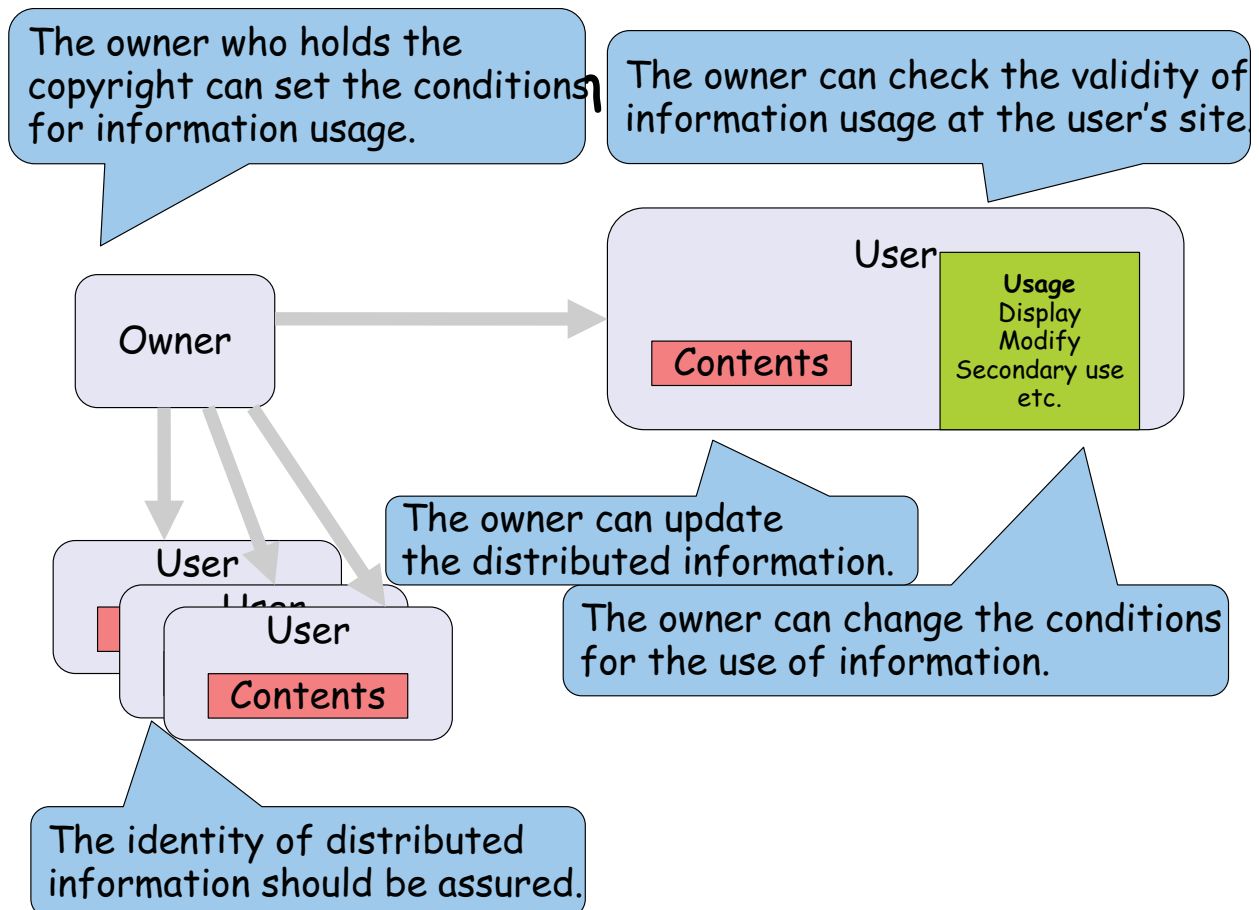


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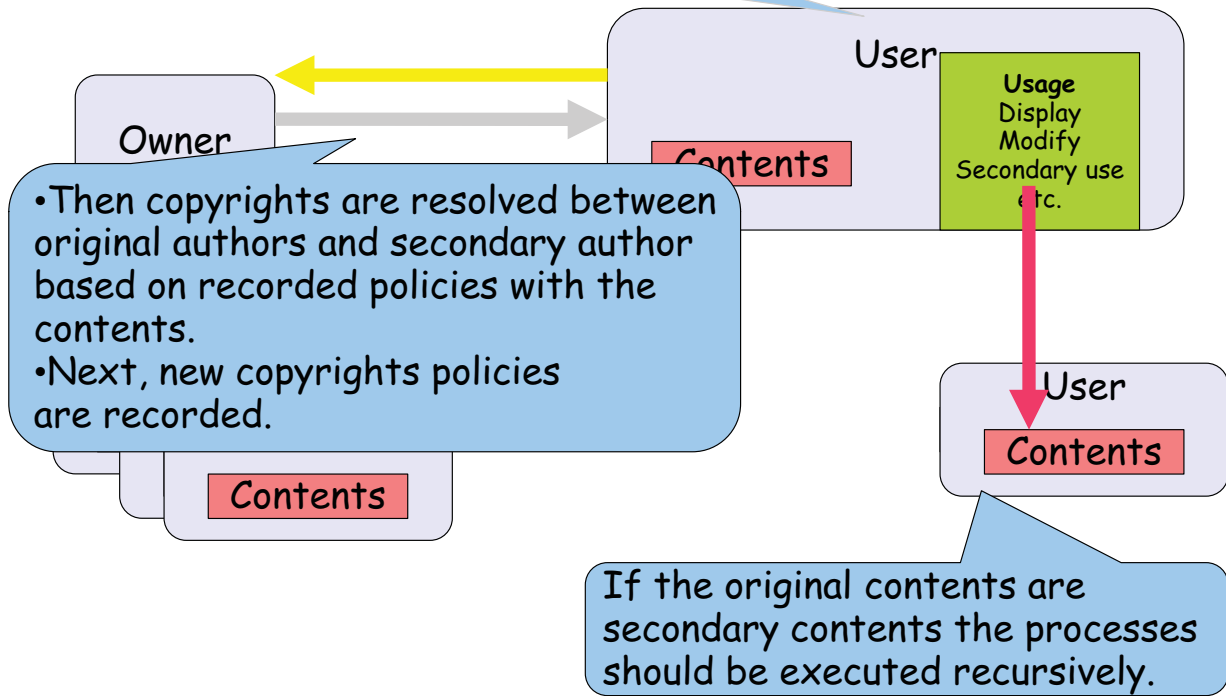
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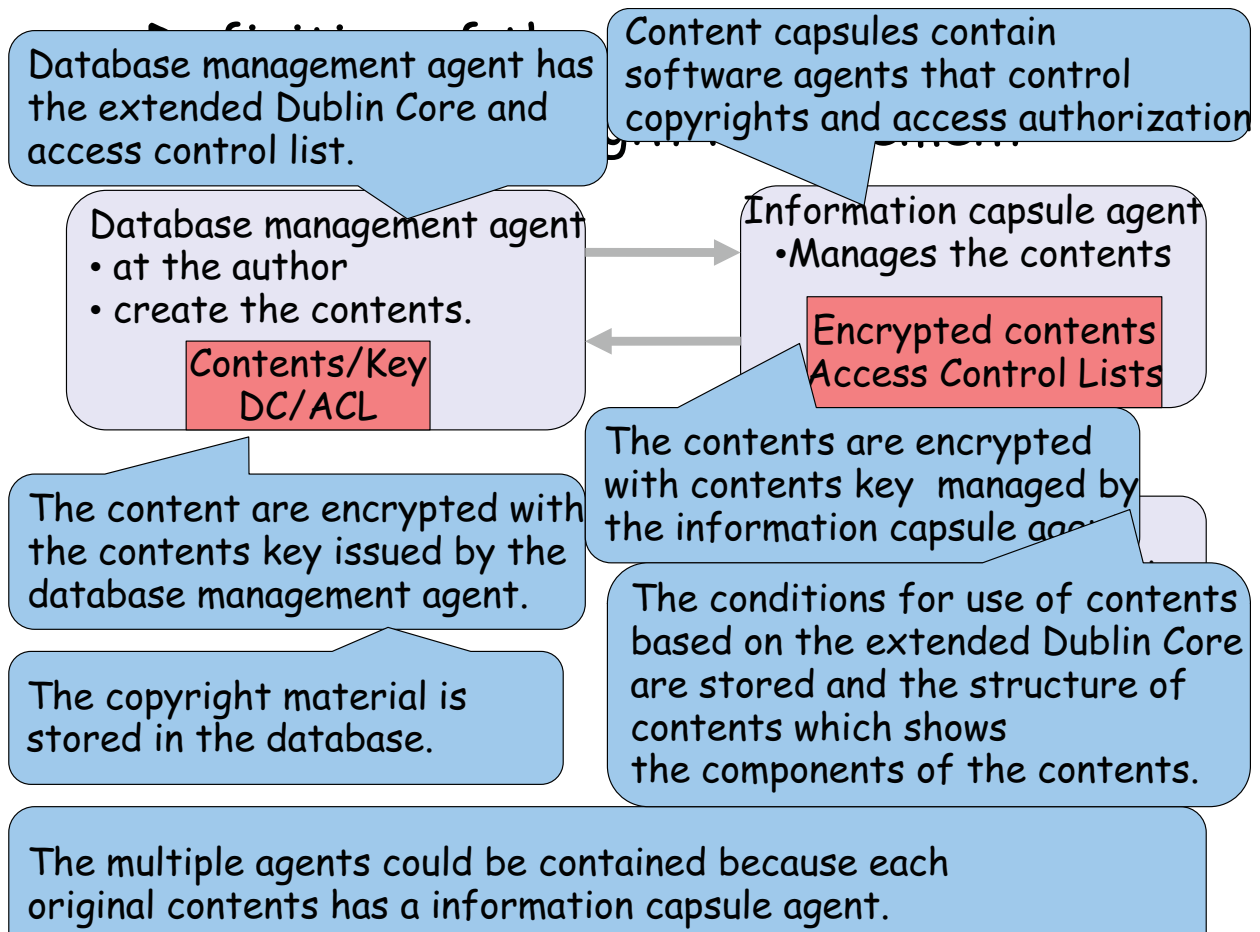
Kanagawa Univ. Kinoshita Lab. Jul 21, 2009 (9)

If a user wish to be a secondary author of contents in the secondary use, the user can negotiate with the original authors.

# of DRM



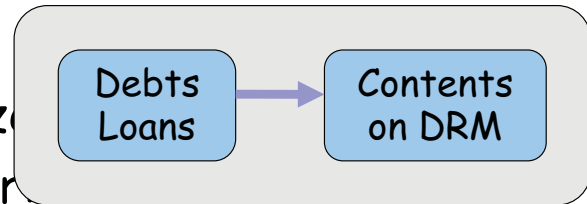
Kanagawa Univ. Kinoshita Lab. Jul 21, 2009 (10)



## Securitization with Rights management

1) Debts such as loans could be treated as the contents.

2) An investor can recognize which securities are contained in the securities.



3) An investor who has the securities can check the results of the investment from each security.

4) The change of status of the cash flows are propagated from the servicer to the investors.

5) The debtors can check the negotiation of the

KU Kanagawa Univ. Kinoshita Lab. Jul 21, 2009 (13)

## Securitization and Rights management

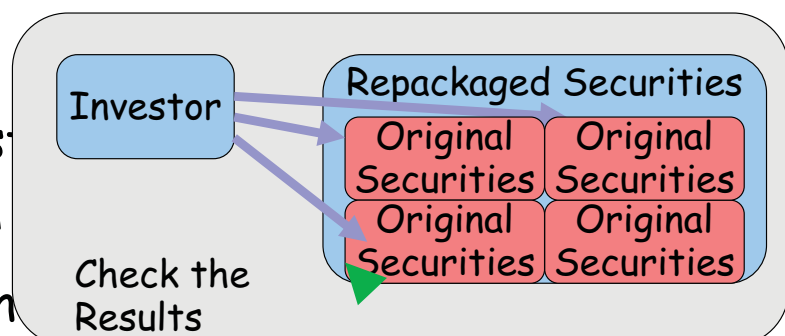
1) Debts such as loans could be treated as the contents.

2) An investor can recognize that which securities are contained in the securities.

3) An investor who has the securities can check the results of the investment from each security.

4) The change of status of the cash flows are propagated from the servicer to the investors.

5) The debtors can check the negotiation of the



## Security

Each function of the DRM system can also be used for the function of the securitization system.

1) Debts such as contents.

Function 2. and 3. are installed as the function of resolving copyrights on the DRM system.

2) An investor can recognize that which securities are contained in

Function 4. is installed as the function of updating contents.

3) An investor who holds the securities can check the results of the investment security.

Function 5. is installed as the function of check the purpose of usage.

4) The change of status of the cash flows are propagated to investors.

We can install these functions for the securitization on the DRM system.

5) The debt of the

## Structure of the securities

The information capsule of the securities contains

- Body of the agent
- Body of the securities
- Key for the encrypted securities
- Identifier of the debtor or SPV
- Contract described in XML
- Evaluation method of the result of the investment and conditions of management in repackaging and tranching.

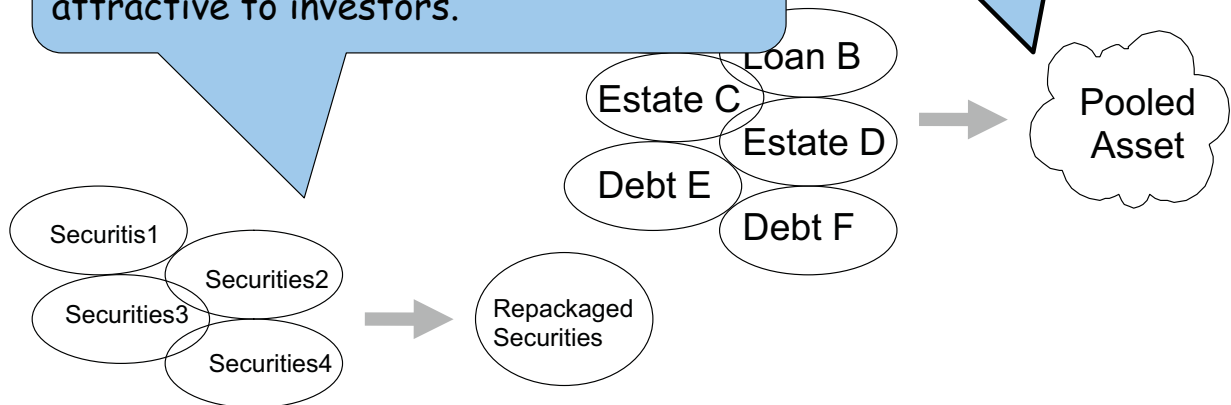
# Repackaging and pooling

- This process is similar to the process of secondary use in copyright management.

Pooling is a resource management term that refers to the grouping together of resources for the purposes of maximizing advantage and/or minimizing risk to the users.

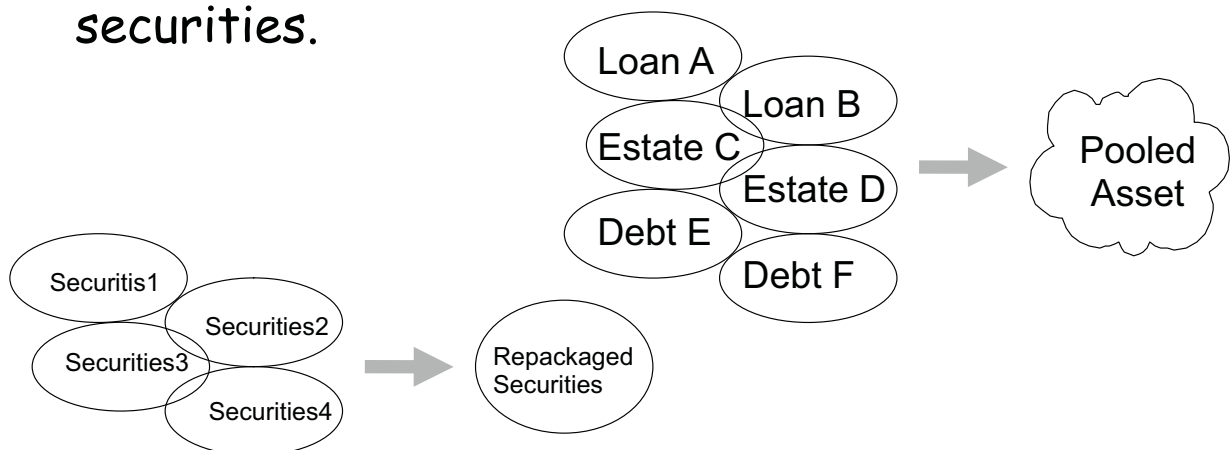
All bodies of securities are concatenated or processed appropriately as new, repacked securities.

Securities have been issued to repackage existing assets which makes them more attractive to investors.



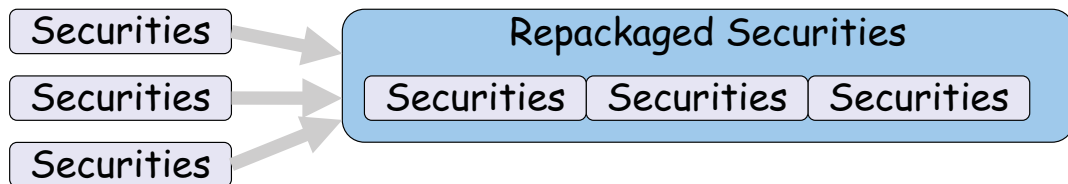
# Repackaging and pooling

- This process is similar to the process of secondary use in copyright management.
- All bodies of securities are concatenated or processed appropriately as new, repacked securities.



## Aggregation of securities

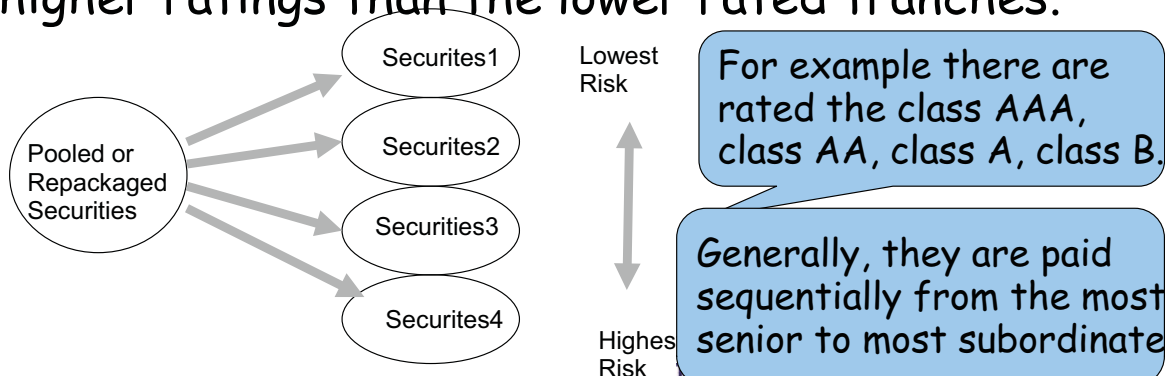
- Each information capsule of securities is concatenated or aggregated.
- The aggregation is key to the repackaging.
  - First, the aggregated agent inherits the functions of previous agents.
  - Then then identifiers of debtors are stored into a database.



Kanagawa Univ. Kinoshita Lab. Jul 21, 2009 (20)

## Tranching

- Tranching is the method that the securities are divided into categories as part of the same transaction. The tranching is an important mechanism of the structured finance.
- Each category has same level of the risk.
- The more senior rated tranches generally have higher ratings than the lower rated tranches.

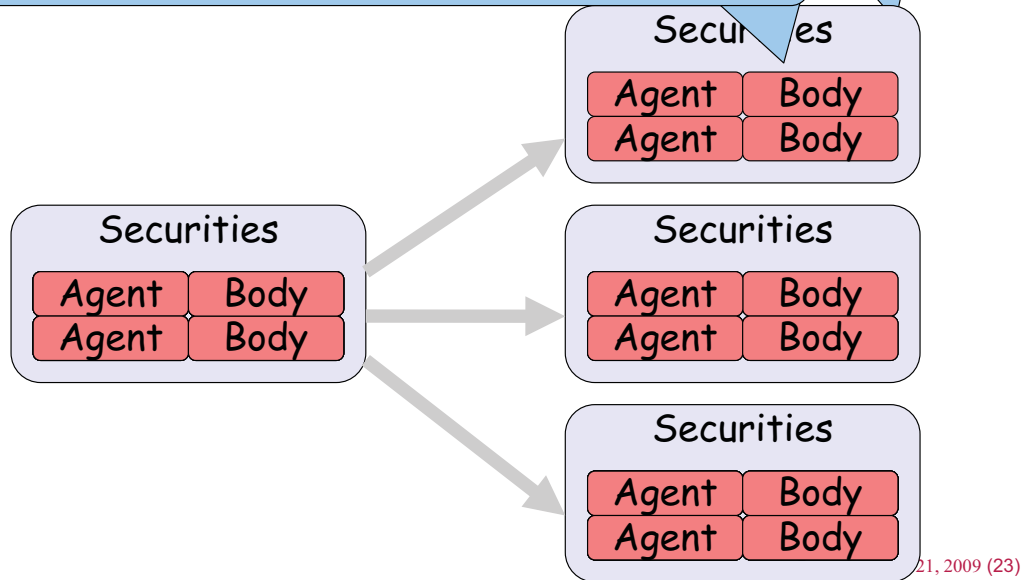


# Tranching and dividing

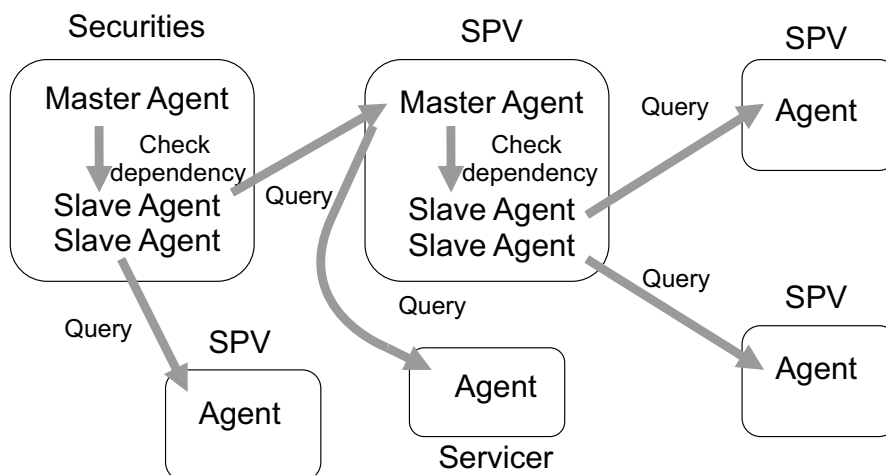
First, the agents are copied to tranching securities.

Next, the body of securities and contracts is reorganized.

The dividing process is similar to that of tranching except that the ranks have the same level of risk.



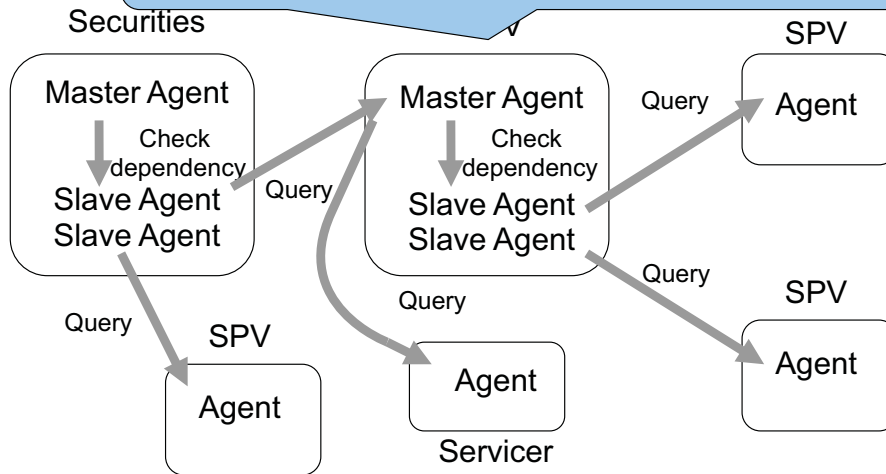
# Operation of securities



# Operation of securities

- The originator pools several of the debtors' loans.
- Next, the pooled loans are transferred to the SPV.
- The SPV then issues the securities on the basis of the pool.

•Another originator and SPV pool these issued securities and issue repackaged securities as new assets.

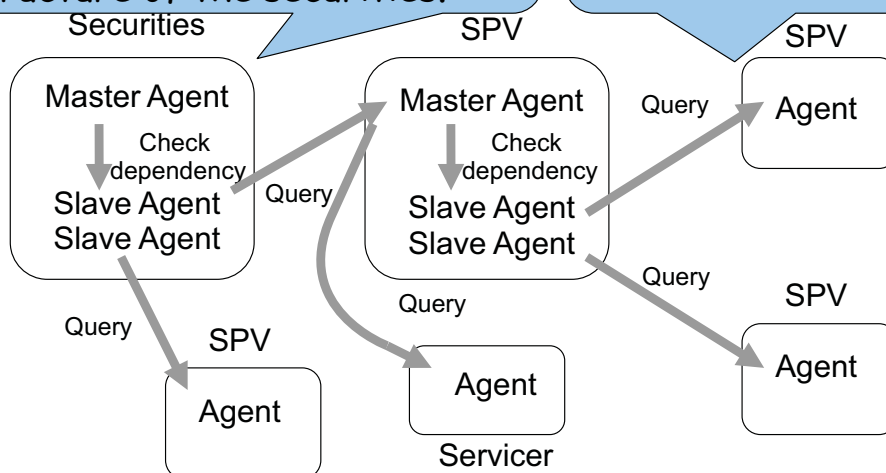


# Operation of securities

When an investor values his or her securities, the agents operate as follows.

The master agent checks the dependencies of the securities and makes a tree of the structure of the securities.

Each node has a method to value the securities located at lower levels of the tree.



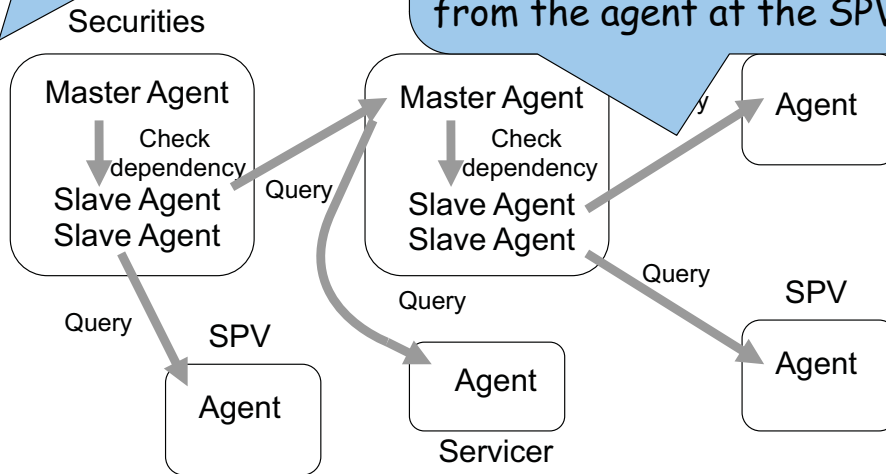


# Operation of securities

The types of method are as follows:

Immediately:  
The securities are evaluated independently.

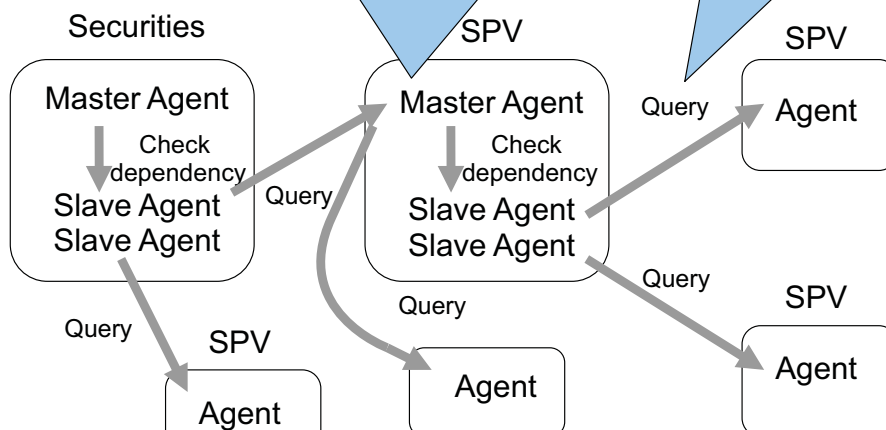
Query: A query to the SPV is required.  
•If it is Query, the dependent slave agent is activated and obtains the information, e.g. losses of the portfolio, from the agent at the SPV.



# Operation of securities

•The agent at the SPV that receives the query from the slave agent, checks the collection of the debt, and reports the results.

If the securities are repackaged, the query is executed recursively.



The advantage of this scheme is that the queries from investors to servicers are distributed.

## Conclusion

- We developed a digital copyright management system can be used to manage financial securities.
- The mobile agents at the information capsule and the parties, e.g. the debtor, the investor, and the SPV, cooperate to manage the securities.
- The secondary use management applied to resolve the dependencies in repackaged securities is especially useful.

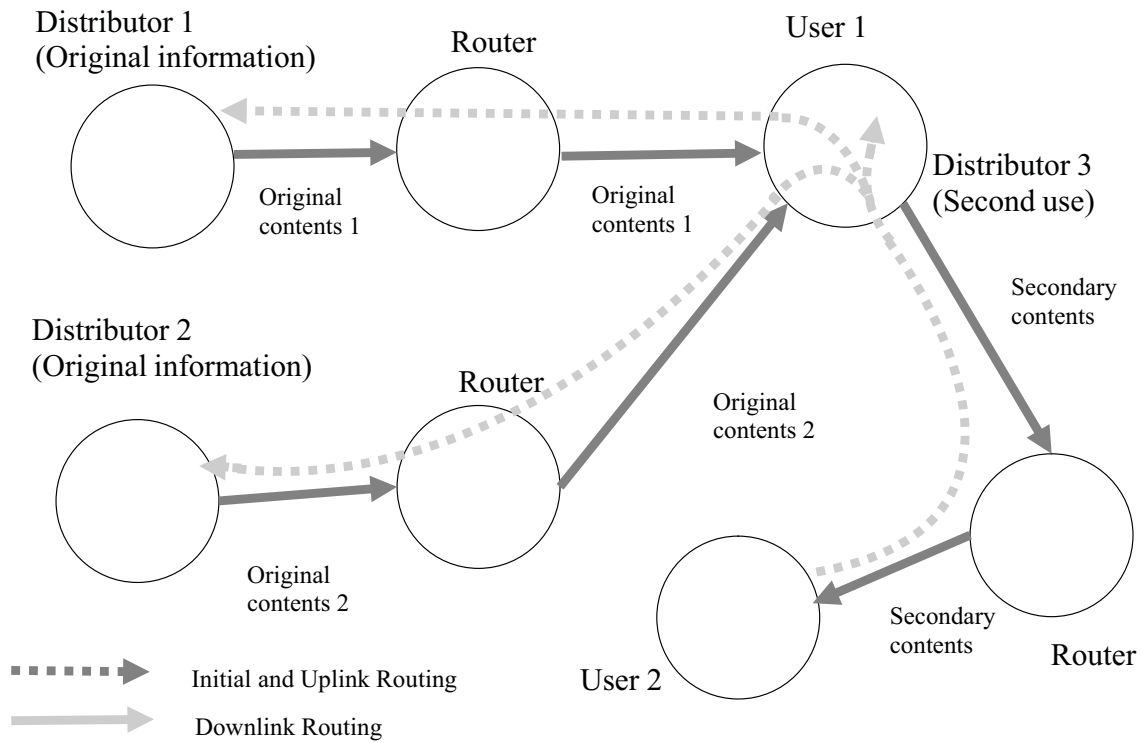
 Kanagawa Univ. Kinoshita Lab. Jul 21, 2009 (32)

## Conclusion

- Consequently, investors can evaluate the value of their securities correctly.
- Further work is required to apply the modern portfolio theory to the proposed system.

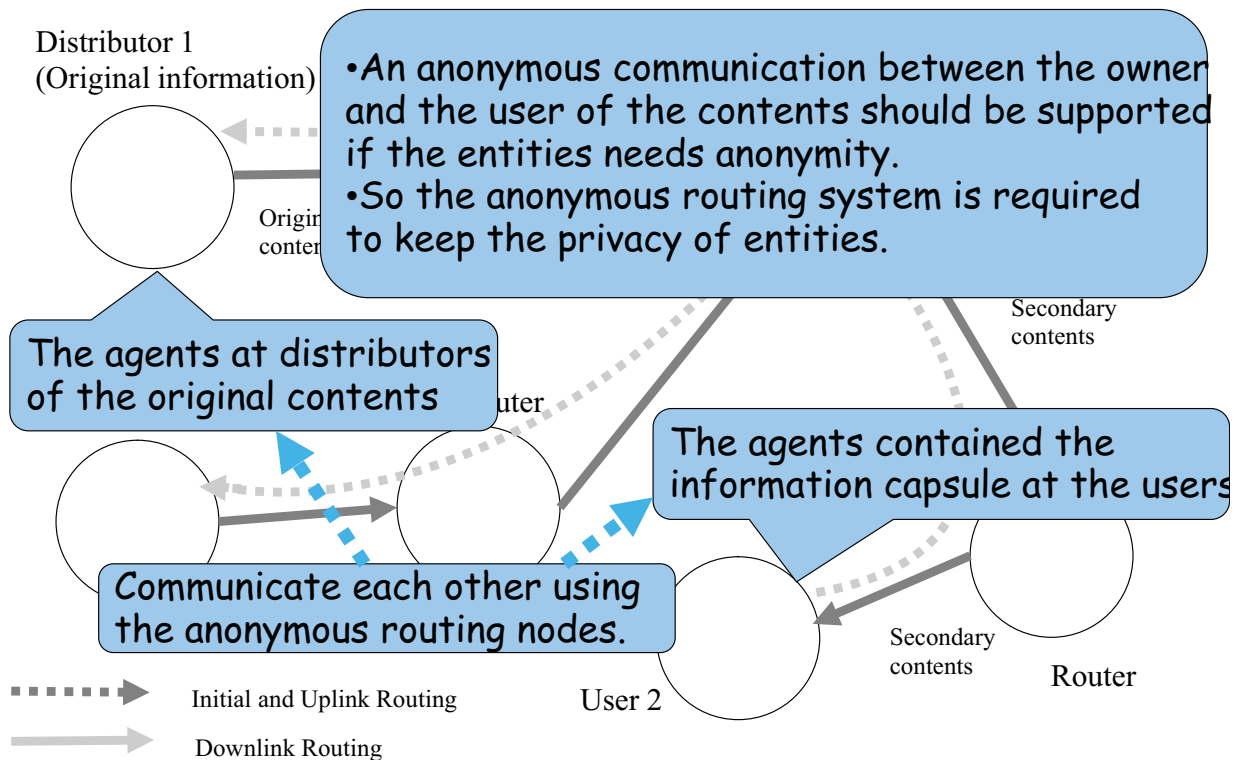
 Kanagawa Univ. Kinoshita Lab. Jul 21, 2009 (33)

## The rights management for the secondary use of the contents



Kanagawa Univ. Kinoshita Lab. Jul 21, 2009 (34)

## The rights management for the secondary use of the contents



Kanagawa Univ. Kinoshita Lab. Jul 21, 2009 (35)



# Enterprise Architecture Creates Business Value

**SAINT2009 Seattle, Washington USA  
July 20-24, 2009**

**The Workshop on ITeS: IT enabled Services (ITeS)  
Session 1: Key Uses of IT enabled Services in Business  
Practices**

**Ph.D. candidate Takaaki Kamogawa\*  
Dr. Hitoshi Okada\*\***

**\*Department of Informatics, School of Multidisciplinary Sciences,  
The Graduate University for Advanced Studies**

**\*\*National Institute of Informatics**

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## Table of Contents



1. Introduction
2. Related Work
3. Conceptual Model & Hypothesis
  - 3.1 Hypothesis
  - 3.2 Methodology
  - 3.3 Findings
4. Discussion
5. Summary

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# 1. Introduction -Background-

- Enterprise: Management Information System
  - Getting large scale & Getting complex
  - ✓ Heterogeneous and distributed system environment
  - ✓ Outsourcing system construction
  - ✓ Complexity of IT asset
- **Problems**
  - *Black-box*
  - *Slow responses to change MIS*
  - *Contribution to business values*
- Enterprise Architecture

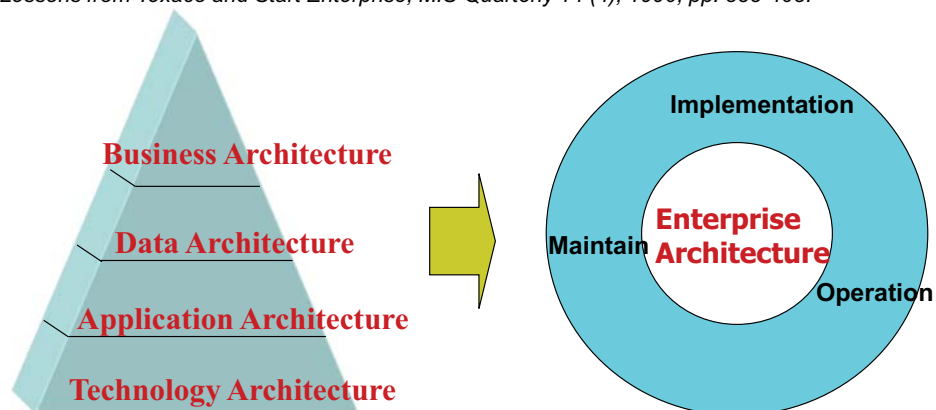


## EA approach solves these problems?



**EA:** -The concept of enterprise architecture (EA) reflects the integration and standardization requirements of the business' s operating model, -The design of EA to plan and coordinate IT resources across an enterprise has been considered a useful approach since the early 1990s

*G.L. Richardson, B.M. Jackson, G.W. Dickson, A Principles-Based Enterprise Architecture: Lessons from Texaco and Start Enterprise, MIS Quarterly 14 (4), 1990, pp. 385-403.*

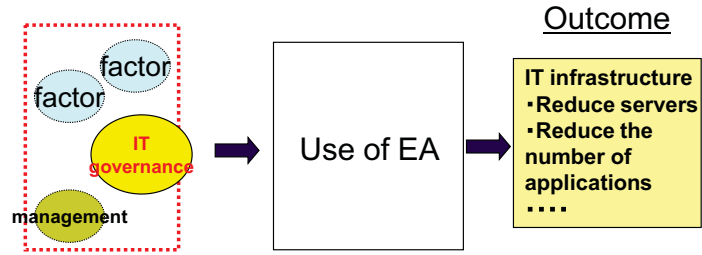


## 2.Related Work



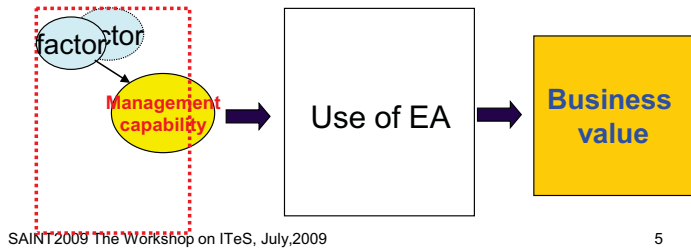
### Prior Research

- Focus on the domain for system infrastructure



### Our Research

- **Research Domain:**
  - ✓ Focus on clarifying which factors are affecting business values of EA.



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## 2.Related Work



### Prior Research

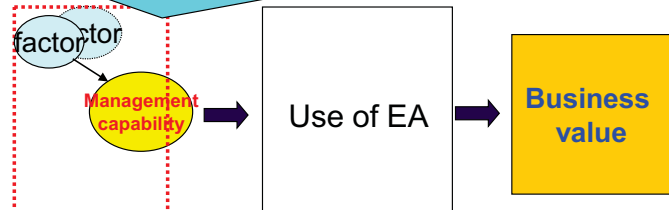
- Focus on the domain for system infrastructure

(1) To what extent financial performance will be affected in companies which tried to adopt EA

(2) How organizations affect the creation of the value of EA

### Our Research

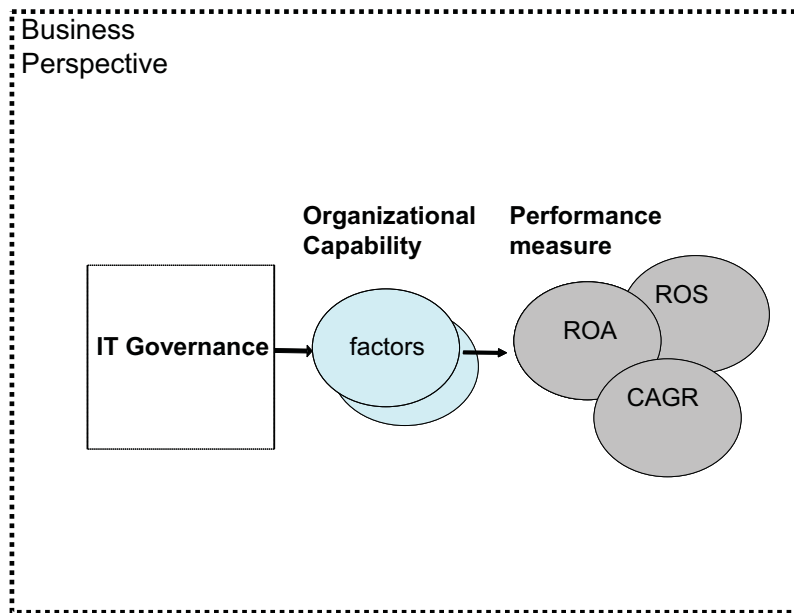
- Research Domain:



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### 3. Conceptual Model & Hypothesis



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### Performance measure



- ROA (return on asset)
  - Judge business efficiency (profitability / total assets)
- ROS ( return on sales)
  - Judge cost efficiency ( profitability / total revenues )
- CAGR (compound annual growth of rate)
  - Judge sustainable growth( 3 years )

\*Based on prior studies

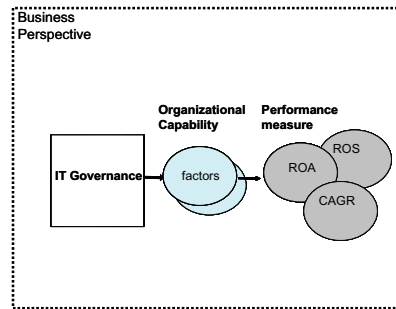
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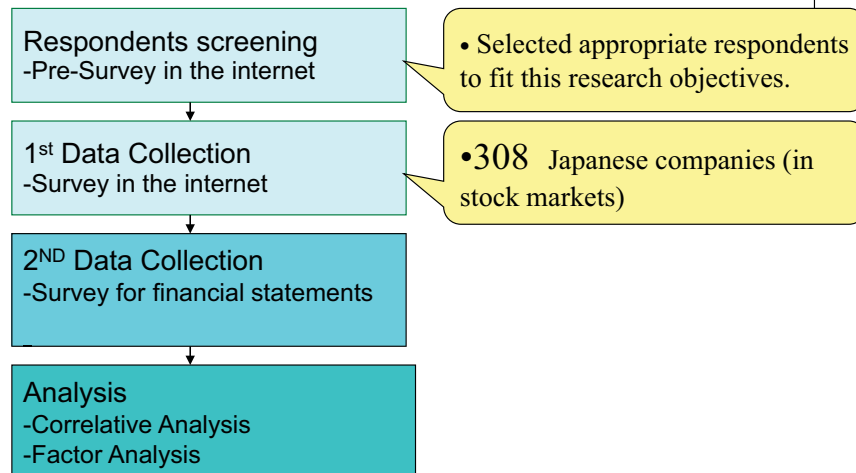


## 3.1 Hypothesis

- The key hypothesis is that the variable, **ROA is positively related to both ROS and CAGR concerning firms that would conduct EA effort.**
- Reasoning
  - ✓ **EA** is a planning, governance, and innovation **process** that enables an organization to progress toward its vision of its future stage to achieve strategic business goals.



## 3.2 Methodology





## Methodology (Data gathering)

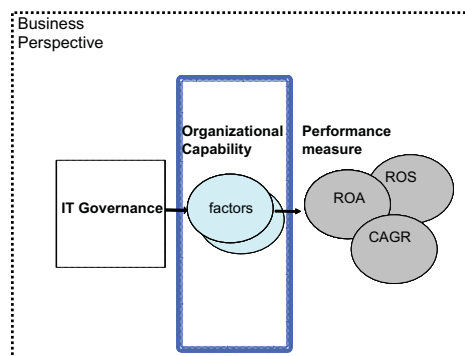


- Questionnaire survey on the Web
  - ✓ Respondents: (higher/senior management class)
    - management planning
    - financial affairs
    - system planning
- Financial statement for the corresponding firm

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## Correlative Analysis



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# Findings

## Non-EA firms

		ROA	ROS			ROA	CAGR
ROA	Coefficient of Pearson correlation	1	0.036	ROA	Coefficient of Pearson correlation	1	0.184
	Probability		0.768		Probability		0.13
	N	69	69		N	69	69
ROS	Coefficient of Pearson correlation	0.036	1	CAGR	Coefficient of Pearson correlation	0.184	1
	Probability		0.768		Probability		0.13
	N	69	69		N	69	69

## EA firms

		ROA	ROS			ROA	CAGR
ROA	Coefficient of Pearson correlation	1	.411 (**)	ROA	Coefficient of Pearson correlation	1	.301 (**)
	Probability		0		Probability		0.006
	N	82	82		N	82	82
ROS	Coefficient of Pearson correlation	.411 (**)	1	CAGR	Coefficient of Pearson correlation	.301 (**)	1
	Probability		0		Probability		0.006
	N	82	82		N	82	82

\*\* Significant at p = 0.01

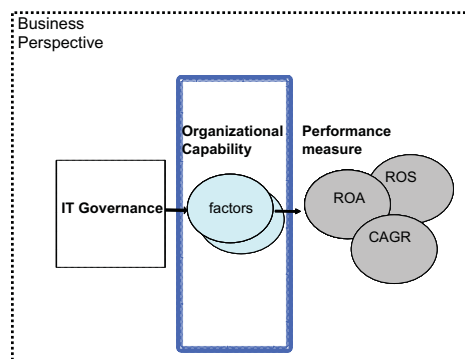
The variable, ROA which indicates the efficiency of asset control is positively related to both sales factors concerning companies that would conduct EA effort.

→ *Tested*

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# Factor Analysis



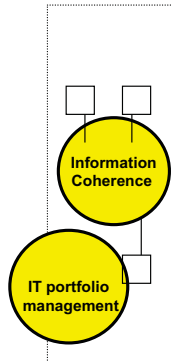
# -Findings (Organizational capability)



Variables (a)

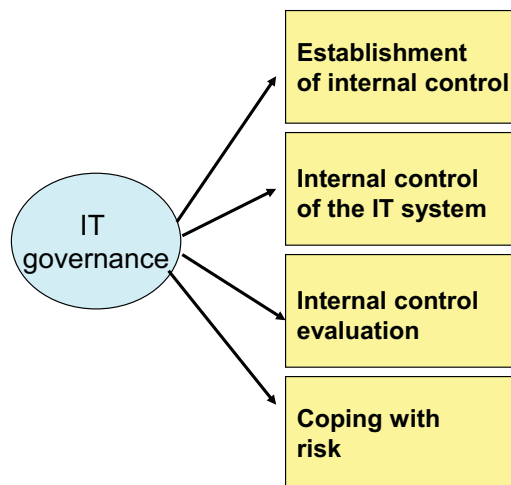
	Factors	
	1	2
EAC-4.1	0.898284	0.199991
EAC-7.1	0.845574	0.264756
EAC-7.2	0.838673	0.394703
EAC-4.2	0.837039	0.224701
EAC-1.0	0.785259	0.389797
EAC-7.3	0.698624	0.504646
EAC-8.0	0.181229	0.809575
EAC-6.0	0.351772	0.778428

Extraction method: exploratory factor analysis  
Rotation method: varimax with Kaiser normalization



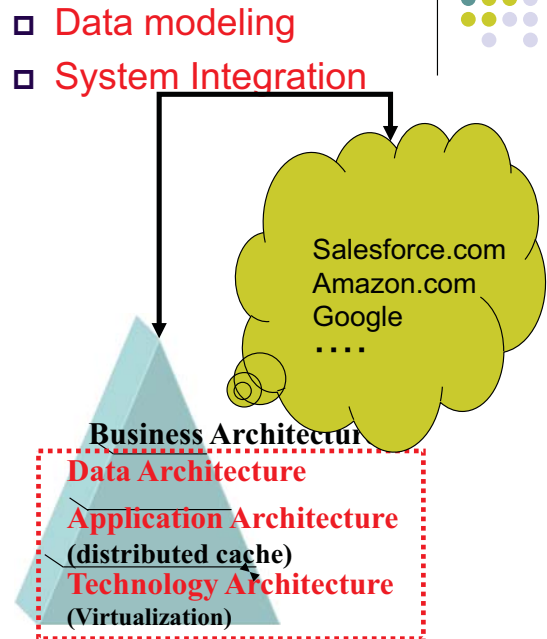
- *Information Coherence*
  - ✓ “Business architecture”
  - ✓ “Data architecture”
  - ✓ “Having adequate knowledge and experience in management”
  - ✓ “Having adequate knowledge and experience in IT”
  
- *IT portfolio management*
  - ✓ “Establishing measurement process for the effect of EA”
  - ✓ “Priority regarding EA implementation as IT portfolio”

# IT governance



## 4. Discussion

- “Cloud-Computing” is next trend in MIS in Japanese firms in near future.
- When firms adopt a “Cloud-Computing” , **an approach based on architecture is critical.**



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## 5. Presentation summary

- **Raise problems** from the view of enterprise architecture and information system in Japanese industry.
- **Present research findings** in terms of organizational capability, and IT governance.
- **Present discussion points** regarding the relation between C-C and enterprise architecture.

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# **Evaluation of the Competition Policy to encourage MVNO system in Japan**

**Yuki Shoji**

**The Graduate University of Advanced Studies**

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## **Index**

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1. Purpose of this research
2. Definition of MVNO
3. Sutton's model
4. Present status of MVNO in the world and Japan
5. Estimation of MIC's Policy
6. Conclusion

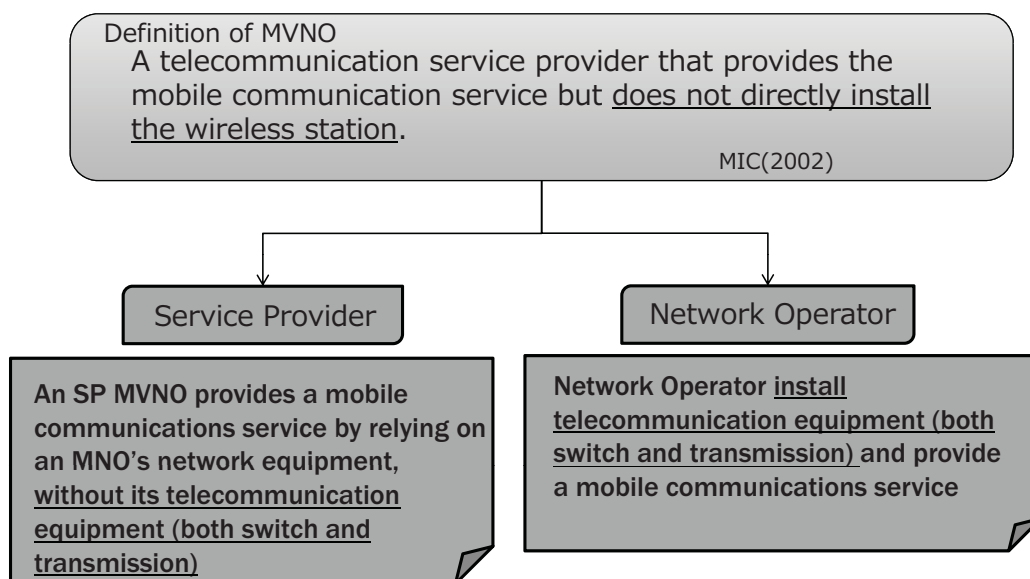
## Purpose of this research

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- MIC, Japanese telecom regulator, has declare their intention to promote MVNO in 2007. They expects that MVNO will not only foster competition but also increase the variety of mobile services.
- MIC published MVNO guideline in 2002 and revised it in 2008.
- In fact, some MVNOs have entered the market after the revision of guideline but most of them focus only on a limited segment, data services.
- In this research, I try to evaluate current policy of MIC to promote MVNO entry into the mobile market and consider the necessity of additional actions.

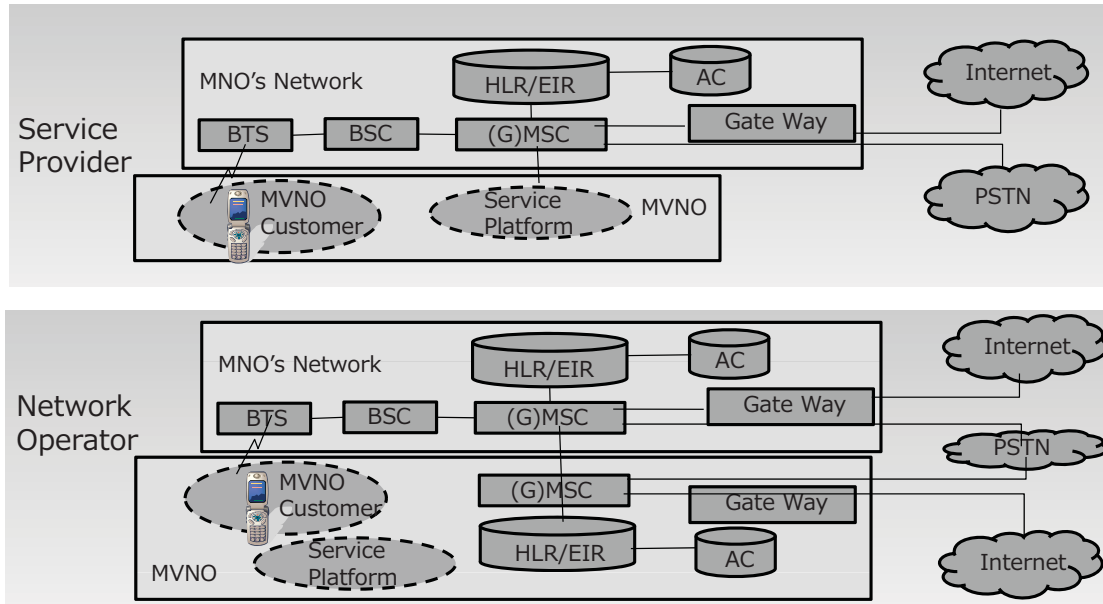
## Definition of MVNO

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Note) These definition are cited from Kanervisto (2005)

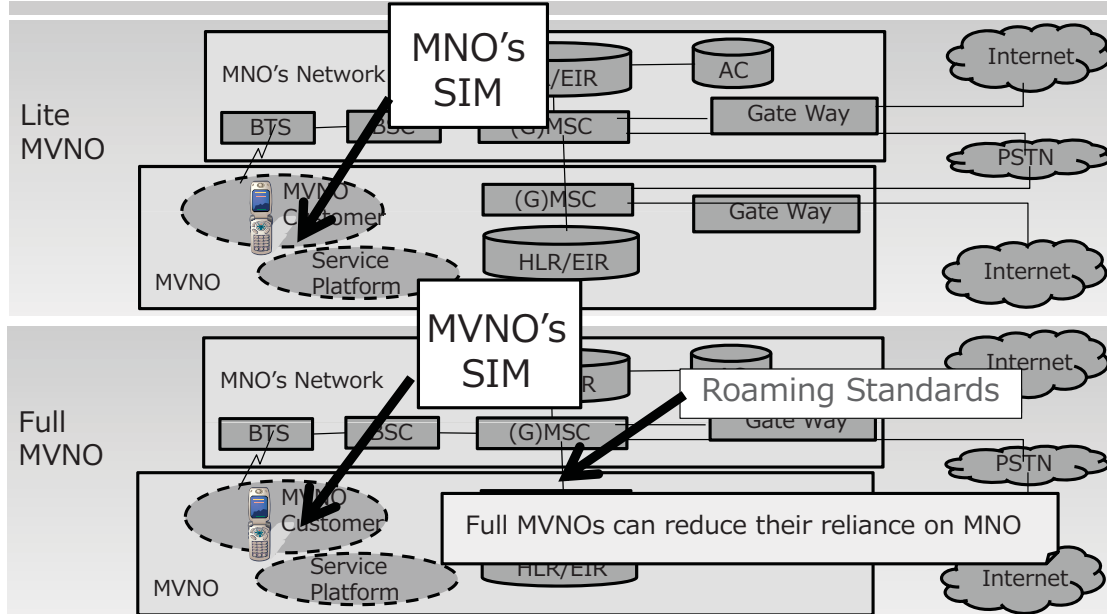
## Network Structure of Voice MVNO



Note) These figures are cited from Kim (2007)

## Network Structure of Full MVNO System

Kim(2007) categorized Network Operator into two. Lite MVNOs use MNO's SIM card but Full MVNOs use their own.



## Entry Cost, the Number of Players and Prices

Spectrum scarcity is usually mentioned to justify MVNO implementation. However, large entry investment is also crucial barrier of entry. Sutton(1992) showed the relation between the number of players and market size by using two stage Cournot model.

N of firms enter a market and symmetrically compete with each other

The firms' two stage competition

First Stage: Decision of entry by firms assuming entry cost F.

Second Stage: Cournot Nash competition

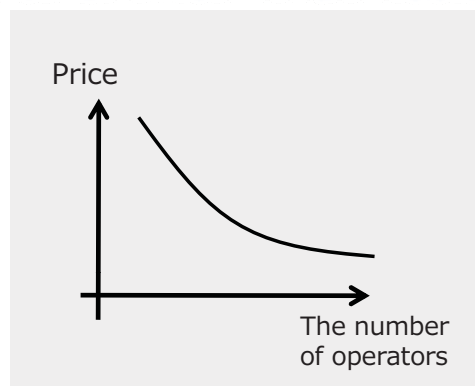
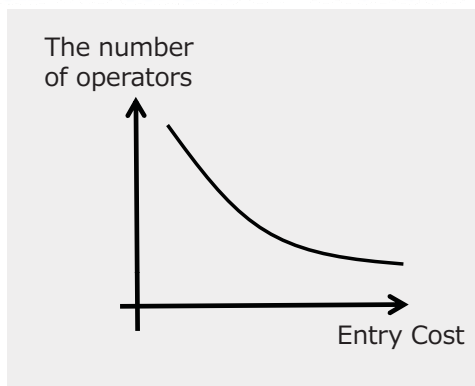
$$p = c \left\{ 1 + \frac{1}{N-1} \right\}$$

$$N^* \geq \sqrt{\frac{S}{F}}$$

p : Price  
 N: The Number of firms  
 S : Market Size  
 F : Entry Cost

- The market size become larger, the more firms can enter into the market.
- Entry cost becomes smaller, the number of firms increases.
- The number of firms becomes larger, Price decreases

## Why is MVNO expected to enlarge customer benefits?



- Sutton(1992) implied that entry costs decrease, the number of operators in the market increase.
- As the number of operators increase, the price of the market decreases.



MVNO systems are expected to decrease entry cost



## Types of MVNO and Cost Structures

	Service Provider	Lite MVNO	Full MVNO
Entry Cost	Small	↔	Large
Interconnection Charge	Large	↔	Small
Customer Control	Heavily Depends on MNO	↔	Lightly Depends on MNO
Differentiation of service from MNO	Small	↔	Large

- Service Providers' Entry Costs are relatively small. But it is difficult to differentiate from MNO's service. At the same time, the sales margin is relatively small.
- However the most successful MVNO, Virgin Mobile in UK is a Service Provider.

## MVNO Development in the World

- Left Figure shows the number of MVNOs in each country.
- Top Five countries had started MVNO system in early time.

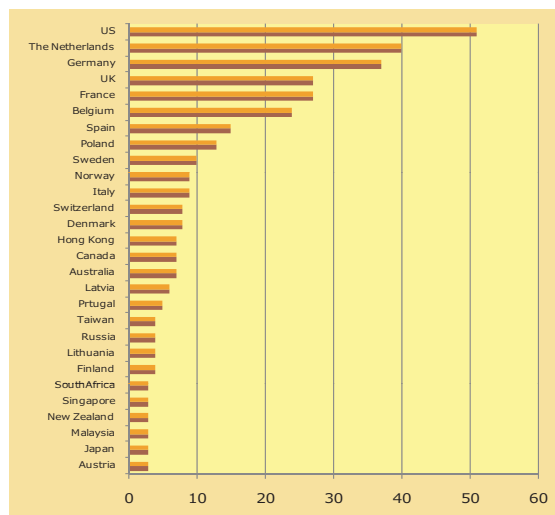


Figure: The Number of MVNOs

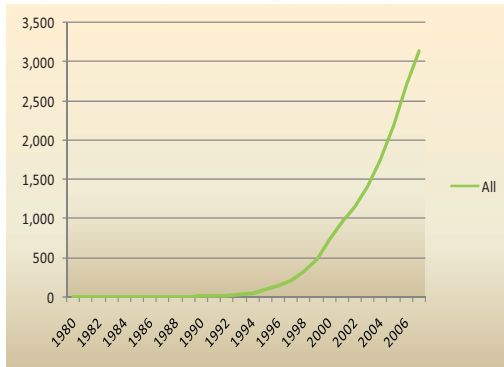
Source: MVNO Directory 2009

Country	Operator	Start Year
US	Air Voice	1999
The Netherland	Tele2Netherland	2001
Germany	Tangens GmbH	1999
UK	Virgin Mobile	1999
France	CBB Mobile	2002

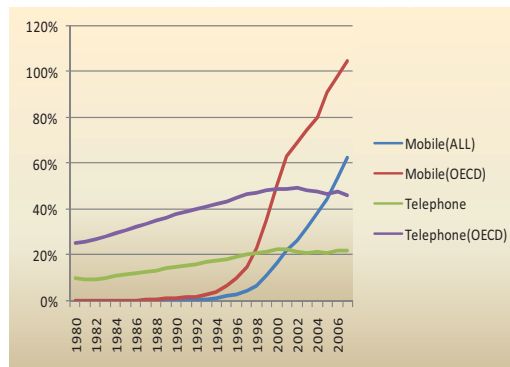
Table: Top 5 Countries' Start Year

Source: MVNO Directory 2009

## Growth of Mobile Markets in the world



The Number of mobile subs in the world



Penetration rates of mobile and fixed telephone

- Since 1979 when the first commercial cellular service launched, the subscribers continue to grow.
- Recently mobile markets in most developed countries have become mature.
- For new MVNOs who try to enter to such matured markets, differentiation of service from MNO (full MVNO) may be expected.

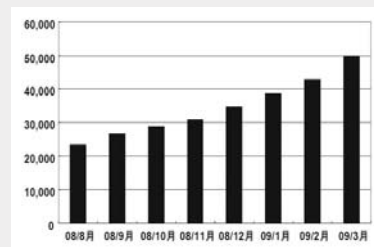
## Present Situation of MVNO in Japan

- Published MVNO guideline in 2002 and revised in 2008.
- MIC's workshop about mobile market published the report in 2007 in which MVNO is said to be promoted.
- Japan Communication Inc (JCI) brought their dispute with NTT DoCoMo to Dispute Settlement Committee and DSC supported JCI's insistence.

### Achievement

Service	MNO	Number of MVNO
Data	DoCoMo	8
Data	E-MOBILE	7
Data	au	1
Data	Wilcom	7
Voice	Softbank	1
Voice	Wilcom	3
Voice	DoCoMo	1

Number of MVNO\*



Number of Subscribers of JCI MVNO\*\*

\* It is made by Author from press releases etc..

\*\* Data Source: JCI's Financial Review Document

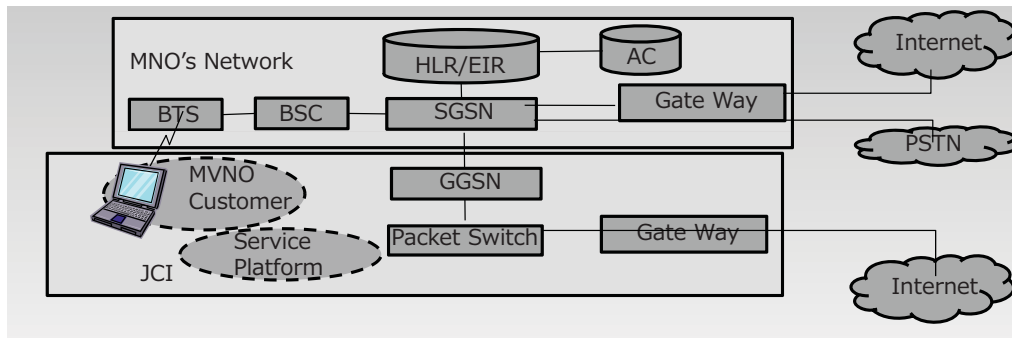
## Network Architectures of MVNO in Japan

Disney Mobile and Vertu

Disney Mobile and Vertu is a Service provider.

Nippon Tsushin (JCI Japan Communications Inc.)

JCI is a MVNO who provides Data service.



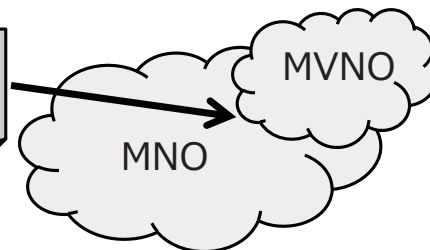
Made from JCI's financial result report in Mar. 2009

•In Japan, there is no full MVNO according to Kim(2007)'s definition.

## Evaluation of MVNO Policy in Japan

### Relation between MNO and MVNO

- MVNO relies on MNO at the same time competes with MNO
- Asymmetry of information.



### Evaluation articles of MVNO Policy

- Regulatory design to oblige MNO to provide their network elements to MVNOs.
- System of Dispute settlement
- Accessibility of Information of MNOs for potential MVNOs to make business plan and negotiate them
- Level of Interconnection charges

## **Obligation of MNO to provide wholesale products to MVNO**

Does MIC impose appropriate obligation on MNOs to provide their network elements to MVNOs?

- MNOs (telecommunication operator) have obligation of accept request of interconnection from any telecommunication operators.
- MNOs have obligation to negotiate with other operators about providing wholesale services but no obligation to provide any products.

From revised MVNO Guideline(2008)

A Status of MVNO is not clearly stipulated in Telecom Business Law. However the Law sets obligation to MNO to negotiate with potential MVNO.

## **Rule of Dispute Settlements**

Does the Regulation set an appropriate settlement rule to resolve disputes between MNO and MVNO?

### Rule of Dispute settlements

- MVNO or potential MVNO can ask to the Minister of MIC for reconciliation or settlement in case that the interconnection negotiation fails to reach agreement.
- MVNO or potential MVNO can ask the Dispute Settlement Committee for reconciliation or settlement in case that the negotiation concerning terms and conditions of wholesale contract fails to agree.

From revised MVNO Guideline(2008)

- JCI could start their MVNO service because the Dispute Settlement Committee made a decision to support JCI's insistence.
- Therefore, the settlement rule is working effectively.

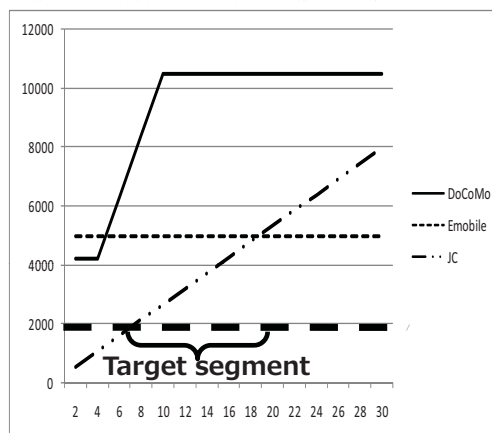
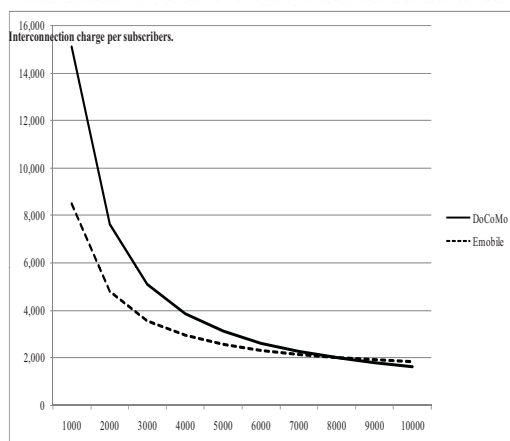
## Problems about Asymmetric Information

Can MVNO and potential MVNO access necessary information of MNO to make business plan for entering the market?

Regulation about disclosure of MNO's Information

- Mobile operators who are assumed to have SMP must open their interconnection tariffs. But no obligation about wholesale tariffs.
  - NTT DoCoMo, E-MOBILE, Wilcom provide wholesale tariffs of DATA service. However no MNO discloses wholesale tariff.
  - Technical information for MVNO to be necessary to interconnect with MNO's network is not disclosed.
- Now the information for potential MVNO to start mobile data services is available.
- However the information for voice MVNO and full MVNO has not been disclosed.

## Evaluation of Interconnection Charges In Japan



- Only Data Interconnection charge are opened to the public.
- Interconnection charge are competitive level for JCI. In that sense, the level of interconnection charge is appropriate.
- However interconnection charge for voice isn't opened.

## Conclusion

---

1. MIC, Telecom regulator in Japan, have declared to promote MVNOs entry in order to increase the variety of services in the oligopolistic mobile market.
2. There are three types of MVNO and the full MVNO type enables them to differentiate their services from MNO.
3. By MIC's promotion, new operators have entered to the mobile market but most of them focus on only data service segment. At the same time, there is no full MVNO in Japan.
4. Inaccessibility of MNO's information and undecided interconnection charge of voice may prevent the potential full MVNO to enter the voice market.
5. Therefore, to promote MVNO in the mobile market in Japan, MIC has to manifest strong support for voice MVNO and make MNOs set and open interconnection charge for voice traffic.

Secondly, the presentations from The 4th Africa-Asia-Australasia Regional Conference are included. This conference is held on 16-18 August, 2009 in Perth, Australia. The following presentations are reproduced.

**ITeS for Solving Agency Problem of Comprehensive Private  
Consignment of Public Facility**

**Takashi OKAMOTO**

**Mobile Marketing in Japan : Considerations from the personal  
information management perspective**

**Yohko ORITO**

**Application of Derivative Functions of Production Possibility  
Frontier Model to ITenabled Services**

**Yuya DAN, Hitoshi OKADA, Shiro UESUGI**

## ITeS for Solving Agency Problem of Comprehensive Private Consignment of Public Facility

ITS2009  
August17, 2009  
Perth, Western Australia

Takashi OKAMOTO  
Faculty of Law and Letters  
Ehime University, Japan

### Table of Contents

1. Background of this work
2. “**Comprehensive Private Consignment**” for Public Facilities
  - its purposes and problems
3. **Information Sharing System** for Sewage Treatment Facilities
  - Sewage treatment facilities are the representatives of public facilities
4. Summary and Future Plans



## Background of this work

- Japanese government faces **sever critical financial condition**
  - Outstanding Japanese government bonds, borrowings and financing bills as of June 30, 2009
    - 860 trillion yen
    - 7.17 million yen debt per one Japanese people
- Japanese **local governments** also face **critical financial condition**
  - stagnating tax revenue, local government loans
- However **residents' needs** for public services are growing **diverse and advanced**
- Public services should be **more efficiently**

## Consign **public** services to the **private** sector

- Supply of public services have been mostly monopolized by **public sector** in Japan
- The cases which **consign** public services to the **private sector** are increasing in recent years
  - There are some cases that consign **maintenance** of public facilities **comprehensively** to private sector

## Public services should be discussed

- Local governments consign various public services to private sector
- From the long term viewpoint
  - Local governments should **carefully** consign to private sector comprehensively
  - Especially for the public services
    - indispensable for residents' daily life
    - need **immense** initial investment and **renewal expense**
- The typical case is **water or sewage facilities**

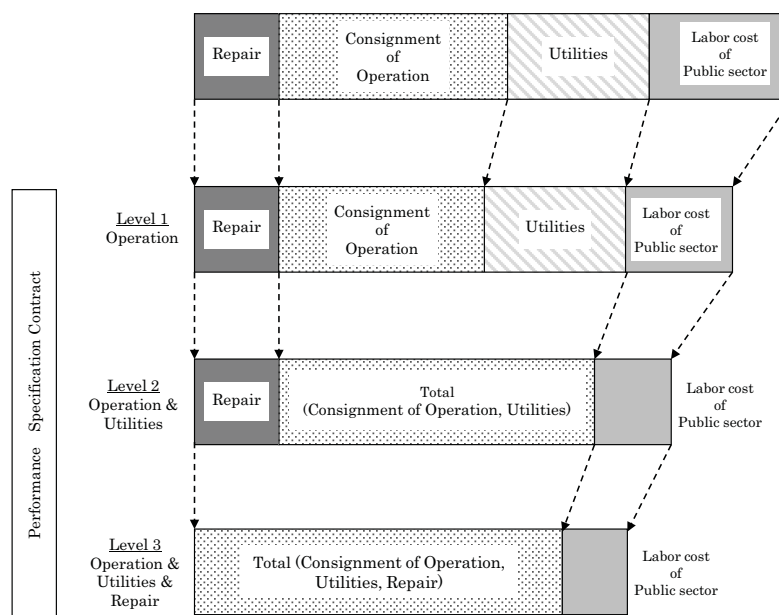
## Comprehensive Private Consignment

- **Recent** Japanese consignment system
  - It can apply to the maintenance of public service
- **Performance specification** contract
  - The trustee can operate freely if it operate appropriately and fulfills contracted demand level
  - **Old consignment** has small margin for the originality and creativity of the private sector
    - **specified** procedure or process the business in **detail**
  - **New consignment** can **utilize private sectors' know-how**

## Two Purposes of comprehensive private consignment

- **Utilizing private sector's know-how**
  - Making operation and maintenance of facilities more efficient
  - This means improvement in business process reengineering or technical capabilities
- **Cost reduction**
  - Reduction of labor cost
  - Reduction of direct expense, etc.
- Fund shortage condition of local government  
Cost reduction = **“Main Purpose”**

### Conceptual Diagram of Cost Reduction



Source: MLIT "The Guideline for the Private Consignment Based on the view of Performance Specification Contract" (Japanese: presenter translates)

## Some **Problems** of Comprehensive Private Consignment

- **Continuity** of the cost reduction effect
  - Cost reduction is realized **at the beginning**
  - This reduction does not continue **in a long term**
    - because main factors of cost reduction are **payroll cut** and **outsourcing**
- **Technical succession**  
(in truster: local governments side)
  - There is the risk that truster will **lose skills** about maintenance and management of facilities
- The consignment may promote the structure of **“Asymmetry of Information”**

## **Agency Problem** and Public Facilities

- Asymmetry of information generates the **agency problem**
  - **truster's** profit  $\neq$  **trustee's** profit  
↓
  - Trustee may choose the **opportunistic behavior**
    - Trustee may use facilities **violently**
    - Trustee may **not repair sufficiently**
- **Durable years** of facilities may be **short**
  - As a result, the cost of facilities may increase

## Agency Problem and Public Facilities

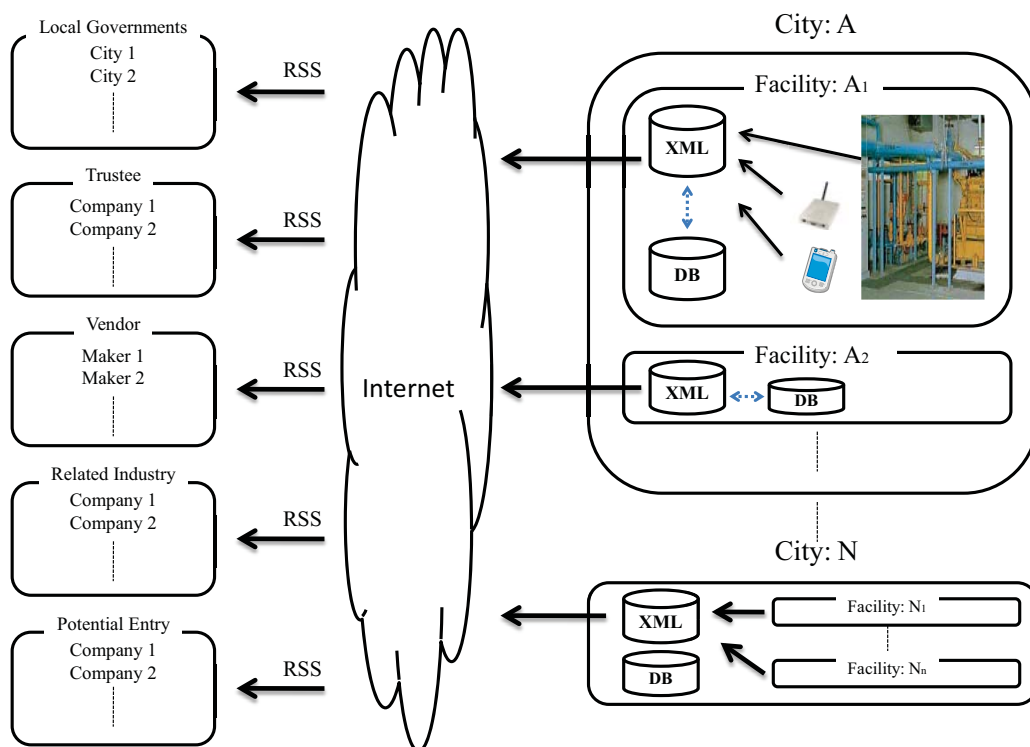
- Almost perfect consignment continues  
↓
- trustor **may not be able to improve the contract**
  - trustor may lose know-how of maintenance
- trustor cannot **judge** the contract appropriately
  
- Asymmetry of information
  - problems of renewal contract

## Japanese Sewage System

- Financial features of Japanese sewage system
  - **Charges** of sewage system **cannot pay** all **maintenance** fees of the system
  
- **Management** of the sewage system is **sever**
  - **Lifetime** of equipment should be **lengthened**
  
- **Maintenance** of the sewage facilities should be **more efficiently**

## Present Management System of Japanese Sewage Treatment Facilities

- Japanese sewage treatment facilities
  - **Various** informatization levels
    - Paper based systems → using public LAN
- Some facilities have been performing advanced information management
  - Conventional system consider **only about their own facilities** fundamentally
  - **Do not** consider to **share** information **over local governments or organizations**



## Necessity of Incentive System

- Trustee may have **few motivation** of inducing the information sharing system
  - The data and information can be the **management resource for competitive advantage**
- It is the important to design the **incentive system**
  - The truster has to provide the trustee with some incentives
    - truster can **contract** with the company which induces the system **preferentially**
    - truster and trustee decide the **range** of sharing information

## Summary and Future Plan

- **Comprehensive private consignment for maintenance of public facilities**
  - Agency problem
  - Future risk of cost increase
  - Importance information sharing
  - Outline of information sharing system
- **Some problems**
  - Specific description and construction of the system
  - Practical design of incentive system

# Mobile Marketing in Japan

: Considerations from the personal information  
management perspective

ITS 2009, Perth, Australia

Yohko ORITO  
Faculty of Law and Letters, Ehime Univ, Japan

## Over view

- ✓ Research motivation and objectives
- ✓ Japanese mobile marketing environment
- ✓ Legal challenges for mobile marketing strategies  
in Japan
- ✓ Further discussion points



## Research motivations

- Mobile marketing strategy in Japan
  - “Keitai”
  - Use of personal information
    - Track record of consumers
  - Personal information management
    - Development of favorable relationship with consumers

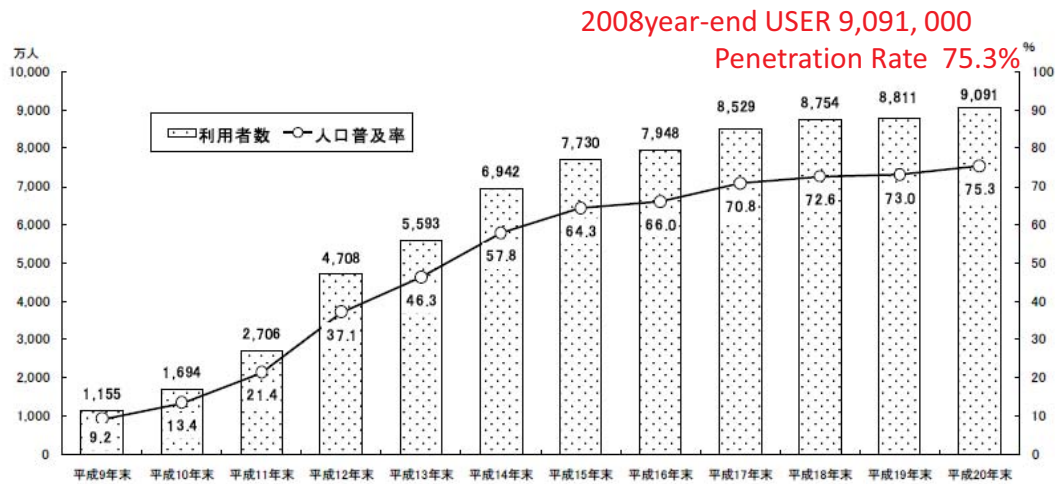
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## Objective of this study

- Examinations to Japanese mobile marketing approaches
- First step in considering future mobile marketing strategies in Japan

# Japanese mobile marketing environment

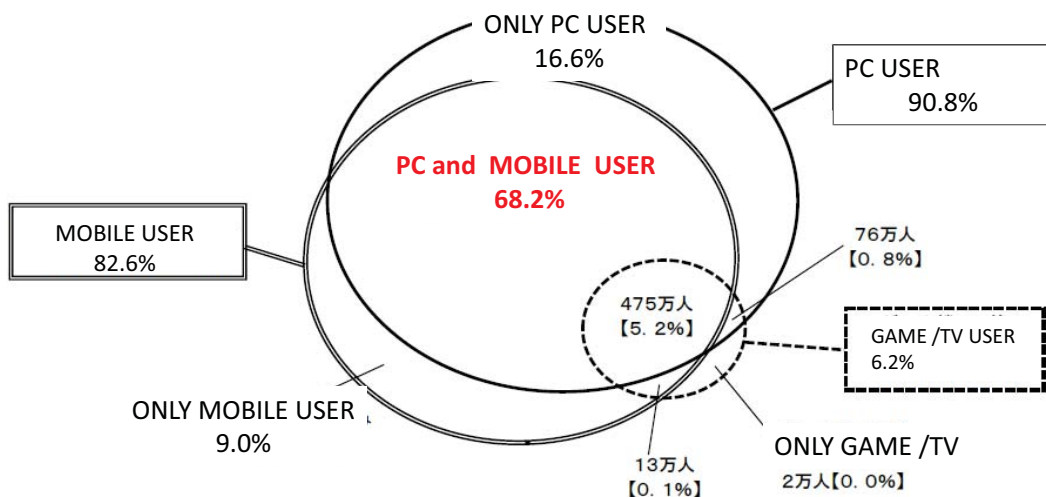
Number of internet user and the penetration rate of the Internet (Individuals)



Source: Ministry of Internal Affairs and Communications( 2009)

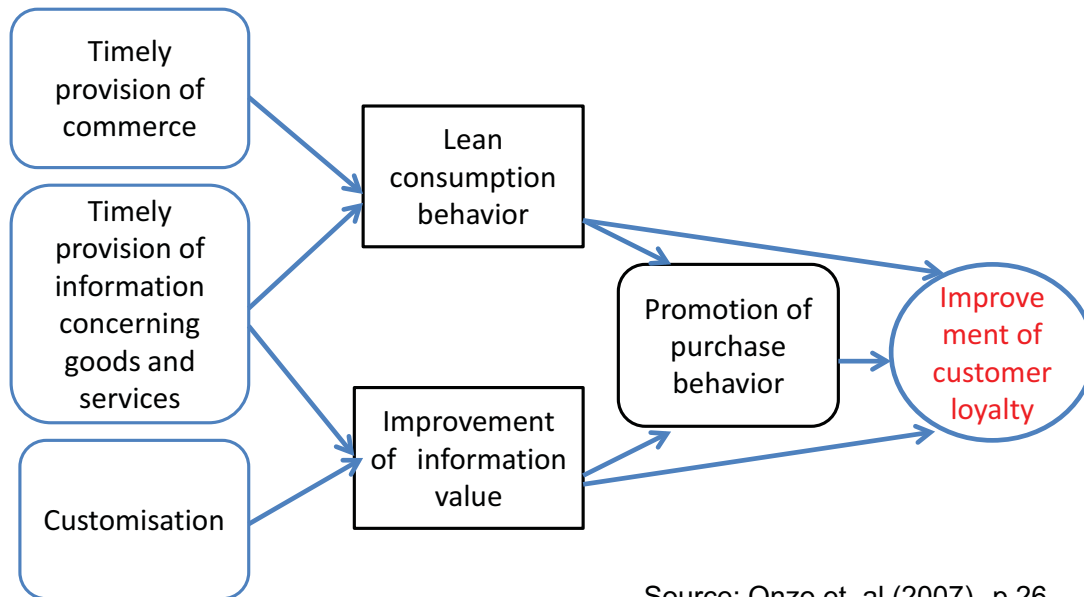
## Access terminals

Types of internet access terminals (individuals) 2008 year-end



Source: Ministry of Internal Affairs and Communications( 2009)

## Effect mechanism of mobile marketing



Source: Onzo et. al (2007) p.26

## Mobile marketing and personal data

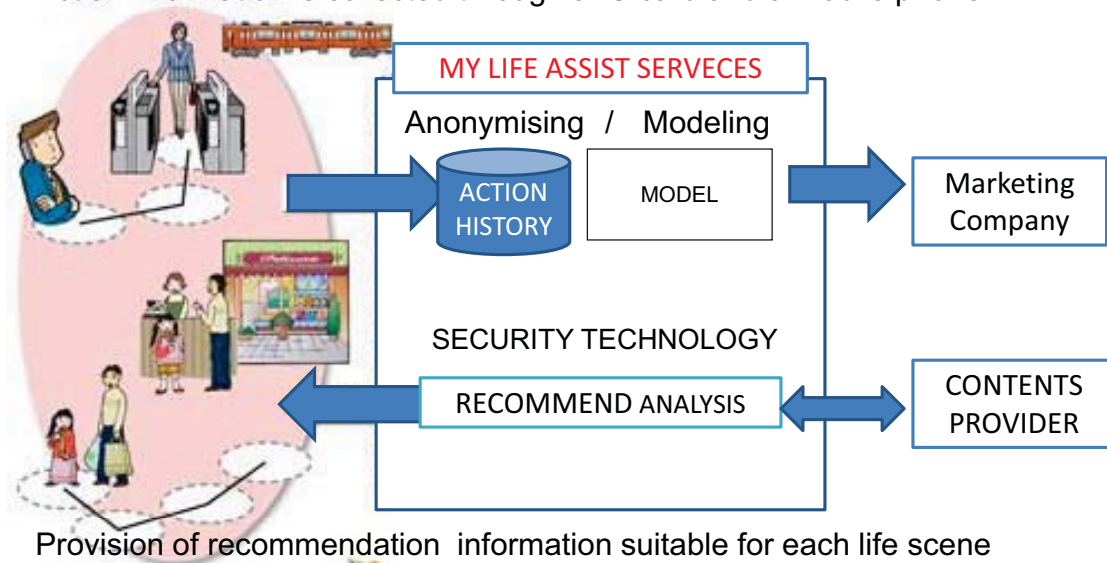
- Importance of accuracy and timeliness of personal information
  - Continuous collections of information on consumer activities
    - Online / Offline
  - Track record

## Challenges for mobile marketing from the personal information management perspective

- **“LIFE LOG” information**
  - Tracking record of consumers' activity
  - Automatic collection ⇒ Provision of automatic customised information services
    - Recommendation
  - Basis for action support system for individual users

### MY LIFE ASSIST SERVICE (NTT DOCOMO)

Action information is collected through a IC card and a mobile phone



SOURCE: IGV (Information Grand Voyage) Project  
<http://www.igvpj.jp/contents/activity2008/next-test/cat43/0102/post-35.html>

## Legal issues related to mobile marketing using life log information

- Hesitation to use of life log information
  - No law or guideline concerning the handling of life log information in Japan
- The Act for the Protection of Personal Information
  - April 2005

## Definition of personal information

- “Information about a living individual that can identify the specific individual by name, date of birth or other description contained in such information, including information that would allow easy reference to other information and thereby enable identification of the specific individual “

SOURCE: The Act for the Protection of Personal Information

# I concier (NTT DOCOMO)

- Life support services
  - Railroad information
  - Personal schedule
    - e.g. return date of rental CD/DVD
  - E- Coupon

ひつじのしつじくん



I'm your concierge ,  
I can provide useful information to you, at  
the right time!

SOURCE: NTT DOCOMO

[http://www.nttdocomo.co.jp/info/news\\_release/page/081105\\_01.html#p02](http://www.nttdocomo.co.jp/info/news_release/page/081105_01.html#p02)

## Display of “I concier”

(例) 鉄道運行情報



Source: NTT DOCOMO

## The situation of the near future in Japan

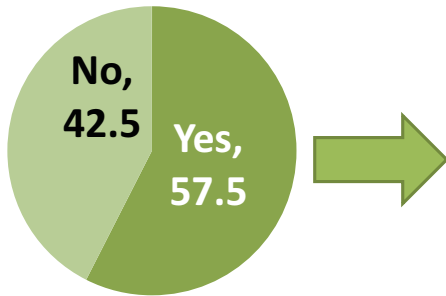
- Establishment of an appropriate social environment conducive to the use of life log information
- Approaches of Japanese government
  - Guidelines
    - Options open to the user
    - Disclosure of information management practices
    - Promotion of information security measures

## Further discussions

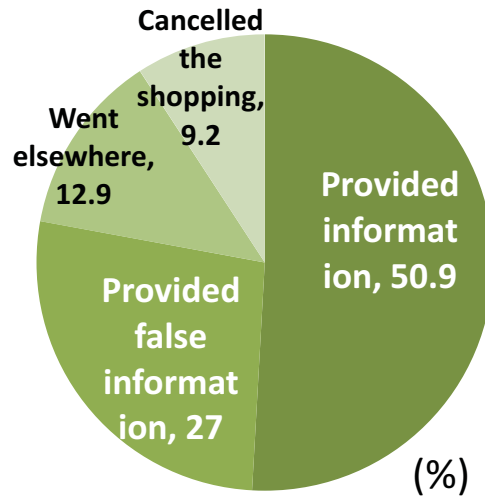
- Only maintenance of legal regulation?
- Discussion point from business viewpoints
  - How the consumer feel when business organisation request too much information?

## Provision of personal data items required by online shopping site

Have you ever felt that online shopping sites require too much personal data?



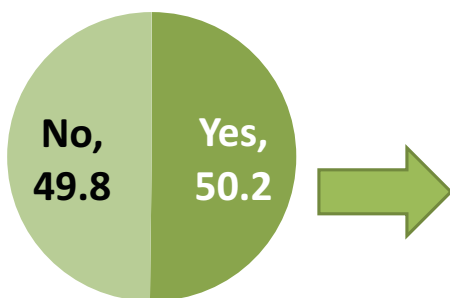
If "yes," what did you do?



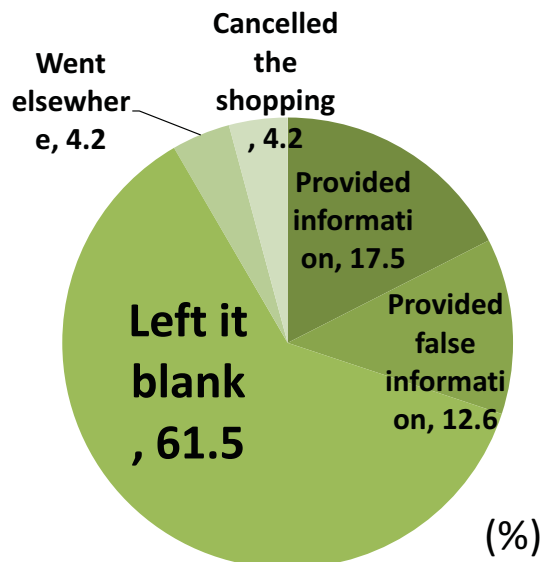
Source: Orito et al (2008)

## Provision of personal data items required by online shopping site (Option)

Have you ever felt that online shopping sites require too much optional personal data?



If "yes," what did you do?



Source: Orito et al (2008)



## Favorable relationship with consumers?

- Automatic collection of life log information
  - Fuss-free for the consumers
    - Difficulty of Judgment to the degree of rational use of Life log information
  - Data matching → personal identification
- Future Discussion point
  - e.g. what kind of customised services provisions are suitable for the use of life log information?

## Discussion point from social view points

- Height dependence on the architecture or algorithm
- Social risk
  - Control by the system architecture (Orito,2009)
- Really favorable relationship with consumers?

## Conclusions

- What kind of benefit is given priority in the constructions of relationships with consumers ?
- Necessity of reconsidering to the mobile marketing strategies that use life log information

Thank you for your attention.

### Acknowledgement

This work was supported by Research Grant-in-Aid for Young Scientists (B) 21730304 from Ministry of Education, Culture, Sports, Science and Technology (MEXT) Japan.

# Application of Derivative Functions of Production Possibility Frontier Model to IT- enabled Services

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Matsuyama University, Ehime

\*\*National Institute of Informatics, Tokyo,  
Japan

## Questions

- Whether Concepts of Privacy in Japan affect Japanese Consumer Behaviors in e-Commerce?  
(The effect of Privacy Concern seems very strong.)
- Production Possibility Frontier Model (PPFM) seems to provide a reasonable explanation why and how Japanese Consumer behave in relation to e-Commerce. (Seems like “Yes” ← APCIM2009)  
(Continues....)

## Questions (Continued)

- Derivative Function of Production Possibility Frontier Model
- Whether DPPFM can be used to predict what level of Privacy a product should satisfy?  
(i.e. Defining the level of Privacy an e-Commerce produce to satisfy.)
- Is it useful to ITeS (IT-enabled services, as well? ← it is always difficult to determine before the services are in the market, if determined prior to go to the market.....)

---

## Plan of Presentation

- Characteristics of Privacy Concept of ordinary Japanese
- ITeS (= IT enabled Services) growing market
- e-Money as an example of ITeS
- Hypothesis and Model
- Some Considerations

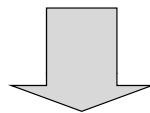
# Privacy Concept in Japan

- Unlike Western Countries, Privacy Concept in Japan has very short history
- The concept of Privacy is not yet embedded in Japanese ordinary people.
  - Too crowded in large cities
  - Lot's of mutual dependency in rural areas

## Characteristics of Privacy Concept of ordinary Japanese

- More like a fashion, or trendy actions, which one follows because many follow.

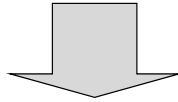
By Dr.Yoko Orito



- Internet Privacy and Computer Privacy are the good example of this attitude.

## Privacy as “Fashion”

- Act on the Protection of Personal Information (APPI) of 2002 created huge echoing concerns and criticism right after it was launched.



- The concerns had been faded out before long, even though the numbers of crimes and malicious activities have been increasing.
  - However.....,

### Example:

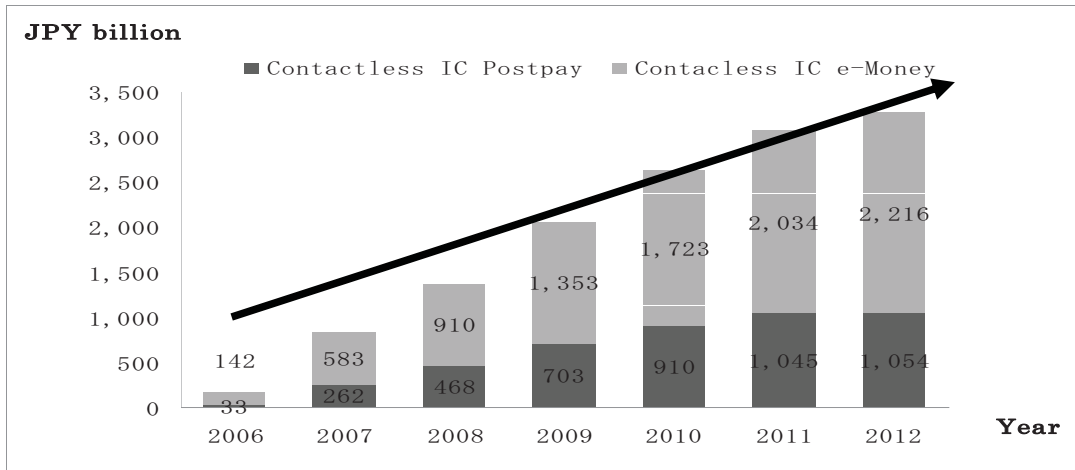
#### An observation from e-Money

- Even though, “ordinary” Japanese People echoed eagerly to the idea of protecting privacy
- Penetration of e-Money into them is extraordinary fast
- They are everywhere.....



# e-Money as typical ICT present privacy problems

- Land-sliding diffusion of “Felica” based e-Money in 2007



(Figure 1) Estimated Market Scale of e-Money in Japan (Source: NRI 2008, p.26)

## From BOJ's reports

- Nikkei calculates the drop of numbers of coins in the market
- Since 2008, sharply dropping
- Correlates to the increase of e-Money

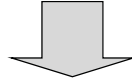
(Nikkei July 19, 2009)

## Numbers of Coins in present market compared to last year



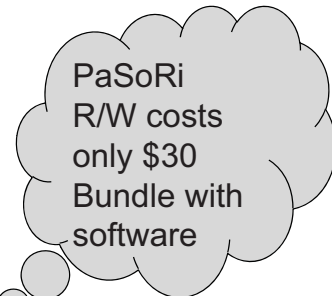
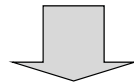
# Problem? “Felica” and Privacy

- Dominance of “Felica” system



## A problem related to Privacy

- Felica has non-secured area which contains history of usage such as these



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6875-0100-3607

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ポイント残高 456.0  
本日ミールカード利用累計金額 ¥0

お取引履歴(最新10明細まで表示)

No.	利用日時	区分	金額
1	2008/09/13 13:29	利用	¥110
2	2008/09/12 12:37	加金	¥583
3	2008/09/12 12:37	利用	¥333
4	2008/09/11 14:53	利用	¥110
5	2008/09/11 10:17	利用	¥110
6	2008/09/10 15:38	利用	¥110
7	2008/09/10 15:37	利用	¥110
8	2008/09/10 12:23	加金	¥773
9	2008/09/10 12:23	利用	¥318
10	2008/09/10 10:16	利用	¥110

お知らせ 保存 クリア

History  
of  
Usage  
Viewed  
by  
PaSoRi



Threat  
of  
Privacy  
Theft

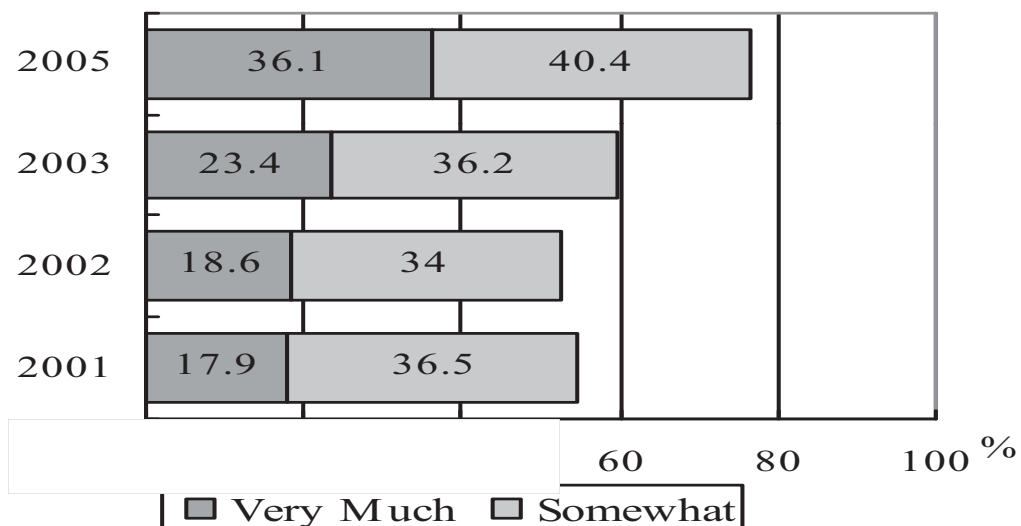


## Contradiction?

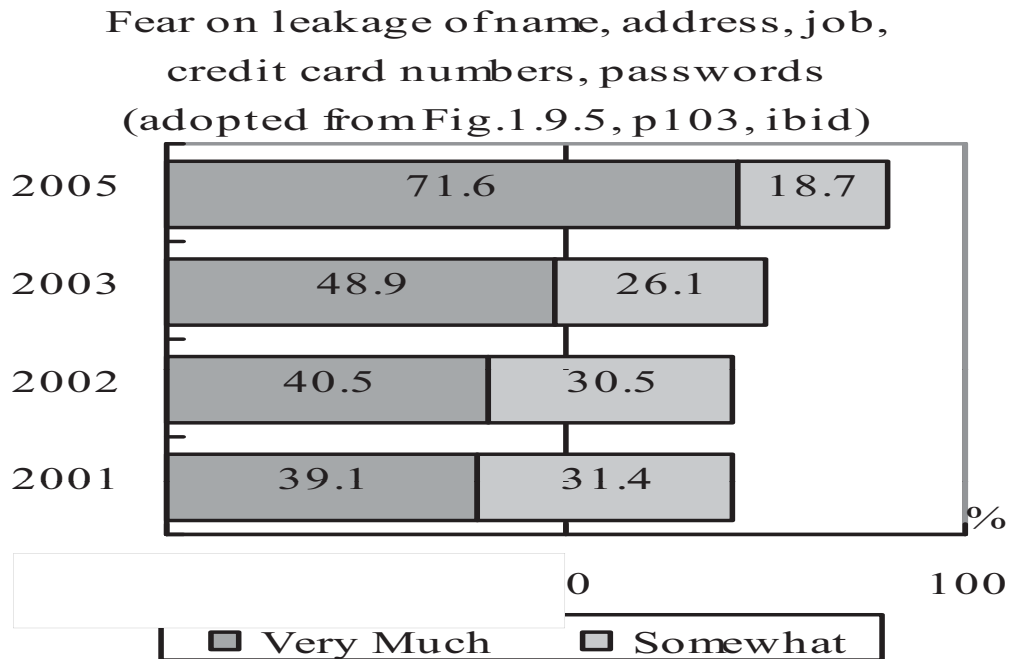
While e-Money gains so much popularity,  
2006 survey indicates that Japanese are still  
concerned about certain aspects that are  
involved in the use of ICT.

(Figure 4) Survey result on Japanese Privacy Concerns reproduced from Tokyo Daigaku (2006) p.102 and 103.

Fear on leakage of history of web browsing  
and the contents of e-mails  
(adopted from Fig.1.9.2, p.102, *ibid.*)



(Figure 4) Survey result on Japanese Privacy Concerns reproduced from Tokyo Daigaku (2006) p.102 and 103.



### Economic Factors are more Important

- 2006 Survey may be interpreted as :

“The concerns derive from the fear to loose economic benefits rather than losing privacy”

.....this raise question among us:

**“What behavior Japanese Consumers will take?” in accordance with the level of Privacy Protection?”**

# Hypothesis

Though it is true that “trade-offs” between “Convenience” and “Privacy” exist, the level of the combination between them are not set to one fixed level.

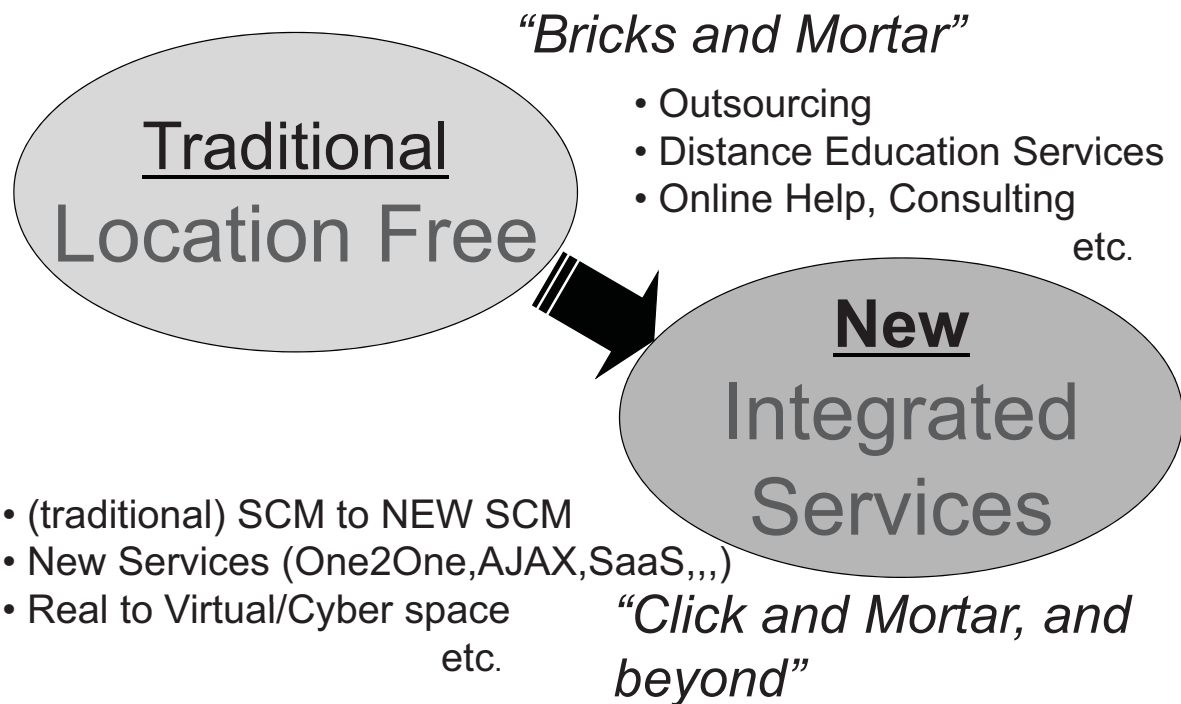
The level of Consumer’s concern about a product’s level of “trade-offs” between “Convenience” and “Privacy” may be used to evaluate ITeS in a handy manner.

## Application of DPPFM to ITeS

- This is “Anyca”, with  $\mu$ -chip, an IC-chip, produced by Hitachi Ltd.
- Is this comparable to “Felica”?



## Re-Defining ITeS (from SAINT2008)

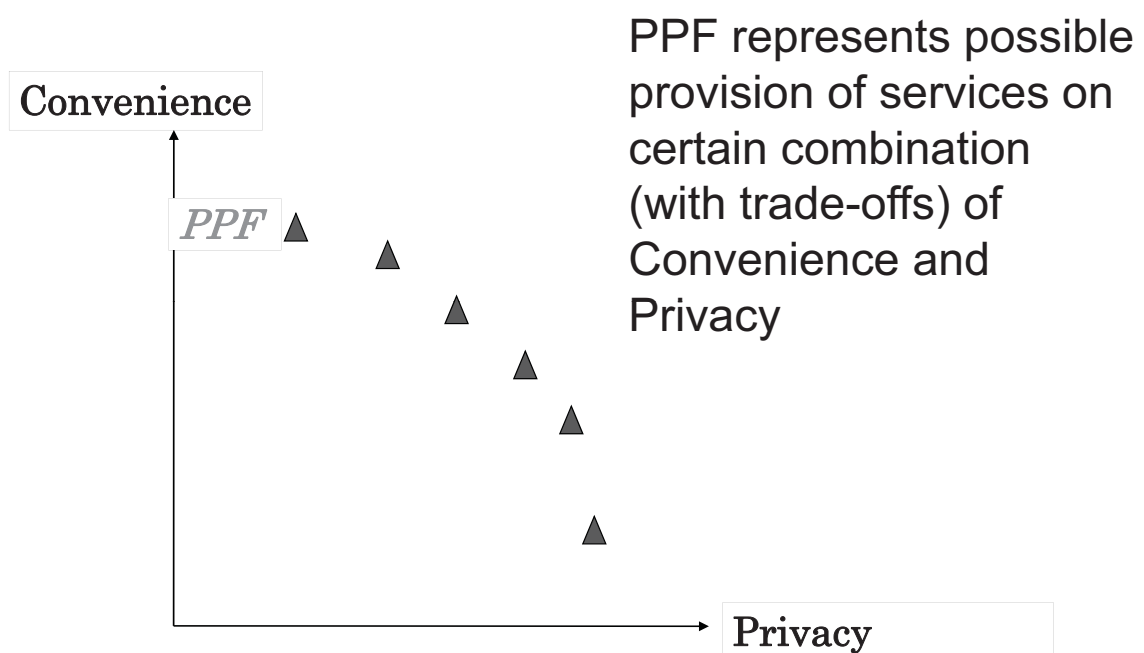


### Production Possibility Frontier Model (PPFM)

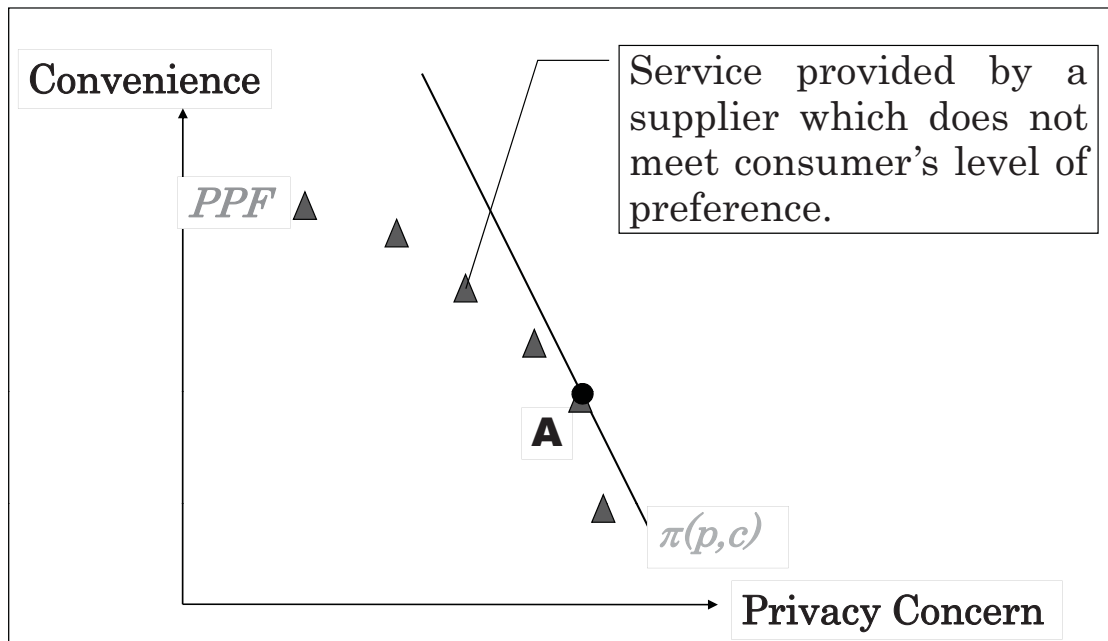
- Production Possibility Frontier model (PPF) is used in economics in order to estimate the possible level of productions of two complementing goods. It is used in the case of estimation where macroeconomic model is involved.
- There is a methodology where PPF is utilized in the analysis of productivity and efficiency of a corporation. (Takemura et.al.2007)
- The benefit of PPF is the simplicity of description of comparison in two complementing goods.
- Furthermore, if we may use PPF in the analysis of privacy perception, and use to explain peculiar behavior of consumers in the case of e-Money successfully, we may also be able to use PPF in order to forecast future consumer response to certain new technology or products when privacy issues are involved.

## Relation with AHP/ANP and PPFM

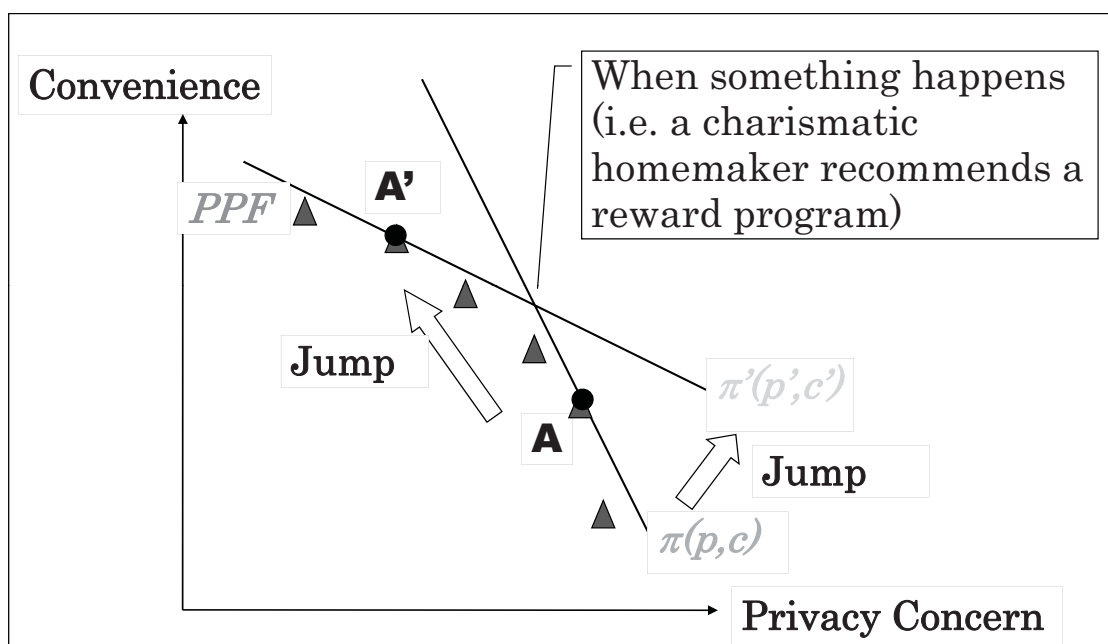
- There are considerable factors involved before reaching the result thusly the factors conceal true and the most impacting cause behind. However, in the case of explosive diffusion of Felica based IC e-Money in Japan.
- AHP (Analytic Hierarchy Process) and its generalized version of ANP (Analytic Network Process) are known analytical models for multi-criteria decision making analysis.
- However, the component of the panel or each decision maybe too complicated.
- PPFM may be a simple model to describe consumer behavior in the first instance, before conducting AHP/ANP analysis.



(Fig.5) Change in Japanese Concept of Privacy



(Fig.5) Change in Japanese Concept of Privacy



# An example of DPPFM

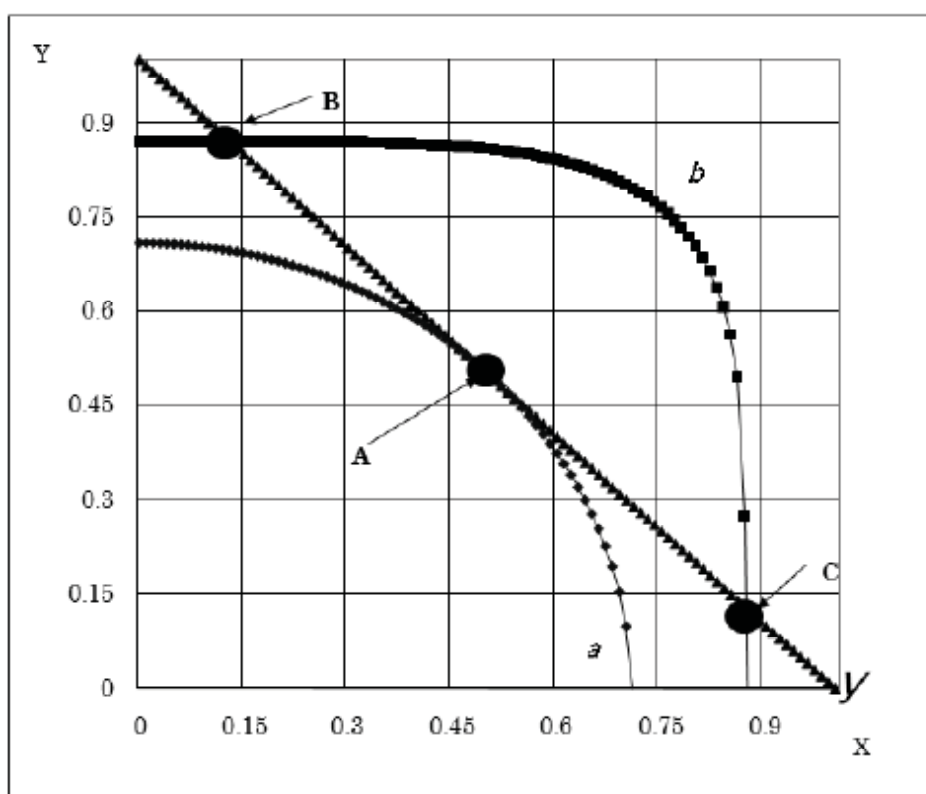
X : Market Share of good X

Y : Market Share of good Y

$$y : y = 1 - x \quad (1)$$

$$a : x^{r^a} + y^{r^a} = 0.5, \text{ where } r^a \text{ is supposed to } 5 \quad (2)$$

$$b : x^{r^b} + y^{r^b} = 0.5, \text{ where } r^b \text{ is supposed to } 2 \quad (3)$$



# Preliminary Survey Analysis

- In 2007, 2008 and 2009
- Freshman Students, 100 students in MIS101 class
- Questions:
  - Whether they use e-Money?
  - What kinds of attitudes they indicate to the use of e-Money?
  - Any reason not using?

## Test survey on Students How many are using?

(Table 1) Survey result about the use and awareness of e-Money

Questions	2007	2008	2009
1. Use e-Money of Corp	59% ↑	75% →	71%
2. (for "yes" in above) Use on Vending Machine	44% ↑	68% →	68%
3. Know e-Card	55% ↑	62% →	59%
4. Use e-Card	21% ↑	28% →	25%
5. (for "yes" in above) Use e-Card for shopping	13% ↑	30% ↓	16%
6. (for "yes" in 4) Use e-Card on Vending Machine	14% ↑	23% →	19%
7. (for "yes" in 4) Use e-Card at convenience store	5% ↓	0% ↑	6%
8. Know mobile e-Card	14% ↑	24% ↓	16%
9. Know e-Money (Edy, e-Card, etc.)	74% ↑	82% ↓	77%
10. (for "yes" in 9) Use e-Money	16% ↑	22% →	27%
11. (for "yes" in 10) Is it Convenient?	83% ↓	71% ↑	86%
12. (for "n" in 10) Want to use them?	40% ↑	51% →	52%



# Why they don't use?

Reason of :	Do not Know how to use			Charging is troublesome			Vague anxiety			Other		
	'07	'08	'09	'07	'08	'09	'07	'08	'09	'07	'08	'09
Not using Co-op e-Money	32%	13%	16%	42%	59%	58%	17%	9%	10%	9%	19%	16%
Not using e-Card	33%	45%	22%	19%	20%	26%	14%	3%	11%	35%	33%	41%
Not using mobile e-Card	57%	65%	52%	13%	26%	31%	0%	4%	10%	30%	7%	6%
Not want use e-Money (Edy etc.)	28%	24%	18%	28%	29%	26%	38%	38%	43%	6%	9%	2%

(Table 2) Survey result about the reasoning of "No use"

# Test survey on Students

- (Table 3) Survey result about the reasoning of "Want to use"

Reason want to use e-Money	Convenient			Everyone is using			Attractive Merits			Other		
	'07	'08	'09	'07	'08	'09	'07	'08	'09	'07	'08	'09
	81%	81%	77%	3%	2%	1%	16%	16%	19%	0%	0%	3%

A typical comments that indicates that there is no relevance to "Privacy" or "Economics".

This is an acute movement from  
one status to another status  
and  
we name this :

**“Shishi Odoshi Effect”**

“Shishi Odoshi”



**Thank you!**