From the Editor

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

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

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

The first part of this Journal is contributed by Dr. Shiro Uesugi. He summarized the five years of development of ITeS research and indicates a scope for the future research. The study of ITeS started as an investigation to look for more value in IT-enabled Services than mere outsourcing. During the course of five years of research, the development in the argument illustrated the resourceful contents of ITeS.

The second part of this Journal consists of the reproductions of presentation slides from the conferences. The 4th ITeS Workshop was held as a session in SAINT 2011 (The 11th Annual International Symposium on Applications and the Internet) held in Munich, Germany on July 18-21. This is a follow up of the 1st Workshop held in Turuku in July 2008 and the 2nd ITeS Workshop held in Bellevue WA, USA in July 2009, and the 3rd ITeS Workshop held in Seoul in July 2010..

The Workshop was made up from 3 sessions – “Trust and IteS,” “ITeS and Payment” and “ITeS and infrastructure.” Each session consist of 3 presentations. The papers presented in the workshop is included in the proceedings of SAINT2011 and retrieved from IEEE Xproler® Digital Library.

This edition of Journal is consisted by the collections of up-to-date researches on ITeS. The editor would like to express sincere thank to the contributors of paper and the presenters in the Workshop who make this wonderful omnibus of journal come to existence.

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ITeS Revisited

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***Abstract*—Past researched of the ITeS are reviewed and revisited and new scope is indicated. The five years' accumulations of the research from the first congress in 2007 to the fourth workshop of ITeS in SAINT2011 are summarized. The philosophies behind the design of each conference are presented. New scope for the future research is presented.**

***Index Terms*—ITeS; IT-enabled Services**

I. INTRODUCTION

As the workshops of IT-enabled Services (ITeS) have counted three times this year in IEEE/IPSJ joint Symposium of Application of Internet (SAINT) since 2008, the scope of researches has developed to include more varieties of ITeS. In this article, these developments of ITeS are revisited and reviewed.

It is almost five years since the first International Congress of ITeS was held at Shih-Chien University in Taipei with participants from Taiwan, Thailand and Japan in 2007. ITeS was considered a synonym of ”outsourcing” at this time. However, the meaning of ITeS has transformed during these five years. Nowadays, it includes more variety of notions not only limited to the ”outsourcing” but also to the ”services in general.”

In the followings, the process of research about the expansion of notion of ITeS is revisited in this manner. Firstly, the summary of the past research is illustrated. Secondly, the philosophy behind the design of the research developments will be presented. Thirdly, the new scope about ITeS will be discussed.

II. SUMMARY OF THE PAST RESEARCH

A. First Congress

The first “International Congress on Innovative IT-enabled Services (ITeS) in the New Economy
–
Web2.0 Services and e-finance” was held on February 2nd, 2007 with the initiatives by Chunhua Institute of Economic Research, Taiwan, Department of Finance, National Sun Yat-sen University, Taiwan, IDEAS, Institute of Information Industries, Taiwan, Shih Chien University, Taiwan, National Institute of Informatics, Japan and Matsuyama University, Japan. The participants included Mr. Tokihiro Nakamura, the Mayor of Matsuyama. The theme of the congress was set as to investigate the situation on: *“a resurgence of dot com business with a set of new business logic (Web2.0) also cast some lights on the possibilities to develop innovative web services along sides with the deregulated ICT industries. Another area showed great potential for IT enabled innovative service is in the area of e-finance, as most financial services today can be provided through the digital means. The advance in IC smart card makes it possible to carry out all of our daily transactions with only a plastic card (or other devices).”*

The structures and the topics covered are the followings.

Keynote Speech One: Mr. NAKAMURA, Tokihiro, Mayor of Matsuyama City, “The Experience of “e-Machizukuri” (Use of ICT in the City Development)”
Keynote Speech Two: Prof. LIU, Canng-Yung., Vice President of Shih-Chien University, “Entrepreneurship Development and Innovative IT-enabled Services (ITeS)”
Coffee Break
Session One: Promotion of Innovative Web2.0 Services
Chair: Prof. HSIEH, Chung-Hsing, (Vice President, Shih Chien University)
Paper Presented by:
Dr. OKADA, Hitoshi (Associated Professor of National Institute of Informatics, NII)
Ms. ATCHARIYACHANVANICH, K. (Graduate Student, National Institute of Informatics, NII)
“The Success Factors of e-Commerce”
Mr. OGAWA, Hiroshi (i-Creative Director, SunBridge Co.)
“Web2.0-a New Business Model”
Mr. UEDA, Masashi (Assistant Professor of NII)
“u-Japan - A New Frontier in Mega-Competition”
Mr. SU, Weiren, (Section Chief, IDEAS, Institute for Information Industry)
Mr. CHANG, Kent (Research Fellow, IDEAS, Institute for Information Industry)
“Issues and Approaches for Promoting Web2.0 services in Taiwan”
Dr. HWANG , Boi-Yi (Director, Graduate Institute of Innovation and Entrepreneurship, Shih Chien University) Mr. LIU, Jau-Yang (National Central University) “The Adoption of WebATM - A Case Study”
Session Two: Experiences and Cases of e-finance Applications

Chair: Prof. CHOU, Tein Chen (Dean, College of Management, Shih Chien University)
Papers Presented by:
Dr. UESUGI, Shiro (Associate Professor of Matsuyama University)
"Factor for Successful Introduction of Smartcard - A Comparative Case Study of IC Card Business in Shikoku"
Mr. HUANG, Garfield (Director, IDEAS, III)
"IT-enabled Innovative e-finance in Taiwan"
Dr. CHANG, Yue-shan (Professor of Finance, National Sun Yat-sen University) Dr. LEE, Kuo-jung (Assistant Professor of Finance, Shih-Chien University, Kaohsiung Campus)
"The Design of Exchange Mechanism for Micropayment and Optimal Fees for Electronic Payments - an Analytical Approach"
Dr. LEE, Chun Roy (Assistant Research Fellow, Chung-Hua Institution for Economic Research)
"The Two Dimensions of WTO and e-finance: Market Access and Domestic Regulation"
Dr. LEE, Maria R. (Dean of Research and Development Office, Shih-Chien University)
"Knowledge Management and Web 2.0"
Coffee Break
Panel Discussion:
The Development of Innovative Services in the New Economy
Chair: Dr. CHEN, Shin Horng (Director, 2nd Institute, Chung-Hua Institution of Economic Research)
Discussants:
Mr. YOSHINO, Takahiko (Director, Regional Economy Division, Industrial Economy Department, Matsuyama City)
Dr. OKADA, Hitoshi (Associated Professor of National Institute of Informatics, NII)
Mr. SU, Weiren, (
Section Chief, IDEAS, Institute for Information Industry)
Dr. UESUGI, Shiro (Associate Professor of Matsuyama University)
Mr. OGAWA, Hiroshi (i-Creative Director, SunBridge Co.)
Dr. CHANG, Yue-shan (Professor of Finance, National Sun Yat-sen University)
Dr. LEE, Roy. C. (Assistant Research Fellow, WTO Center, Chunhua Institute of Economic Research)

B. *Second congress*

Second International Congress of Innovative ITeS (IT-enabled Services) was held at The International Seminar House for Advanced Studies (Inose Lodge) of National Institute of Informatics on 14-15 September, 2008. This workshop aimed to the issues related to the e-finance as one of the kind of services. Participants and topics of the papers presented are the followings.

Professor Yue-Shan Chang of National Sun Yat-Sen University and Dr. Yueh-Chun Shih of National Kaohsiung Hospitality College, Taiwan
"The Entrepreneurship Guidance Mechanism of IT-enabled Innovative Services in Taiwan"
Shyh-Jane Li of National Sun Yat-Sen University and Mr. Wei-jen Su and Mr. Yu- Chuan Chang of IDEAS, Institute of Information Industries, Taiwan "Analyzing the Key Factors of Next Emerging Web Services' Operation: A System Dynamics Approach"
Professor Yu-Hui Tao of National Kaohsiung University and Dr. C. Rosa Yeh of National Taiwan Normal University, Taiwan
"Internet Search Summarization for General and Management Applications"
Dr. Yoko Orito of Ehime University
"The counter-control revolution: social influence of dataveillance systems"
Dr. Hidenobu Sai of Ehime University,
"The Framework for Analyzing ITeS Business Model"
Other participants included Dr. Shiro Uesugi of Matsuyama University, Mr. Masashi Ueda and Dr. Hitoshi Okada of National Institute of Informatics, Japan.

C. *Workshop 2008*

The workshop of ITeS at the occasion of SAINT2008 was held for the first time on August 1, 2008 in Turku, Finland. The papers presented at the workshop are the followings.

Dr. Peter Dell and Dr. Khwaja Shan-ul-Hasan Ghori,
"A Simple Way to Improve the Security of Bluetooth Devices"
Professor Yu-Hui Tao,
"From Internet Information Search to Information Summarizing"
Dr. Yuya Dan,
"Possibility of Human Grid Computing for Artificial Intelligence Systems"
Dr. Takashi Okamoto,
"B to C for Revitalizing Rural Economy"
Dr. Kanokwan Atchariyachanvanich and Professor Noboru Sonehara
"Cluster Analysis of E-Commerce Customer Profiles based on Trust Perception"
Professor KINOSHITA Hirotsugu and Mr. MORIZUMI Tetsuya,
"A network for copyright management and control of private information"
Mr. Takaaki Kamogawa and Dr. Hitoshi Okada,
"Enterprise Architecture and Information Systems - In Japanese Banking Industry"
Dr. Shiro Uesugi,
"Bridging between Real and Virtual - Technologies to advance ITeS"

D. Workshop2009

Next workshop of ITeS at SAINT2009 was held on July 21, 2009 in Bellevue WA, USA and the structures and papers presented were the followings.

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)
Hirotsugu Kinoshita, Tetsuya Morizumi, and Kazuhiro Suzuki
"Financial Securitization with Digital Rights Management System"
Tetsuya Morizumi, Kazuhiro Suzuki, and Hirotsugu Kinoshita
"A System for Search, Access Restriction, and Agents in the Clouds"
Takaaki Kamogawa and Hitoshi Okada
"Enterprise Architecture Creates Business Value"
Memiko Ootsuki, Tetsuro Kobayashi, and Noboru Sonehara
"IT-Enabled Survey and Its Problems: Analyses of an Australian Internet Poll"
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)
Takashi Okamoto
"Information Sharing System for Maintenance of Sewage Facilities"
Yousin Park, Yunju Chen, and Masashi Ueda
"Business Models for IPTV Service; Integrated or Platform?"
Yuki Shoji
"Evaluation of the Competition Policy to Encourage MVNO System in Japan"
Shoko Kiyohara
"A Study on How Technological Innovation Affected the 2008 U.S. Presidential Election: Young Voters' Participation and Obama's Victory"

E. Workshop in 2010

The workshop of ITeS at SAINT2010 was held on July 22-23, 2010 in Seoul, Korea and the papers presented were the followings.

Thursday July 22 and Friday July 23
Welcome note by Workshop Organizers: Hitoshi Okada
Session 1: Trust and IteS - Thursday July 22, 15:30-17:00, Meeting Room 1C (3rd floor)
Session Chair: Hitoshi Okada
Shigeichiro Yamasaki
"A Dynamic Trust Estimation Method for 'Persona' from the Human Relationship of Social Web Social Web and Trust by the Rating of a Persona's Active Audience " Manish Pokharel, Jong Sou Park
"Disaster Recovery for System Architecture using Cloud Computing"
Takahisa Suzuki, Tetsuro Kobayashi
"Web-based experiment to analyze norms of reputation making - How to evaluate actions with a opponent having a bad reputation"
Session 2: ITeS and Payment - Friday July 23, 13:30-15:00, Meeting Room 1C (3rd floor)
Session Chair: Shiro Uesugi
Nagul Cooharojananone, Kamonwan Taohai, Suphakant Phimoltares
"A New Design of ATM Interface for Banking Services in Thailand"
Kinoshita Hirotsugu, Kudo Mamoru, Morizumi Tetsuya, Suzuki Kazuhiro
"An electronic money system as substitutes for banknote"
Takashi Okamoto
"The Study on Consumer Behavior of Online Shops"
Session 3: ITeS and infrastructure - Friday July 23, 15:30-17:00, Meeting Room 1C (3rd floor)
Session Chair: Shiro Uesugi
Hidenobu Sai
"The Problems for Diffusion of Location Based Services in Rural Areas"
Masashi Ueda, Yunju Chen, Yousin Park
"An analysis of IPTV competition model"
Yu-Hui Tao
"Transforming the Interactive Response System to a Cloud Voting Service"
Closing Remarks

F. Workshop2011

The workshop of ITeS at SAINT2011 was held in July 2011 in Munich, Germany and the papers presented are contained in the second part of this edition of the journal.

III. THE PHILOSOPHY BEHIND THE WORKSHOP DESIGN

As can be seen in the above summary, the focuses of the workshop has expanded yearly. In 2007, when the first congress was held, the focus was on electronic payments and financing in the era of Web2.0. The major discussion in the preparation of the congress focused on the transformation of the methodology of the delivery of the services. It was the time when Web2.0 gathered attention. Basically, it was interpreted as the expansion of upstream capability. For example, there were development of expansion of band width and technologies which were easy to deploy by the
end users so as to upload their information. This can also be interpreted as the enhanced capabilities of extraction of information at the
end users from the perspectives of network operators.

In 2008, the focus still existed on the financial transactions and related area. However, in the SAINT workshop, wider scope of the ITeS was introduced. In the Call For Papers (CFP), it states as follows.

> *Bridging "real" to "virtual" is easier than before. One can easily dive into the deep ocean of "virtual reality." It open up a very attractive frontier for all of us including business sectors - a service sector which will succeed the industrial sector - in other words, ITeS (IT enabled Services). We need to discuss various factors such as follows.*
>
> - *How easy it should be?*
> - *In what kind of technology should we depend?*
> - *How sophisticated the interface should be?*
> - *In what way the technology can be embedded into the business model?*

That was the reflection of the questions to look at ITeS as only the descriptions of ”outsourcing.” This is the views from service centric perspectives and to start to investigate the expansion of the scope of ITeS. As a result, the workshop attracted international body of contributors, and they shared the vision to look at the ITeS to include more scope of services.

In 2009, the CFP of the workshop stated

> "The "xICT" vision is for a fusion of ICT with industry and community, leading to a true information society." And ”This 2nd Workshop, following on from the first in 2008, will envisage further application of the Internet, especially in business and betterment of daily lives with ITeS xICT."

In line with Government of Japan's xICT policy, the workshop aimed to expand the scope of "services" dramatically. In other words, it aimed to include whatever services in order to examine whether the methodology of the approach is acceptable. As a result, the participants of the workshop shared the aspects of further expansion of the scope of "services" which are enabled by ICT in the consequence of "fusions" that xICT expected.

In 2010, the CFP stated the followings.

> "In this third workshop, wide ranges of debates and presentations are invited in order to re-appreciate the benefits of the applications of the internet, especially stressing the aspects of services provided over the internet as well as the mechanism and engineering of the mechanisms that enables the provisions of the services. Expected topics for discussions also include but not limited to information management, business administration with the help of ICT, innovative use of the internet for providing services, and so on. We invite not only business persons or regulators but also engineers, all who are interested in open up the frontier of collaborative development of application of internet - the application in ITeS."

The workshop aimed to include more aspects about "business." One of the central goal of the design of the workshop is to establish common understanding about "services" delivered via network should be recognized as ITeS by definition. As a result of the workshop, participants agreed on the idea and this goal was attained.

In 2011, the CFP included "Medical Practices" as a kind of services. As a result, two presentations related to medical practices were presented at the workshop. The participants of the workshop reassured the importance of looking at the medical practices from the perspectives of ITeS.

IV. THE NEW SCOPE OF THE RESEARCH

From the beginning of the research on ITeS, the coverage of the ”Services" in IT-enabled Services has been expanding. On the truck of this expansion, it can be safely said that more scope of services will be included as the object of ITeS. Today, it includes such areas as Business, Government, Community, Medical Practices and Education. It also includes the aspect of enabling factors such as Paths of delivery, Methods of delivery, fee collection mechanism, business designs.

The future research should include right response to the volume of data, mechanism of the data generation because they are the core objects that derive from dairy lives and the sources for providing the services. Responding to new technologies is another scope of research. A lot of inputs from the researchers will be made as the technologies and bandwidths are enhanced.

V. CONCLUSION

This article revisited the five years of history of ITeS research. It first summarized the past congresses and workshop and presented the lists of papers and contributors. Then, it presented the philosophy behind the design of the past workshops. Finally, it presented the future views about ITeS research. The research is still undergoing the development today. Future development can be observed in line with the development of the environment and the technologies relating to service provisions.

ACKNOWLEDGMENT

The author would like to express sincere gratitude toward those who cooperate with the survey. This research was conducted partly supported by the grant of Matsuyama University's Special Research Grant (Tokubetsu Kenkyu Josei) in FY 2011.

VI. REFERENCES

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FROM THE CONFERNCE

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

The presentations from *The Fourth Workshop on IT Enabled Services (ITeS 2011)* are included. The entire program of the Workshop is shown as follows.

The Fourth Workshop on IT-enabled Services

Monday July 18 and Thursday July 21
Holiday Inn, Munich, Germany

Session 1: Information Diffusion

Chair: Shiro Uesugi

- *A Comparative Study on Smartphones' diffusion in Korea and Japan*
  Yousin Park and Masashi Ueda
- *Mathematical Analysis and Simulation of Information Diffusion on Networks*
  Yuya Dan

Session 2: ITeS in Financial Services

Chair: Hitoshi Okada

- *A Study On Intention To Use Factor In The Internet Banking Websites In Thailand*
  Nagul Cooharojananone, Sedtanun Chofa and Suphakant Phimoltares
- *A Local Currency System Reflecting Variety of Values*
  Hirotsugu Kinoshita, Yoshiaki Tajima, Naoya Kubo, Tetsuya Morizumi and Kazuhiro Suzuki

Session 3: ITeS in Commerce

Chair: Shiro Uesugi

- *Using Choice Experiments to Value an Electronic Commerce*
  Nobuyuki Soga and Takashi Okamoto
- *Trust on E-Commerce Website in Thailand: A Case of Online Hotel Reservation*
  Kanokwan Atchariyachanvanich and Hitoshi Okada
- *A Trust Rating Method for Information Providers over the Social Web Service*
  Shigeichiro Yamasaki

Session 4: ITeS in Healthcare and Privacy Protection

Chair: Hitoshi Okada

- *Open Issues toward Successful Deployment of Electronic Health Information Exchange in Japan - Analysis of Regional Health Information Network in Kagawa Prefecture*
  Daisuke Yamakata and Hiroki Nogawa
- *A Framework for an Authorization System with Spatial Reasoning Capacity to Improve Risk Management and Information Security in Healthcare*
  Eizen Kimura, Shinji Kobayashi, Takeki Yoshikawa and Ken Ishihara
- *Information Offering by Anonymous in Japanese Human Flesh Search*
  Hidenobu Sai and Yohko Orito

Session 5: Panel Discussion: Future of ITeS

Chair: Hitoshi Okada

Panelists: Shiro Uesugi and Nagul Cooharojananone

Closing Remarks: Hitoshi Okada

A Comparative Study on Smart phones' diffusion in Korea and Japan

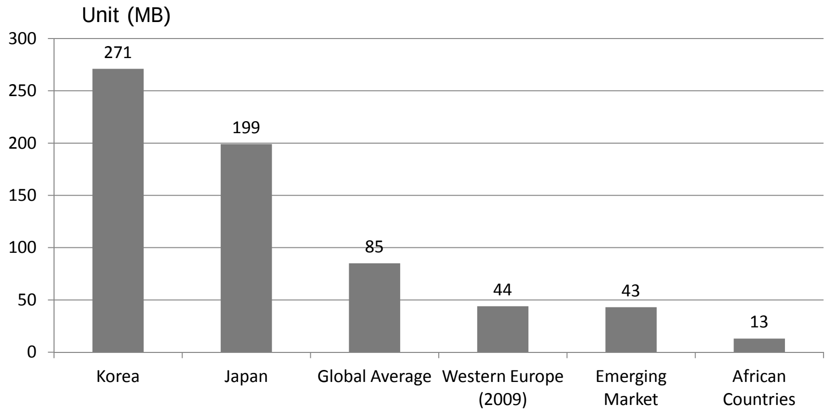
Yousin Park and Masashi Ueda

Agenda

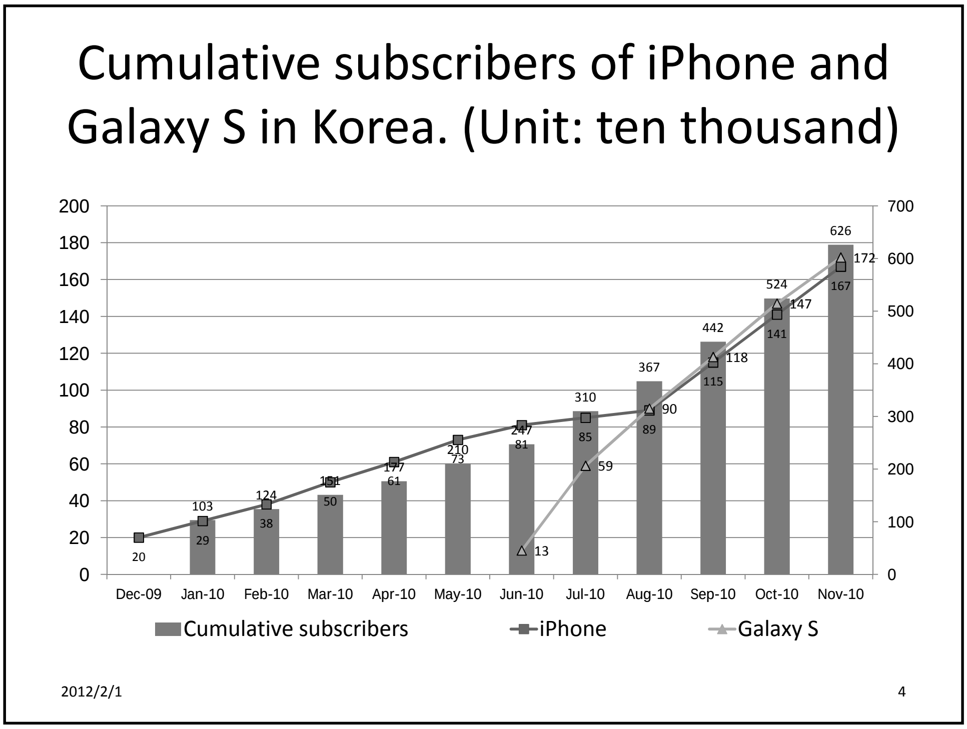
- Case study
  - Korean case
  - Japanese case
- Comparative study

KOREAN CASE

Average traffic per smart phone user in select countries



Source: Informa Telecoms and Media (2010)



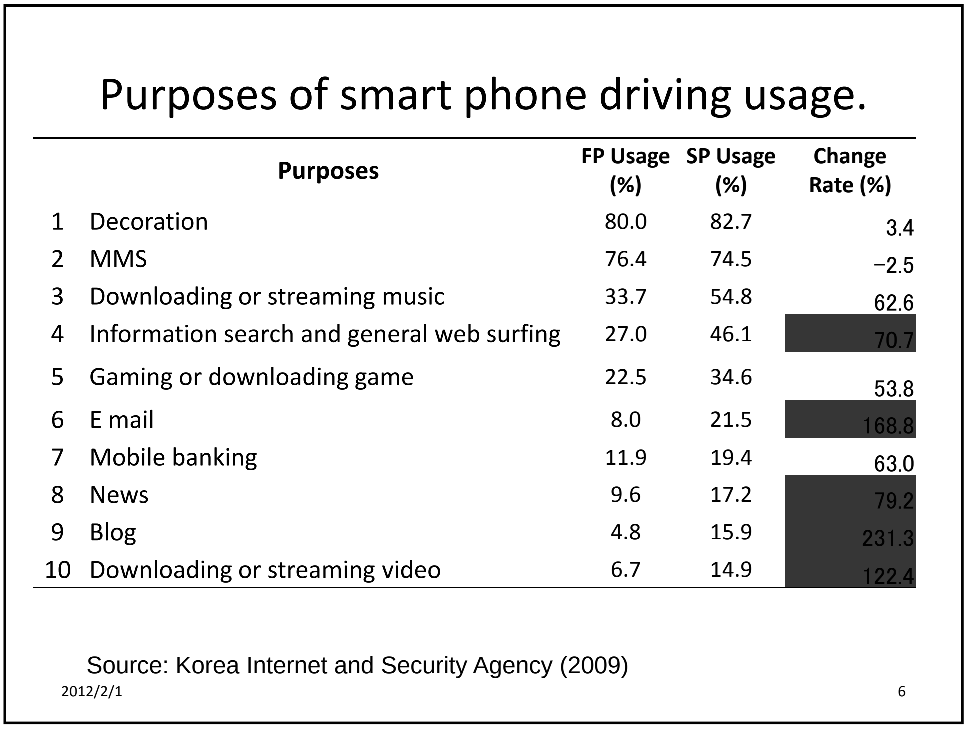
Cumulative subscribers of iPhone and Galaxy S in Korea. (Unit: ten thousand)

2012/2/1 4

Driving usage of smart phones in a subway in Seoul, Korea.

Source: http://blog.naver.com/shinsuper/50097706770?copen=1

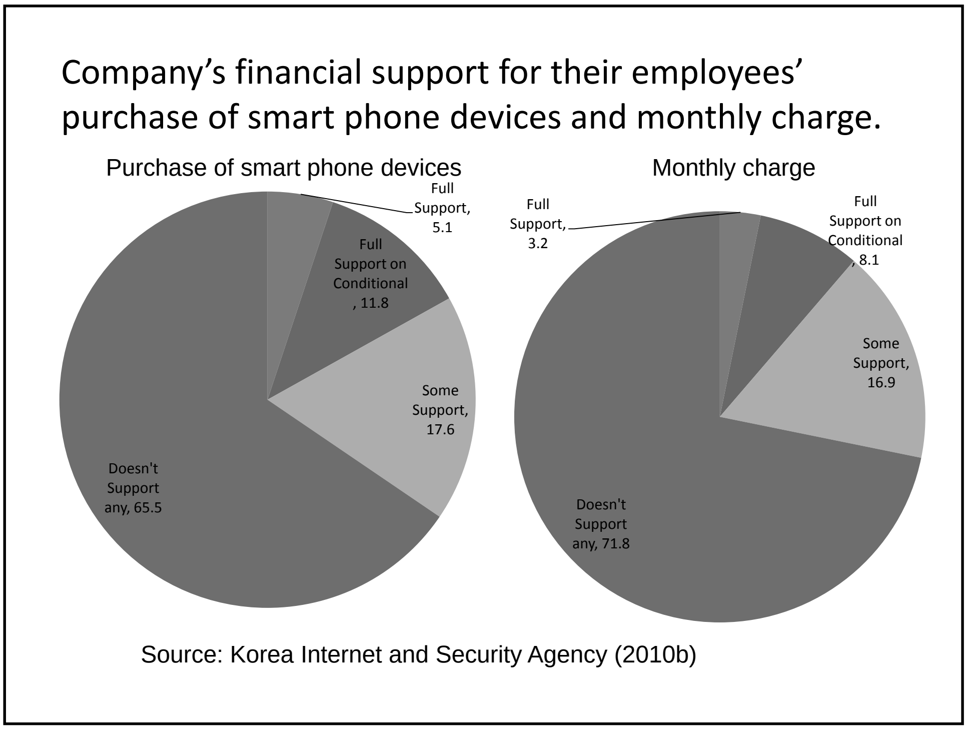
2012/2/1 5



Purposes of smart phone driving usage.

	Purposes	FP Usage (%)	SP Usage (%)	Change Rate (%)
1	Decoration	80.0	82.7	3.4
2	MMS	76.4	74.5	−2.5
3	Downloading or streaming music	33.7	54.8	62.6
4	Information search and general web surfing	27.0	46.1	70.7
5	Gaming or downloading game	22.5	34.6	53.8
6	E mail	8.0	21.5	168.8
7	Mobile banking	11.9	19.4	63.0
8	News	9.6	17.2	79.2
9	Blog	4.8	15.9	231.3
10	Downloading or streaming video	6.7	14.9	122.4

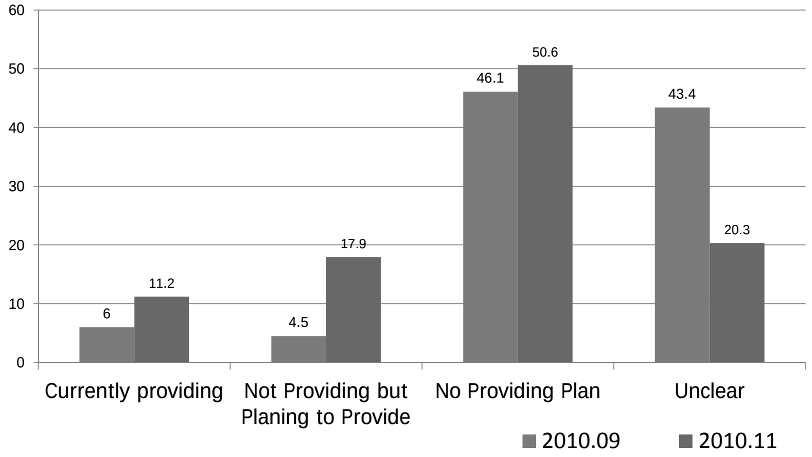
Source: Korea Internet and Security Agency (2009)



Company's financial support for their employees' purchase of smart phone devices and monthly charge.

Source: Korea Internet and Security Agency (2010b)

Employers providing mobile office services for employees aged 18 or over.



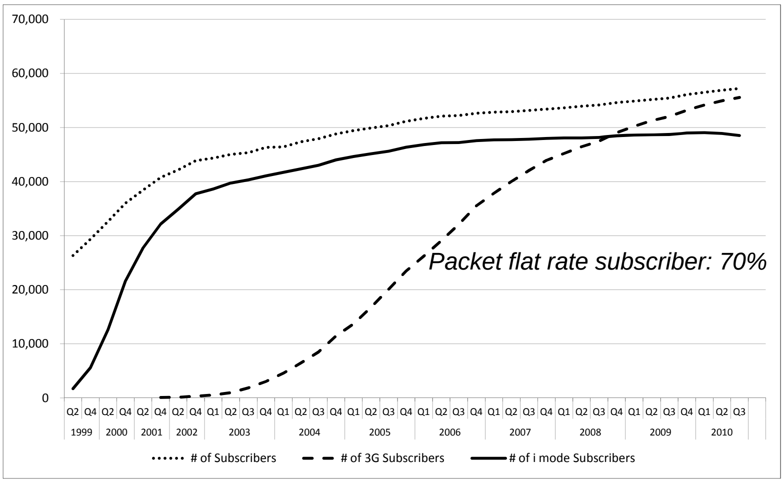
Summary – Korean case.

- The usage patterns of smart phone users are similar with that of PC users. (Hwang et al. 2010)
  - Popular service : Information search and general web surfing, E-mail, News, Blog, Downloading or streaming video et al.

- Company’s financial support for their employees’ purchase of smart phone devices and monthly charge

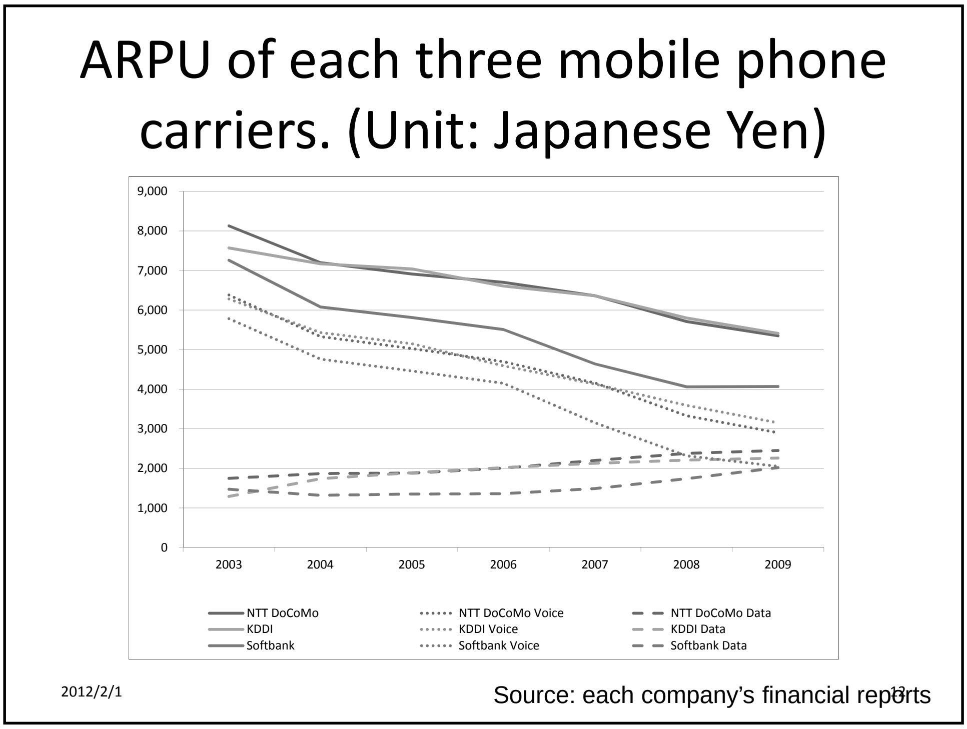
JAPANESE CASE

Mobile Subscribers of NTT DoCoMo.



Packet flat rate subscriber: 70%

Source: NTT DoCoMo Financial Reports



ARPU of each three mobile phone carriers. (Unit: Japanese Yen)

2012/2/1

Source: each company's financial reports

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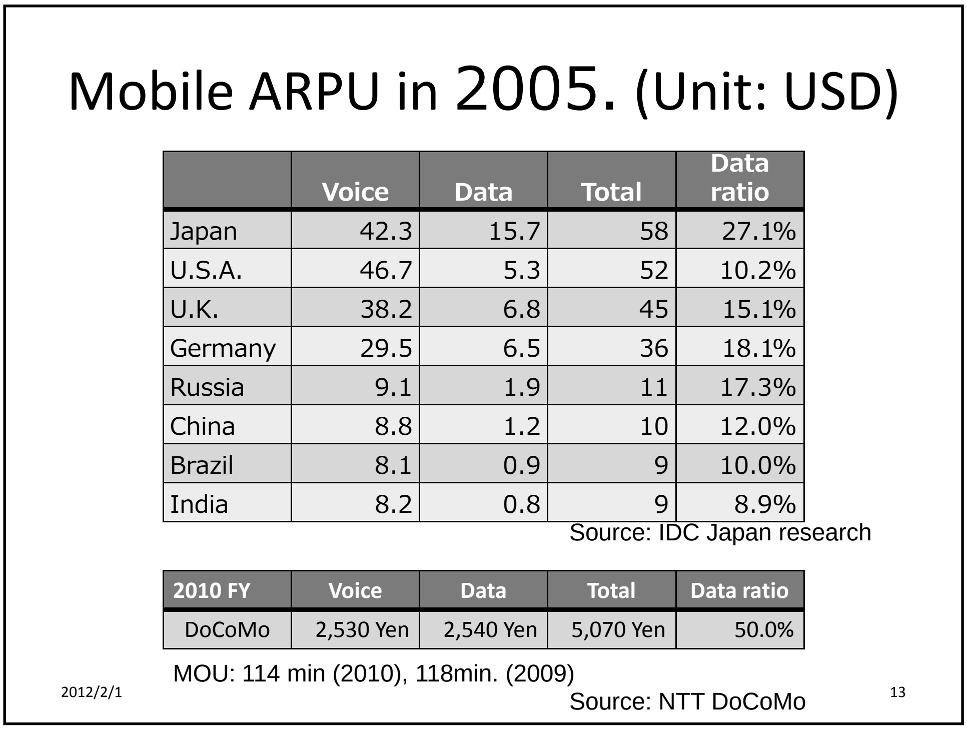

Mobile ARPU in 2005. (Unit: USD)

	Voice	Data	Total	Data ratio
Japan	42.3	15.7	58	27.1%
U.S.A.	46.7	5.3	52	10.2%
U.K.	38.2	6.8	45	15.1%
Germany	29.5	6.5	36	18.1%
Russia	9.1	1.9	11	17.3%
China	8.8	1.2	10	12.0%
Brazil	8.1	0.9	9	10.0%
India	8.2	0.8	9	8.9%

Source: IDC Japan research

2010 FY	Voice	Data	Total	Data ratio
DoCoMo	2,530 Yen	2,540 Yen	5,070 Yen	50.0%

MOU: 114 min (2010), 118min. (2009)

2012/2/1

Source: NTT DoCoMo

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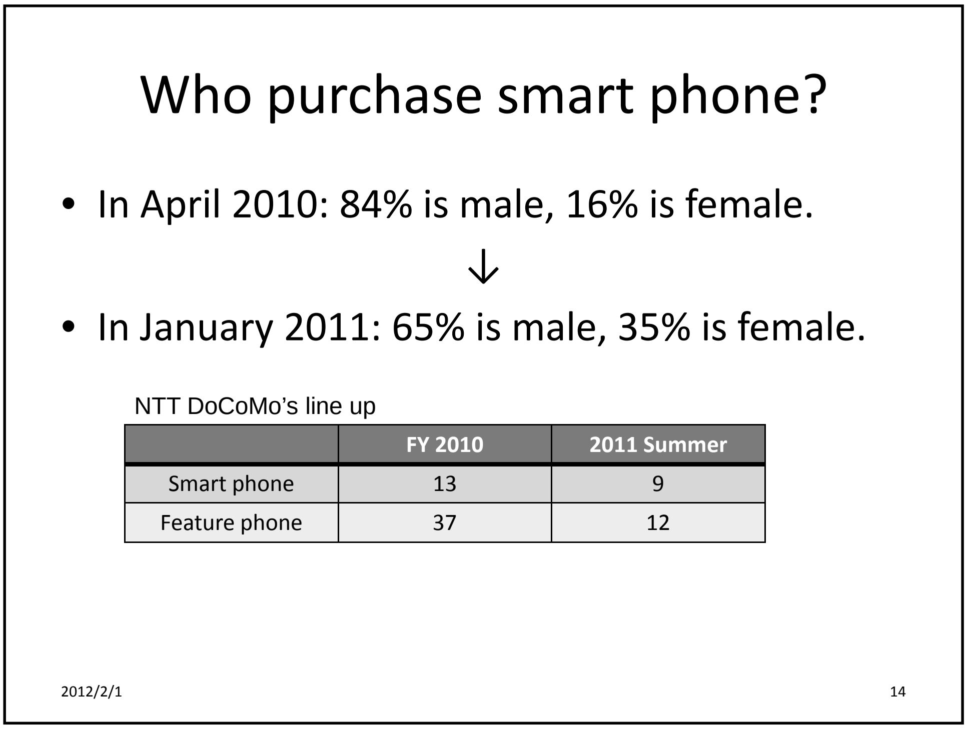


Who purchase smart phone?

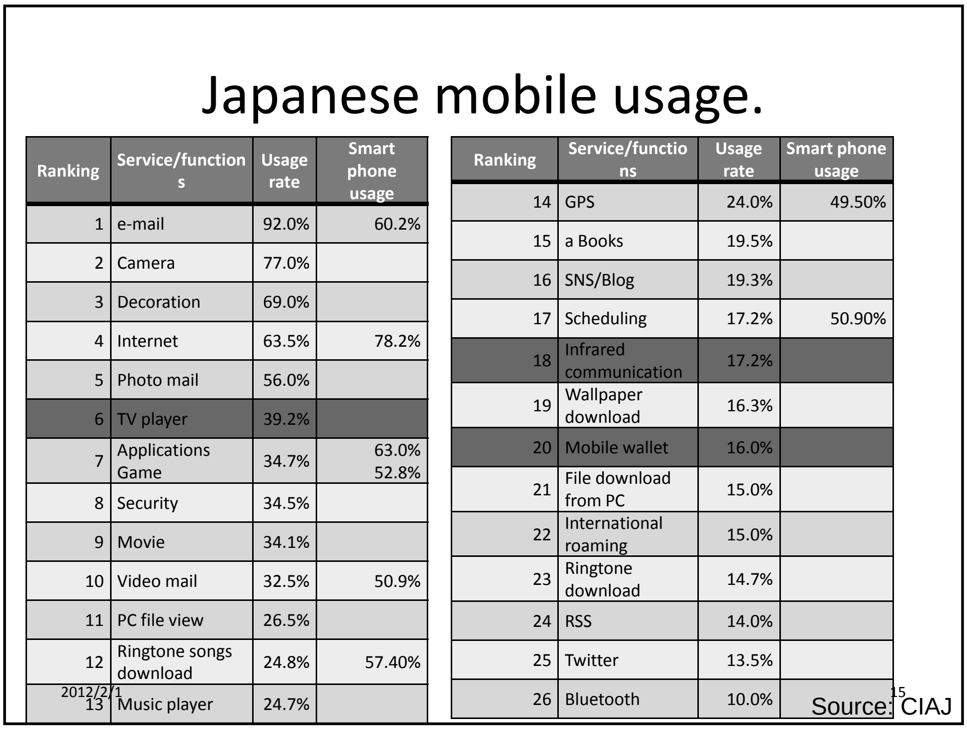
- In April 2010: 84% is male, 16% is female.

↓

- In January 2011: 65% is male, 35% is female.

NTT DoCoMo’s line up

	FY 2010	2011 Summer
Smart phone	13	9
Feature phone	37	12



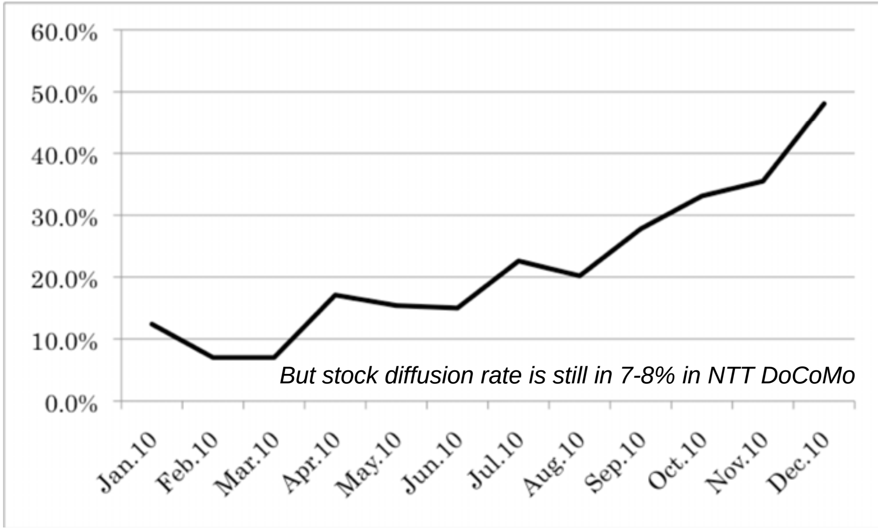
Japanese mobile usage.

Ranking	Service/functions	Usage rate	Smart phone usage
1	e-mail	92.0%	60.2%
2	Camera	77.0%	
3	Decoration	69.0%	
4	Internet	63.5%	78.2%
5	Photo mail	56.0%	
6	TV player	39.2%	
7	Applications Game	34.7%	63.0% 52.8%
8	Security	34.5%	
9	Movie	34.1%	
10	Video mail	32.5%	50.9%
11	PC file view	26.5%	
12	Ringtone songs download	24.8%	57.40%
13	Music player	24.7%	

Ranking	Service/functions	Usage rate	Smart phone usage
14	GPS	24.0%	49.50%
15	a Books	19.5%	
16	SNS/Blog	19.3%	
17	Scheduling	17.2%	50.90%
18	Infrared communication	17.2%	
19	Wallpaper download	16.3%	
20	Mobile wallet	16.0%	
21	File download from PC	15.0%	
22	International roaming	15.0%	
23	Ringtone download	14.7%	
24	RSS	14.0%	
25	Twitter	13.5%	
26	Bluetooth	10.0%	

Source: CIAJ

Smart phone sales share.

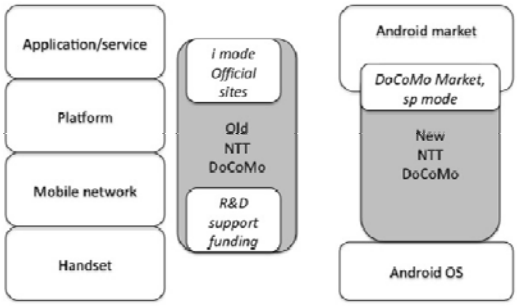


But stock diffusion rate is still in 7-8% in NTT DoCoMo

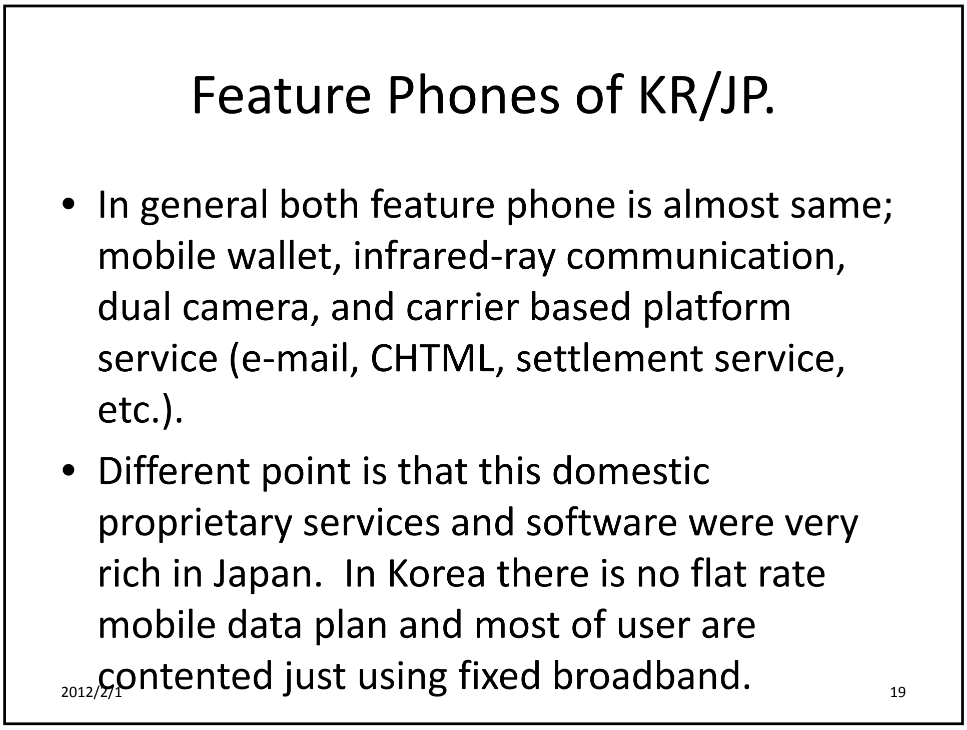
Source: BCN news release

Summary – Japanese case.

- Market structure of smart phone for vendors and operators.

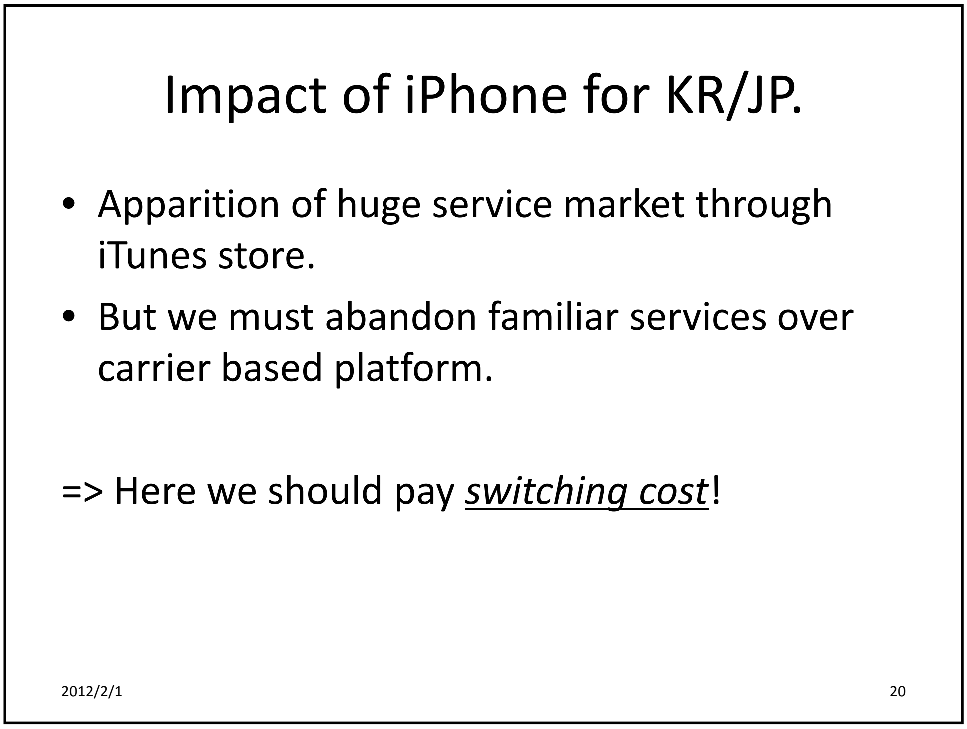

Application/service
Platform
Mobile network
Handset
i mode Official sites
Old NTT DoCoMo
R&D support funding
Android market
DoCoMo Market, sp mode
New NTT DoCoMo
Android OS

COMPARATIVE STUDY



Feature Phones of KR/JP.

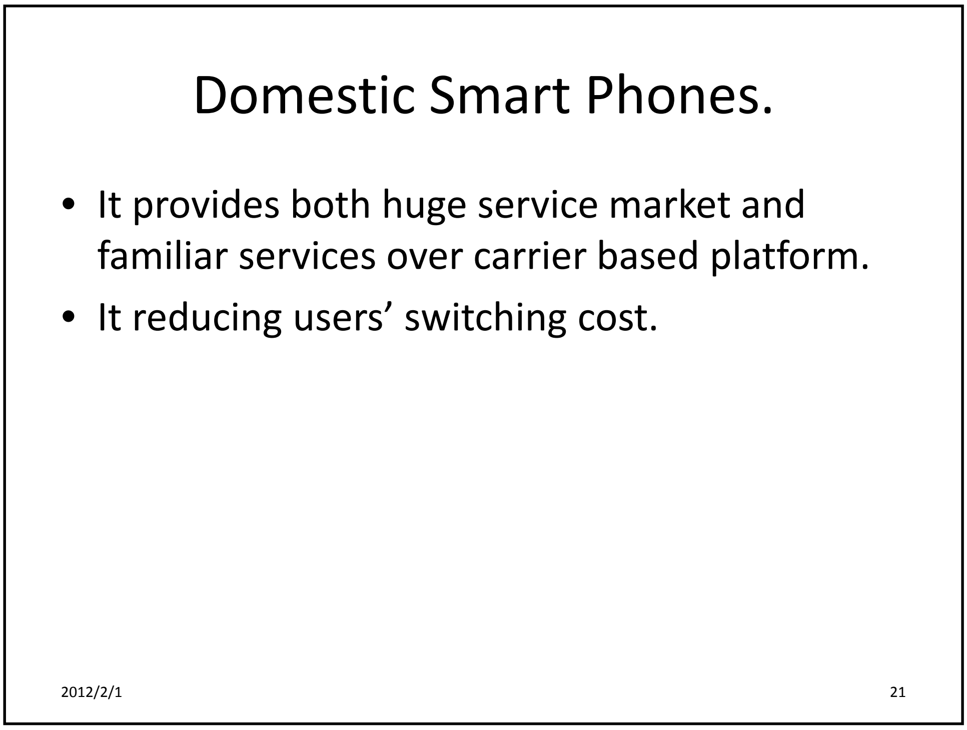
- In general both feature phone is almost same; mobile wallet, infrared-ray communication, dual camera, and carrier based platform service (e-mail, CHTML, settlement service, etc.).
- Different point is that this domestic proprietary services and software were very rich in Japan. In Korea there is no flat rate mobile data plan and most of user are contented just using fixed broadband.



Impact of iPhone for KR/JP.

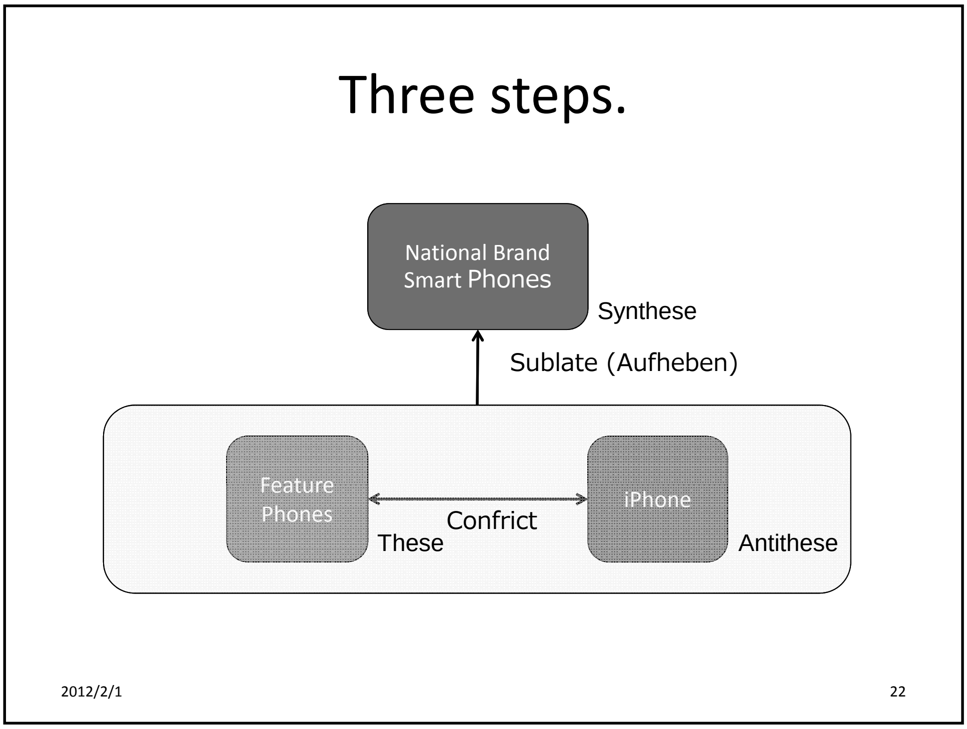
- Apparition of huge service market through iTunes store.
- But we must abandon familiar services over carrier based platform.

=> Here we should pay ***switching cost***!



Domestic Smart Phones.

- It provides both huge service market and familiar services over carrier based platform.
- It reducing users’ switching cost.



Three steps.

National Brand Smart Phones

Synthese

Sublate (Aufheben)

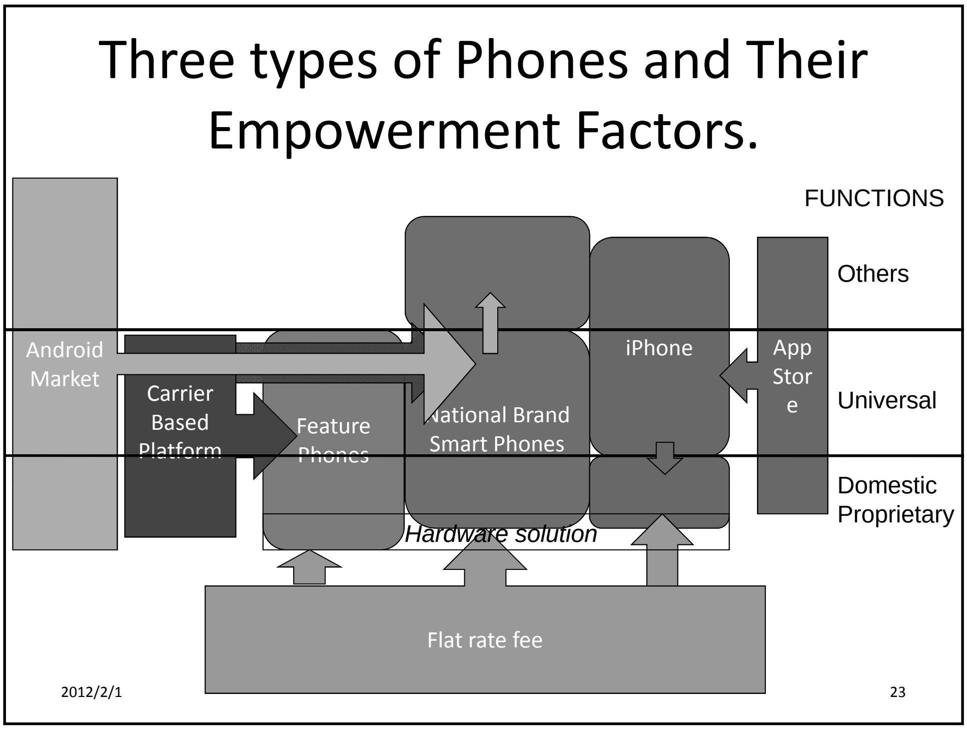
Feature Phones

These

Confrict

iPhone

Antithese



Three types of Phones and Their Empowerment Factors.

FUNCTIONS

Others

Universal

Domestic Proprietary

Android Market

Carrier Based Platform

Feature Phones

National Brand Smart Phones

iPhone

App Stor e

Hardware solution

Flat rate fee

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The 11th IEEE/IPSJ International Symposium on Applications and the Internet
(Munich, Germany)

Mathematical Analysis and Simulation of Information Diffusion on Networks

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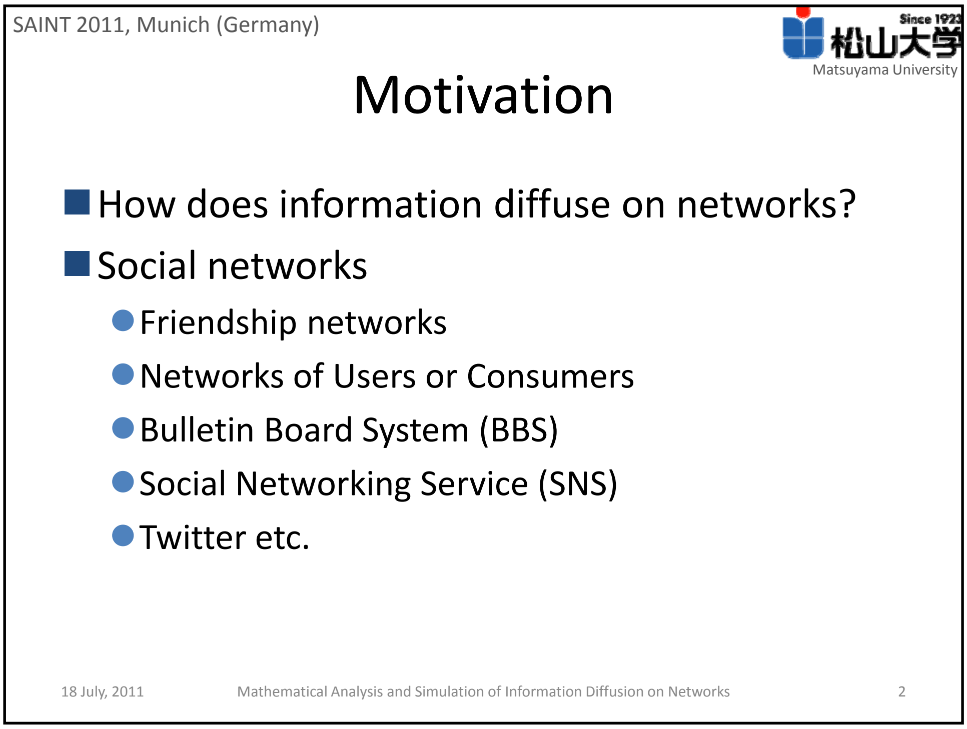
Contents

1. Introduction
2. Mathematical analysis
3. Computer simulation
4. Results
5. Conclusion

$$\frac{\partial}{\partial t}u(t,x) = \nabla\cdot(D(x,u)\nabla u(t,x))$$

```
for( i = 0; i < LOOP; i++ ){
  a = (int)( R() * NUM );
  b = (int)( R() * NUM );
  if( i % STEP == 0 )
    printf( ″%d¥t%d¥n″, i, cAP( persona ) );
  if( persona[a] == 1 && persona[b] == 0 )
    persona[b] = 1;
}
```



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Motivation

- How does information diffuse on networks?
- Social networks
  - Friendship networks
  - Networks of Users or Consumers
  - Bulletin Board System (BBS)
  - Social Networking Service (SNS)
  - Twitter etc.

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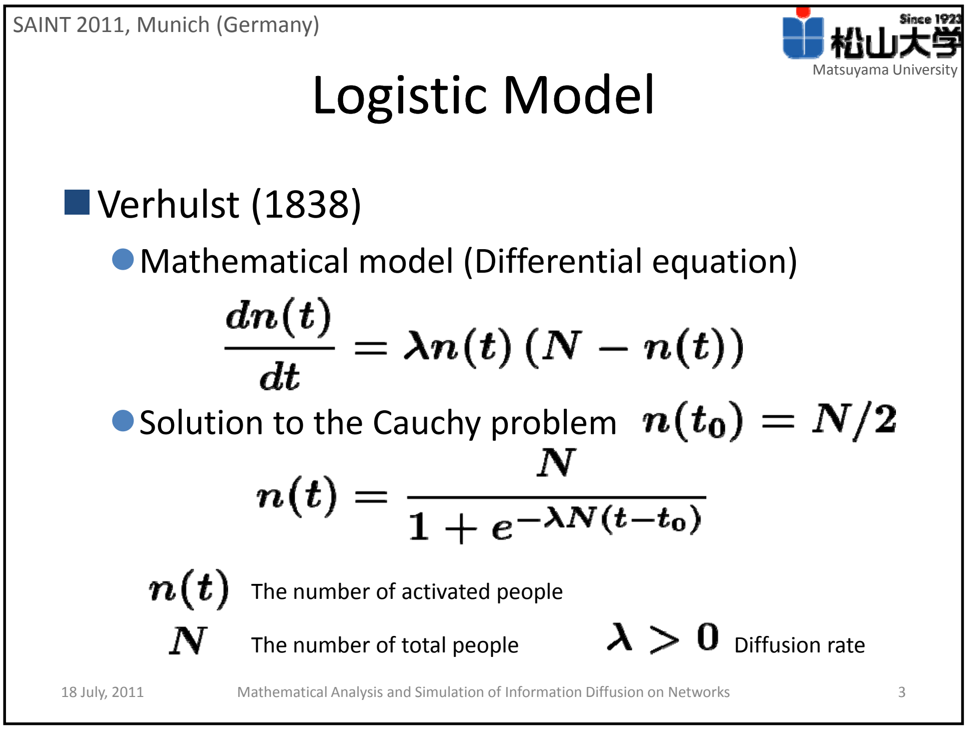

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Logistic Model

- Verhulst (1838)
  - Mathematical model (Differential equation)

$$\frac{dn(t)}{dt} = \lambda n(t)\left(N - n(t)\right)$$

  - Solution to the Cauchy problem $n(t_0) = N/2$

$$n(t) = \frac{N}{1 + e^{-\lambda N(t-t_0)}}$$

$n(t)$ The number of activated people

N The number of total people $\lambda > 0$ Diffusion rate

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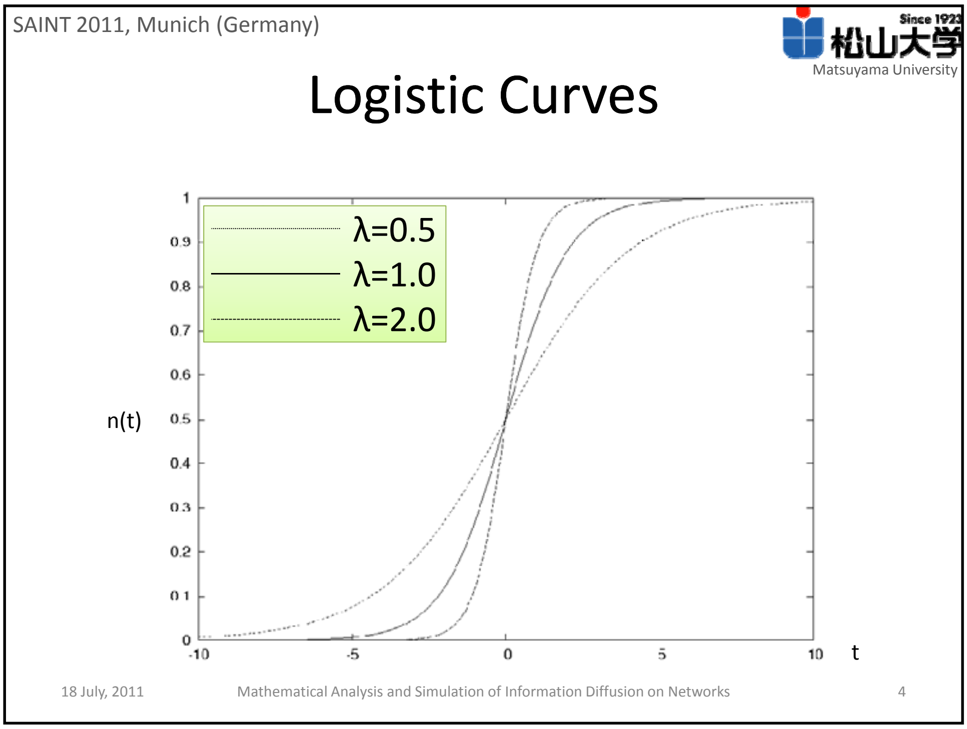

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Logistic Curves

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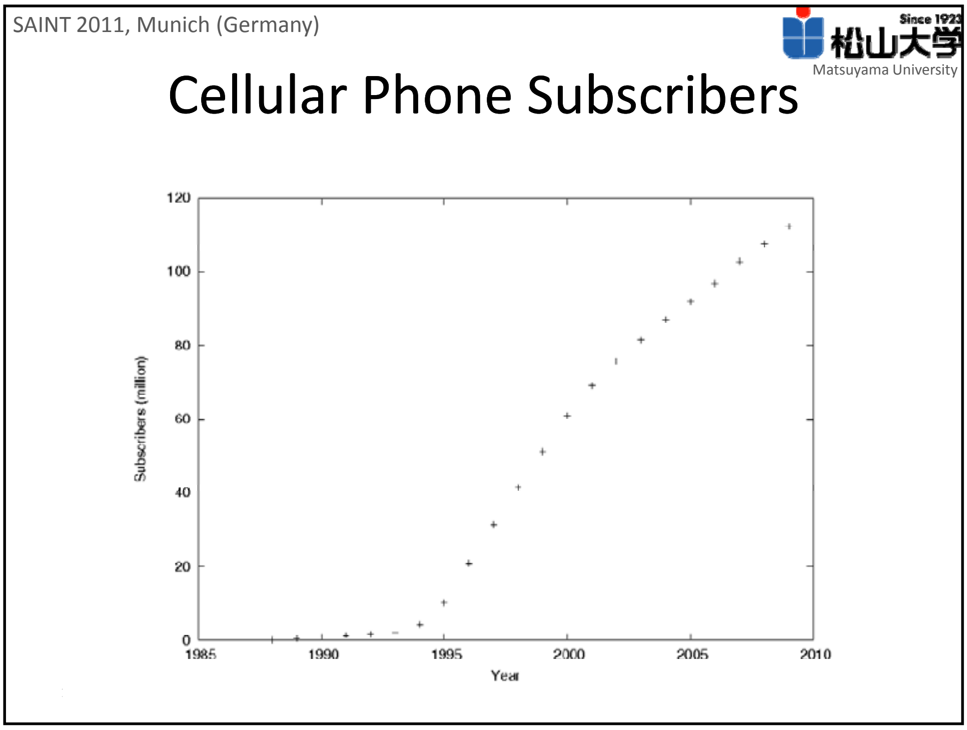

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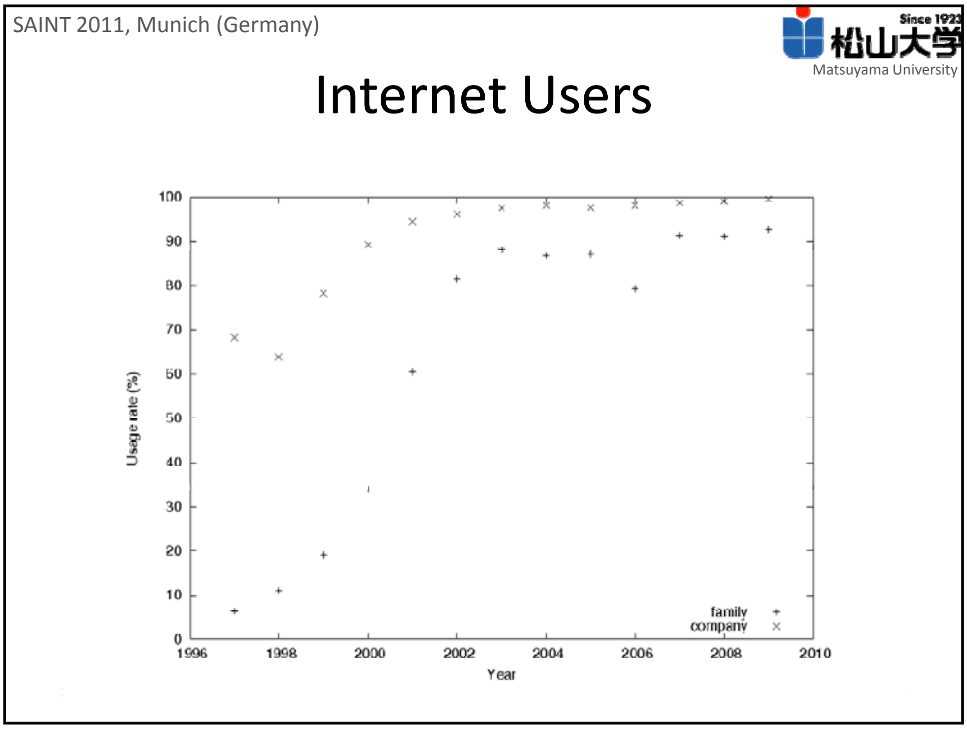
Cellular Phone Subscribers



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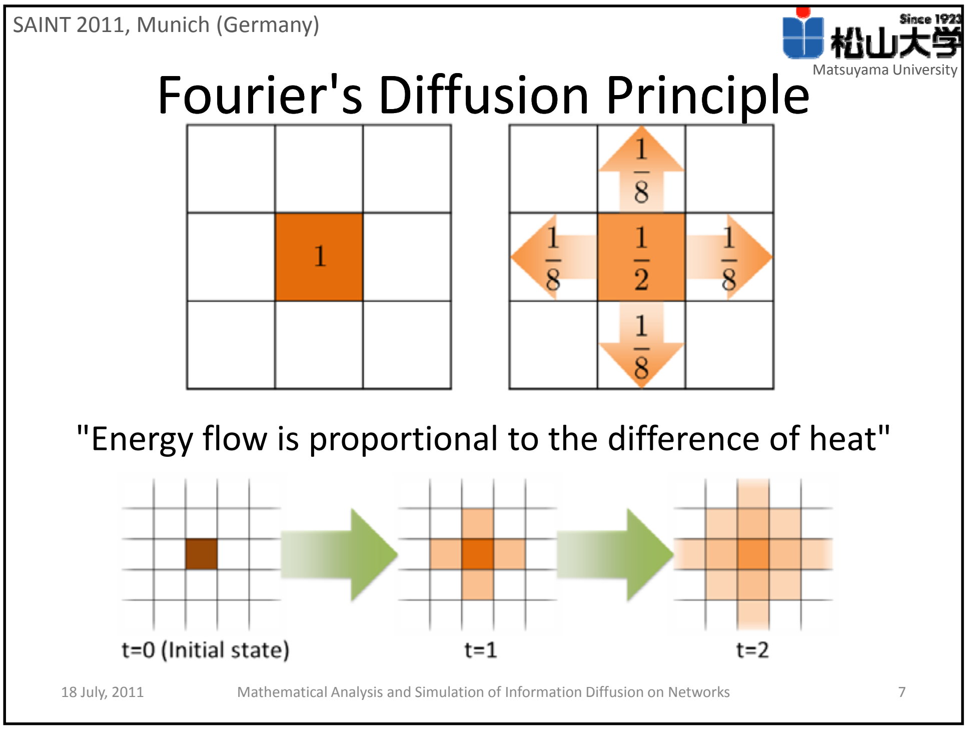
Internet Users



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Fourier's Diffusion Principle

"Energy flow is proportional to the difference of heat"

t=0 (Initial state)

t=1

t=2

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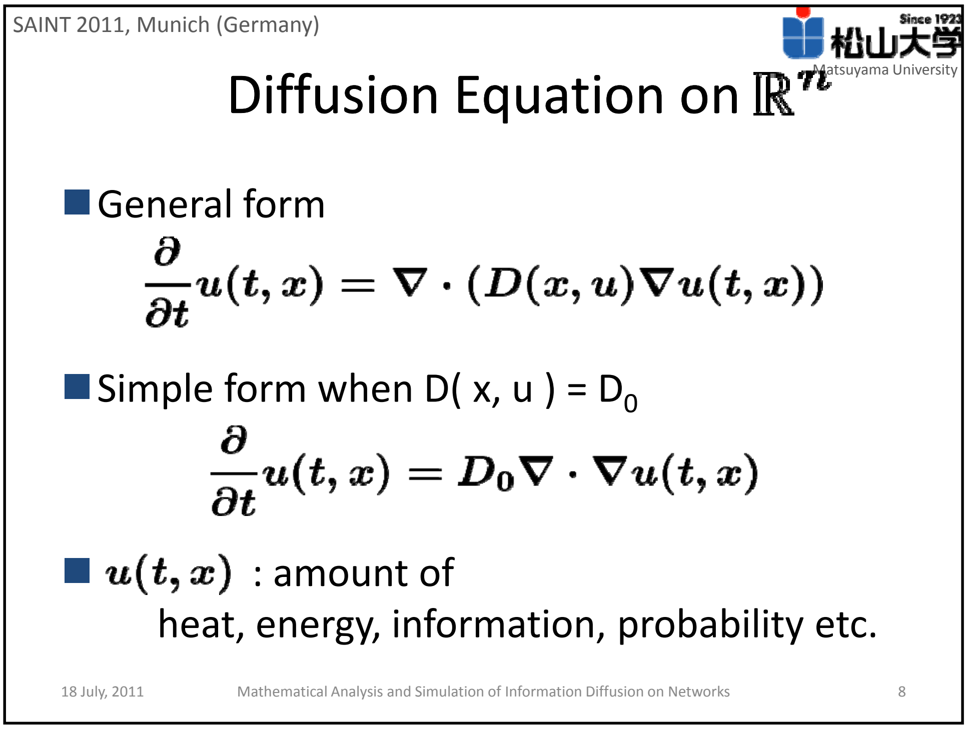

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Diffusion Equation on $\mathbb{R}^n$

- General form

$$\frac{\partial}{\partial t}u(t,x) = \nabla \cdot (D(x,u)\nabla u(t,x))$$

- Simple form when D(x, u) = D_0

$$\frac{\partial}{\partial t}u(t,x) = D_0 \nabla \cdot \nabla u(t,x)$$

- $u(t,x)$: amount of
  heat, energy, information, probability etc.

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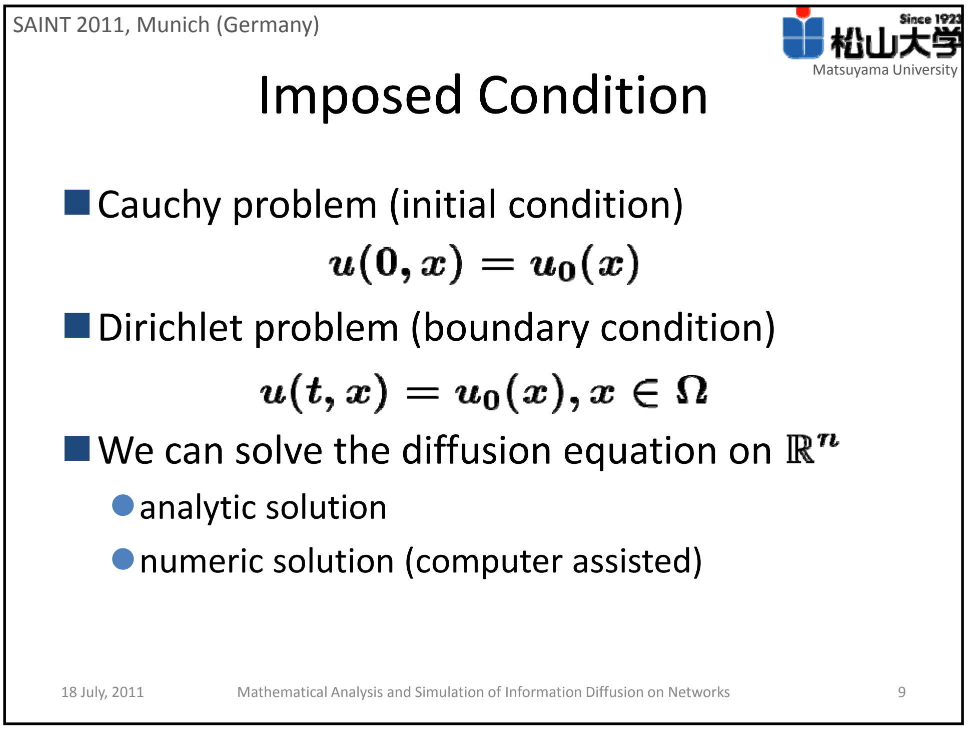

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Imposed Condition

- Cauchy problem (initial condition)

$$u(0,x) = u_0(x)$$

- Dirichlet problem (boundary condition)

$$u(t,x) = u_0(x), x \in \Omega$$

- We can solve the diffusion equation on $\mathbb{R}^n$
  - analytic solution
  - numeric solution (computer assisted)

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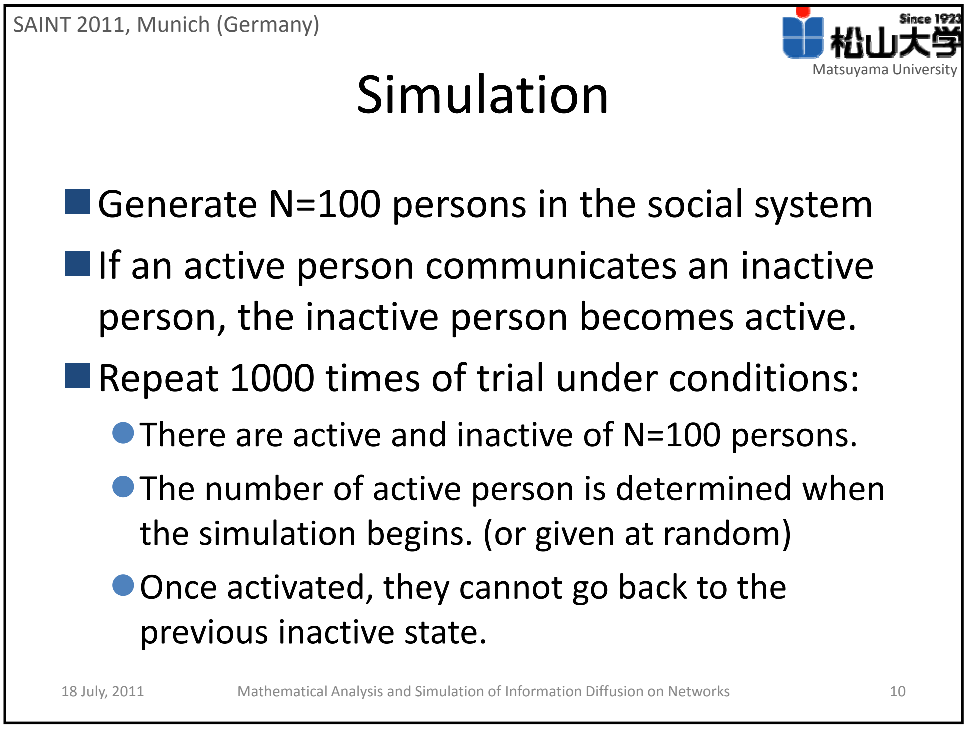

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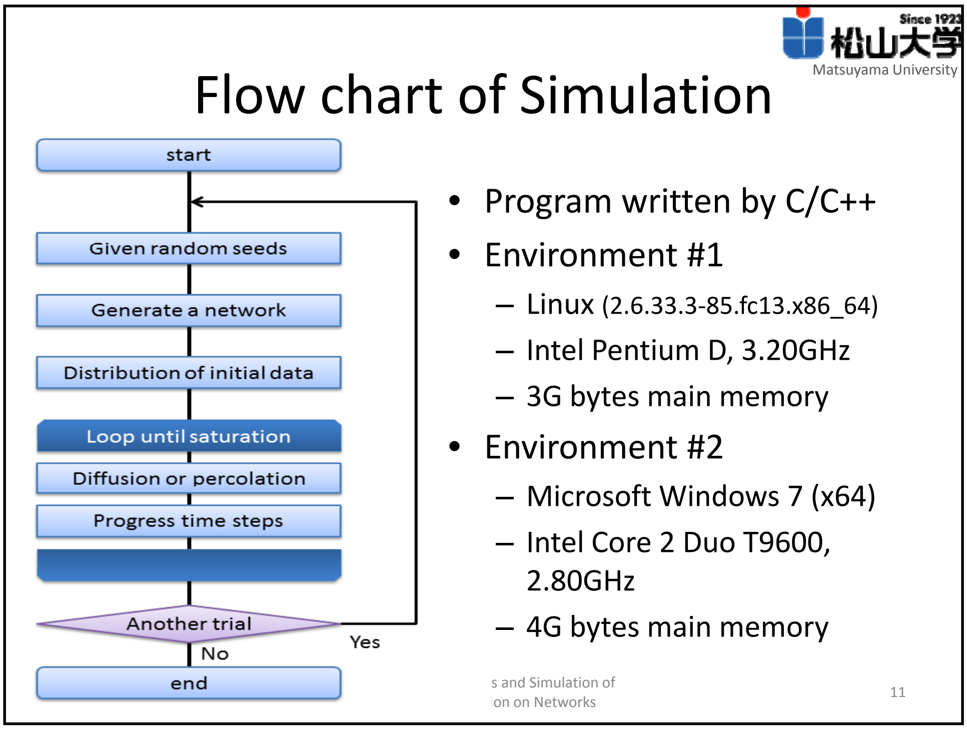
Simulation

- Generate N=100 persons in the social system
- If an active person communicates an inactive person, the inactive person becomes active.
- Repeat 1000 times of trial under conditions:
  - There are active and inactive of N=100 persons.
  - The number of active person is determined when the simulation begins. (or given at random)
  - Once activated, they cannot go back to the previous inactive state.



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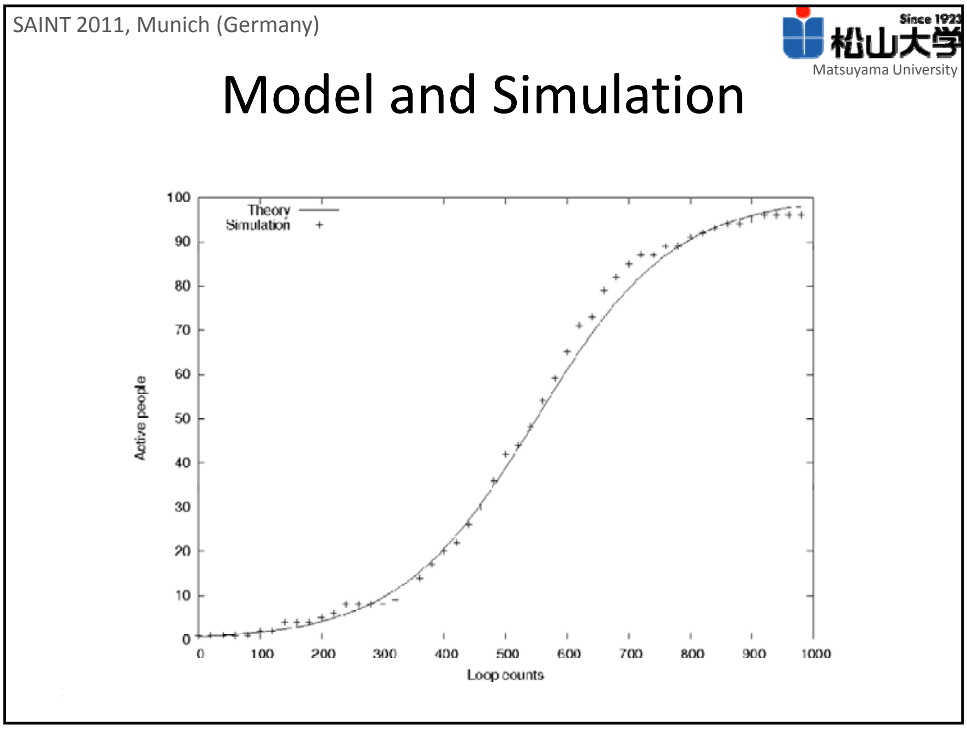
Flow chart of Simulation

start
Given random seeds
Generate a network
Distribution of initial data
Loop until saturation
Diffusion or percolation
Progress time steps
Another trial
Yes
No
end

- Program written by C/C++
- Environment #1
  - Linux (2.6.33.3-85.fc13.x86_64)
  - Intel Pentium D, 3.20GHz
  - 3G bytes main memory
- Environment #2
  - Microsoft Windows 7 (x64)
  - Intel Core 2 Duo T9600, 2.80GHz
  - 4G bytes main memory



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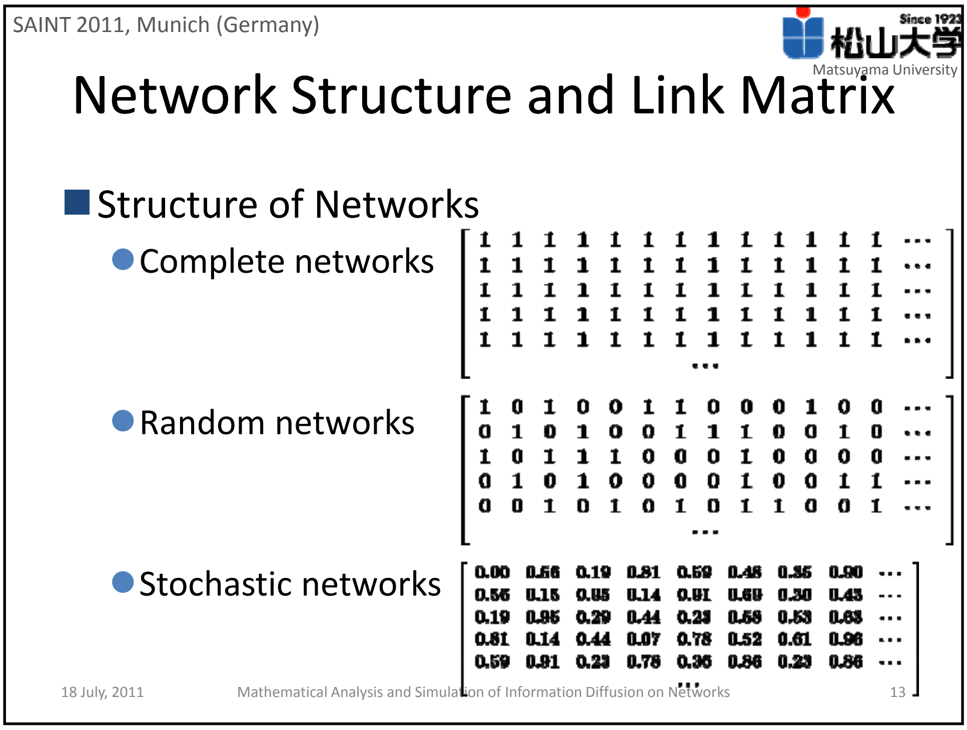
Model and Simulation



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Network Structure and Link Matrix

- Structure of Networks
  - Complete networks

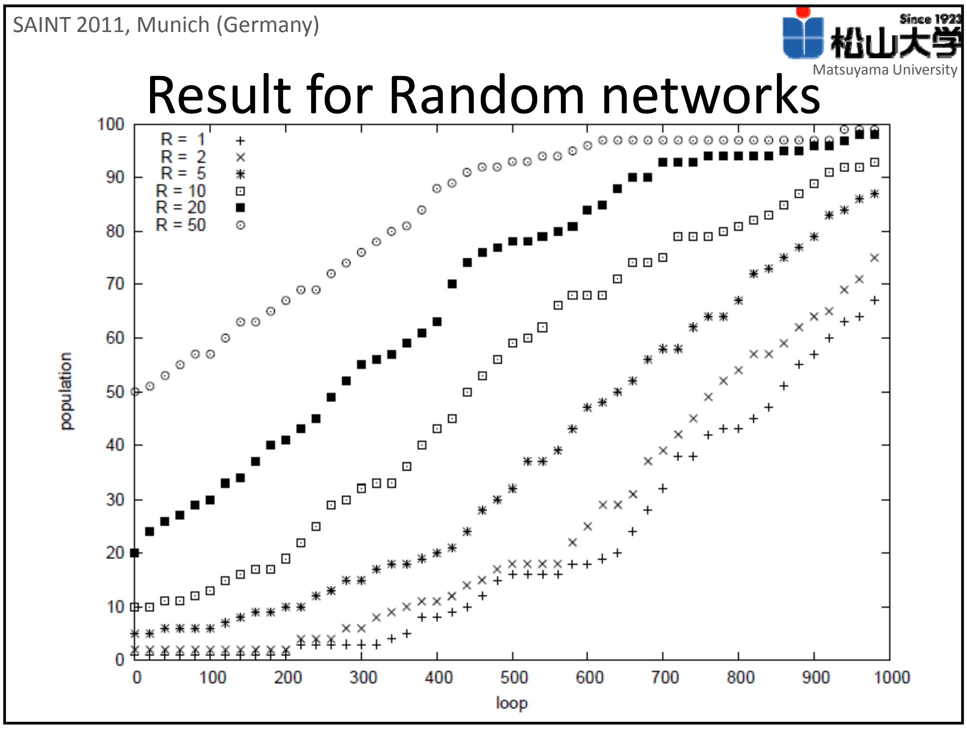
$$\begin{bmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & \cdots \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & \cdots \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & \cdots \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & \cdots \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & \cdots \\ & & & & & & \cdots & & & & & & & \end{bmatrix}$$

  - Random networks

$$\begin{bmatrix} 1 & 0 & 1 & 0 & 0 & 1 & 1 & 0 & 0 & 0 & 1 & 0 & 0 & \cdots \\ 0 & 1 & 0 & 1 & 0 & 0 & 1 & 1 & 1 & 0 & 0 & 1 & 0 & \cdots \\ 1 & 0 & 1 & 1 & 1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & \cdots \\ 0 & 1 & 0 & 1 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 1 & \cdots \\ 0 & 0 & 1 & 0 & 1 & 0 & 1 & 0 & 1 & 1 & 0 & 0 & 1 & \cdots \\ & & & & & & \cdots & & & & & & & \end{bmatrix}$$

  - Stochastic networks

$$\begin{bmatrix} 0.00 & 0.56 & 0.19 & 0.81 & 0.59 & 0.46 & 0.35 & 0.90 & \cdots \\ 0.56 & 0.15 & 0.95 & 0.14 & 0.91 & 0.69 & 0.30 & 0.43 & \cdots \\ 0.19 & 0.95 & 0.29 & 0.44 & 0.23 & 0.56 & 0.53 & 0.63 & \cdots \\ 0.81 & 0.14 & 0.44 & 0.07 & 0.78 & 0.52 & 0.61 & 0.96 & \cdots \\ 0.59 & 0.91 & 0.23 & 0.78 & 0.36 & 0.86 & 0.23 & 0.56 & \cdots \\ & & & & \cdots & & & & \end{bmatrix}$$



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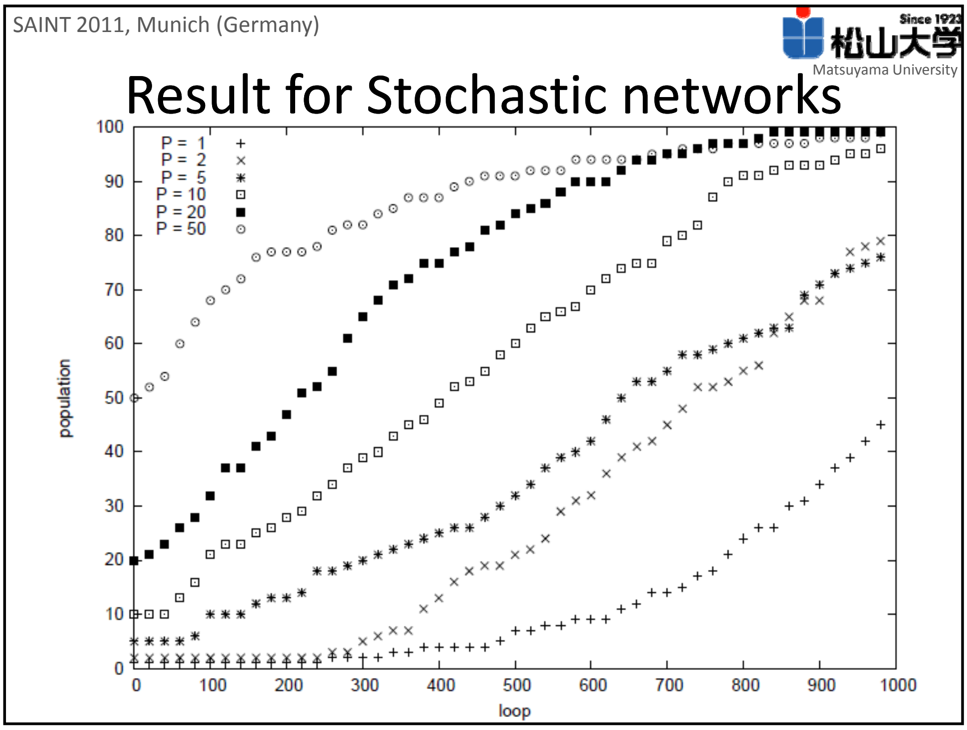
Result for Random networks



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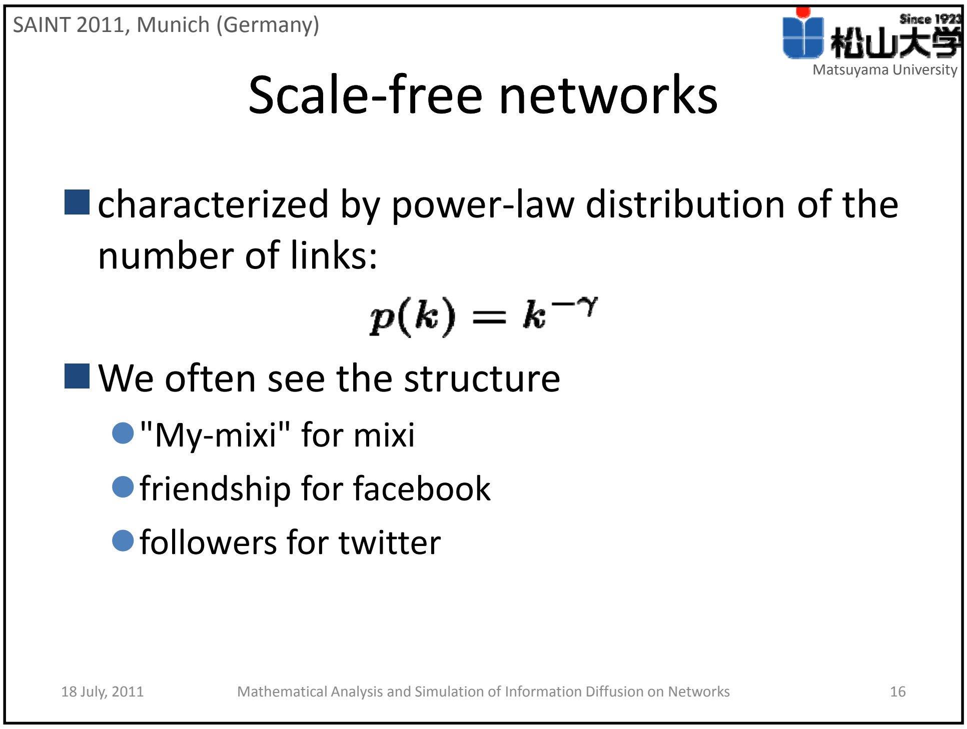
Result for Stochastic networks

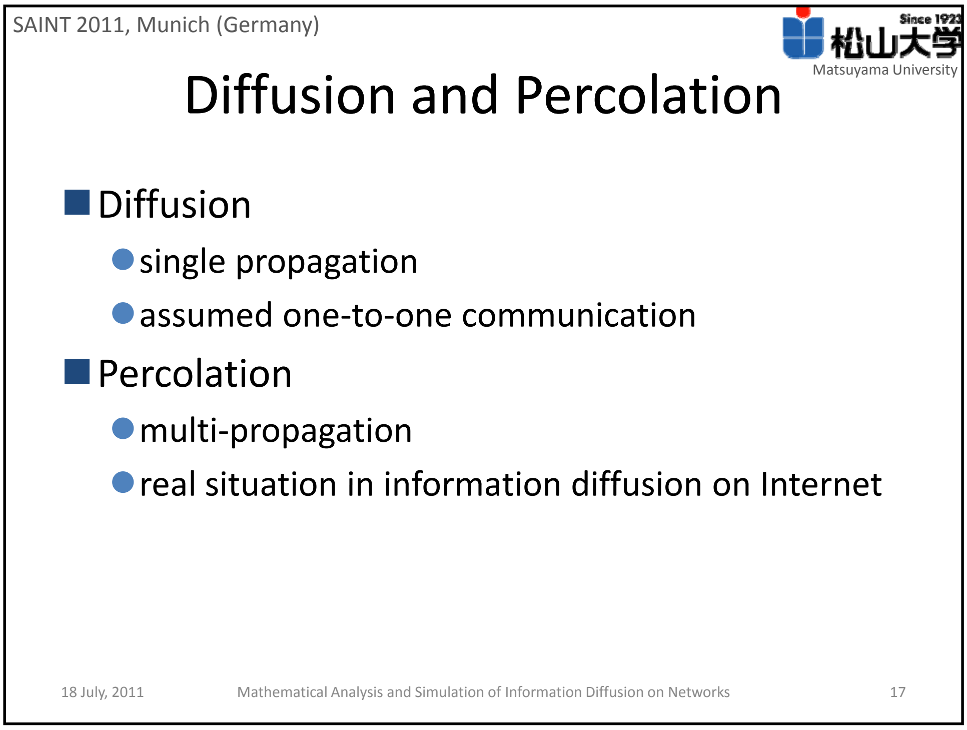


Scale-free networks

- characterized by power-law distribution of the number of links:

$$p(k) = k^{-\gamma}$$

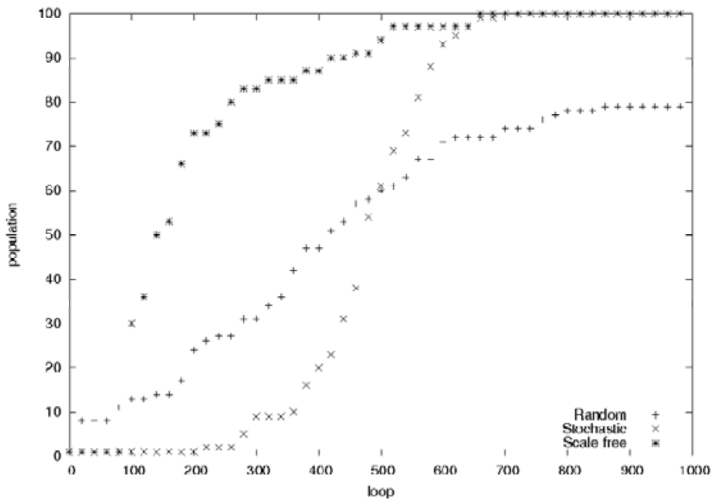
- We often see the structure
  - "My-mixi" for mixi
  - friendship for facebook
  - followers for twitter



Diffusion and Percolation

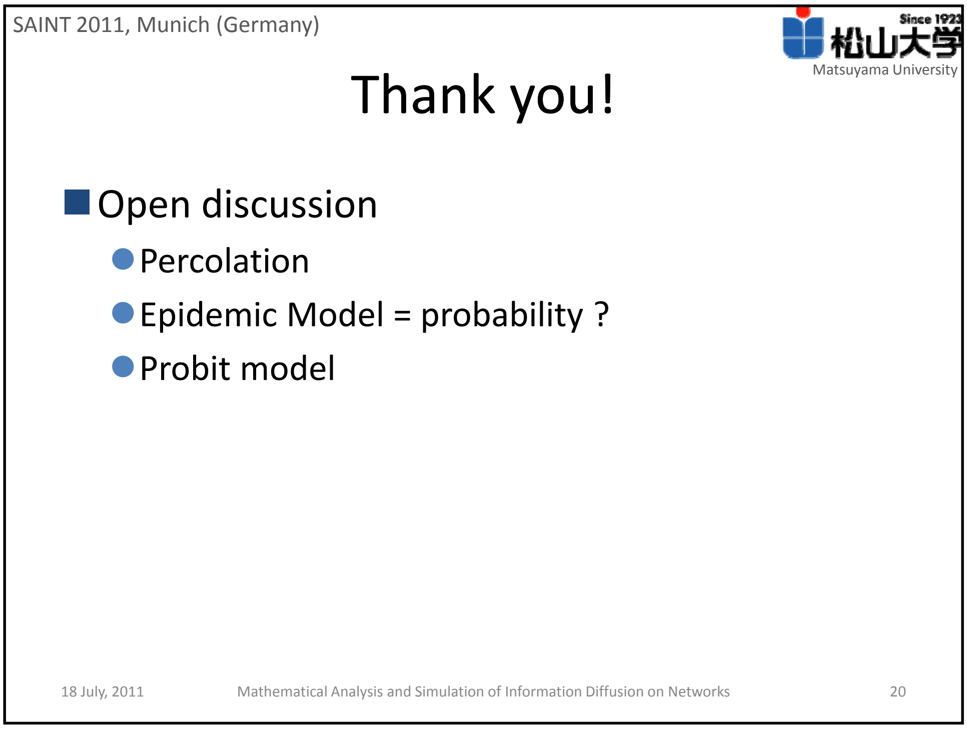
- Diffusion
  - single propagation
  - assumed one-to-one communication
- Percolation
  - multi-propagation
  - real situation in information diffusion on Internet

Percolation Result



Concluding Remarks

- Diffusion equation model can describe information diffusion only on Euclidean spaces
- Differential equations are difficult in solving on discrete or network structure
  - effective if metric or nonlinear terms included?
- Most rapid percolation on scale-free networks than other structure of networks



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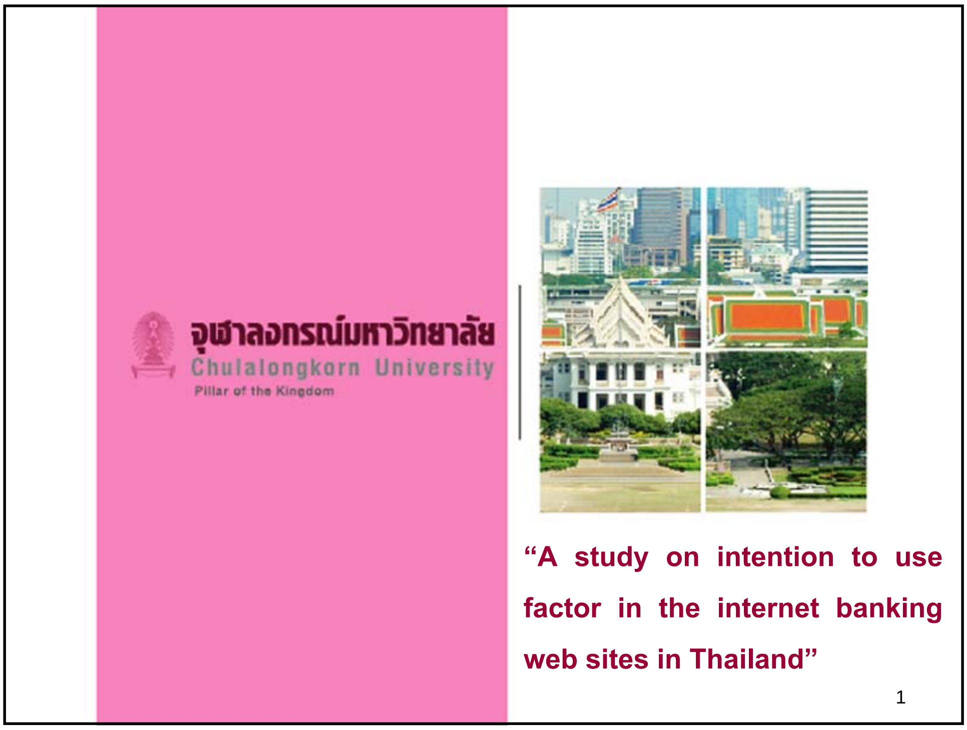
Thank you!

- Open discussion
  - Percolation
  - Epidemic Model = probability ?
  - Probit model



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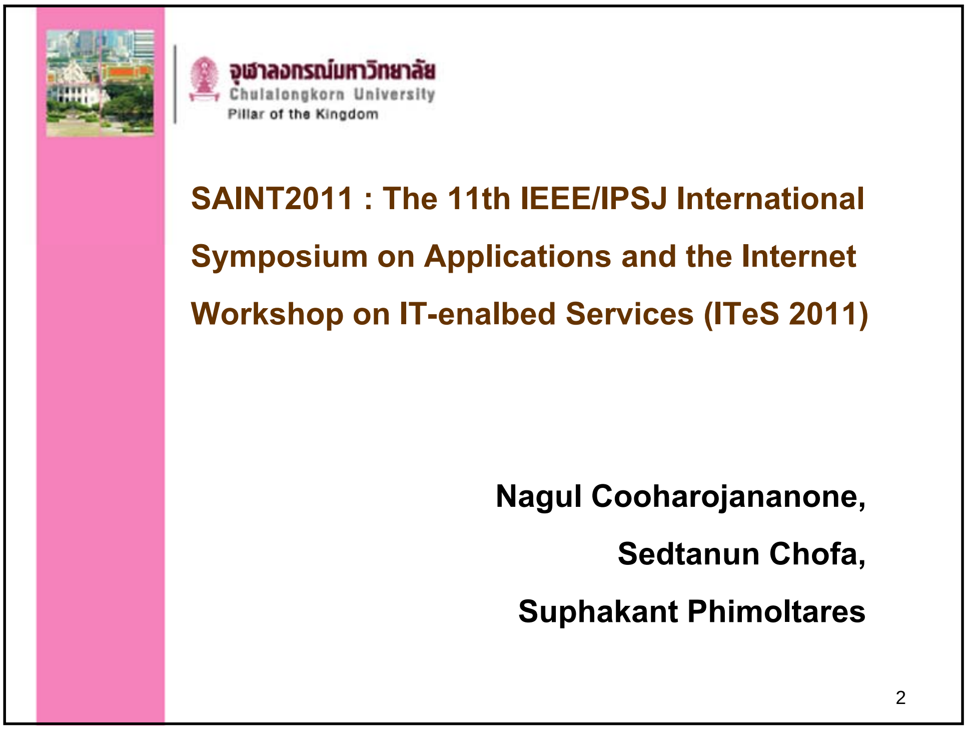
Pillar of the Kingdom

“A study on intention to use factor in the internet banking web sites in Thailand”



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SAINT2011 : The 11th IEEE/IPSJ International Symposium on Applications and the Internet Workshop on IT-enalbed Services (ITeS 2011)

Nagul Cooharojananone,
Sedtanun Chofa,
Suphakant Phimoltares

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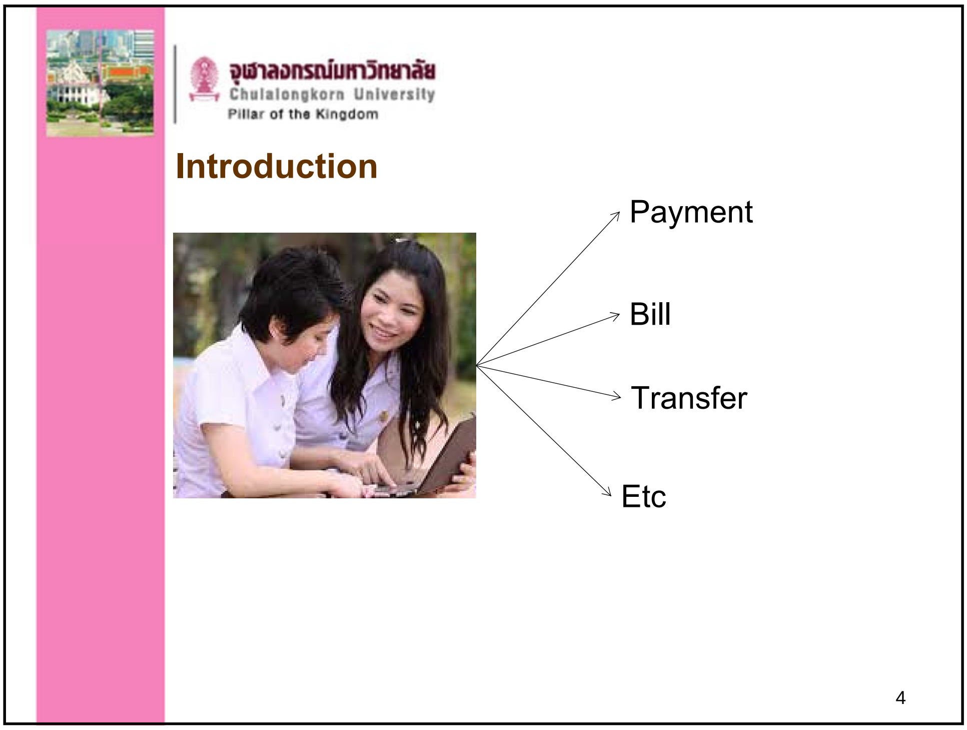
Agenda

- Introduction
- Methodology
- Results
- Conclusion



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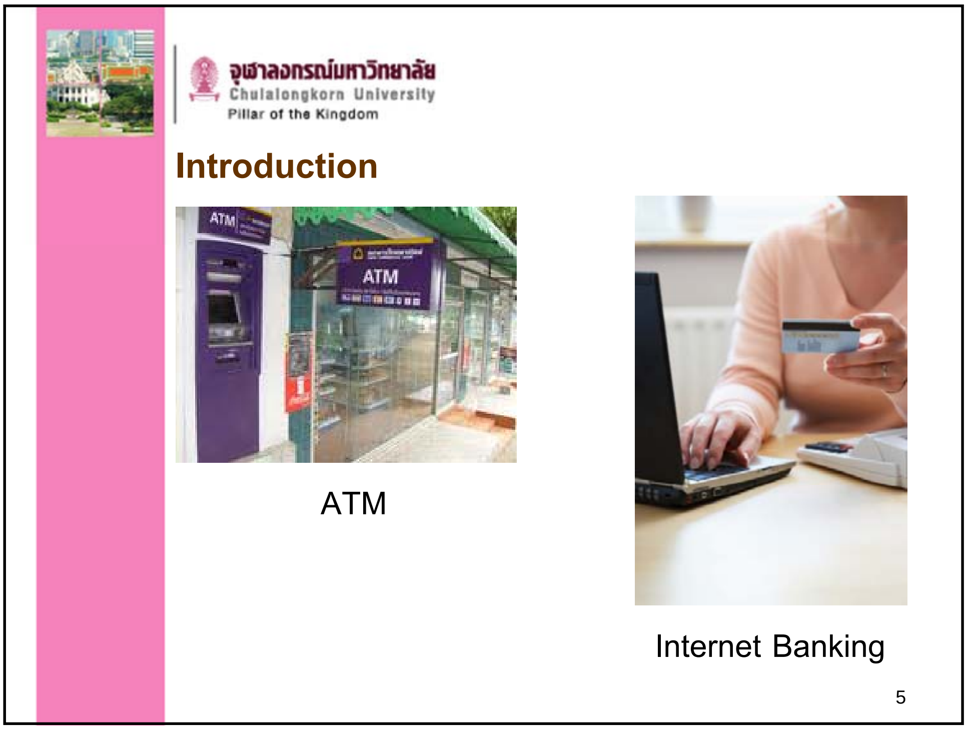
Introduction



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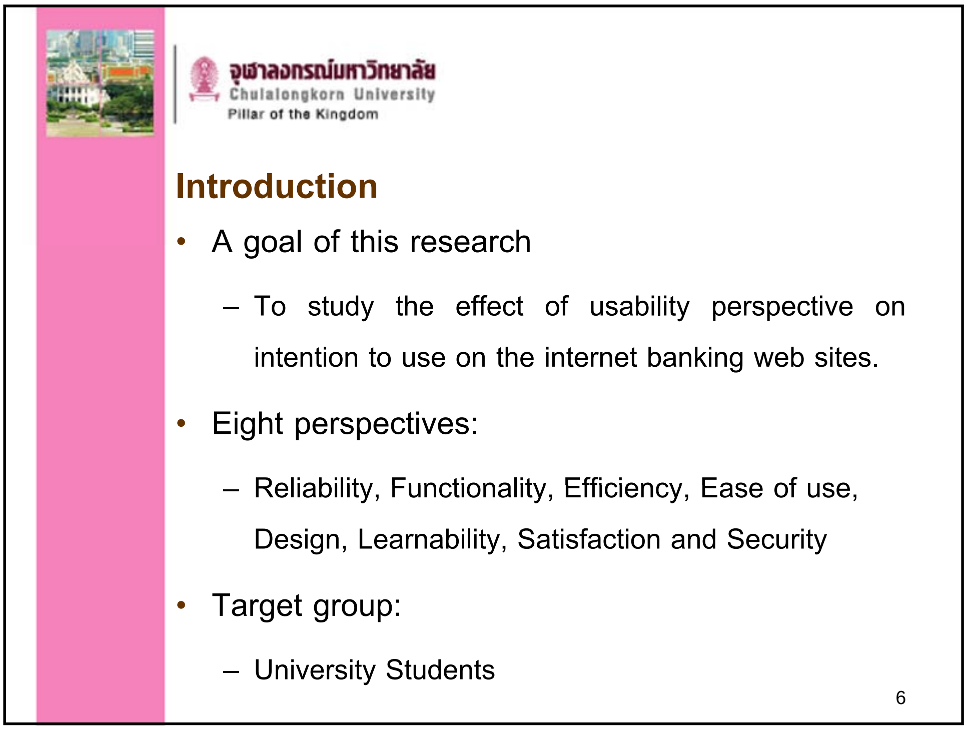
Introduction

ATM

Internet Banking



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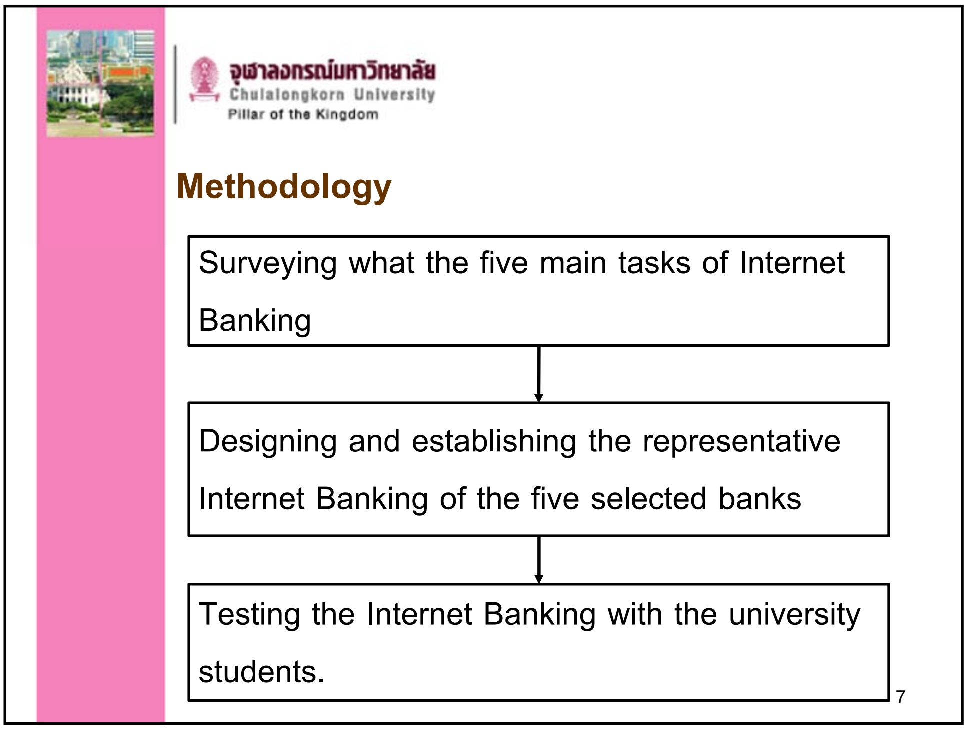
Introduction

- A goal of this research
  - To study the effect of usability perspective on intention to use on the internet banking web sites.
- Eight perspectives:
  - Reliability, Functionality, Efficiency, Ease of use, Design, Learnability, Satisfaction and Security
- Target group:
  - University Students



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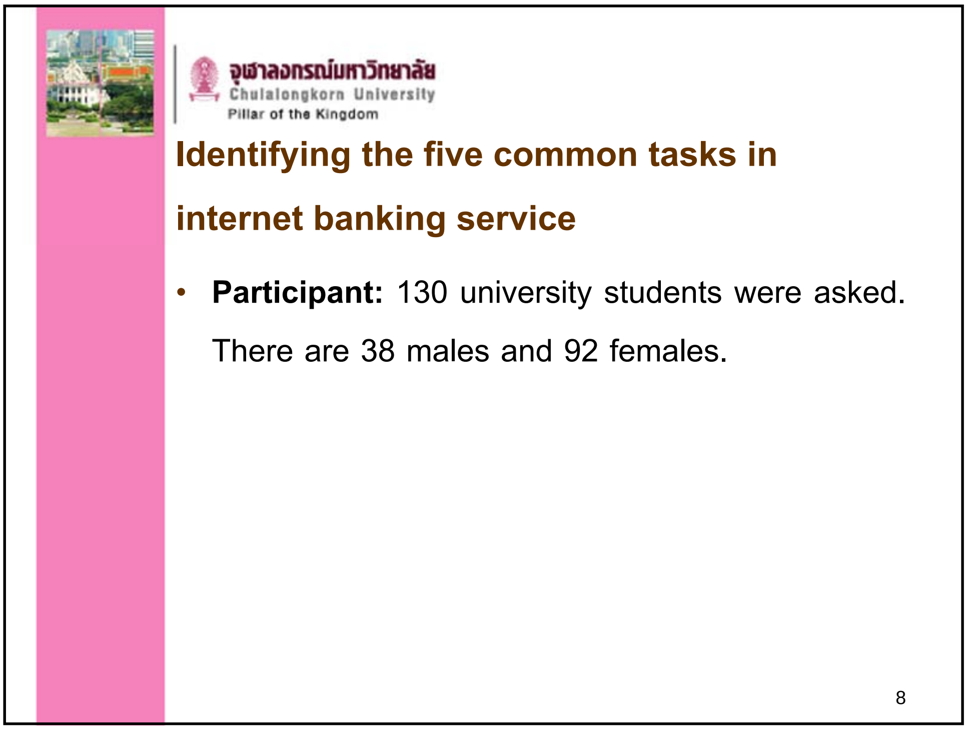
Methodology

Surveying what the five main tasks of Internet Banking

Designing and establishing the representative Internet Banking of the five selected banks

Testing the Internet Banking with the university students.



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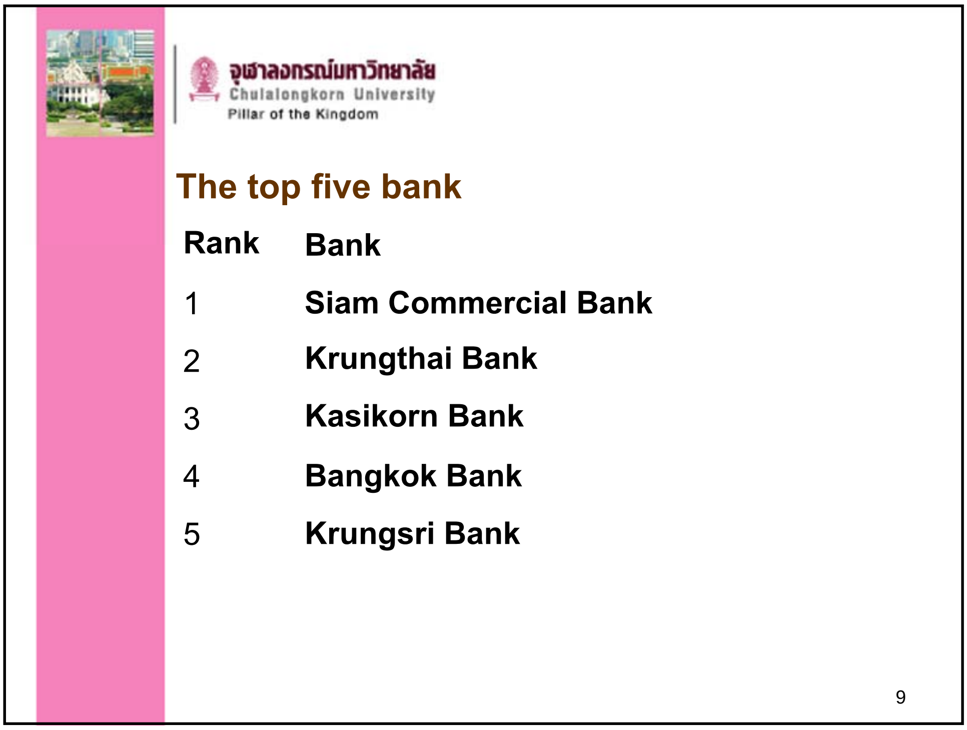
Identifying the five common tasks in internet banking service

- **Participant:** 130 university students were asked. There are 38 males and 92 females.



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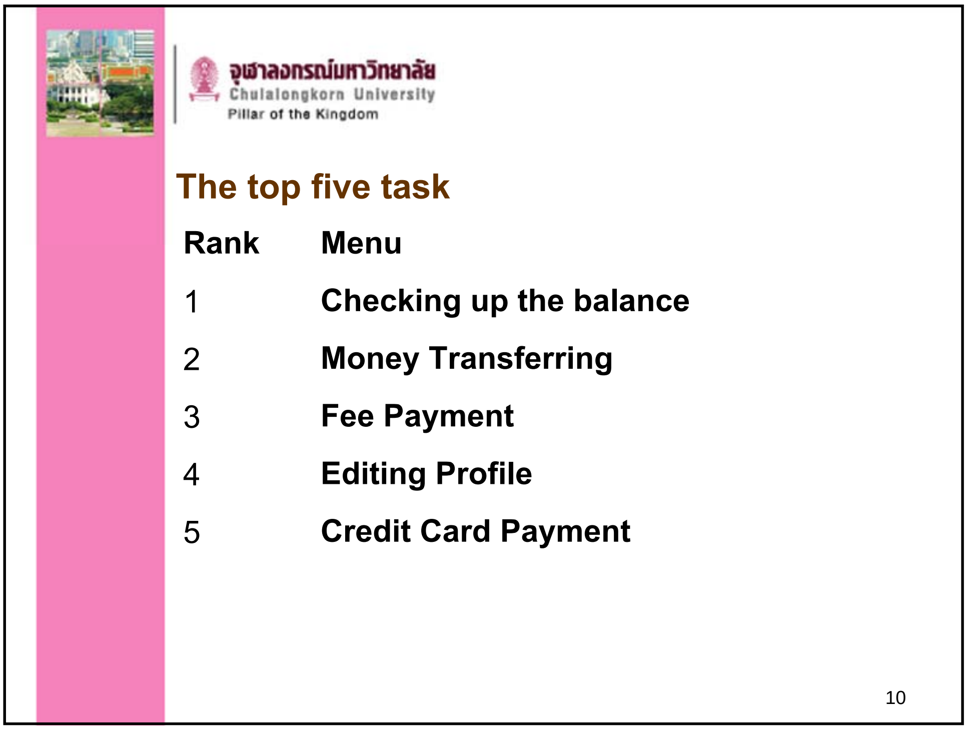
The top five bank

Rank	Bank
1	Siam Commercial Bank
2	Krungthai Bank
3	Kasikorn Bank
4	Bangkok Bank
5	Krungsri Bank



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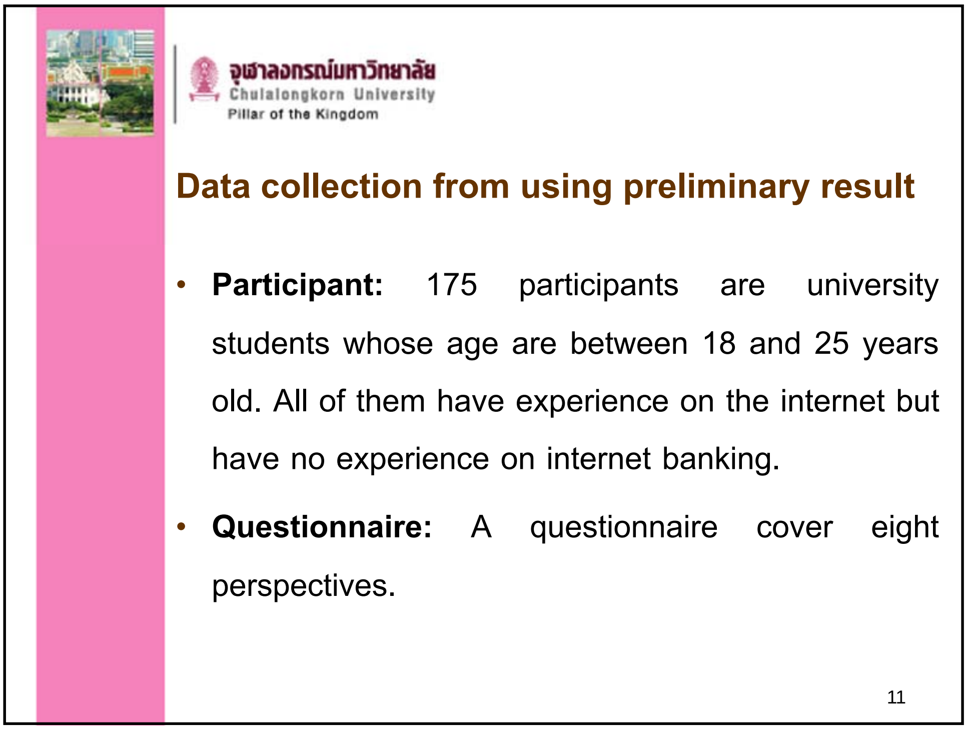
The top five task

Rank	Menu
1	Checking up the balance
2	Money Transferring
3	Fee Payment
4	Editing Profile
5	Credit Card Payment



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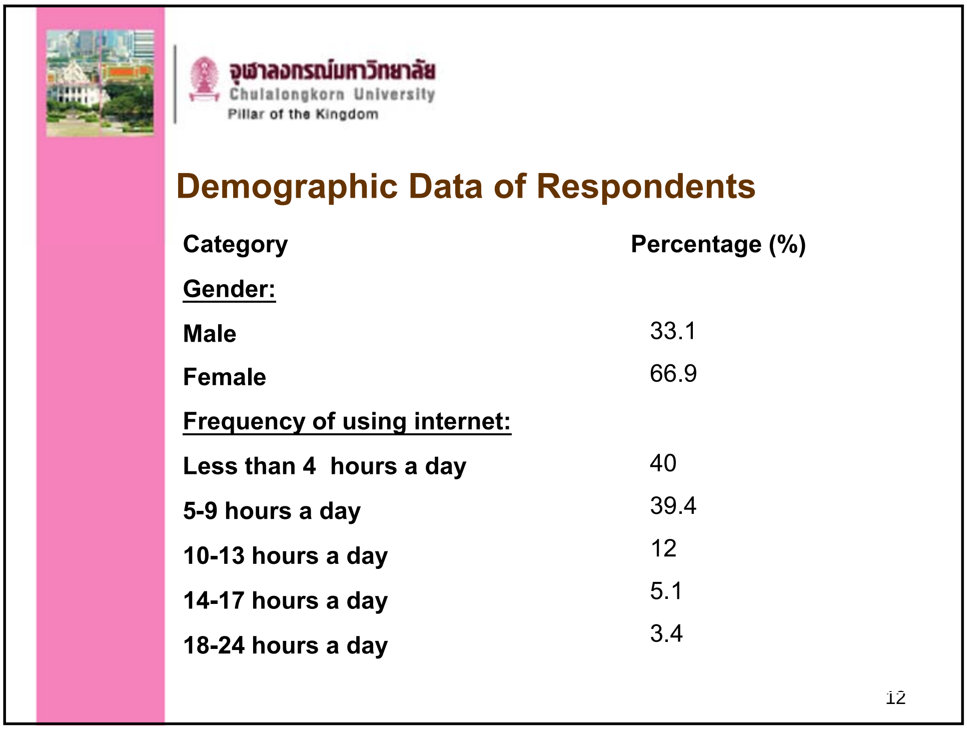
Data collection from using preliminary result

- **Participant:** 175 participants are university students whose age are between 18 and 25 years old. All of them have experience on the internet but have no experience on internet banking.
- **Questionnaire:** A questionnaire cover eight perspectives.



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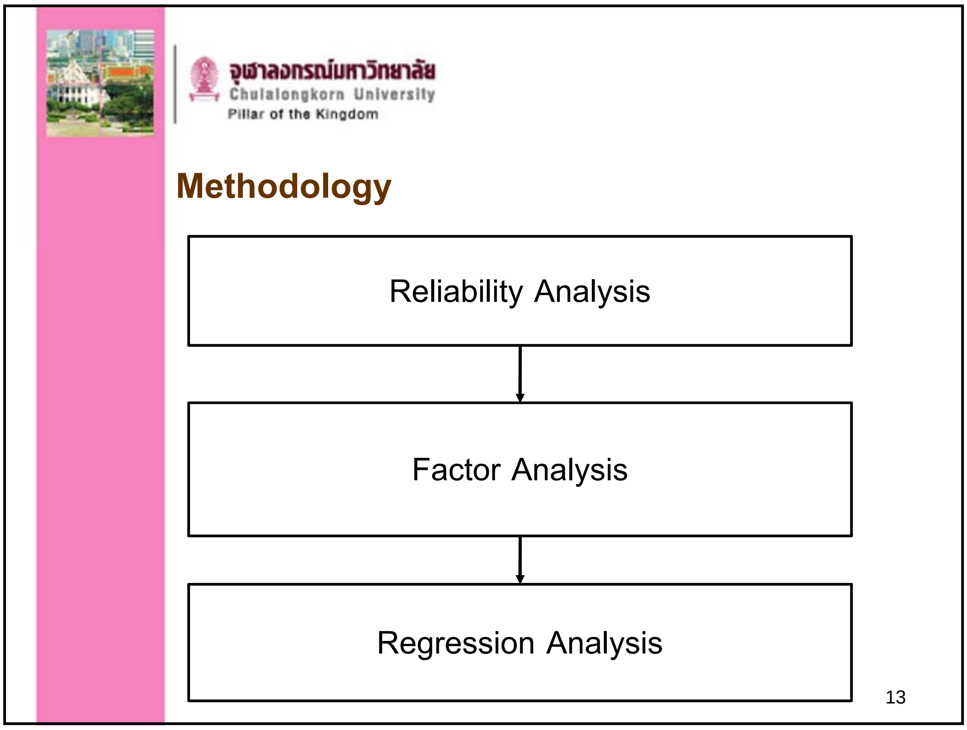
Demographic Data of Respondents

Category	**Percentage (%)**
Gender:	
Male	33.1
Female	66.9
Frequency of using internet:	
Less than 4 hours a day	40
5-9 hours a day	39.4
10-13 hours a day	12
14-17 hours a day	5.1
18-24 hours a day	3.4



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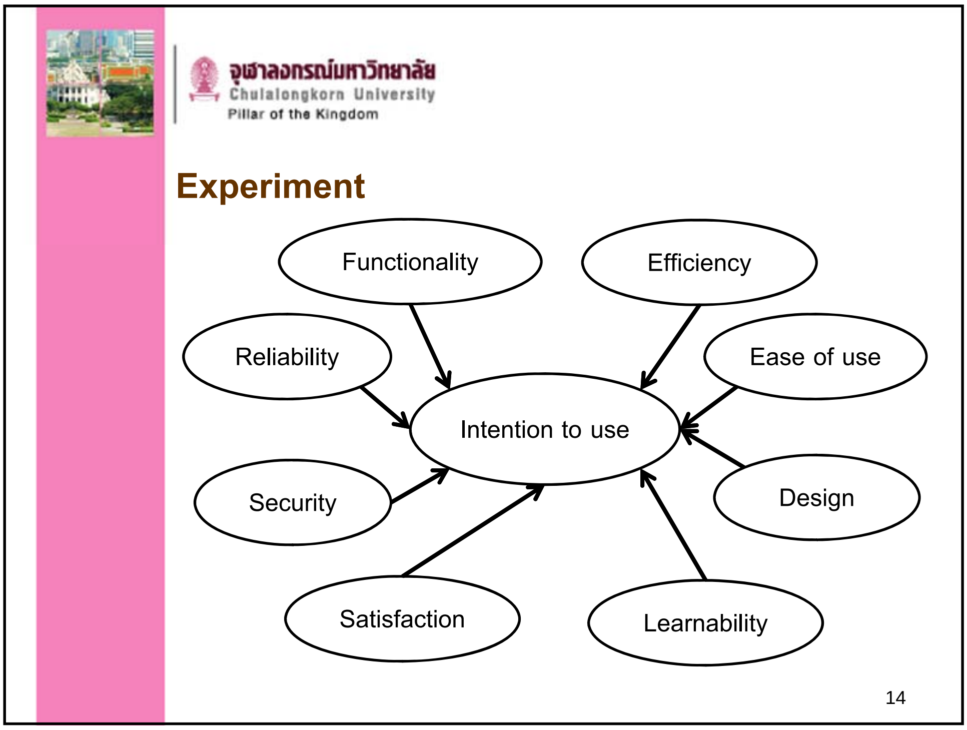
Methodology

Reliability Analysis

Factor Analysis

Regression Analysis



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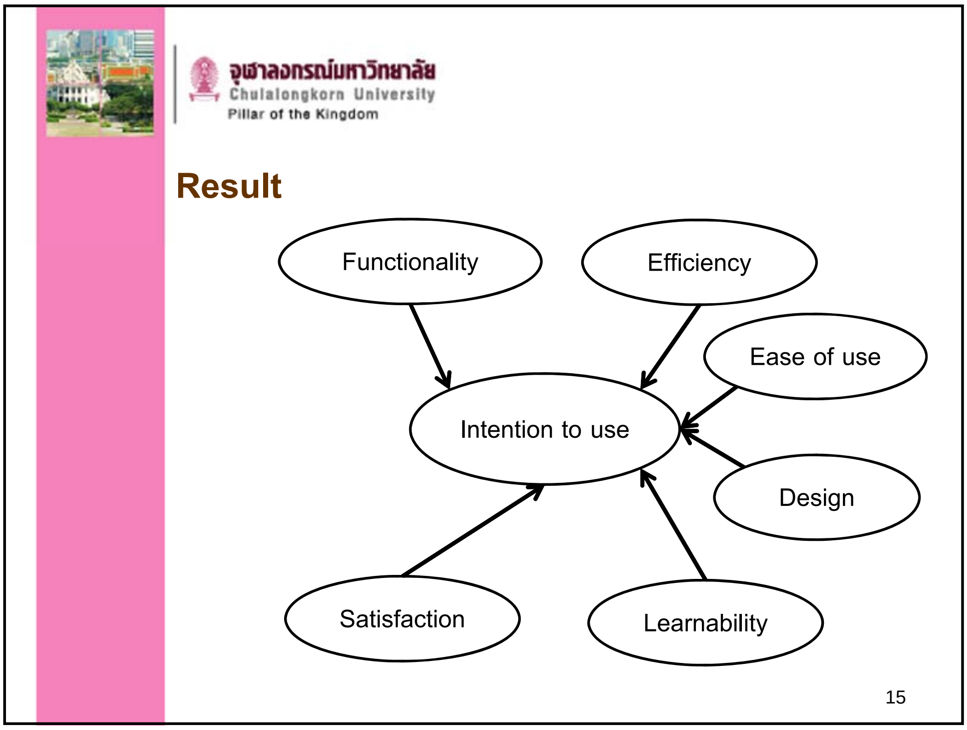
Experiment

Functionality
Efficiency
Reliability
Ease of use
Intention to use
Design
Security
Satisfaction
Learnability



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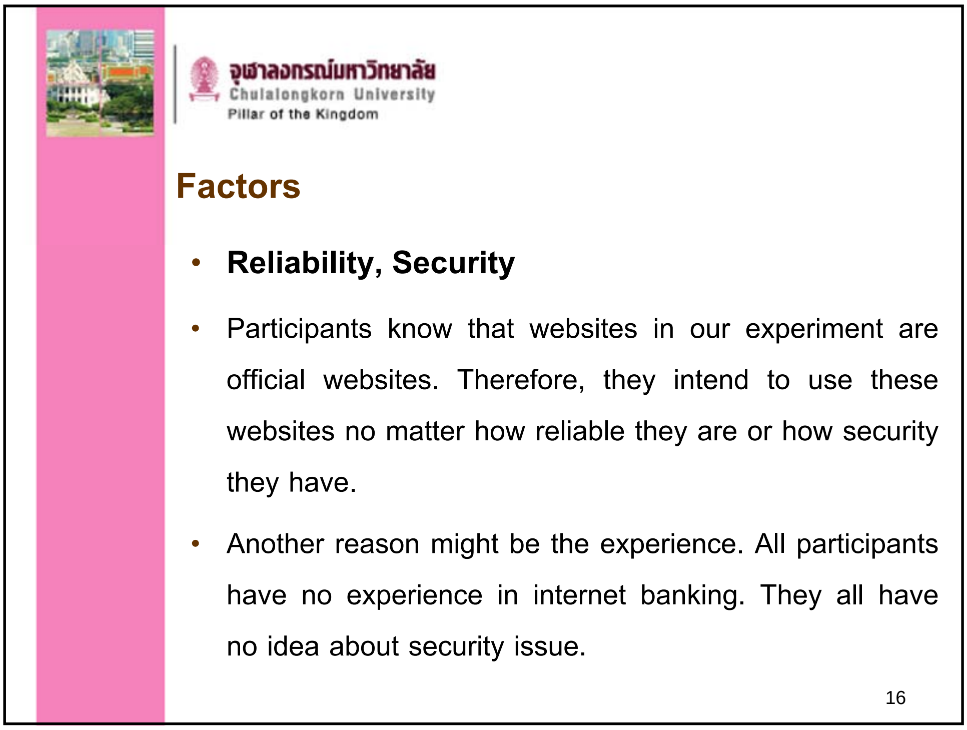
Result

Functionality
Efficiency
Ease of use
Intention to use
Design
Satisfaction
Learnability



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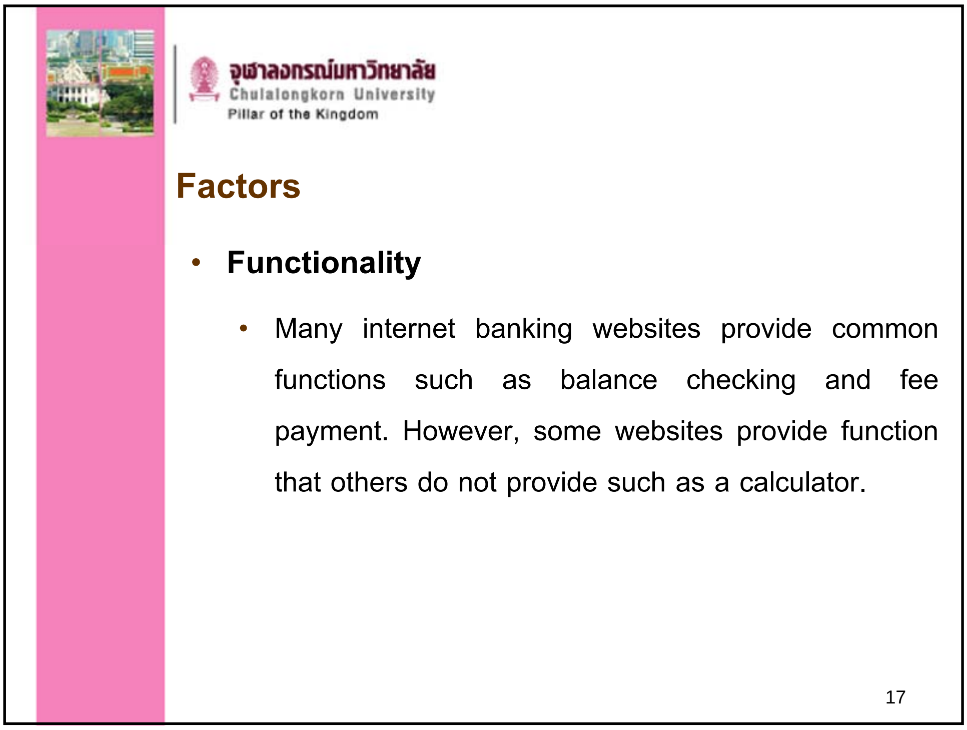
Factors

- **Reliability, Security**
- Participants know that websites in our experiment are official websites. Therefore, they intend to use these websites no matter how reliable they are or how security they have.
- Another reason might be the experience. All participants have no experience in internet banking. They all have no idea about security issue.



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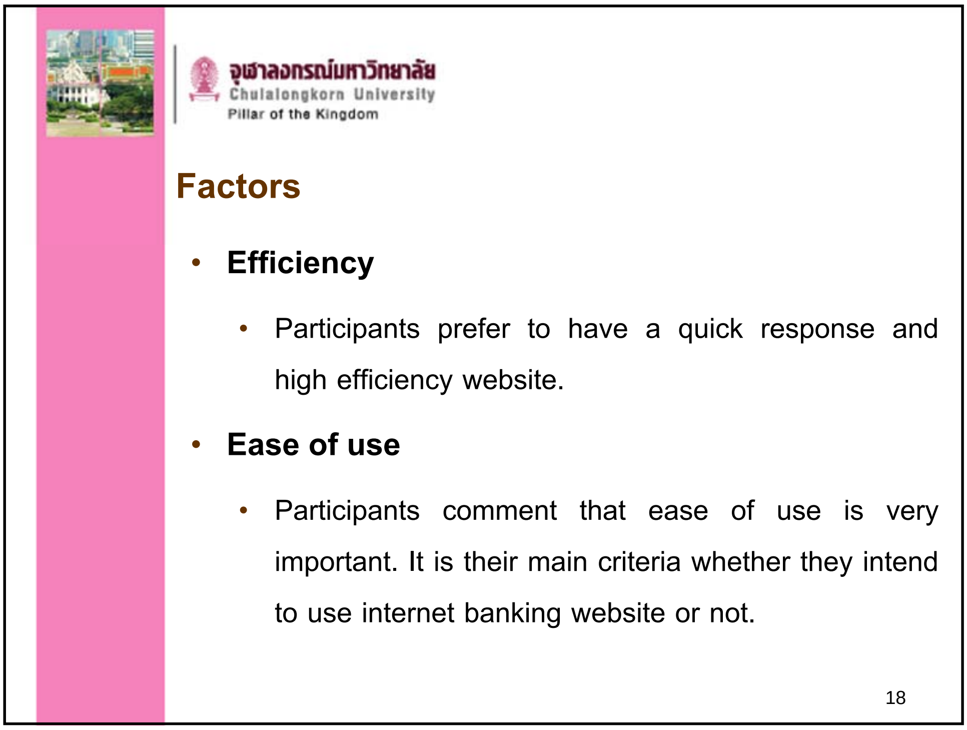
Factors

- **Functionality**
  - Many internet banking websites provide common functions such as balance checking and fee payment. However, some websites provide function that others do not provide such as a calculator.

17



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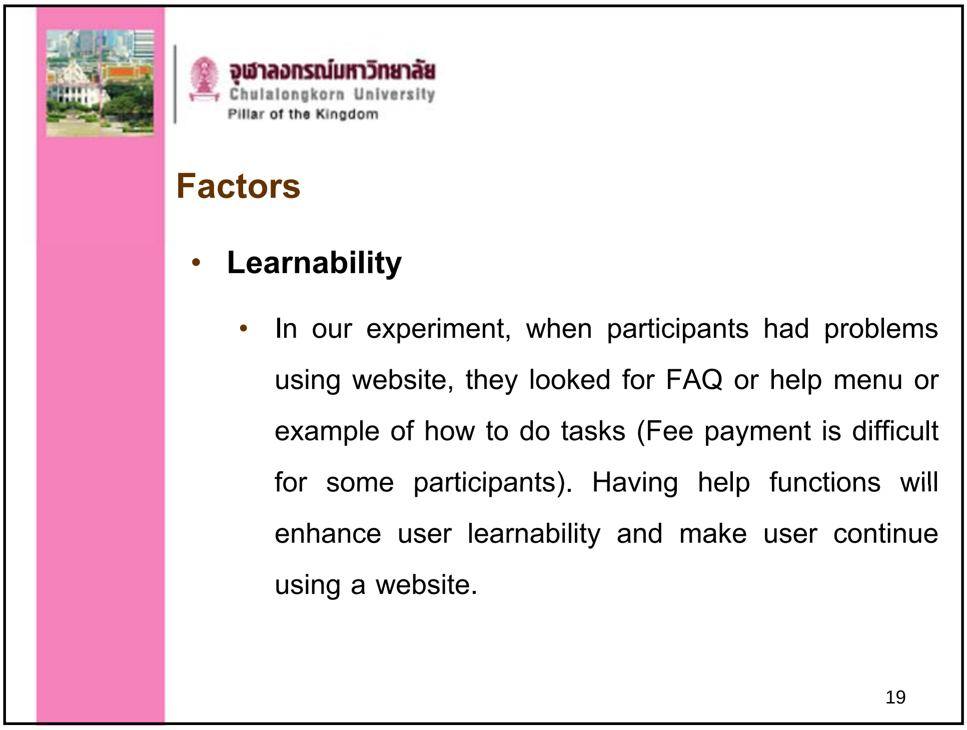
Factors

- **Efficiency**
  - Participants prefer to have a quick response and high efficiency website.
- **Ease of use**
  - Participants comment that ease of use is very important. It is their main criteria whether they intend to use internet banking website or not.

18



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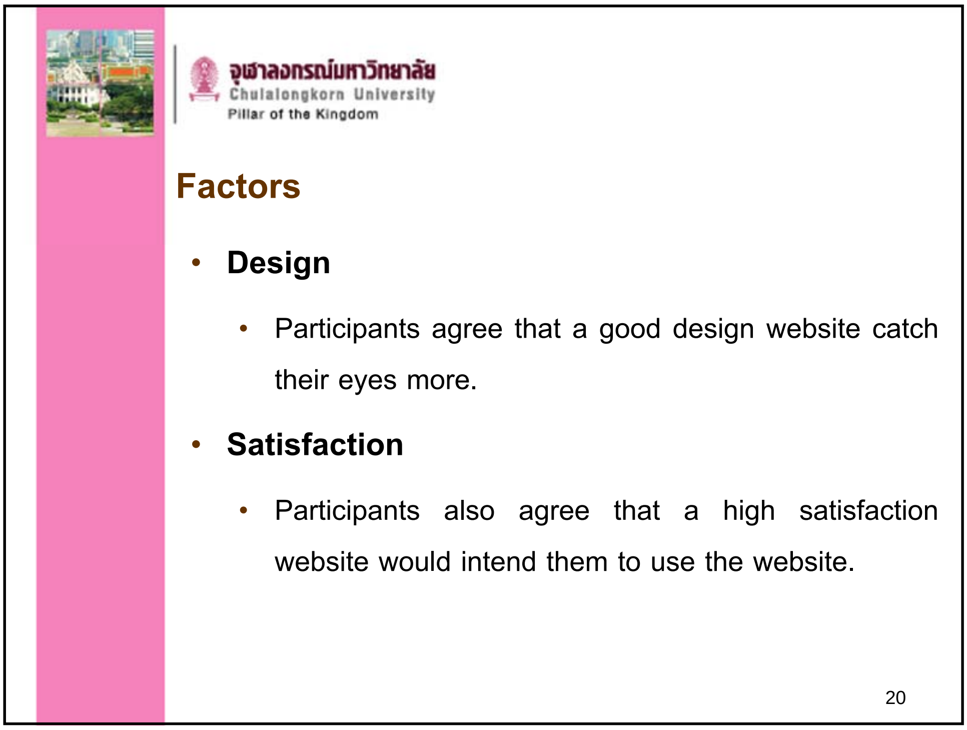
Factors

- **Learnability**
  - In our experiment, when participants had problems using website, they looked for FAQ or help menu or example of how to do tasks (Fee payment is difficult for some participants). Having help functions will enhance user learnability and make user continue using a website.



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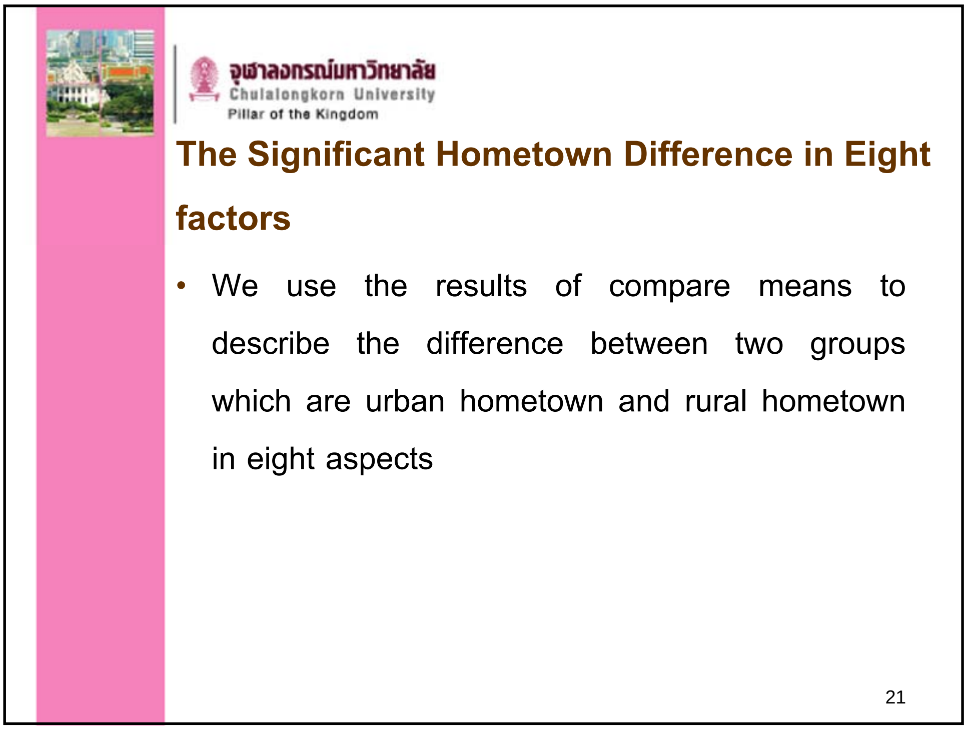
Factors

- **Design**
  - Participants agree that a good design website catch their eyes more.
- **Satisfaction**
  - Participants also agree that a high satisfaction website would intend them to use the website.



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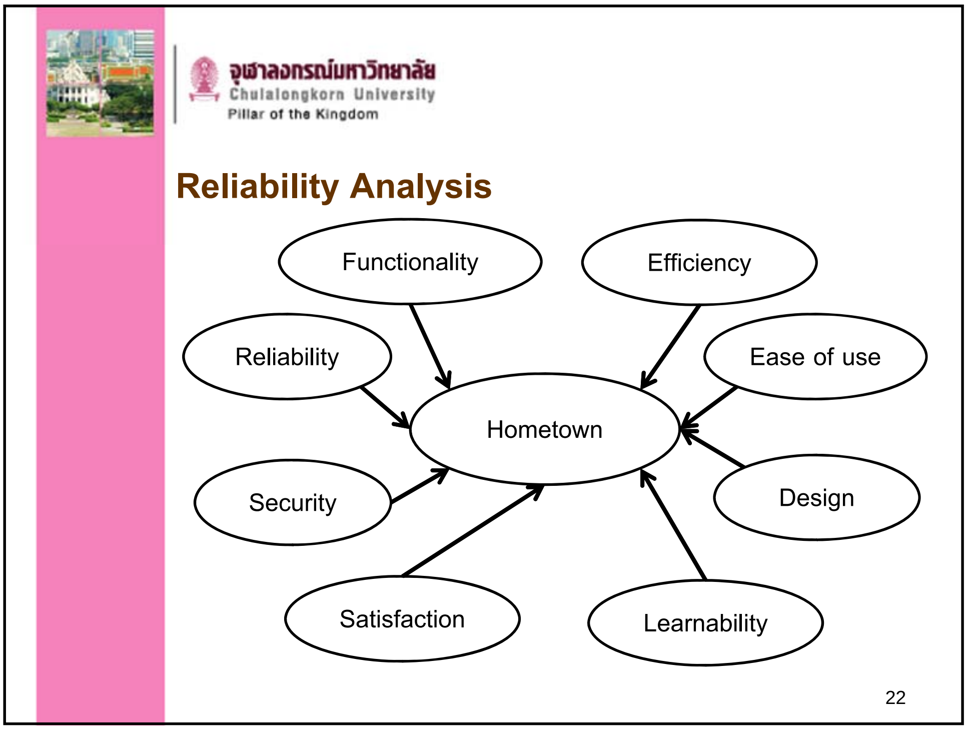
The Significant Hometown Difference in Eight factors

- We use the results of compare means to describe the difference between two groups which are urban hometown and rural hometown in eight aspects



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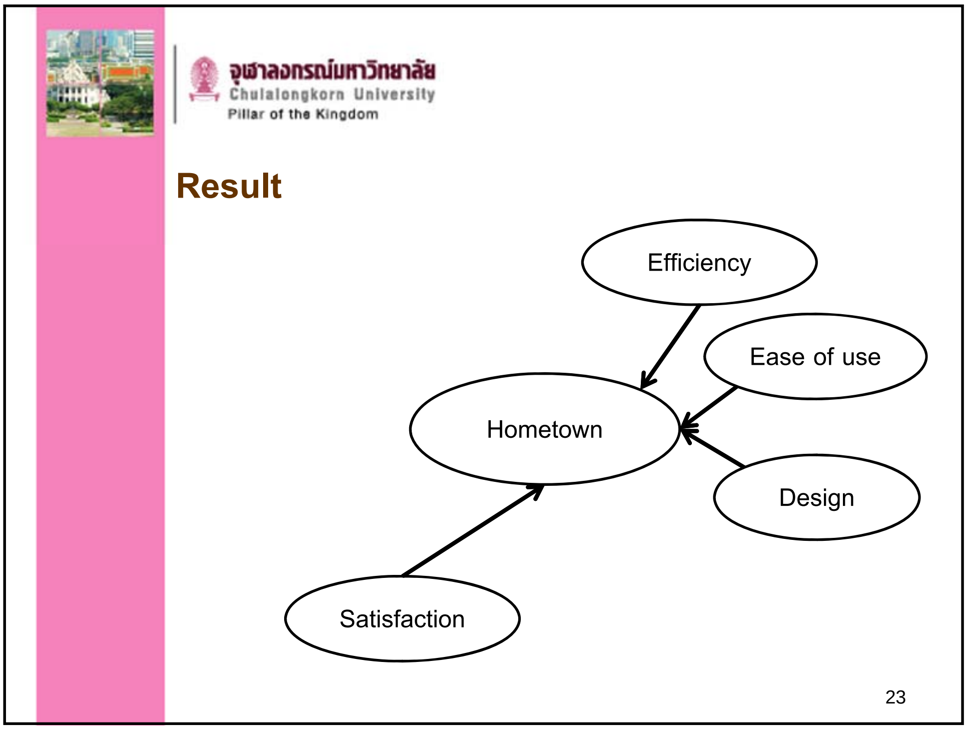
Reliability Analysis

Functionality
Efficiency
Reliability
Ease of use
Hometown
Security
Design
Satisfaction
Learnability



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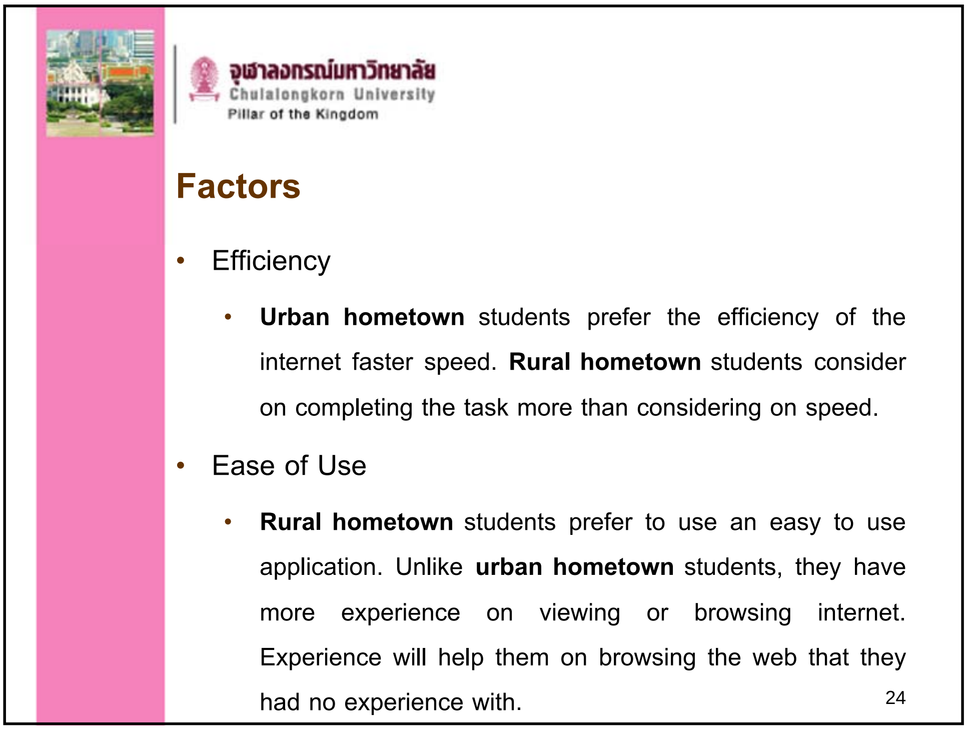
Result



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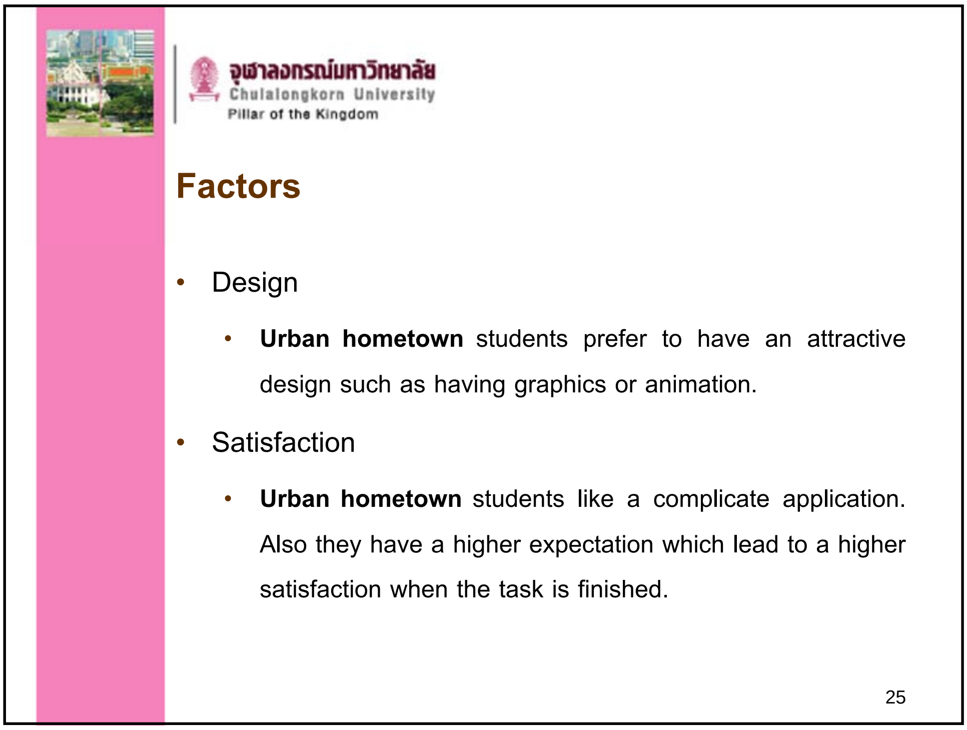
Factors

- Efficiency
  - **Urban hometown** students prefer the efficiency of the internet faster speed. **Rural hometown** students consider on completing the task more than considering on speed.
- Ease of Use
  - **Rural hometown** students prefer to use an easy to use application. Unlike **urban hometown** students, they have more experience on viewing or browsing internet. Experience will help them on browsing the web that they had no experience with.



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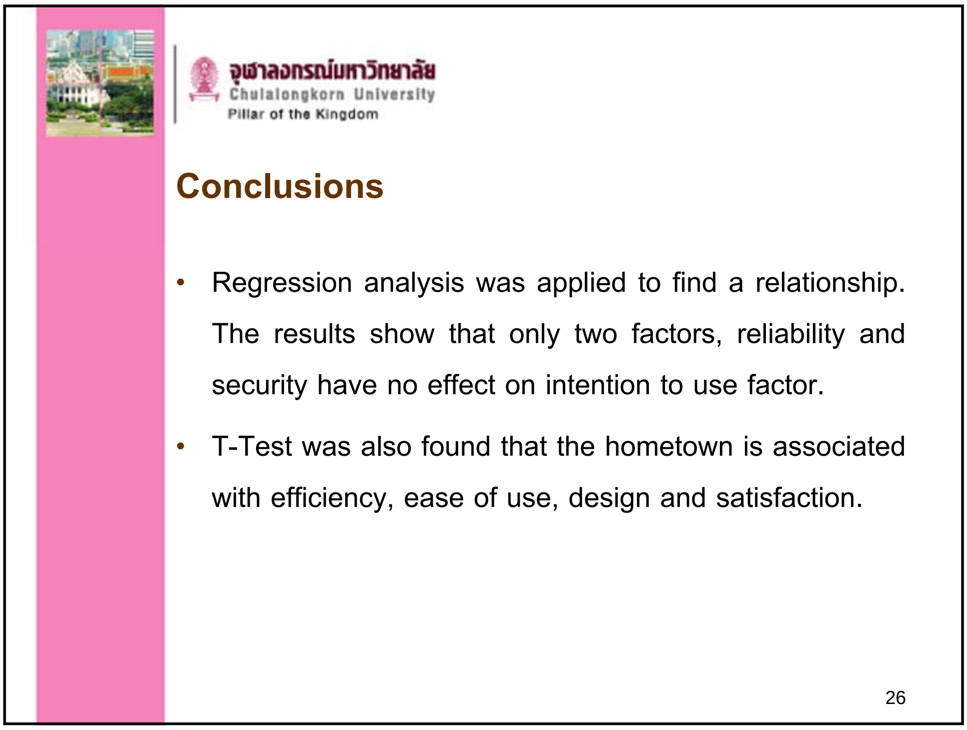
Factors

- Design
  - **Urban hometown** students prefer to have an attractive design such as having graphics or animation.
- Satisfaction
  - **Urban hometown** students like a complicate application. Also they have a higher expectation which lead to a higher satisfaction when the task is finished.



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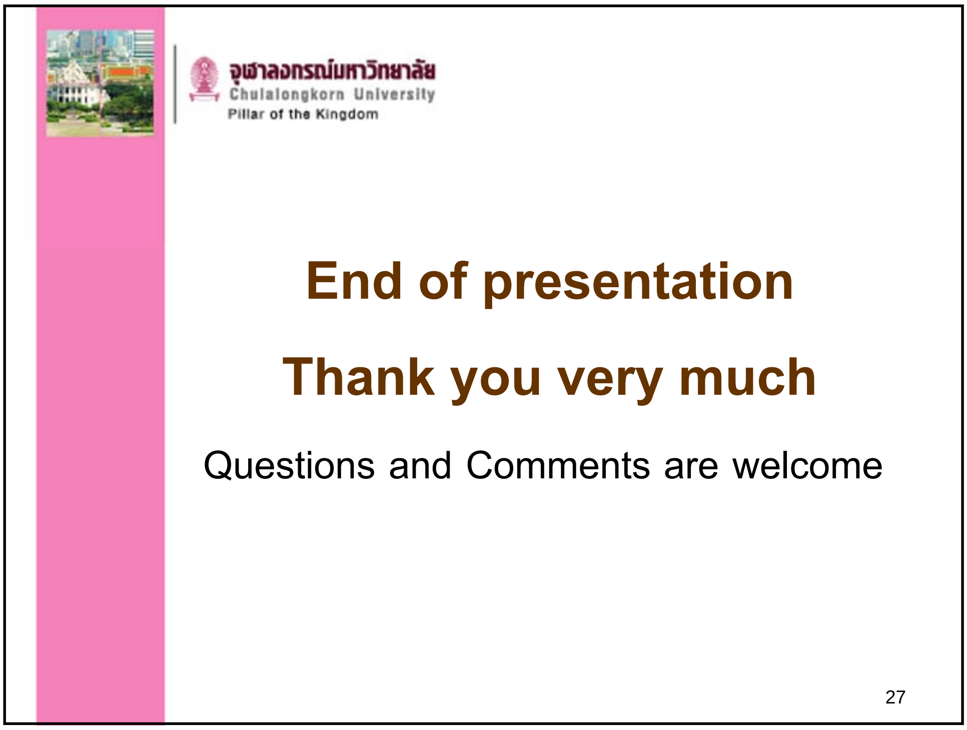
Conclusions

- Regression analysis was applied to find a relationship. The results show that only two factors, reliability and security have no effect on intention to use factor.
- T-Test was also found that the hometown is associated with efficiency, ease of use, design and satisfaction.



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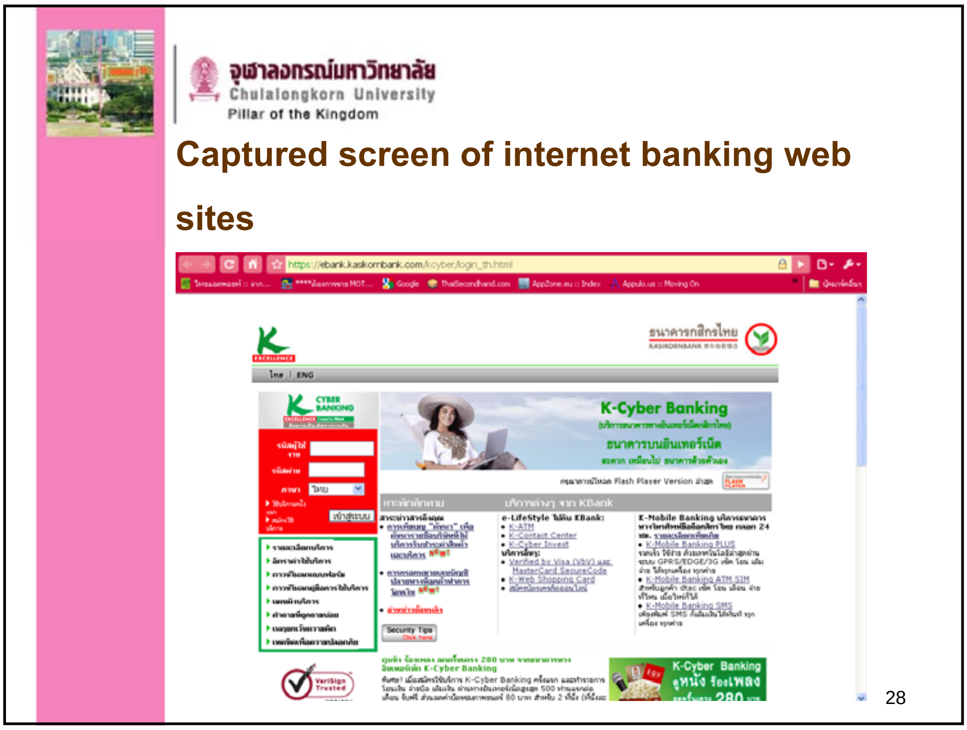
End of presentation

Thank you very much

Questions and Comments are welcome



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Captured screen of internet banking web sites

https://ebank.kasikornbank.com/kcyber/login_th.html
ธนาคารกสิกรไทย
KASIKORNBANK
ไทย | ENG
K-Cyber Banking
CYBER BANKING
Security Tips
K-ATM
K-Contact Center
K-Cyber Invest
K-Mobile Banking PLUS
K-Mobile Banking SMS
K-Cyber Banking

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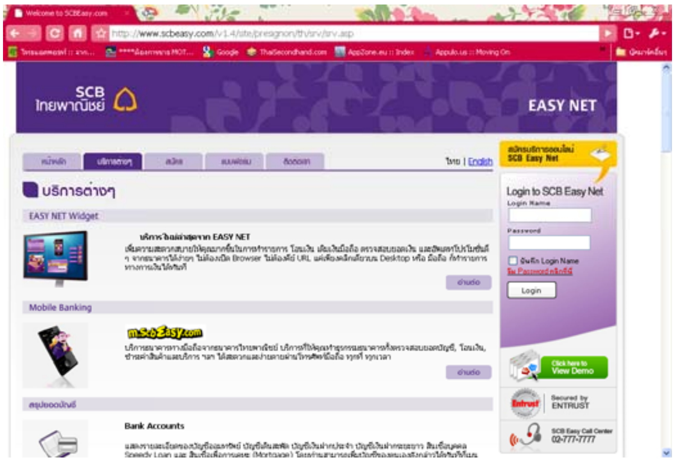
Captured screen of internet banking web sites


Welcome to SCBEasy.com
http://www.scbeasy.com/v1.4/site/presignon/th/srv/srv.asp
Google
ThaiSecondhand.com
AppZone.eu :: Index
Appulo.us :: Moving On
SCB
ไทยพาณิชย์
EASY NET
ไทย | English
บริการต่างๆ
EASY NET Widget
บริการใหม่ล่าสุดจาก EASY NET
Mobile Banking
m.ScbEasy.com
Bank Accounts
Login to SCB Easy Net
Login Name
Password
Login
Click here to View Demo
Secured by ENTRUST
SCB Easy Call Center 02-777-7777

จุฬาลงกรณ์มหาวิทยาลัย
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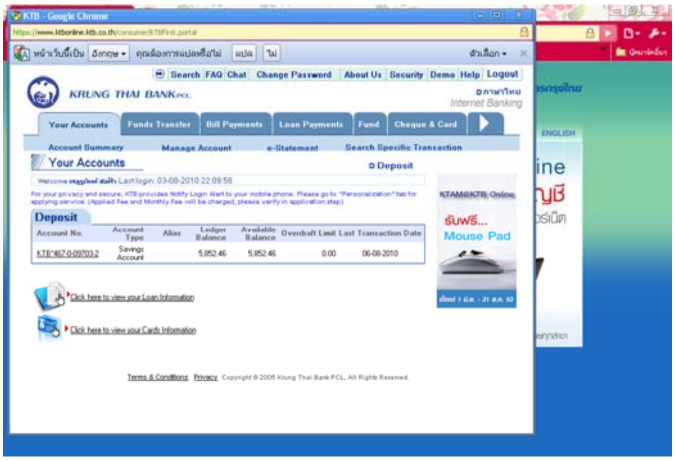
Captured screen of internet banking web sites


KTB - Google Chrome
https://www.ktbonline.ktb.co.th/consumer/KTBFirst.portal
Search
FAQ
Chat
Change Password
About Us
Security
Demo
Help
Logout
KRUNG THAI BANK PCL.
ภาษาไทย
Internet Banking
Your Accounts
Funds Transfer
Bill Payments
Loan Payments
Fund
Cheque & Card
Account Summary
Manage Account
e-Statement
Search Specific Transaction
Your Accounts
Deposit
KTAM@KTB Online
รับฟรี...
Mouse Pad
Click here to view your Loan Information
Click here to view your Cards Information
Terms & Conditions
Privacy

Last login: 03-08-2010 22:09:58

For your privacy and secure, KTB provides Notify Login Alert to your mobile phone. Please go to "Personalization" tab for applying service. (Applied Fee and Monthly Fee will be charged, please verify in application step)

Deposit

Account No.	Account Type	Alias	Ledger Balance	Available Balance	Overdraft Limit	Last Transaction Date
KTB*467-0-09703-2	Savings Account		5,852.46	5,852.46	0.00	06-08-2010

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A local currency system reflecting variety of values

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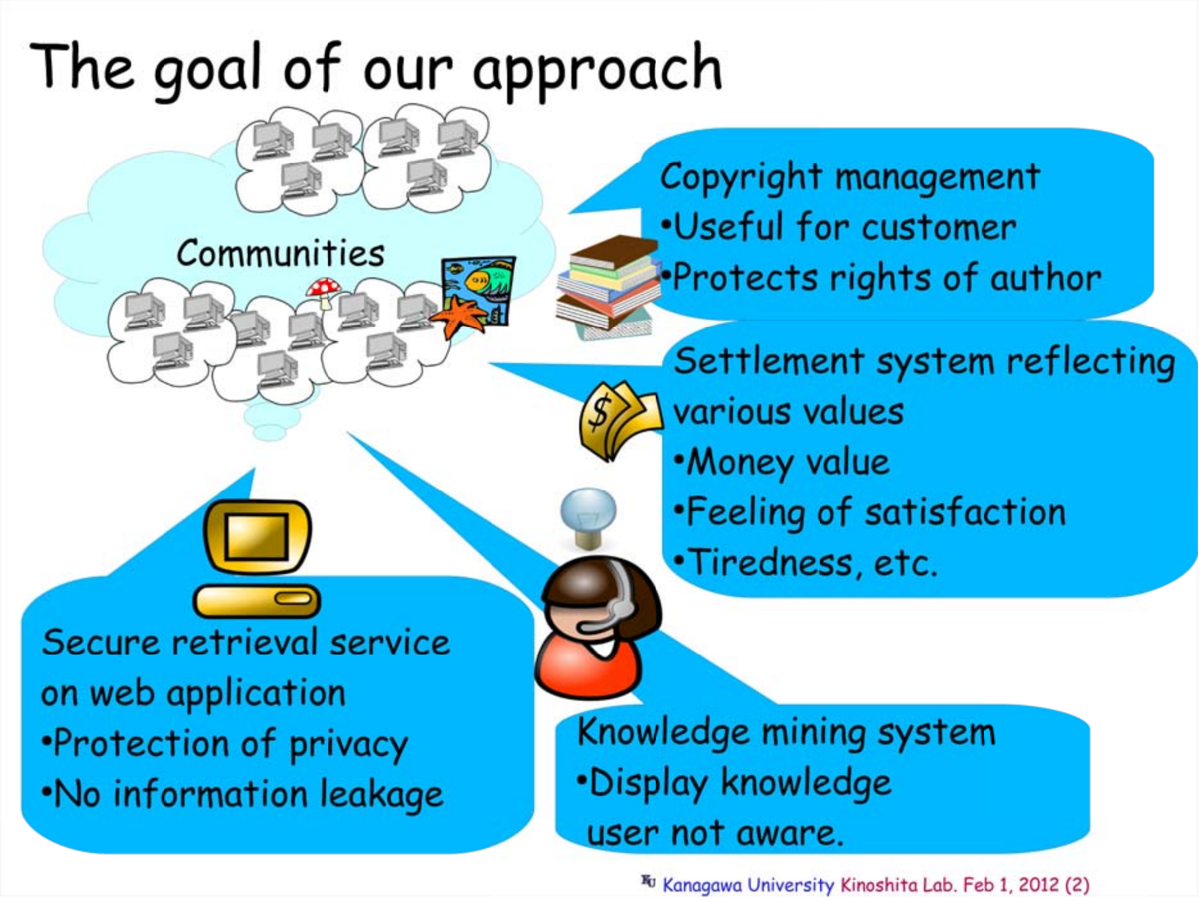


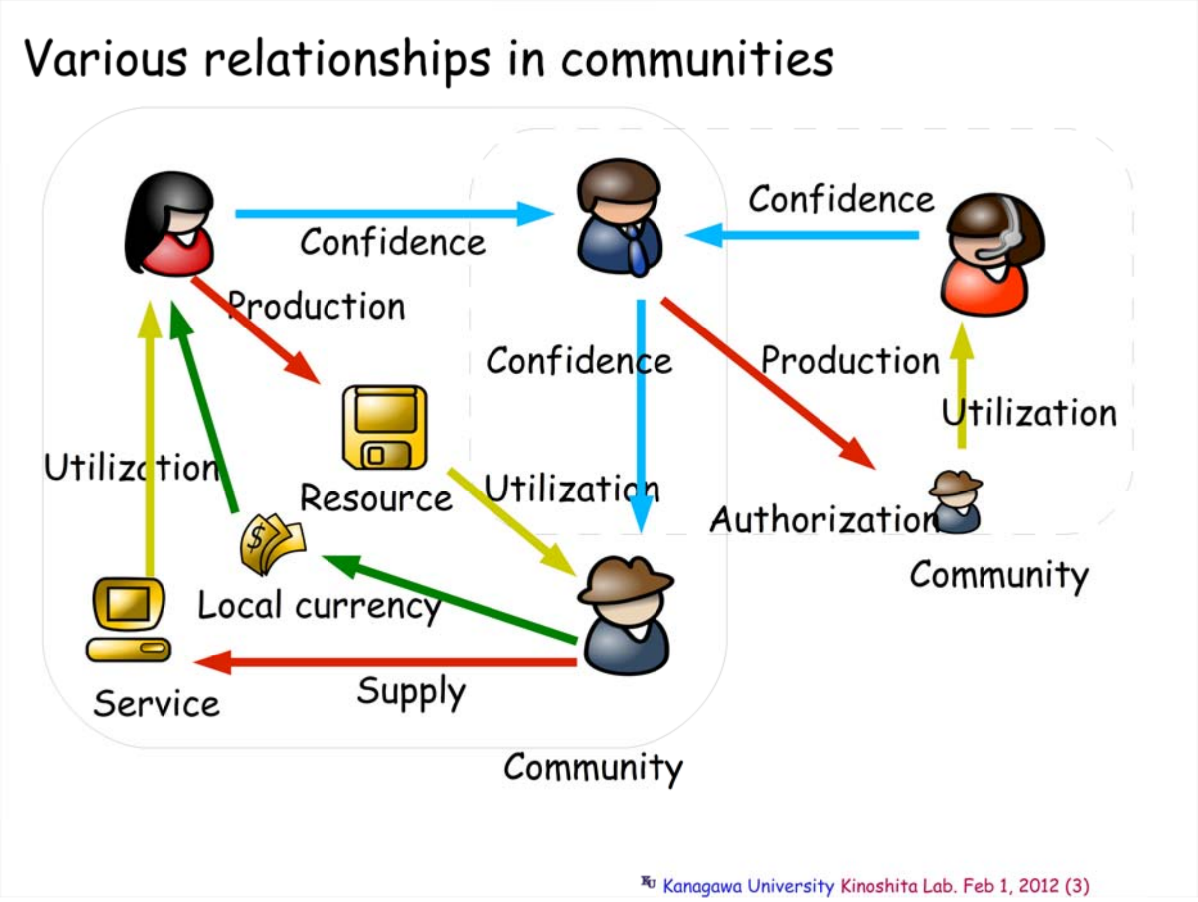
The goal of our approach

Copyright management
- Useful for customer
- Protects rights of author

Settlement system reflecting various values
- Money value
- Feeling of satisfaction
- Tiredness, etc.

Secure retrieval service on web application
- Protection of privacy
- No information leakage

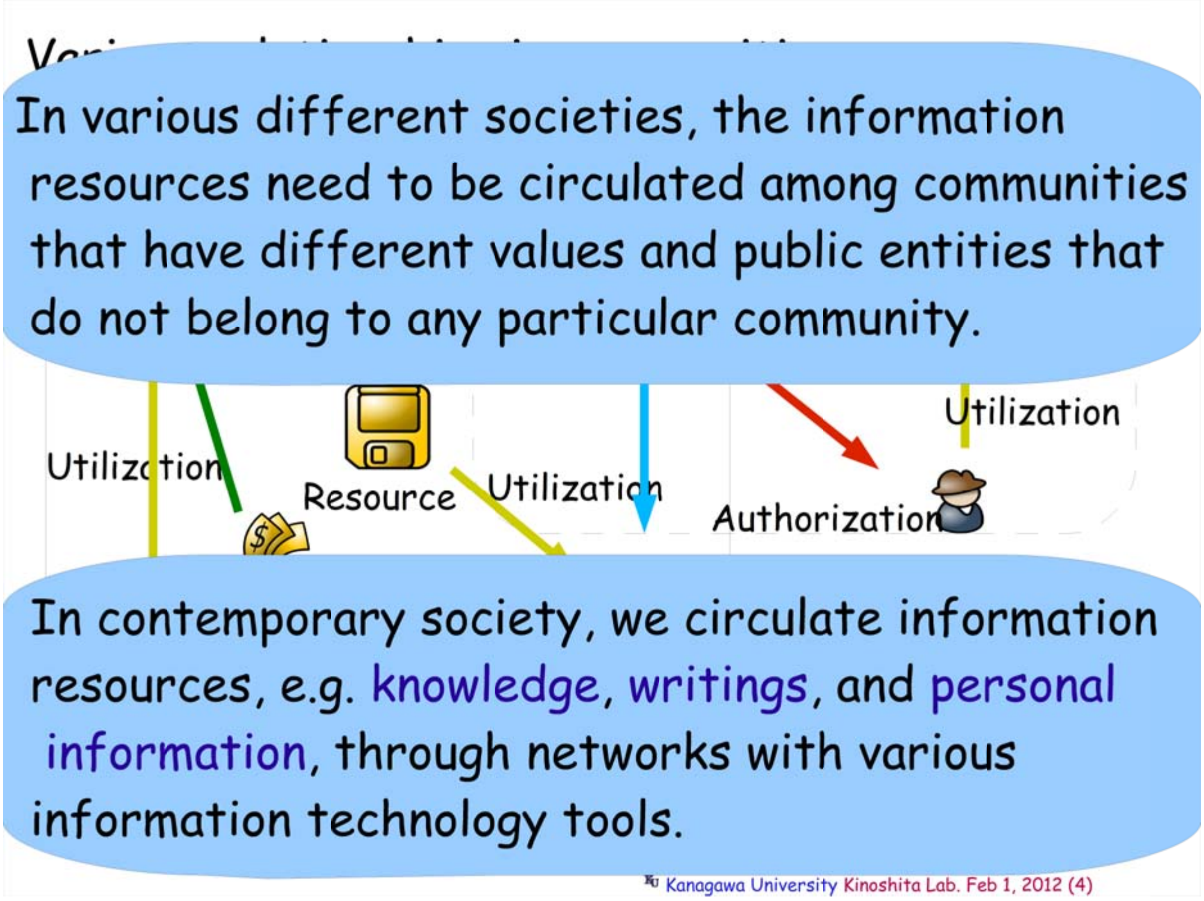
Knowledge mining system
- Display knowledge user not aware.



Various relationships in communities

Confidence
Confidence
Production
Confidence
Production
Utilization
Utilization
Resource
Utilization
Authorization
Community
Local currency
Service
Supply
Community

Kanagawa University Kinoshita Lab. Feb 1, 2012 (3)



In various different societies, the information resources need to be circulated among communities that have different values and public entities that do not belong to any particular community.

Utilization
Utilization
Resource
Utilization
Authorization

In contemporary society, we circulate information resources, e.g. knowledge, writings, and personal information, through networks with various information technology tools.

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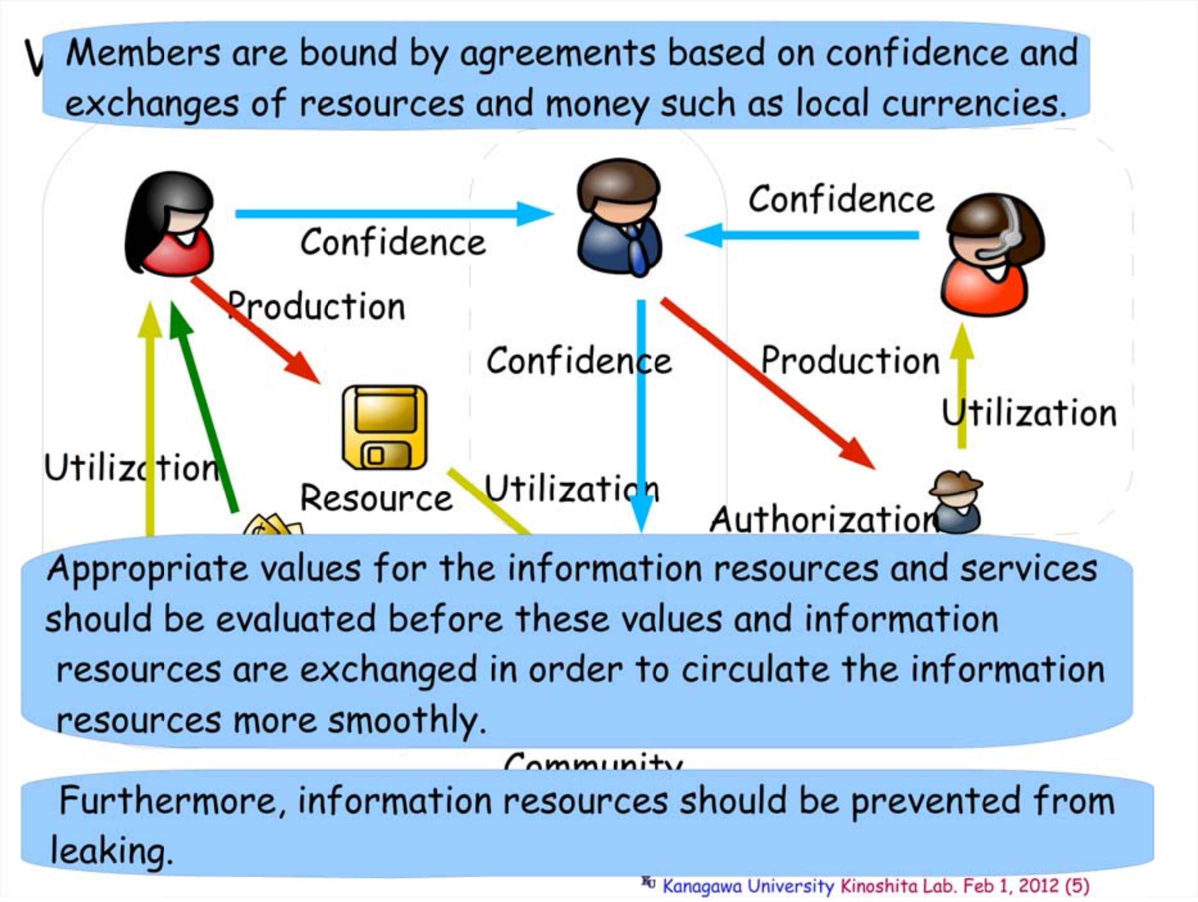
Confidence
Confidence
Confidence
Production
Production
Utilization
Utilization
Utilization
Resource
Authorization
Community

Members are bound by agreements based on confidence and exchanges of resources and money such as local currencies.

Appropriate values for the information resources and services should be evaluated before these values and information resources are exchanged in order to circulate the information resources more smoothly.

Furthermore, information resources should be prevented from leaking.

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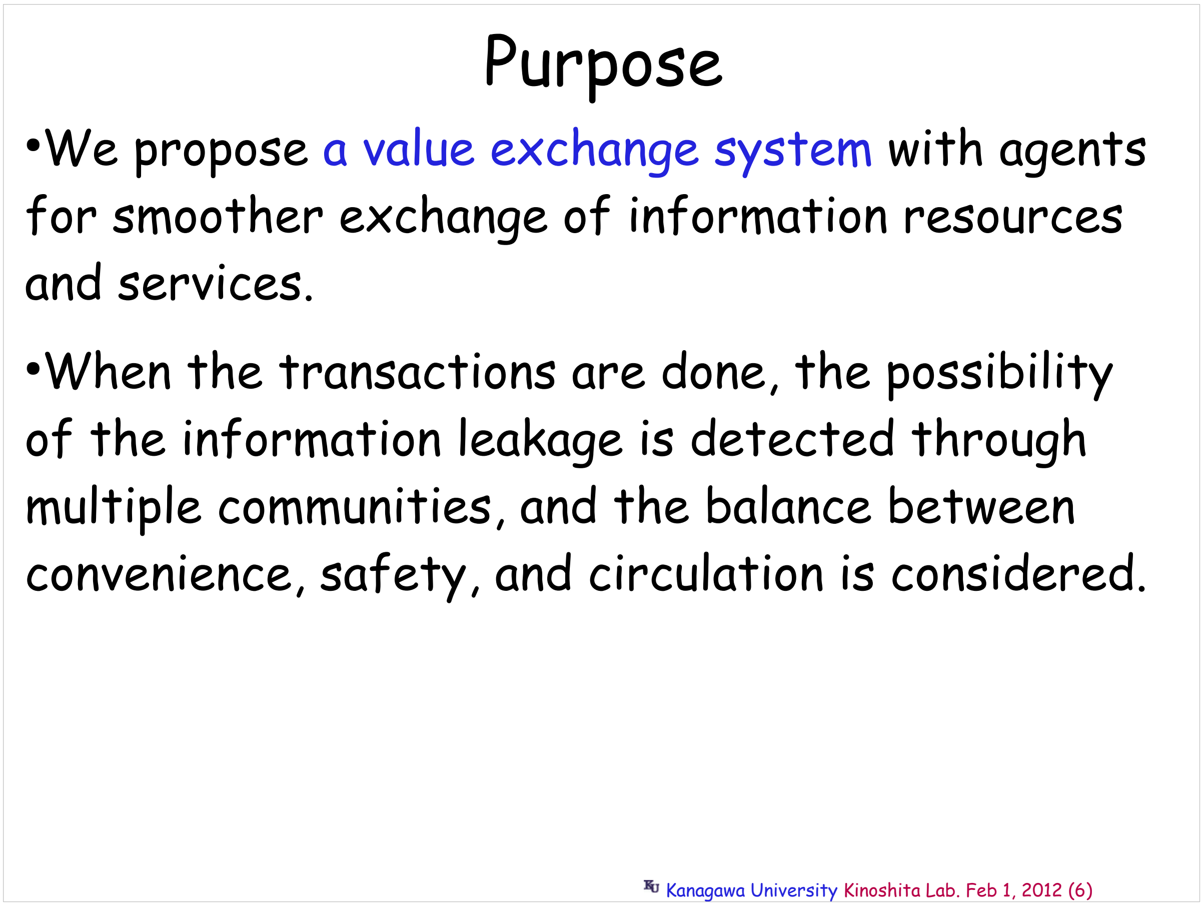

Purpose

- We propose a value exchange system with agents for smoother exchange of information resources and services.
- When the transactions are done, the possibility of the information leakage is detected through multiple communities, and the balance between convenience, safety, and circulation is considered.

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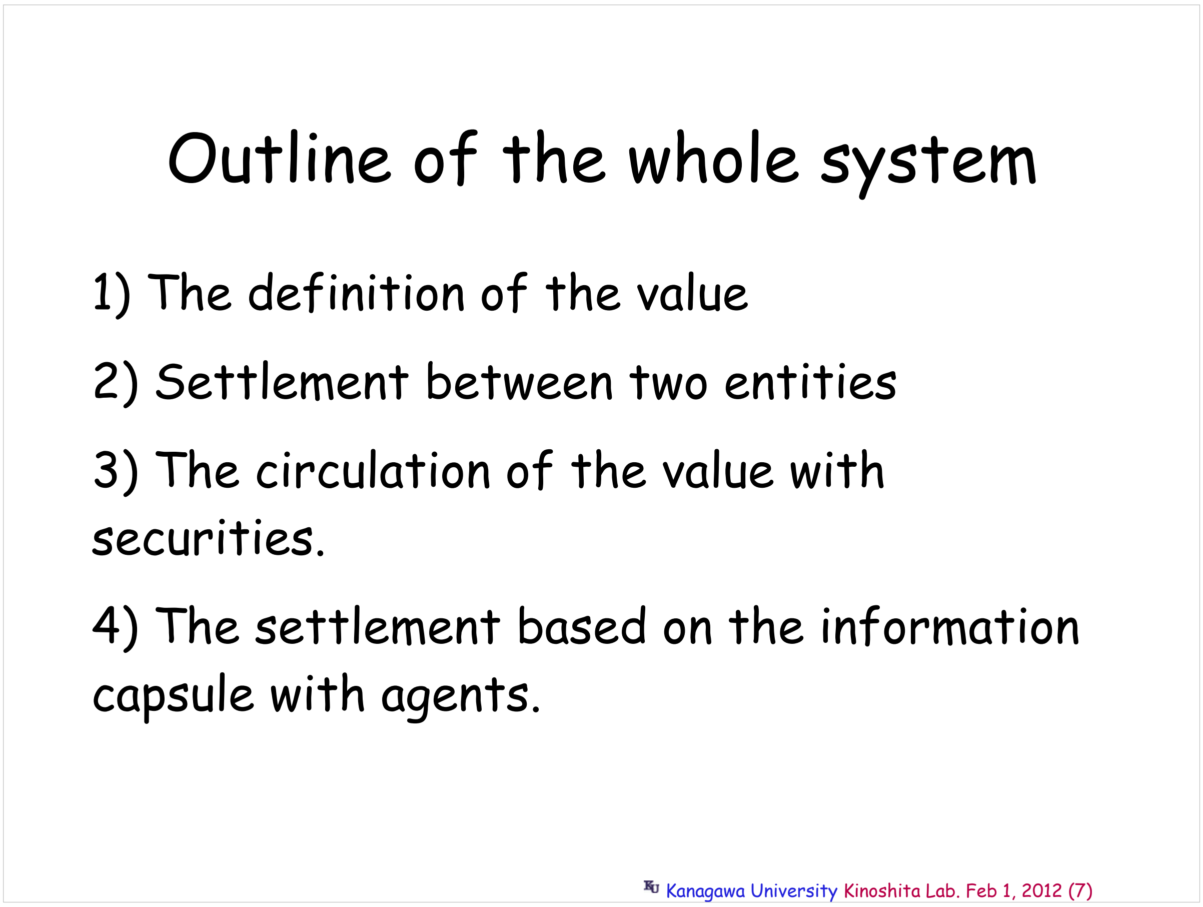


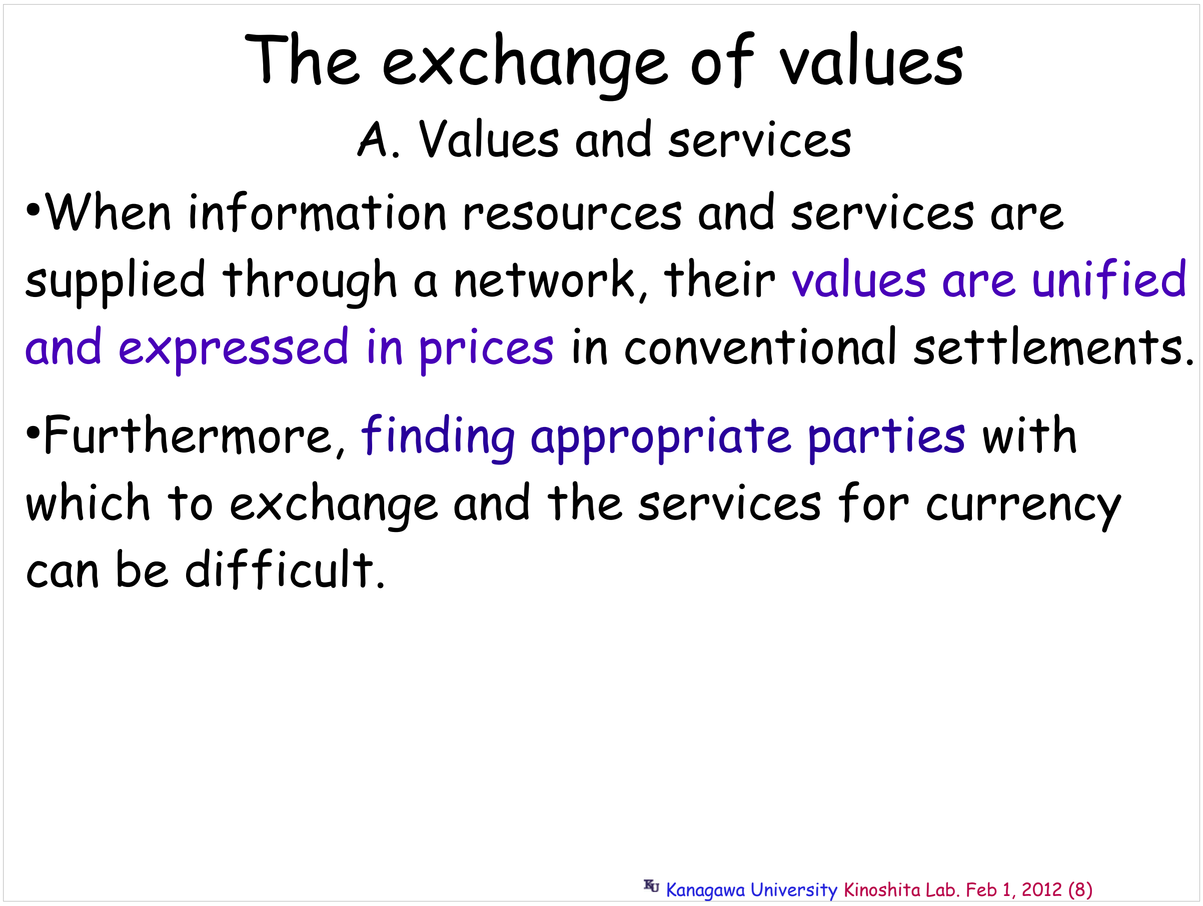
Outline of the whole system

1) The definition of the value

2) Settlement between two entities

3) The circulation of the value with securities.

4) The settlement based on the information capsule with agents.

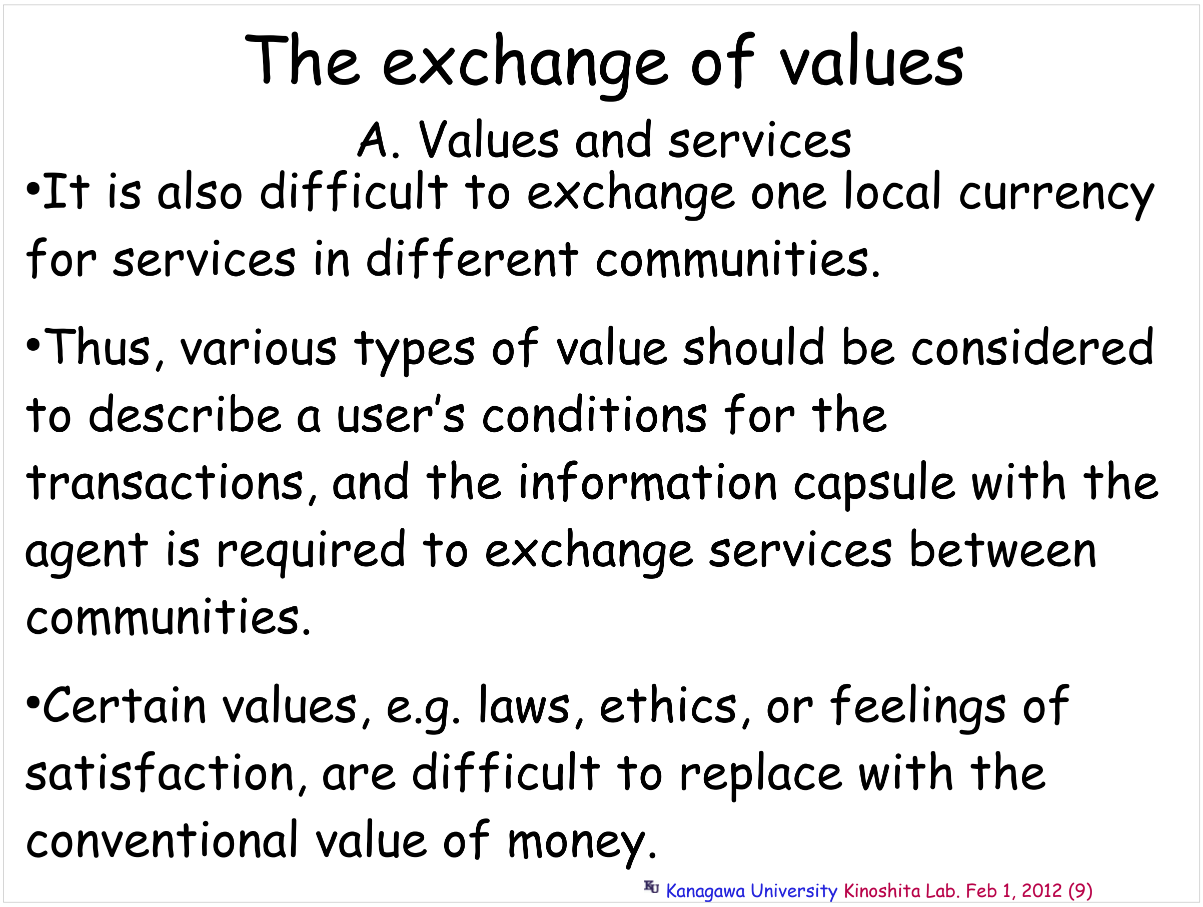


The exchange of values

A. Values and services

- When information resources and services are supplied through a network, their values are unified and expressed in prices in conventional settlements.

- Furthermore, finding appropriate parties with which to exchange and the services for currency can be difficult.



The exchange of values

A. Values and services

- It is also difficult to exchange one local currency for services in different communities.
- Thus, various types of value should be considered to describe a user’s conditions for the transactions, and the information capsule with the agent is required to exchange services between communities.
- Certain values, e.g. laws, ethics, or feelings of satisfaction, are difficult to replace with the conventional value of money.

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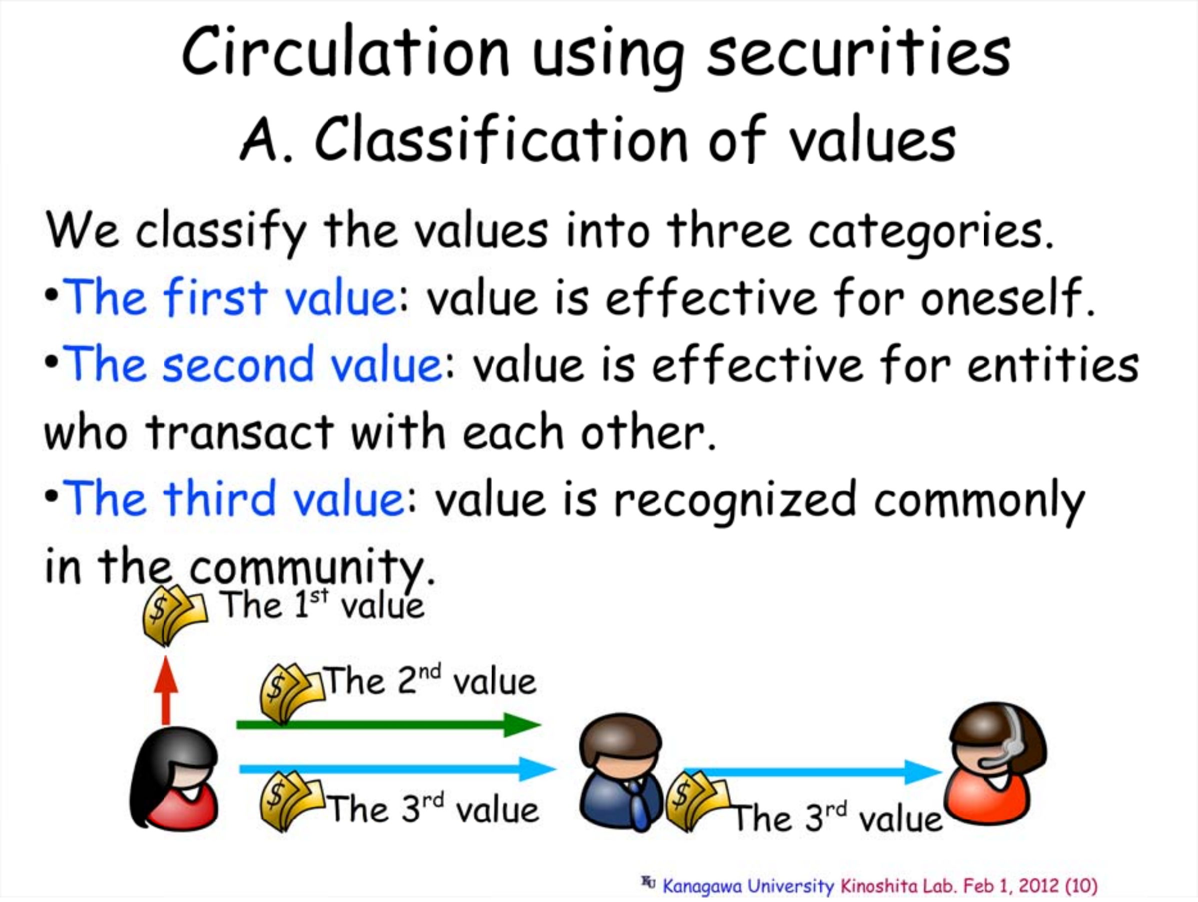

Circulation using securities

A. Classification of values

We classify the values into three categories.

- The first value: value is effective for oneself.
- The second value: value is effective for entities who transact with each other.
- The third value: value is recognized commonly in the community.

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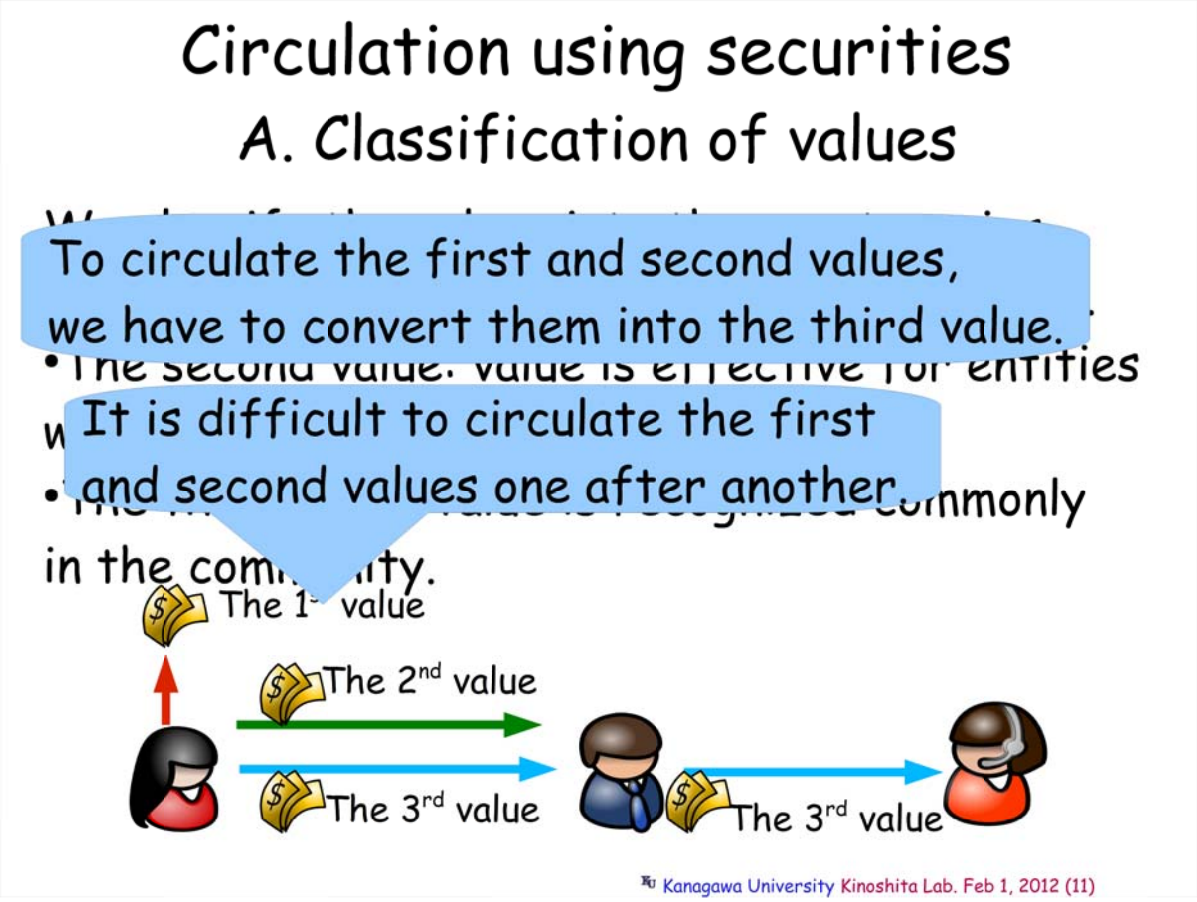


Circulation using securities

A. Classification of values

To circulate the first and second values, we have to convert them into the third value.

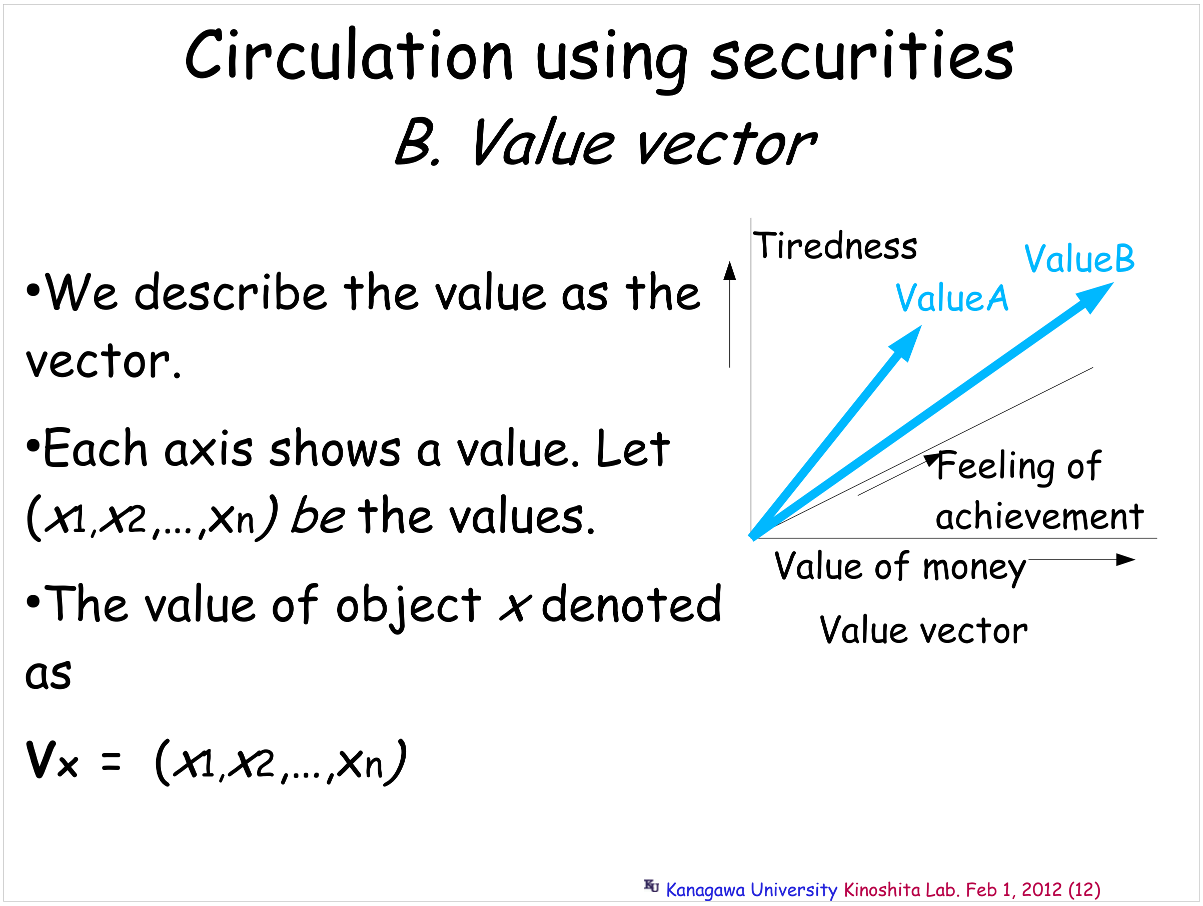
• The second value: value is effective for entities

It is difficult to circulate the first and second values one after another.

commonly in the community.

The 1st value
The 2nd value
The 3rd value
The 3rd value

Kanagawa University Kinoshita Lab. Feb 1, 2012 (11)



Circulation using securities

B. Value vector

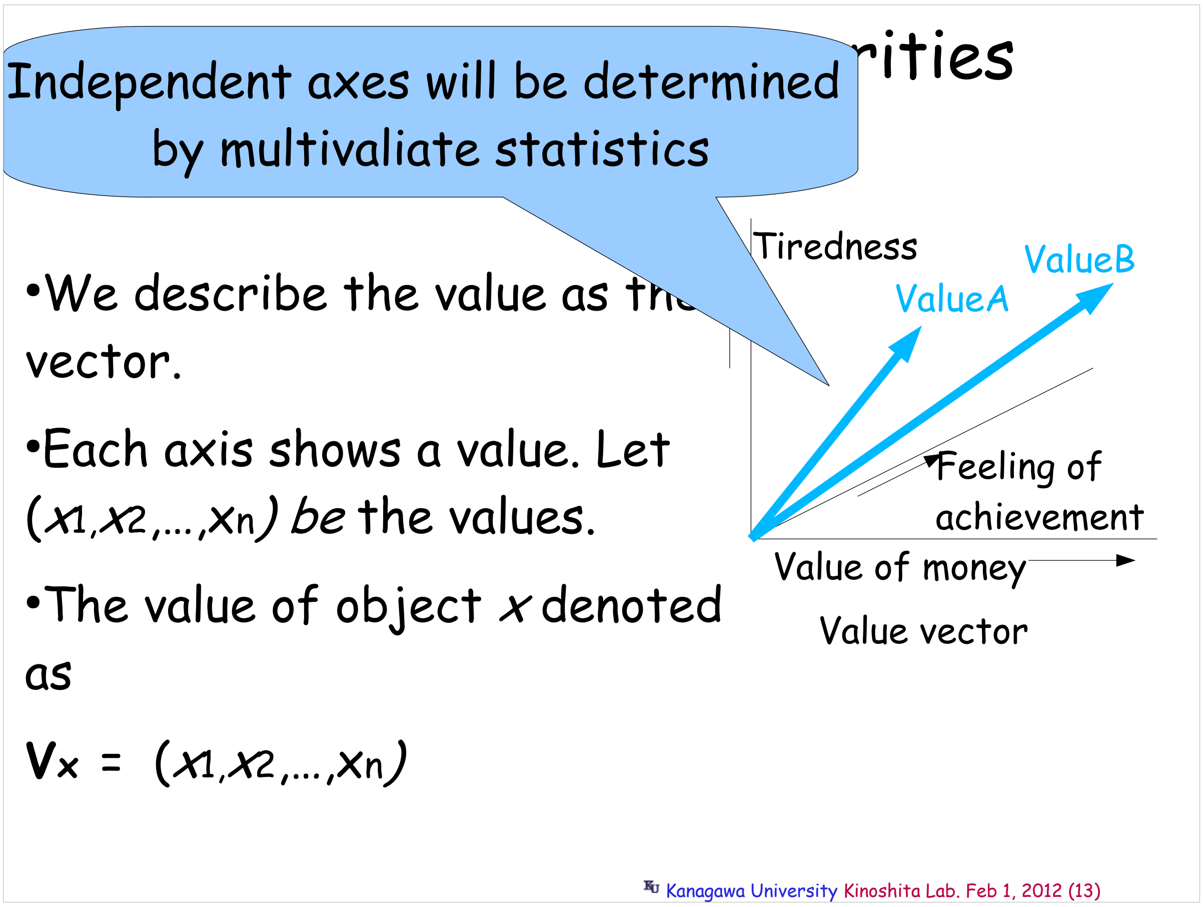
- We describe the value as the vector.
- Each axis shows a value. Let $(x_1, x_2, \ldots, x_n)$ *be* the values.
- The value of object *x* denoted as

$$V_x = (x_1, x_2, \ldots, x_n)$$

Tiredness
ValueB
ValueA
Feeling of achievement
Value of money

Value vector

Kanagawa University Kinoshita Lab. Feb 1, 2012 (12)

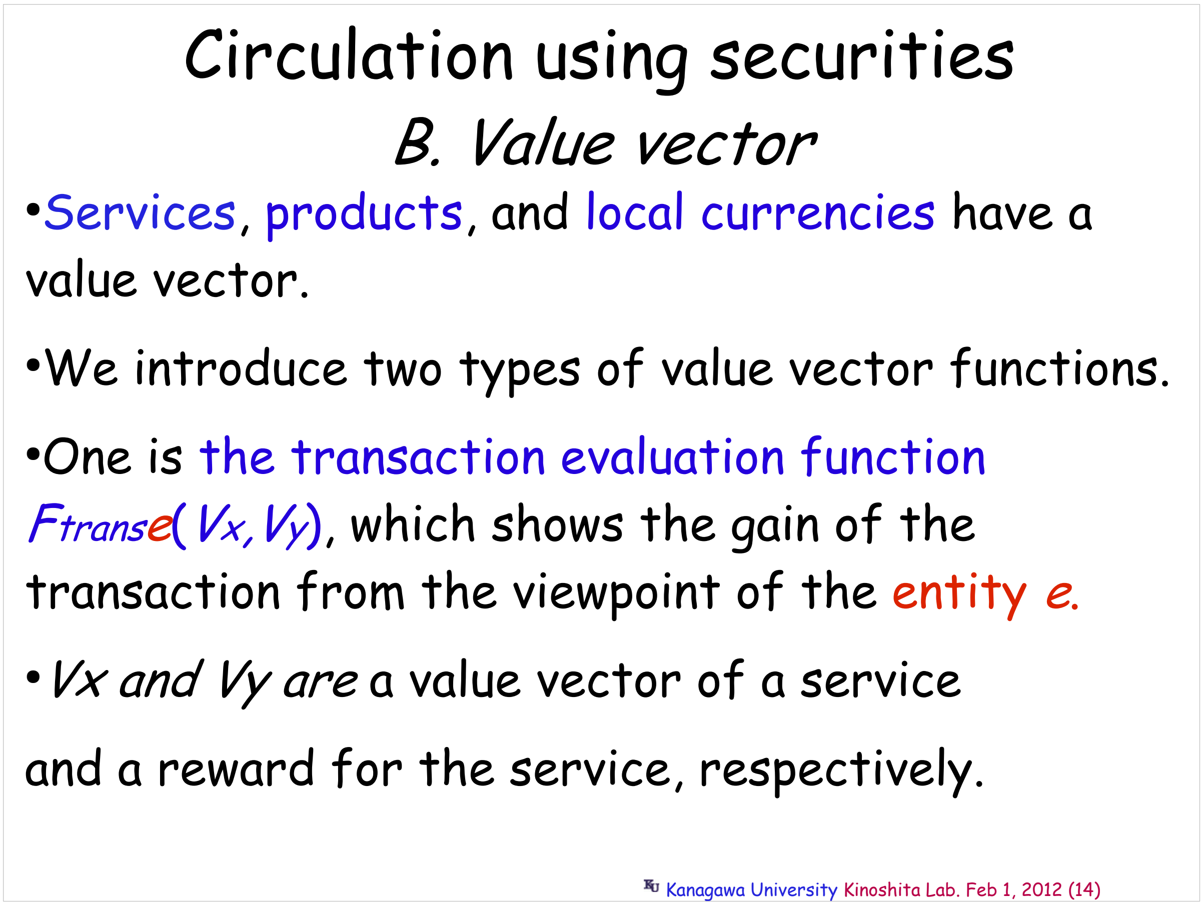


rities

Independent axes will be determined by multivaliate statistics

- We describe the value as th vector.
- Each axis shows a value. Let $(x_1, x_2, \ldots, x_n)$ be the values.
- The value of object x denoted as

$V_x = (x_1, x_2, \ldots, x_n)$



Circulation using securities
B. Value vector

- Services, products, and local currencies have a value vector.
- We introduce two types of value vector functions.
- One is the transaction evaluation function $Ftrans_e(V_x, V_y)$, which shows the gain of the transaction from the viewpoint of the entity *e*.
- V_x and V_y are a value vector of a service

and a reward for the service, respectively.

Circulation using securities

B. Value vector

- F_{transe} becomes positive if the transaction yields a profit for *e*.
- The other is the property function F_{prope}, which shows amount of the property of the entity *e*.

Circulation using securities

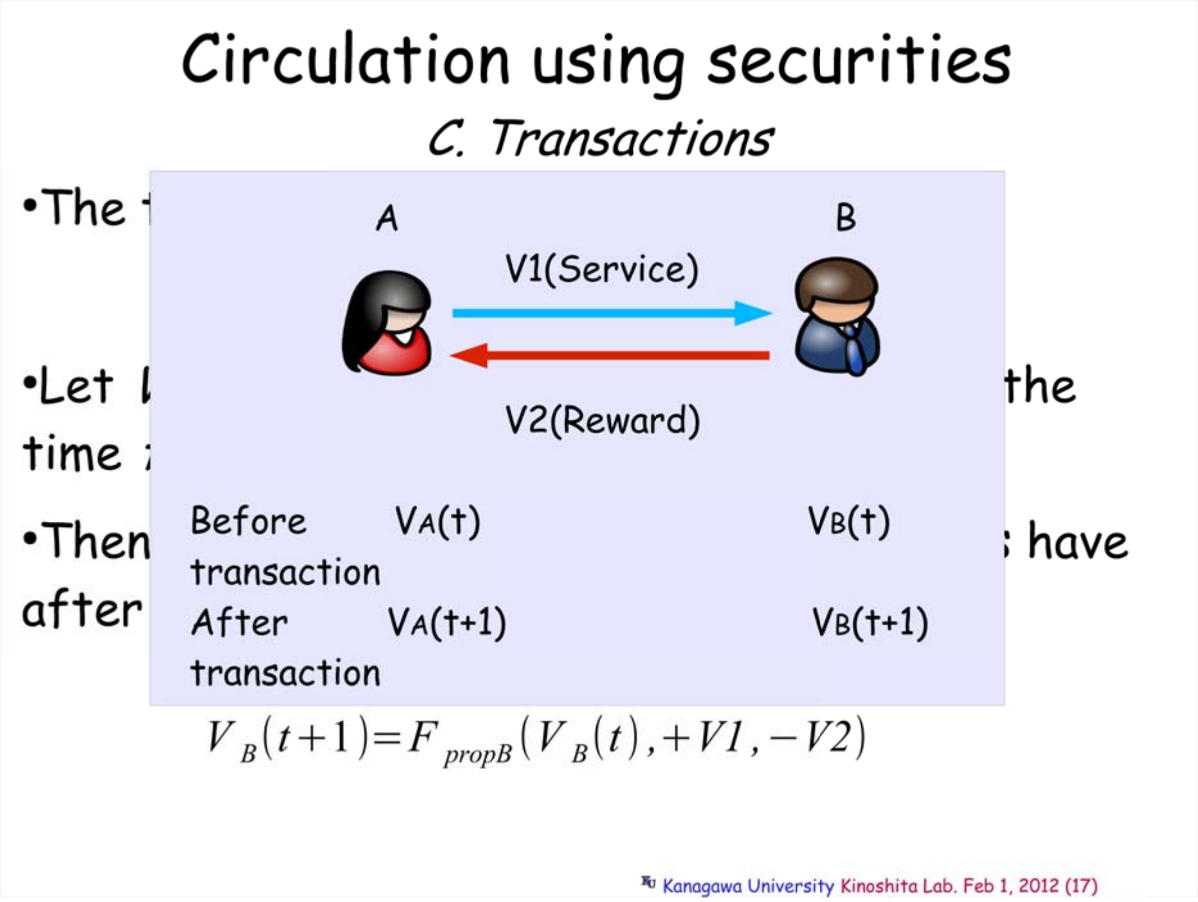
C. Transactions

- The transaction comes off successfully if

$$F_{transA}(V1, V2) > 0 \wedge F_{transB}(V2, V1) > 0$$

- Let $V_A(t)$ and $V_B(t)$ be the value vectors at the time *t* of entities A and B respectively.
- Then, the amounts of property the entities have after a transaction are described as

$$V_A(t+1) = F_{propA}(V_A(t), -V1, +V2)$$
$$V_B(t+1) = F_{propB}(V_B(t), +V1, -V2)$$



Circulation using securities

C. Transactions

•The

•Let … the

time

•Then … have

after

A

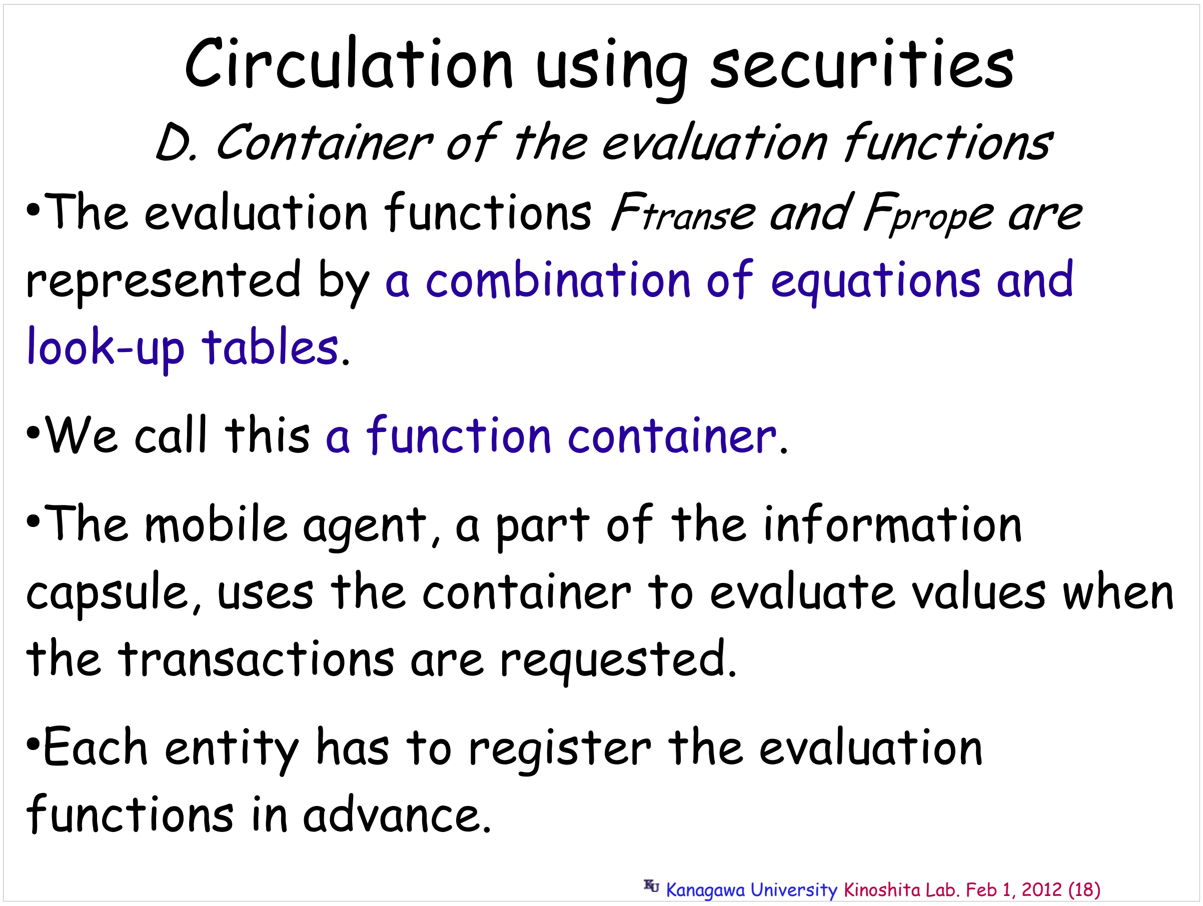
B

V1(Service)

V2(Reward)

Before transaction	$V_A(t)$	$V_B(t)$
After transaction	$V_A(t+1)$	$V_B(t+1)$

$$V_B(t+1)=F_{propB}(V_B(t),+V1,-V2)$$



Circulation using securities

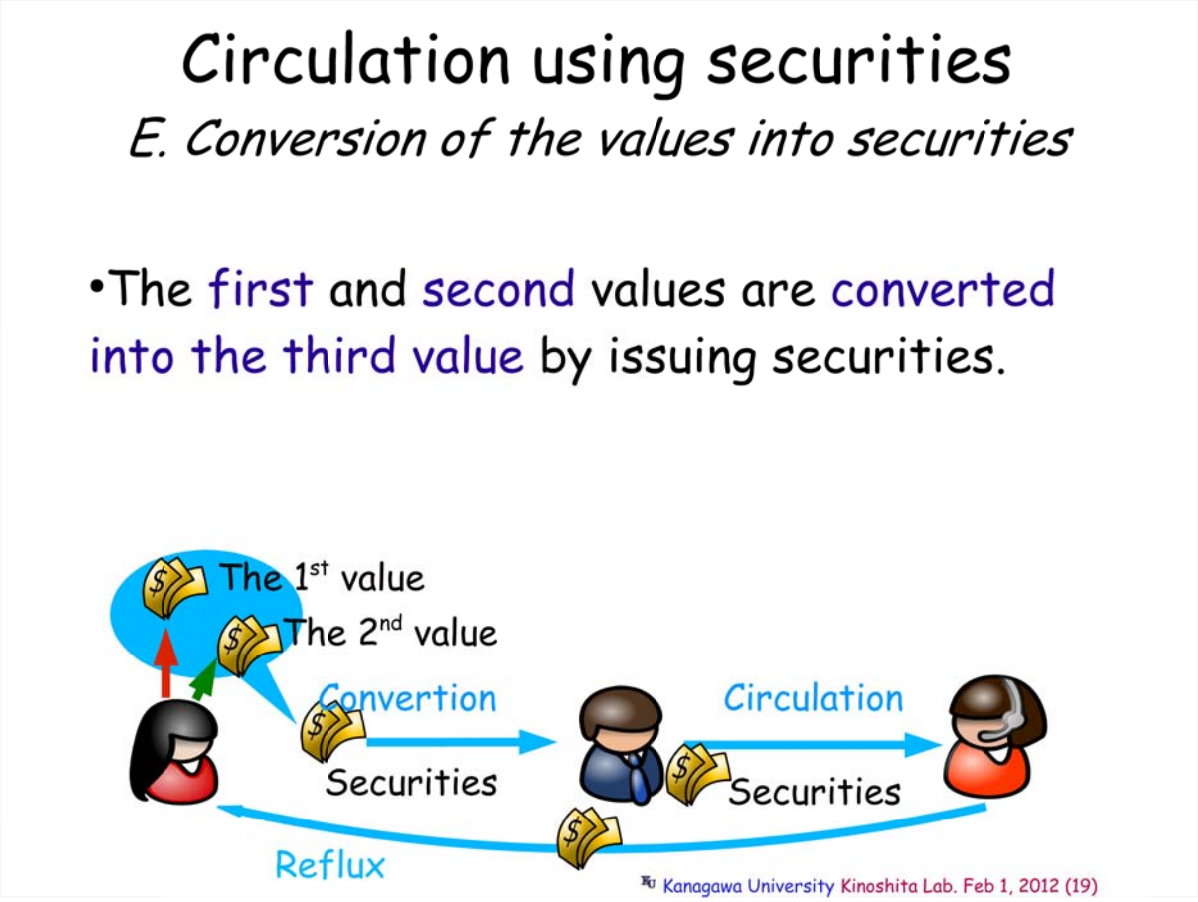
D. Container of the evaluation functions

•The evaluation functions *Ftranse and Fprope are* represented by a combination of equations and look-up tables.

•We call this a function container.

•The mobile agent, a part of the information capsule, uses the container to evaluate values when the transactions are requested.

•Each entity has to register the evaluation functions in advance.



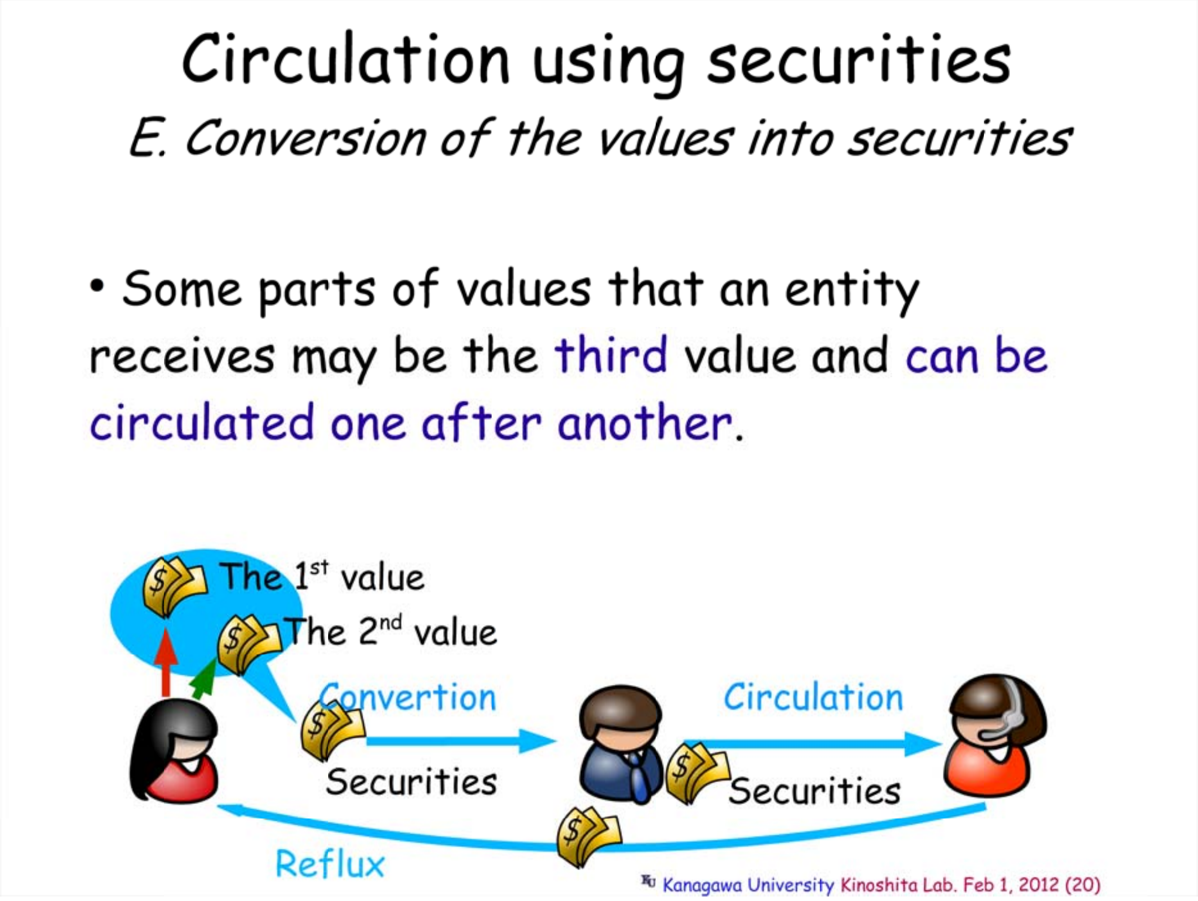
Circulation using securities

E. Conversion of the values into securities

- The first and second values are converted into the third value by issuing securities.

The 1st value
The 2nd value
Convertion
Securities
Circulation
Securities
Reflux

Kanagawa University Kinoshita Lab. Feb 1, 2012 (19)



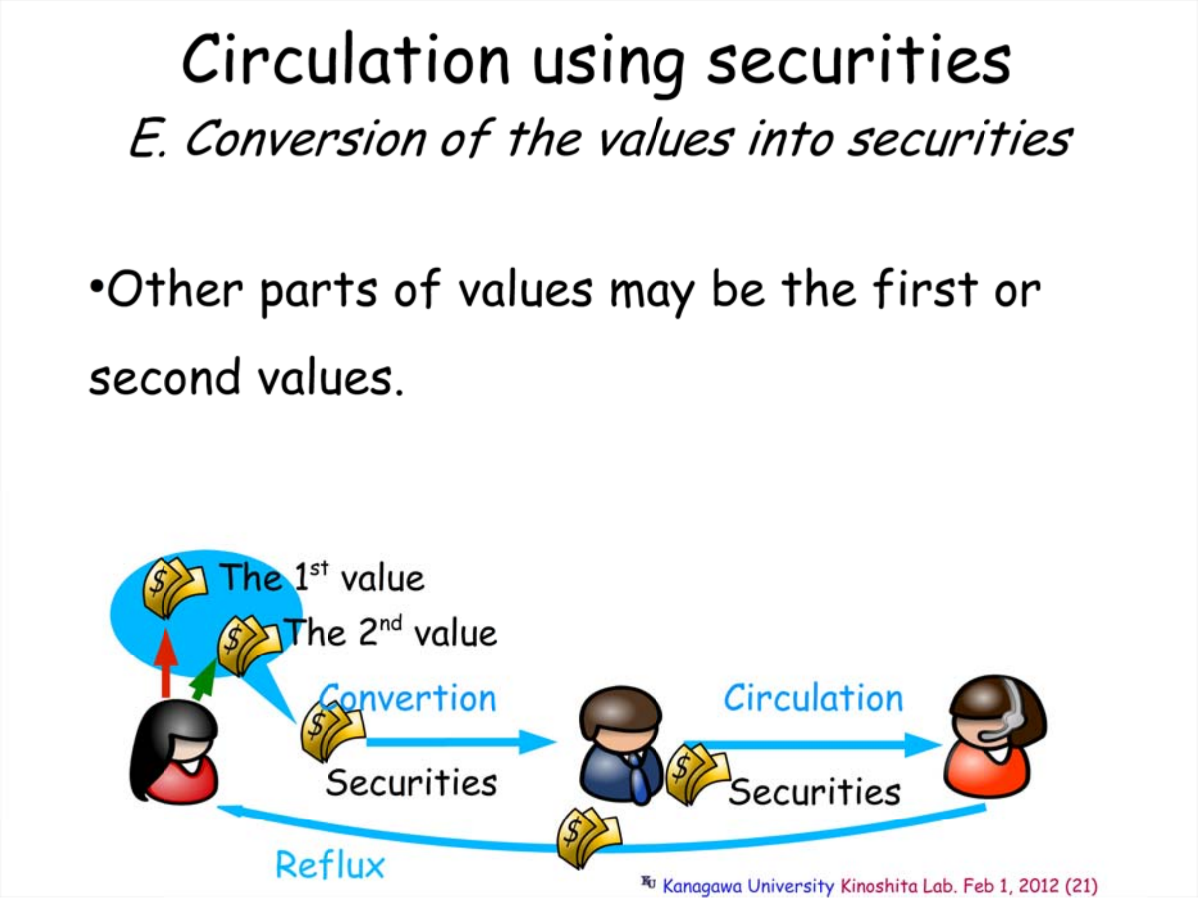
Circulation using securities

E. Conversion of the values into securities

- Some parts of values that an entity receives may be the third value and can be circulated one after another.

The 1st value
The 2nd value
Convertion
Securities
Circulation
Securities
Reflux

Kanagawa University Kinoshita Lab. Feb 1, 2012 (20)



Circulation using securities

E. Conversion of the values into securities

- Other parts of values may be the first or second values.

The 1^{st} value

The 2^{nd} value

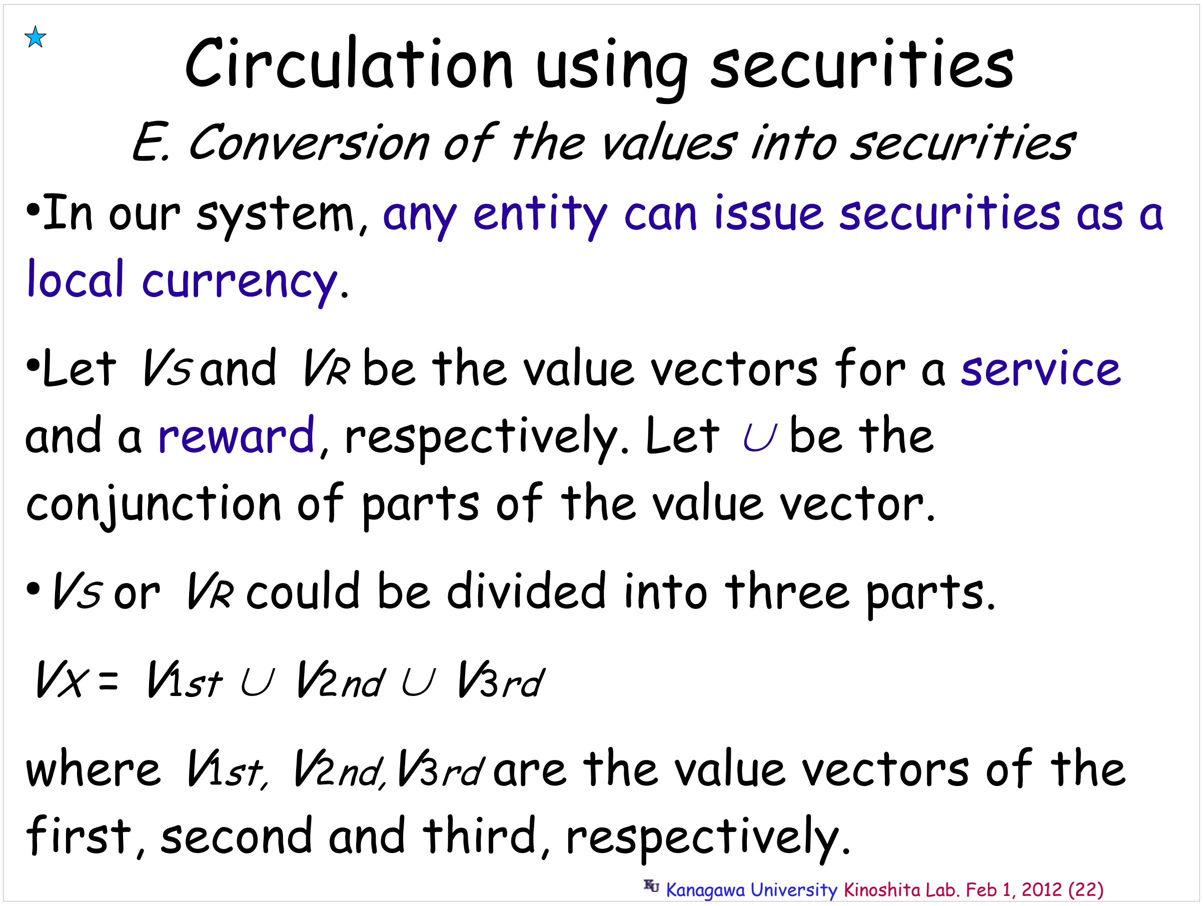
Convertion

Securities

Circulation

Securities

Reflux



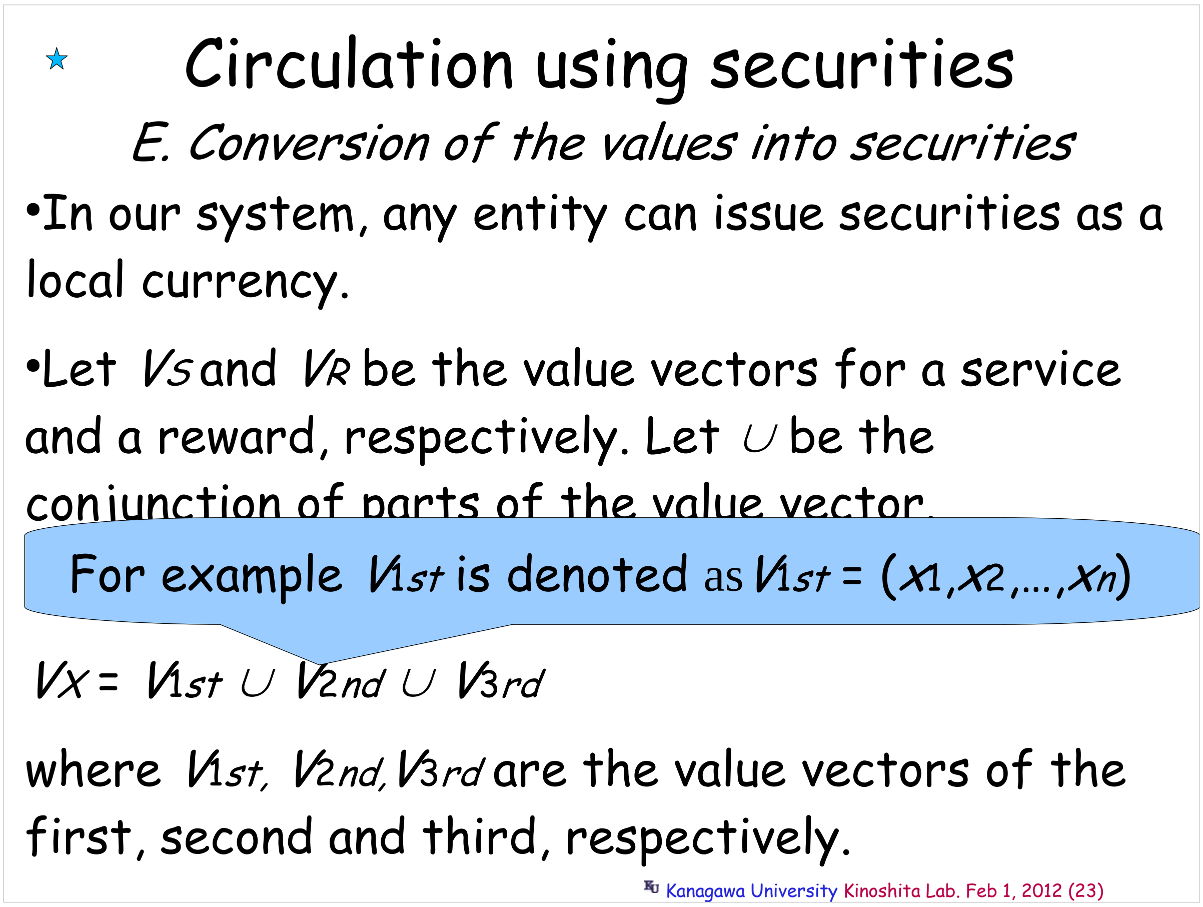
Circulation using securities

E. Conversion of the values into securities

- In our system, any entity can issue securities as a local currency.
- Let V_S and V_R be the value vectors for a service and a reward, respectively. Let $\cup$ be the conjunction of parts of the value vector.
- V_S or V_R could be divided into three parts.

$$V_X = V_{1st} \cup V_{2nd} \cup V_{3rd}$$

where V_{1st}, V_{2nd}, V_{3rd} are the value vectors of the first, second and third, respectively.



Circulation using securities

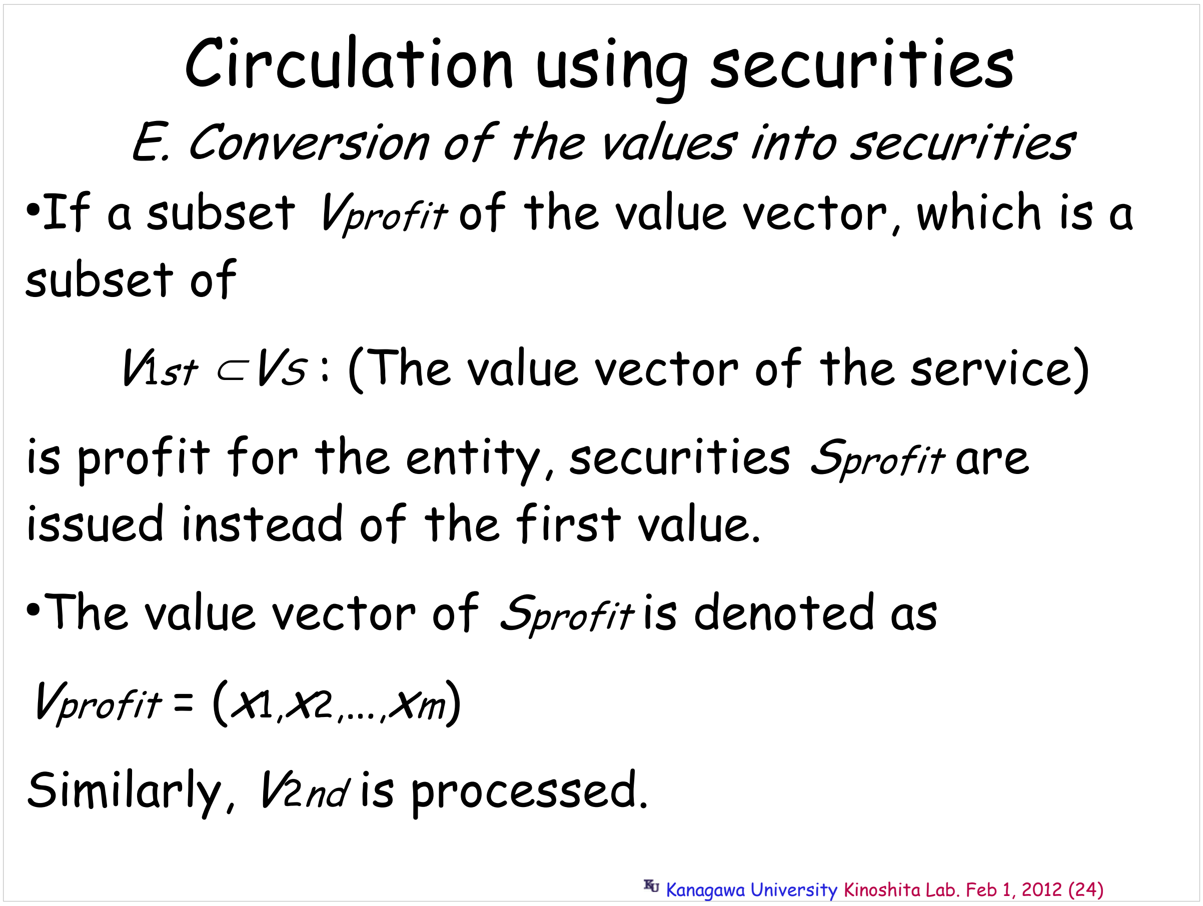
E. Conversion of the values into securities

- In our system, any entity can issue securities as a local currency.
- Let V_S and V_R be the value vectors for a service and a reward, respectively. Let $\cup$ be the conjunction of parts of the value vector.

For example V_{1st} is denoted as $V_{1st} = (x_1, x_2, \ldots, x_n)$

$V_X = V_{1st} \cup V_{2nd} \cup V_{3rd}$

where V_{1st}, V_{2nd}, V_{3rd} are the value vectors of the first, second and third, respectively.



Circulation using securities

E. Conversion of the values into securities

- If a subset V_{profit} of the value vector, which is a subset of

$V_{1st} \subset V_S$: (The value vector of the service)

is profit for the entity, securities S_{profit} are issued instead of the first value.

- The value vector of S_{profit} is denoted as

$V_{profit} = (x_1, x_2, \ldots, x_m)$

Similarly, V_{2nd} is processed.

Credit of the securities

A. Reputation of the personality

1) Outline of the method:

- The reputation of the entities consists of two parts.
- One is evaluated by the performance history of the securities issued by the entity.
- The other is the subjective reliability, which is evaluated by the relationships in the communities.

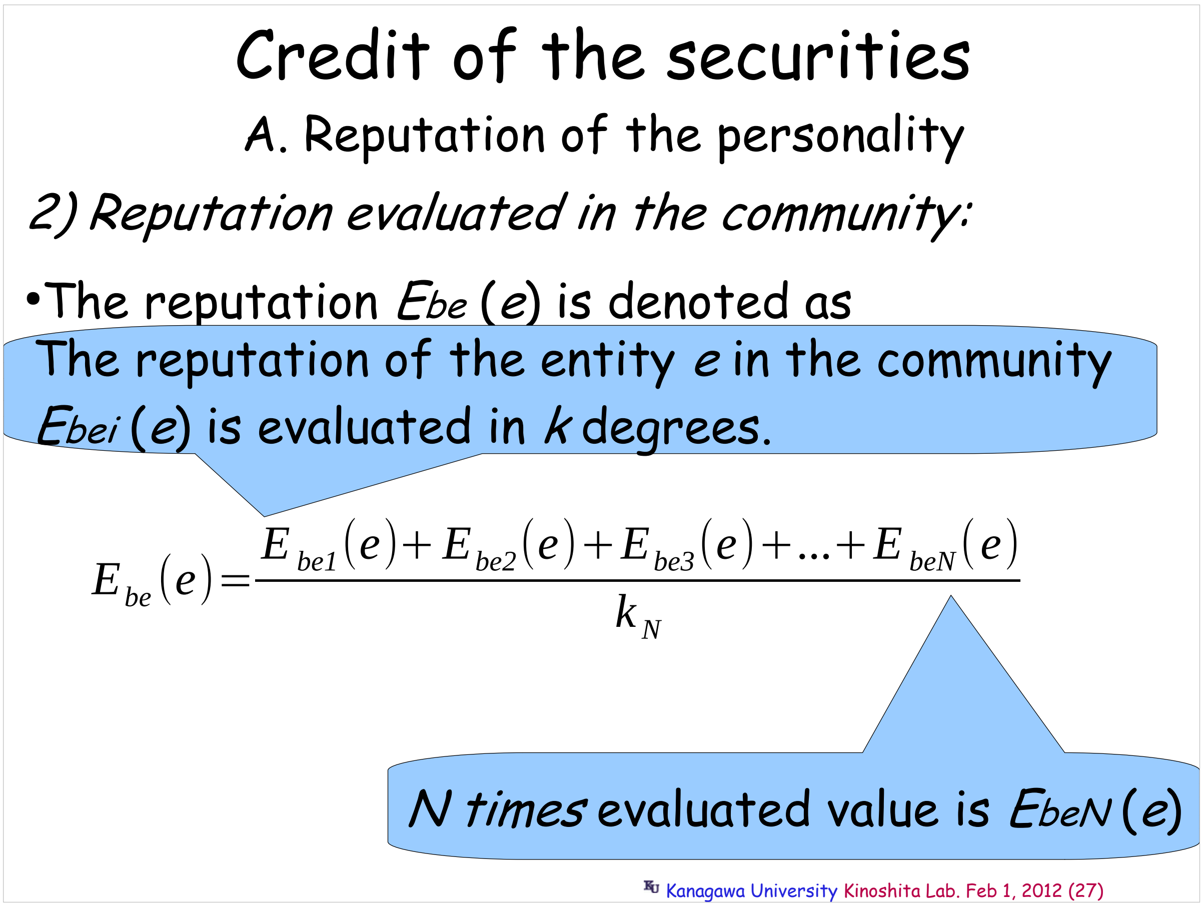
Credit of the securities

A. Reputation of the personality

2) Reputation evaluated in the community:

- The reputation $E_{be}(e)$ is denoted as

$$E_{be}(e)=\frac{E_{be1}(e)+E_{be2}(e)+E_{be3}(e)+\ldots+E_{beN}(e)}{k_N}$$



Credit of the securities

A. Reputation of the personality

2) Reputation evaluated in the community:

- The reputation *Ebe* (*e*) is denoted as

The reputation of the entity *e* in the community *Ebei* (*e*) is evaluated in *k* degrees.

$$E_{be}(e)=\frac{E_{be1}(e)+E_{be2}(e)+E_{be3}(e)+\ldots+E_{beN}(e)}{k_N}$$

N times evaluated value is *EbeN* (*e*)

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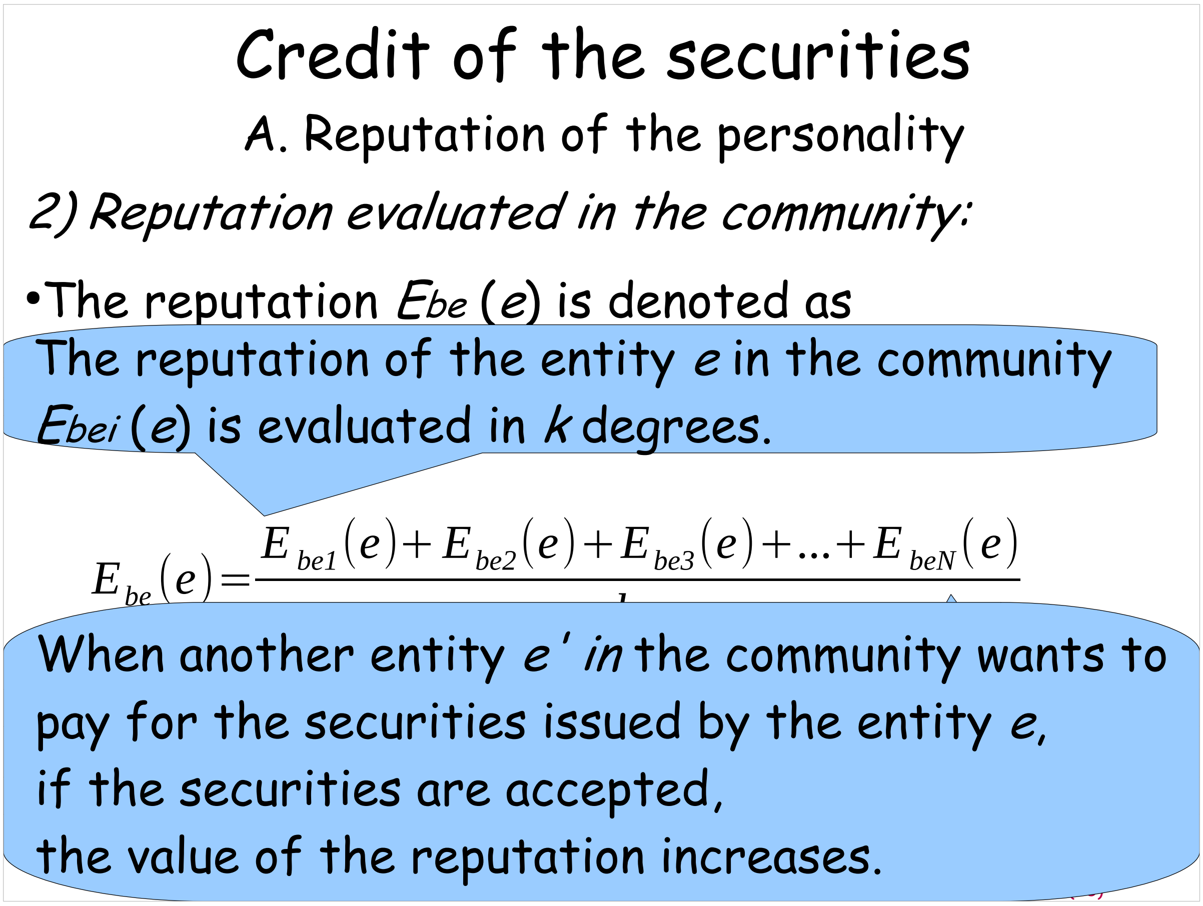


Credit of the securities

A. Reputation of the personality

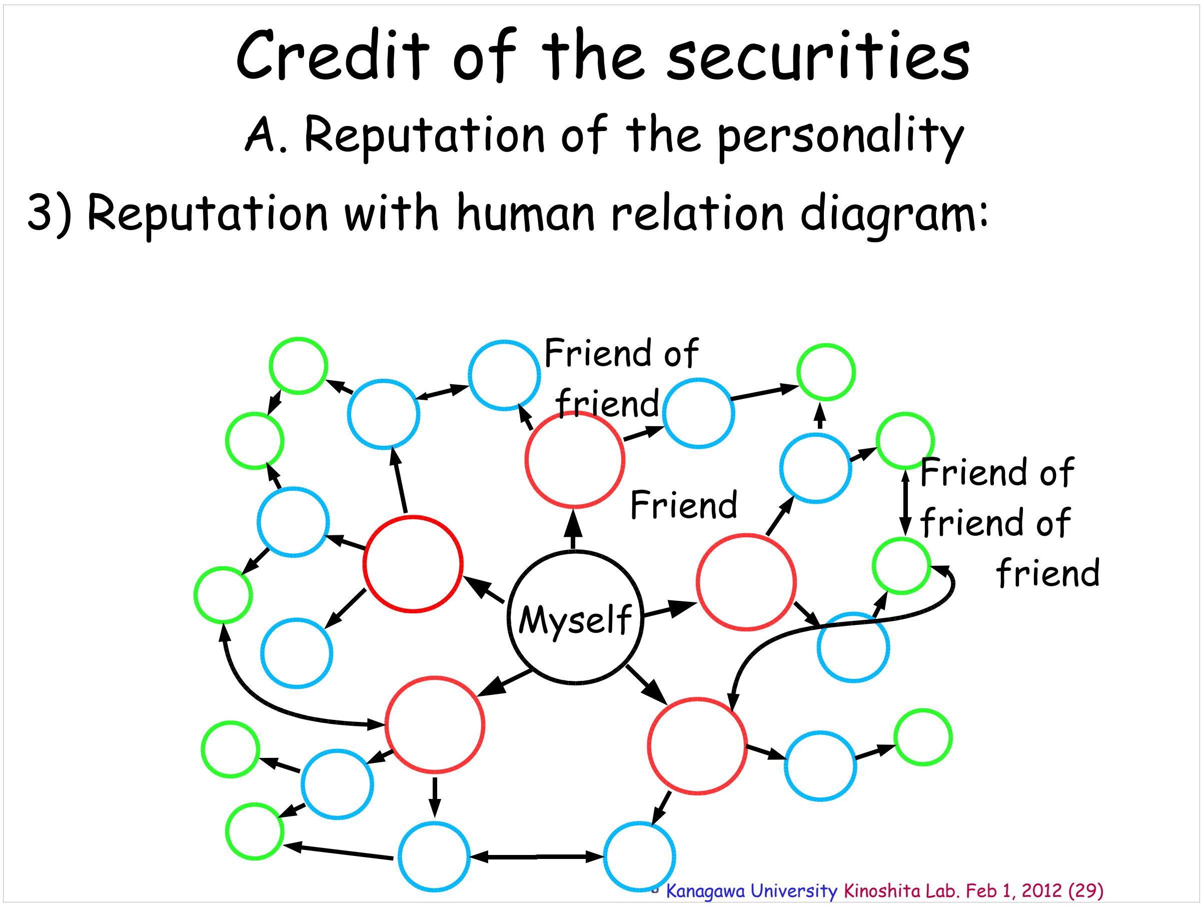
2) Reputation evaluated in the community:

- The reputation *Ebe* (*e*) is denoted as

The reputation of the entity *e* in the community *Ebei* (*e*) is evaluated in *k* degrees.

$$E_{be}(e)=\frac{E_{be1}(e)+E_{be2}(e)+E_{be3}(e)+\ldots+E_{beN}(e)}{}$$

When another entity *e' in* the community wants to pay for the securities issued by the entity *e*, if the securities are accepted, the value of the reputation increases.

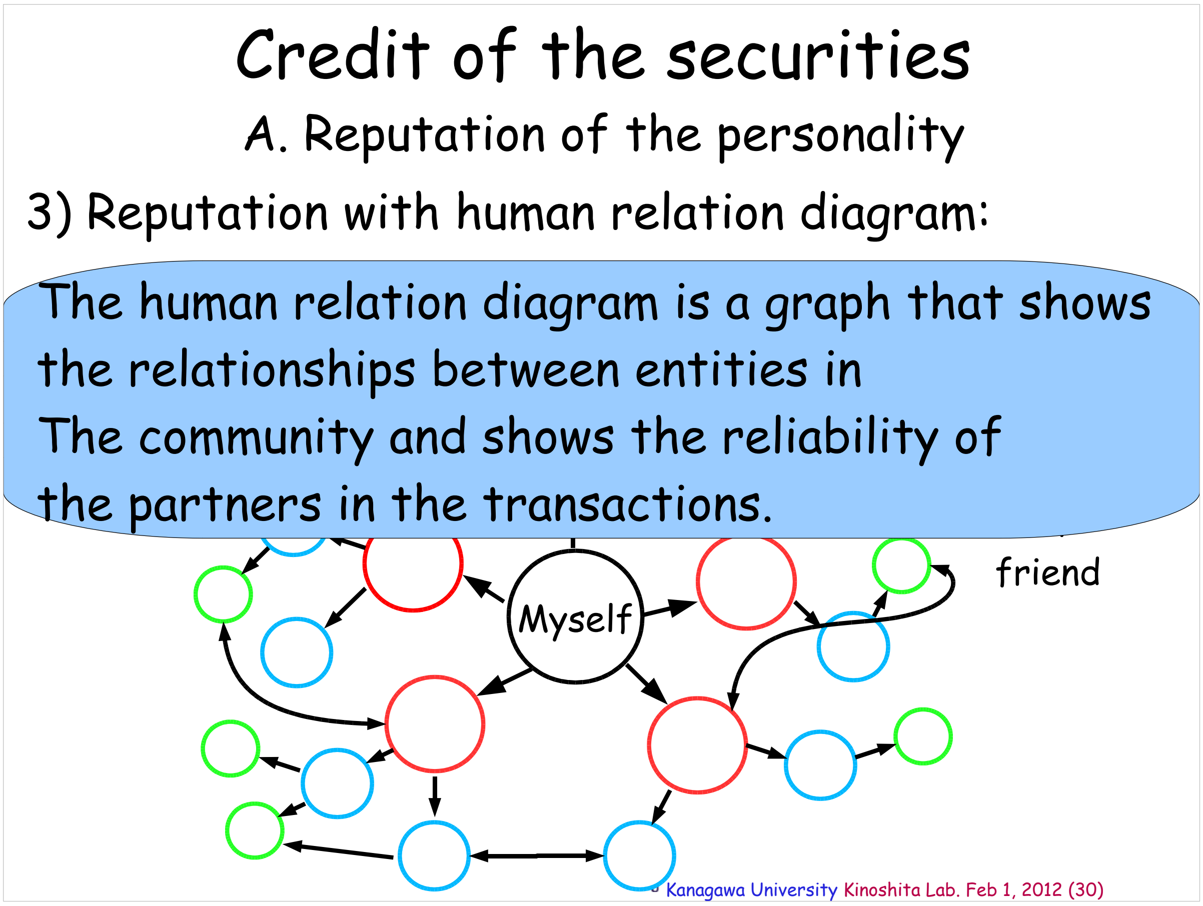


Credit of the securities

A. Reputation of the personality

3) Reputation with human relation diagram:

Friend of
friend
Friend
Friend of
friend of
friend
Myself



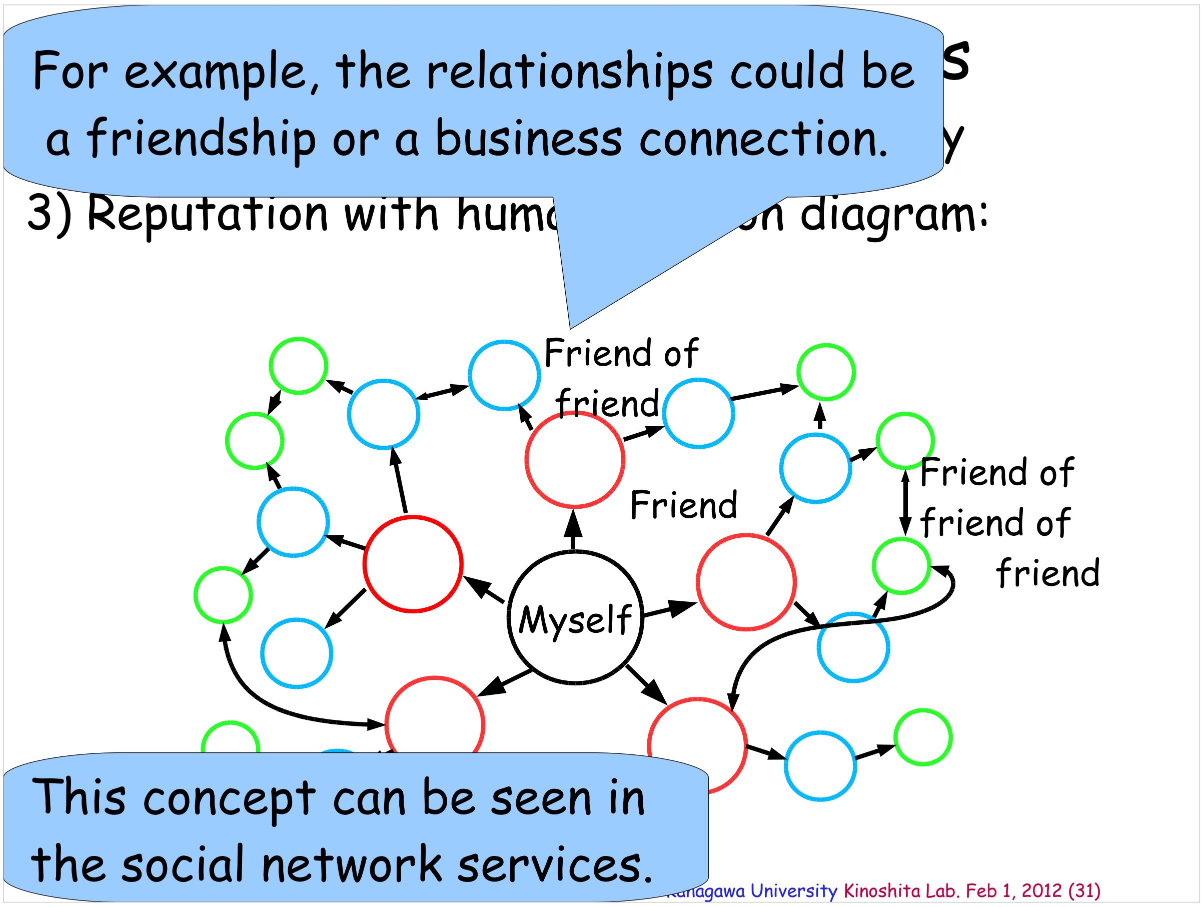
Credit of the securities

A. Reputation of the personality

3) Reputation with human relation diagram:

The human relation diagram is a graph that shows the relationships between entities in
The community and shows the reliability of the partners in the transactions.

friend
Myself



For example, the relationships could be a friendship or a business connection.

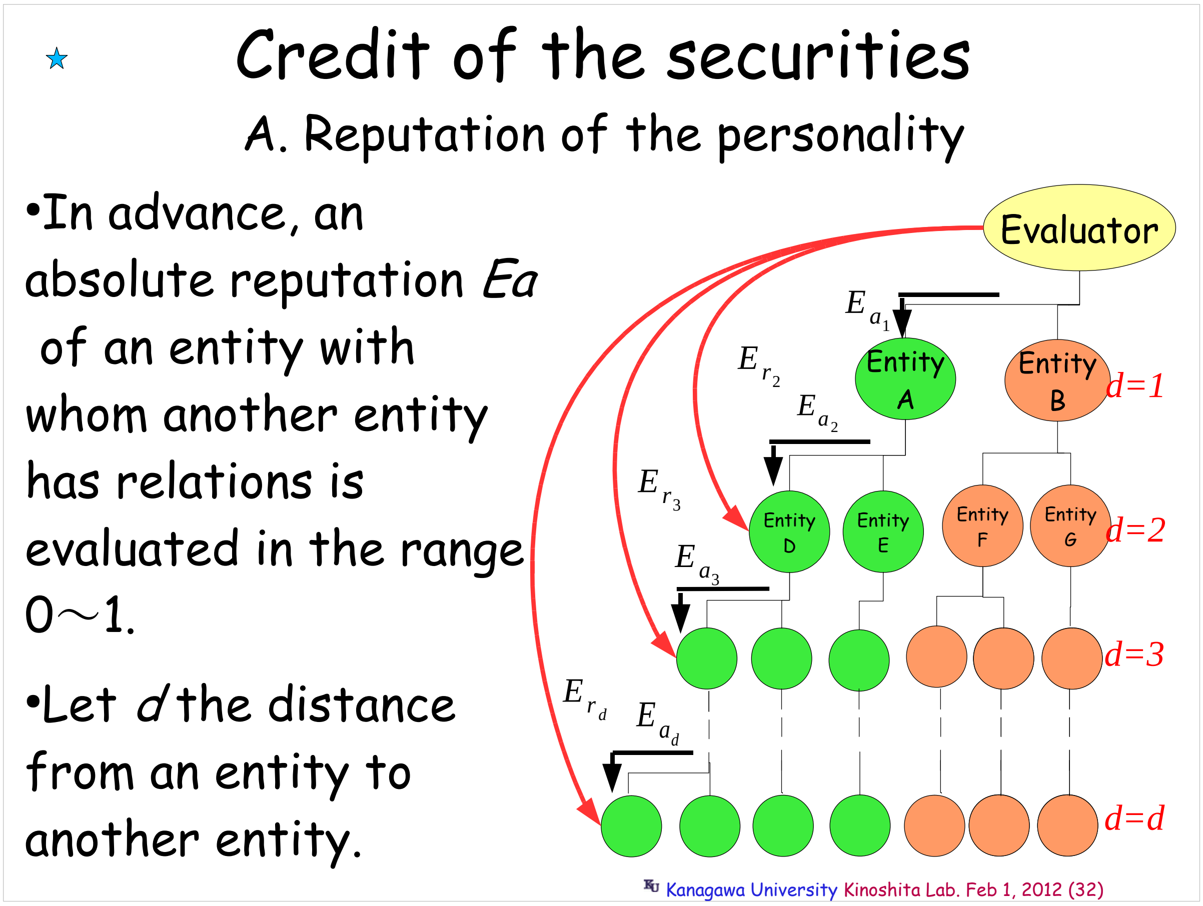
s

y

3) Reputation with hum n diagram:

Friend of
friend
Friend
Friend of
friend of
friend
Myself

This concept can be seen in the social network services.



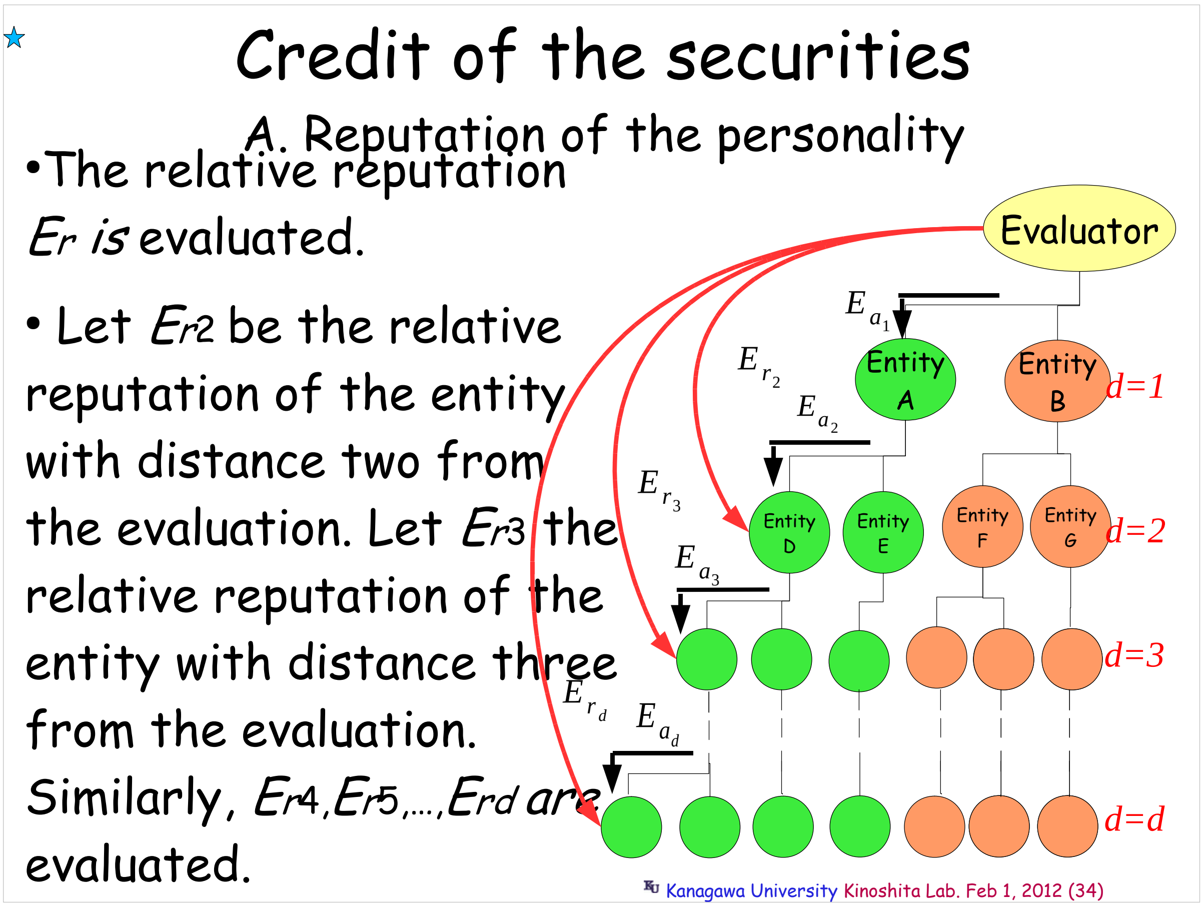
☆ Credit of the securities

A. Reputation of the personality

- In advance, an absolute reputation *Ea* of an entity with whom another entity has relations is evaluated in the range 0～1.

- Let *d* the distance from an entity to another entity.

Evaluator
E_{a_1}
Entity A
Entity B
$d=1$
E_{r_2}
E_{a_2}
Entity D
Entity E
Entity F
Entity G
$d=2$
E_{r_3}
E_{a_3}
$d=3$
E_{r_d}
E_{a_d}
$d=d$



Credit of the securities

A. Reputation of the personality

- The relative reputation E_r *is* evaluated.

- Let E_{r2} be the relative reputation of the entity with distance two from the evaluation. Let E_{r3} the relative reputation of the entity with distance three from the evaluation. Similarly, $E_{r4}, E_{r5}, \ldots, E_{rd}$ are evaluated.

Evaluator
E_{a_1}
E_{r_2}
Entity A
Entity B
$d=1$
E_{a_2}
E_{r_3}
Entity D
Entity E
Entity F
Entity G
$d=2$
E_{a_3}
$d=3$
E_{r_d}
E_{a_d}
$d=d$

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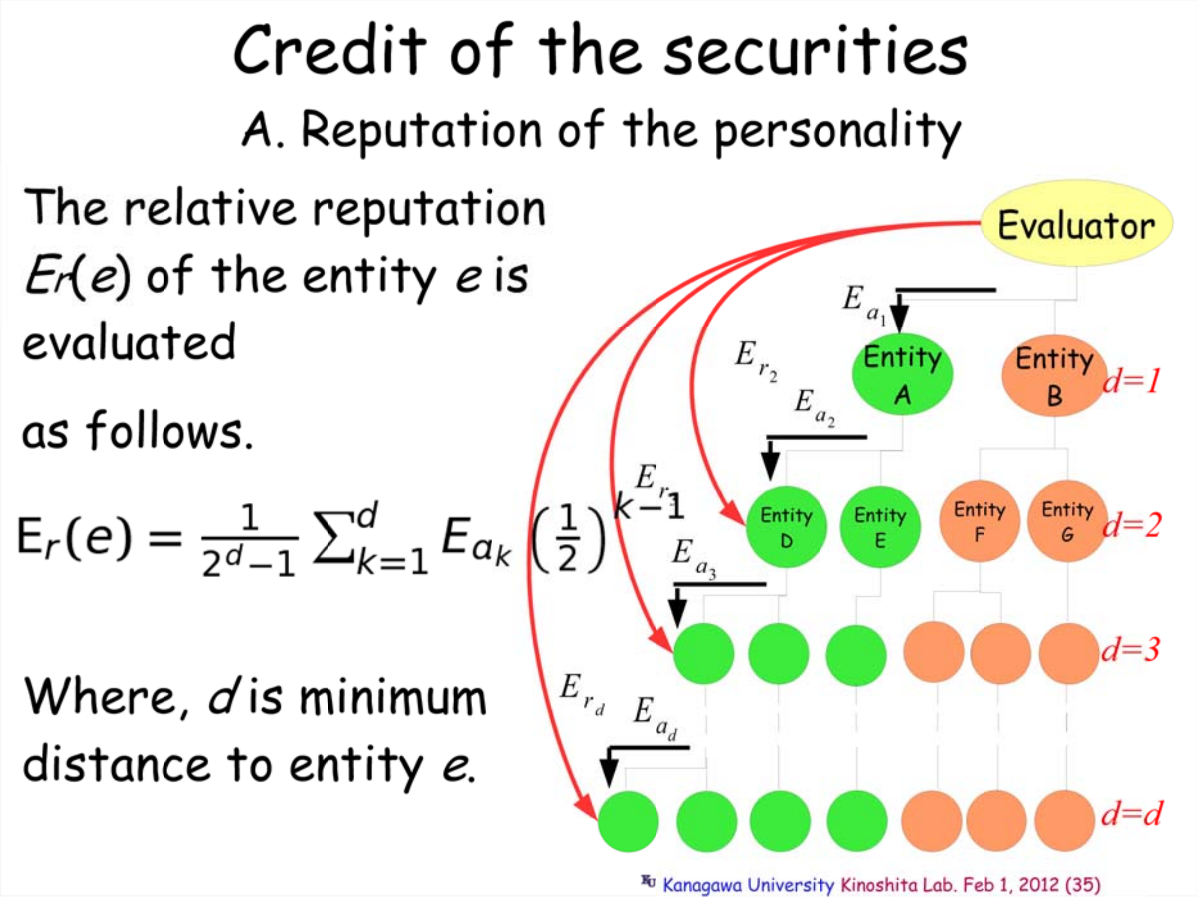

Credit of the securities

A. Reputation of the personality

The relative reputation $E_r(e)$ of the entity e is evaluated

as follows.

$$E_r(e) = \frac{1}{2^d-1}\sum_{k=1}^{d} E_{a_k}\left(\frac{1}{2}\right)^{k-1}$$

Where, d is minimum distance to entity e.

Evaluator
E_{a_1}
E_{r_2}
Entity A
Entity B
$d=1$
E_{a_2}
E_{r_3}
Entity D
Entity E
Entity F
Entity G
$d=2$
E_{a_3}
$d=3$
E_{r_d}
E_{a_d}
$d=d$

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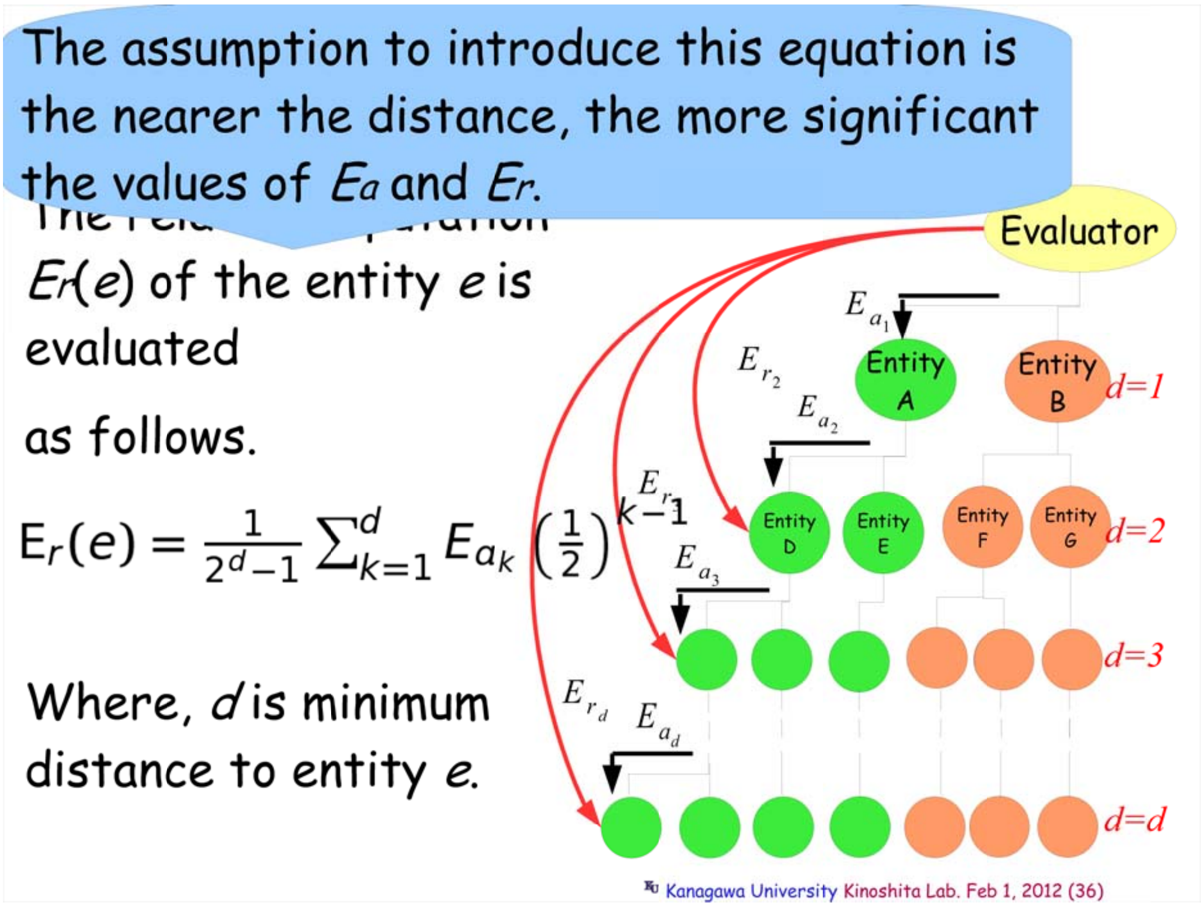


The assumption to introduce this equation is the nearer the distance, the more significant the values of E_a and E_r.

$E_r(e)$ of the entity e is evaluated

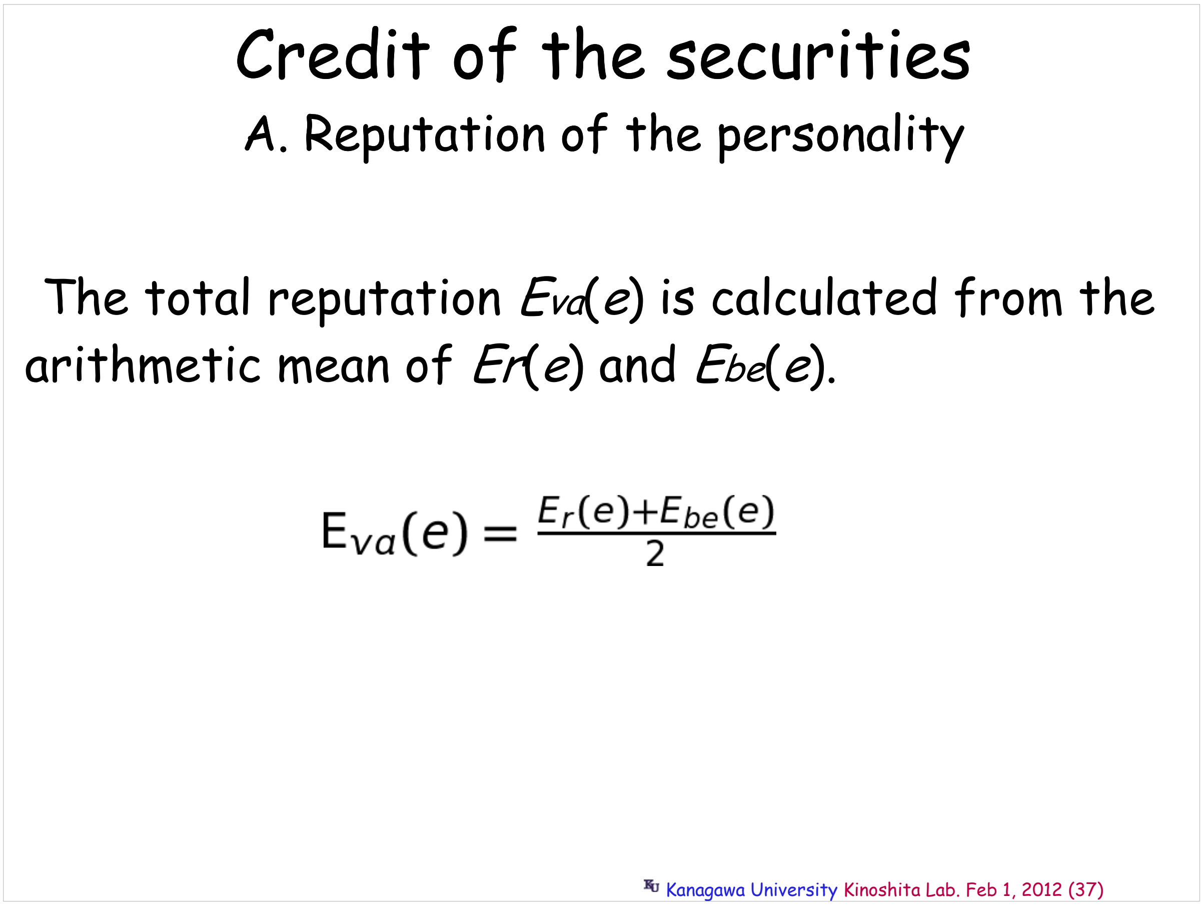
as follows.

$$E_r(e) = \frac{1}{2^d-1}\sum_{k=1}^{d} E_{a_k}\left(\frac{1}{2}\right)^{k-1}$$

Where, d is minimum distance to entity e.

Evaluator
E_{a_1}
E_{r_2}
Entity A
Entity B
d=1
E_{a_2}
E_{r_3}
Entity D
Entity E
Entity F
Entity G
d=2
E_{a_3}
d=3
E_{r_d}
E_{a_d}
d=d

Kanagawa University Kinoshita Lab. Feb 1, 2012 (36)



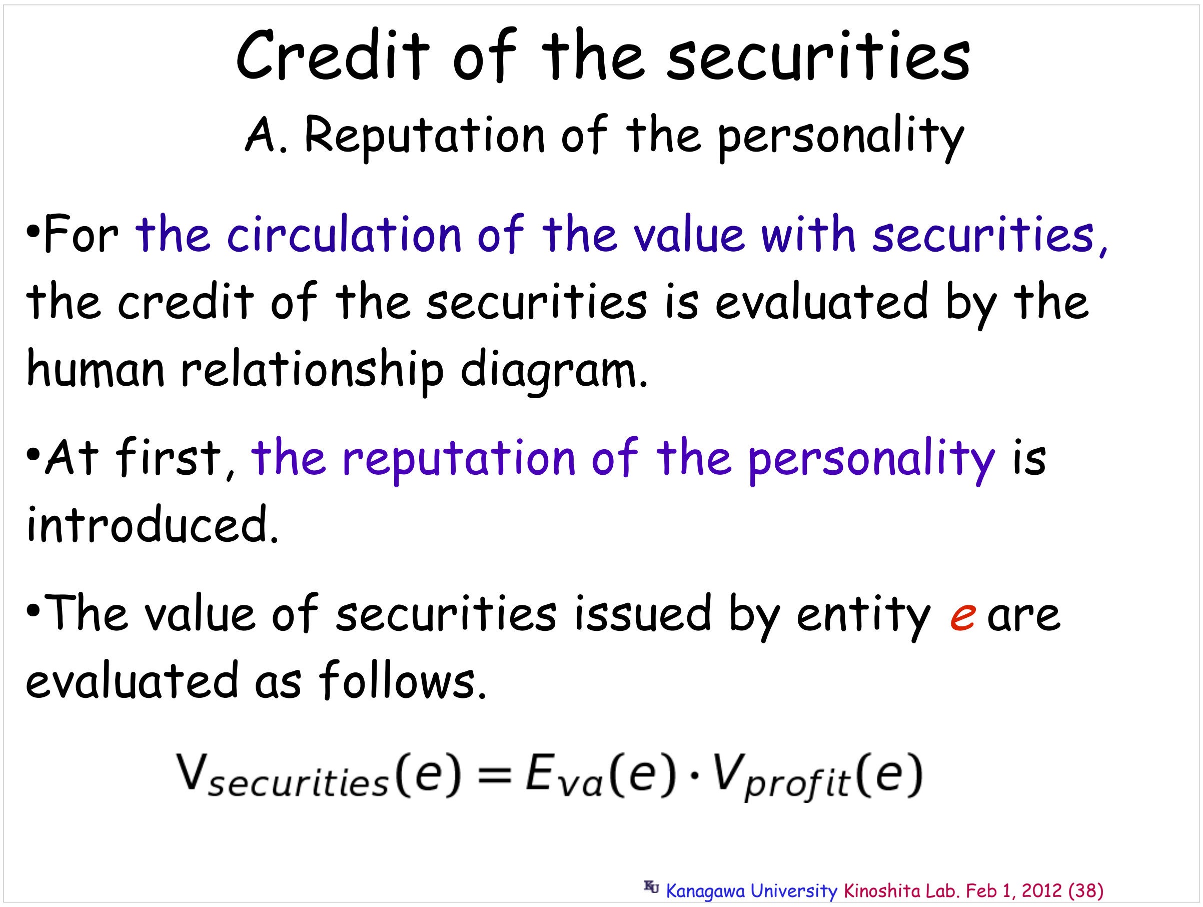
Credit of the securities

A. Reputation of the personality

The total reputation $E_{va}(e)$ is calculated from the arithmetic mean of $E_r(e)$ and $E_{be}(e)$.

$$E_{va}(e) = \frac{E_r(e)+E_{be}(e)}{2}$$

Kanagawa University Kinoshita Lab. Feb 1, 2012 (37)

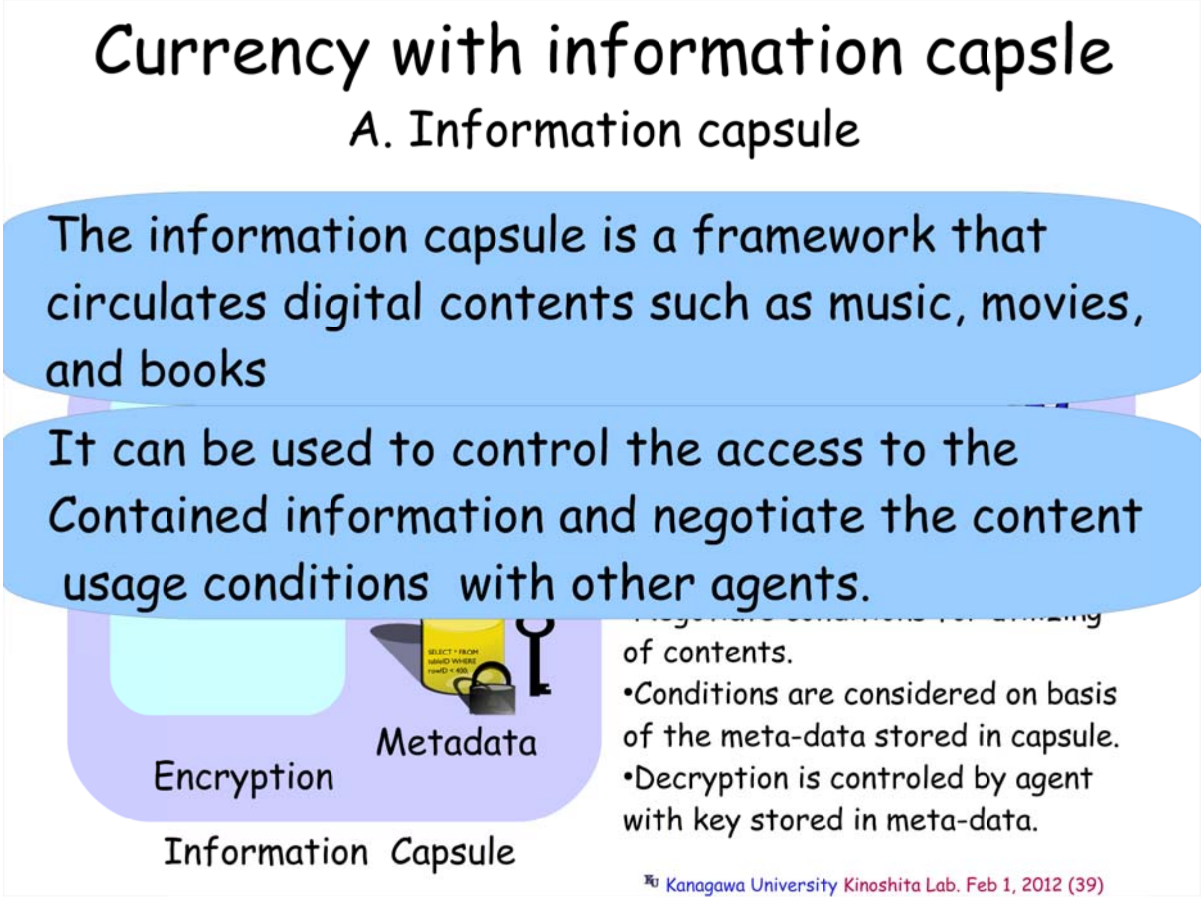


Credit of the securities

A. Reputation of the personality

- For the circulation of the value with securities, the credit of the securities is evaluated by the human relationship diagram.
- At first, the reputation of the personality is introduced.
- The value of securities issued by entity *e* are evaluated as follows.

$$V_{securities}(e) = E_{va}(e) \cdot V_{profit}(e)$$



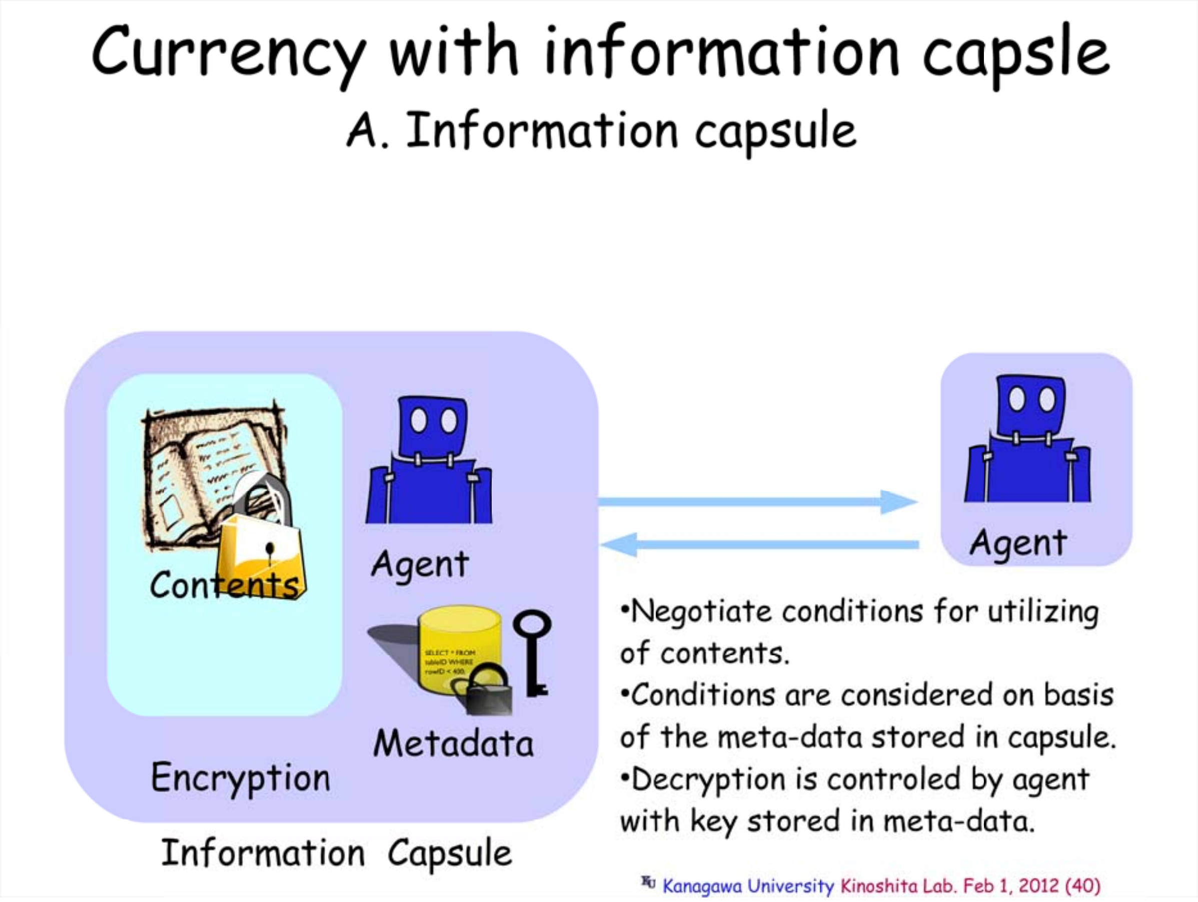
Currency with information capsle

A. Information capsule

The information capsule is a framework that circulates digital contents such as music, movies, and books

It can be used to control the access to the Contained information and negotiate the content usage conditions with other agents.

of contents.
- Conditions are considered on basis of the meta-data stored in capsule.
- Decryption is controled by agent with key stored in meta-data.



Currency with information capsle

A. Information capsule

- Negotiate conditions for utilizing of contents.
- Conditions are considered on basis of the meta-data stored in capsule.
- Decryption is controled by agent with key stored in meta-data.

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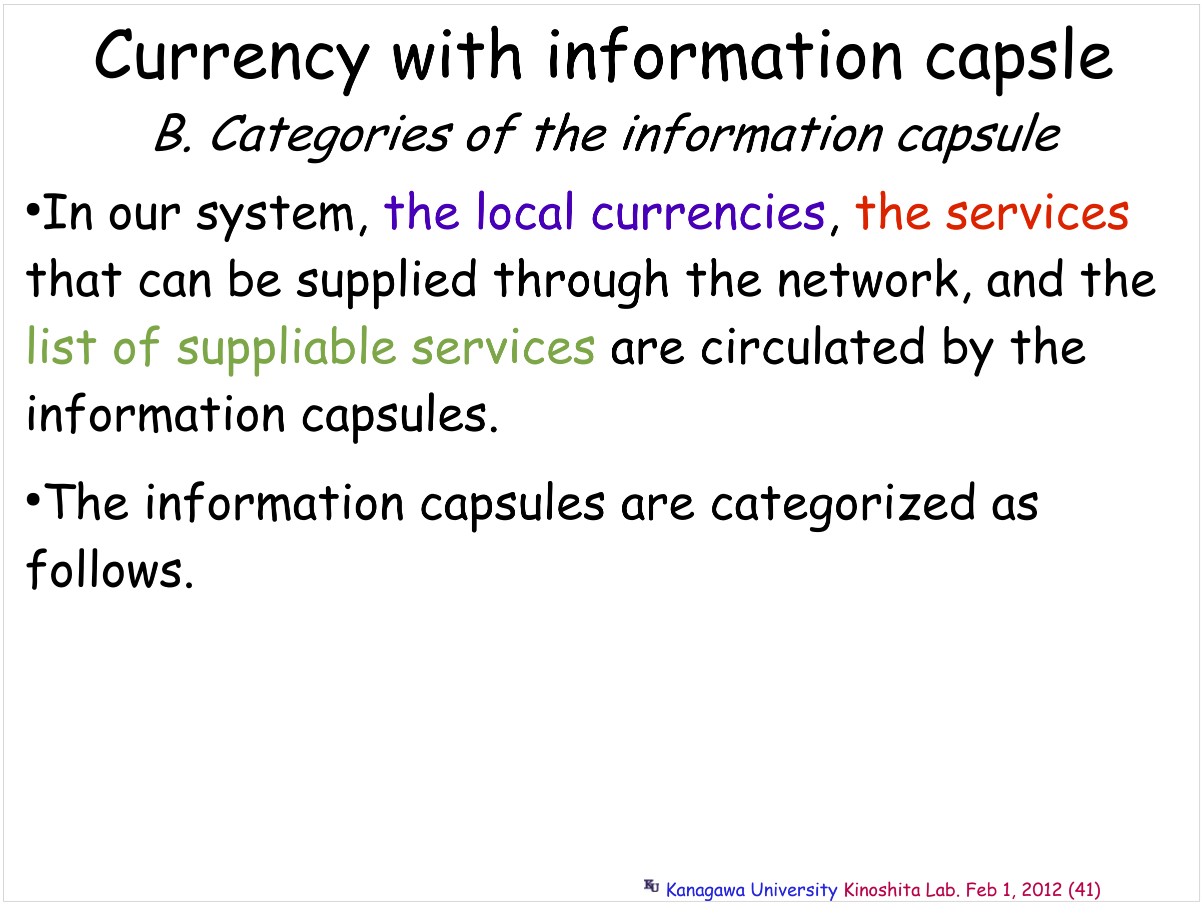

Currency with information capsle

B. Categories of the information capsule

- In our system, the local currencies, the services that can be supplied through the network, and the list of suppliable services are circulated by the information capsules.
- The information capsules are categorized as follows.

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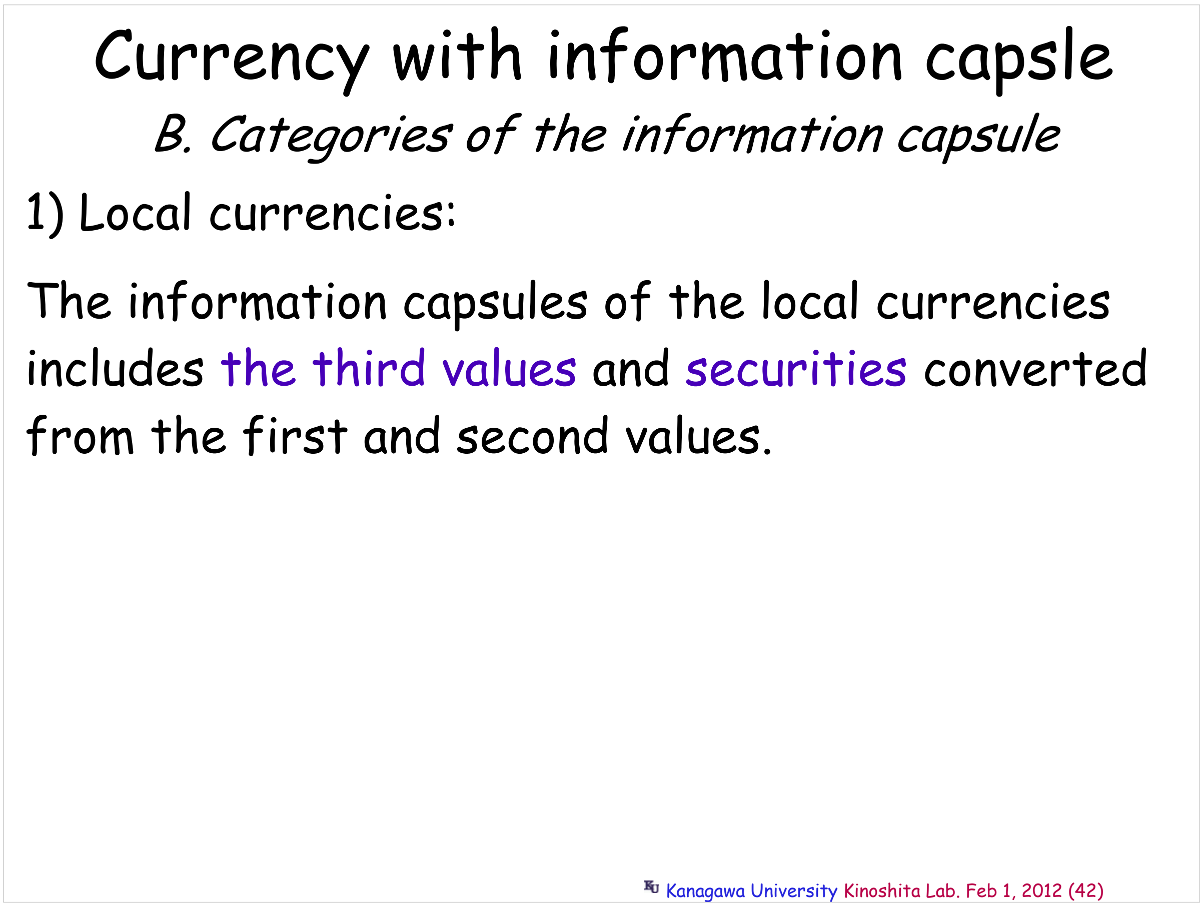
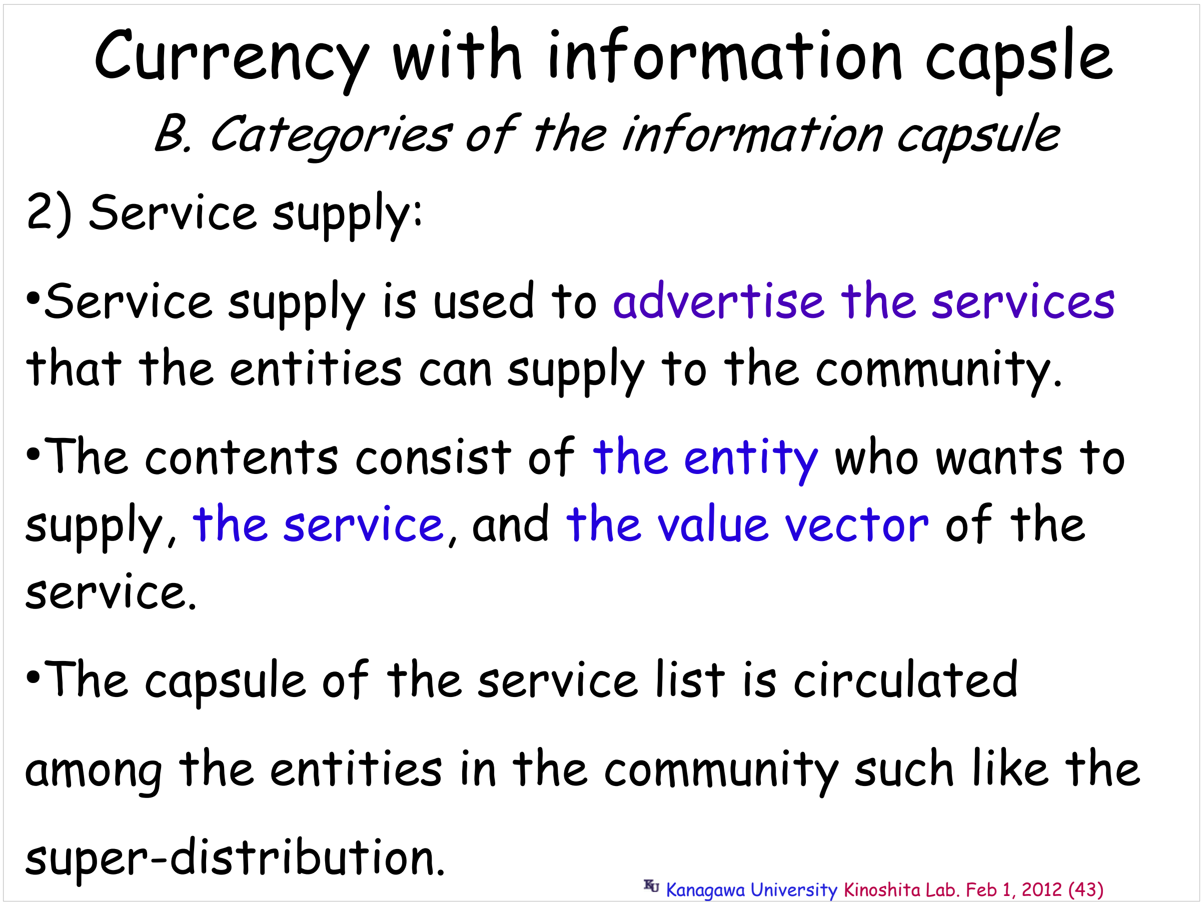


Currency with information capsle

B. Categories of the information capsule

1) Local currencies:

The information capsules of the local currencies includes the third values and securities converted from the first and second values.



Currency with information capsle

B. Categories of the information capsule

2) Service supply:

- Service supply is used to advertise the services that the entities can supply to the community.
- The contents consist of the entity who wants to supply, the service, and the value vector of the service.
- The capsule of the service list is circulated among the entities in the community such like the super-distribution.

Currency with information capsle

B. Categories of the information capsule

3) Service demand:

- The service demand is used to find out the services required in the community.
- The contents consist of the entity who wants the service and the value vector of the service.

Kanagawa University Kinoshita Lab. Feb 1, 2012 (44)

Currency with information capsle

B. Categories of the information capsule

4) Service body:

- The service body is categorized into four types on the basis of the location of the supplier.
- We assume that the supply of the products is considered as a service.

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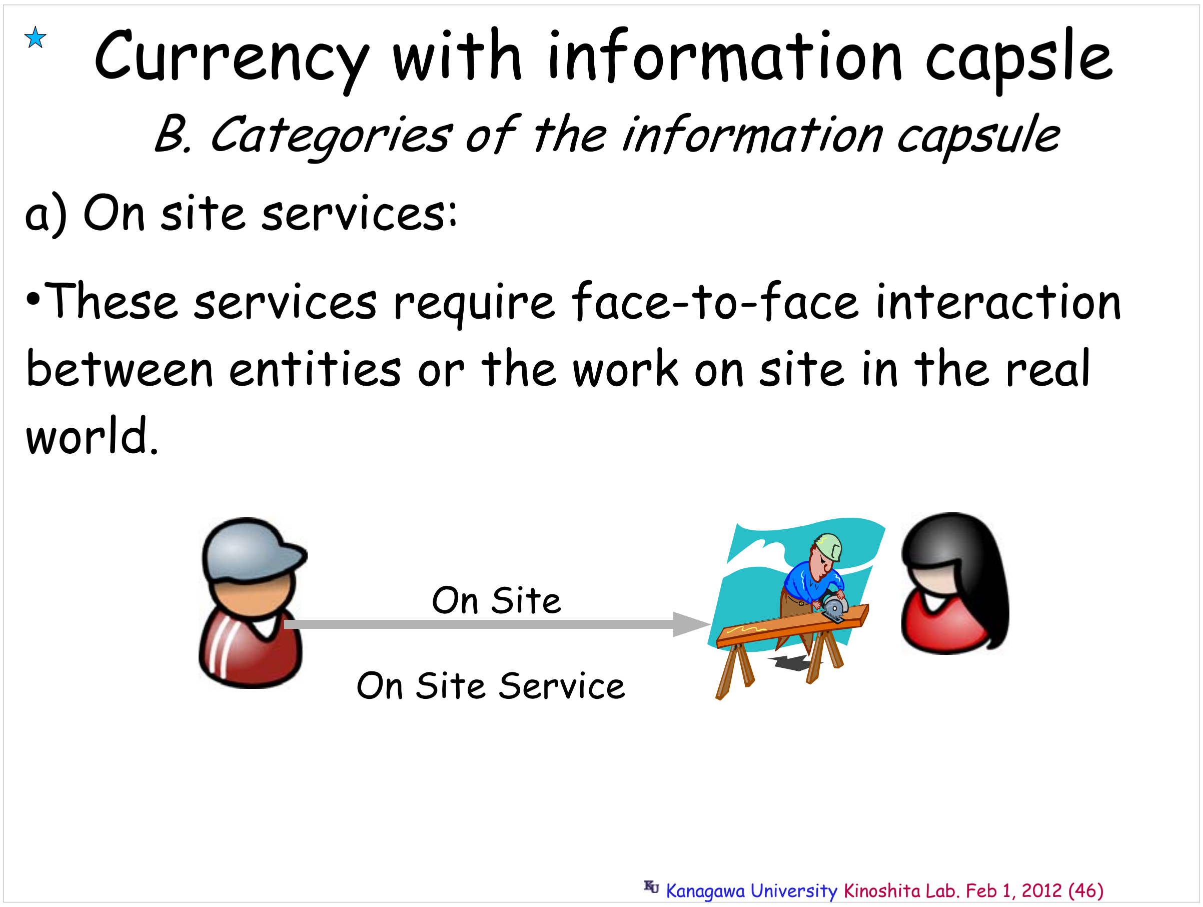

Currency with information capsle

B. Categories of the information capsule

a) On site services:

- These services require face-to-face interaction between entities or the work on site in the real world.

On Site

On Site Service

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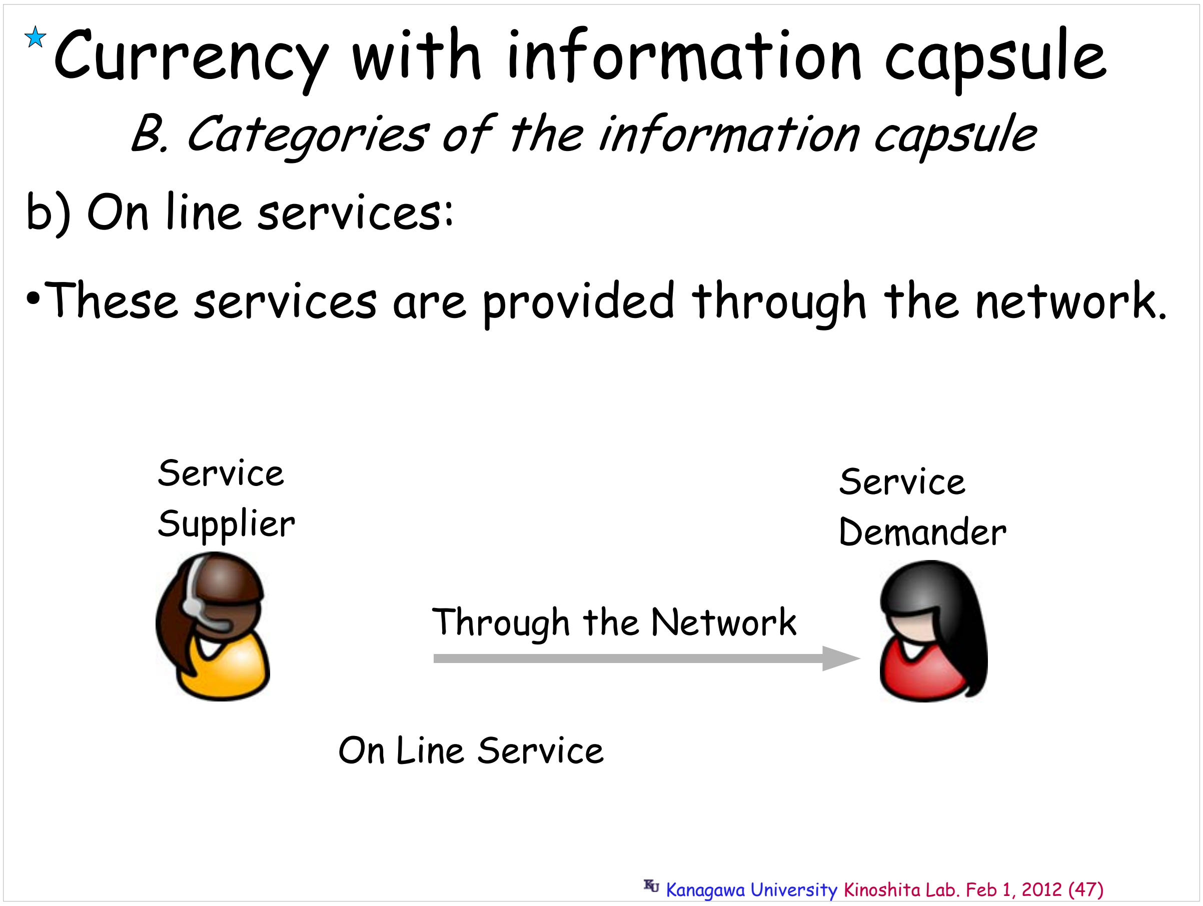


Currency with information capsule

B. Categories of the information capsule

b) On line services:

- These services are provided through the network.

Service Supplier

Service Demander

Through the Network

On Line Service

Kanagawa University Kinoshita Lab. Feb 1, 2012 (47)

★Currency with information capsule

B. Categories of the information capsule

c) Real-world products:

- These services provide real-world products.
- The supplier transfers these to the customer.

d) Digital contents:

- These services provide the products that are distributed through the network.

★Currency with information capsule

C. Protocols

1) User agent:

Each entity has a user agent to negotiate with the agent contained in the information capsule.

2) Finding services:

- An entity, who wants the service, distributes the information capsules of the service demand to the community.
- An entity, who can supply the service, distributes the information capsule of the service supply to the community.

★Currency with information capsule

C. Protocols

2) Finding services:

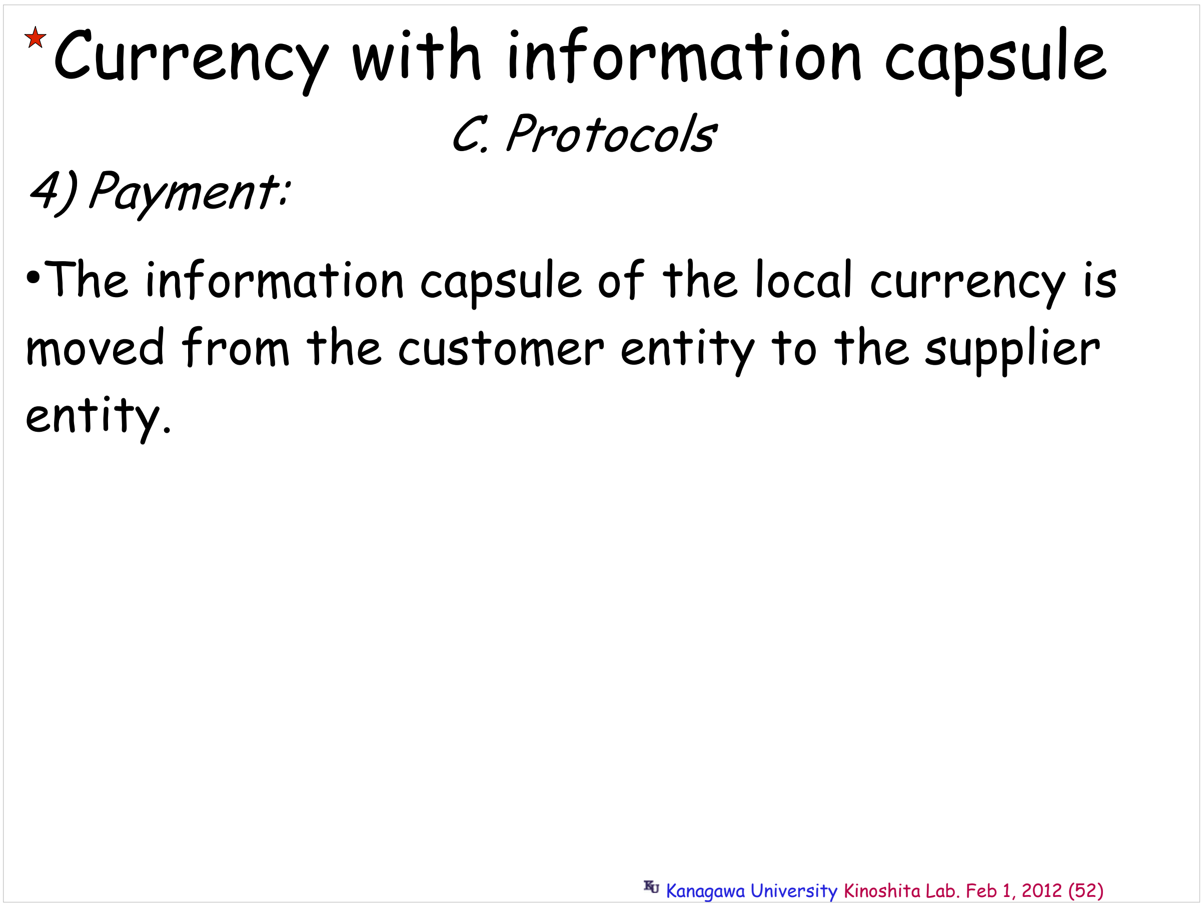
- The service supply agent, the service demand agent, and the user agent exchange the information about services.
- If supply and demand match, the value of the service is presented.

★ Currency with information capsule

C. Protocols

3) Evaluating values:

- The service supply agent and the service demand agent evaluate the value vector using the evaluation functions mentioned above.
- The service demand agent present the value vector in the local currency to be used for the payment.
- If the results of the value evaluation benefit each entity, the transaction comes off successfully.

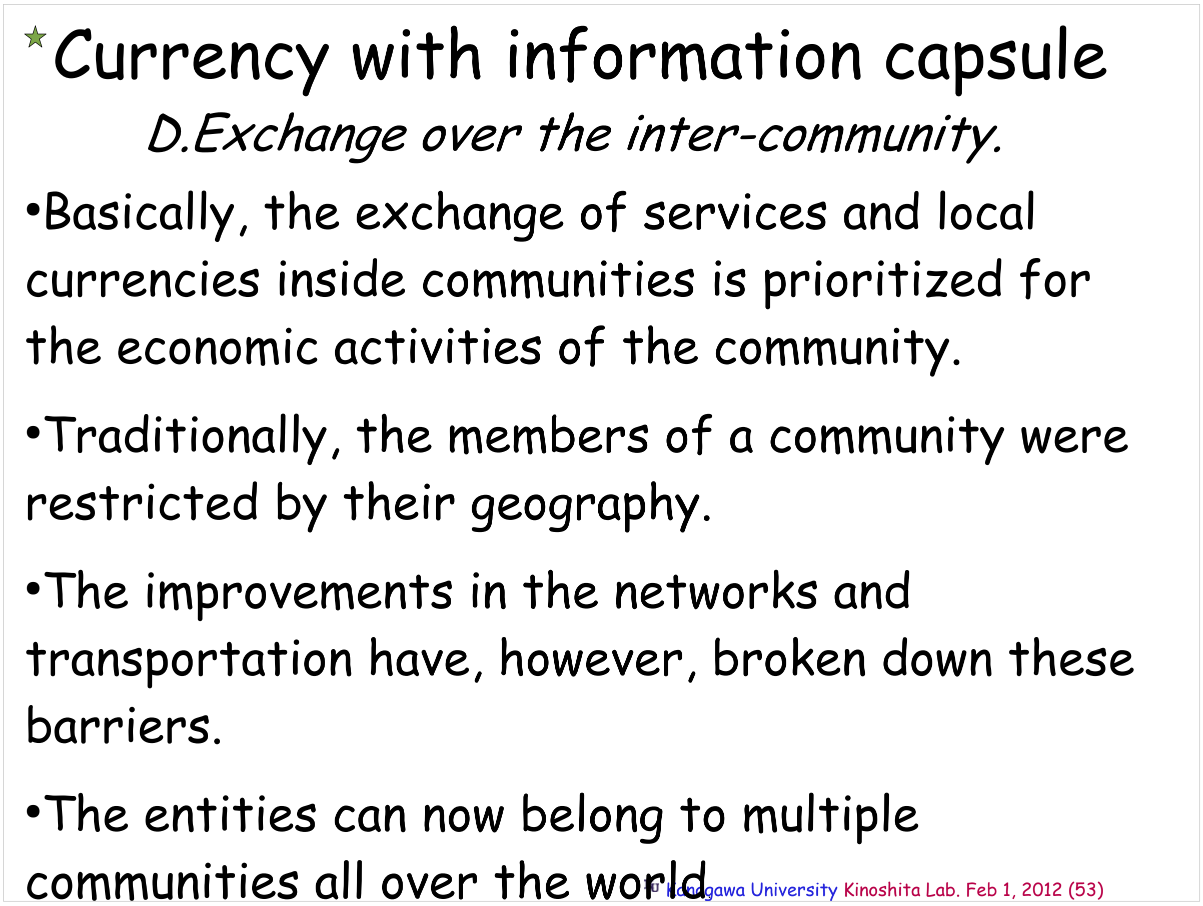


★Currency with information capsule

C. Protocols

4) Payment:

•The information capsule of the local currency is moved from the customer entity to the supplier entity.



★Currency with information capsule

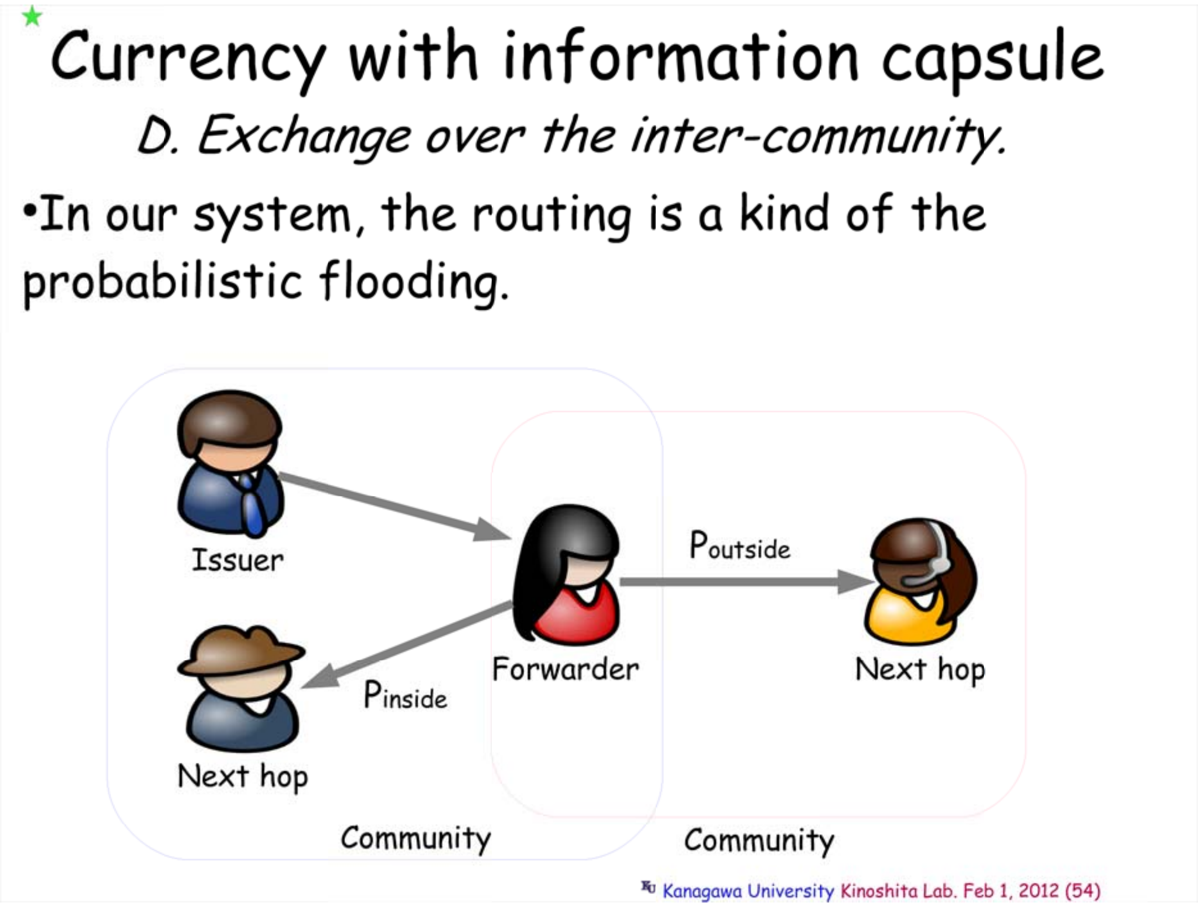
D.Exchange over the inter-community.

•Basically, the exchange of services and local currencies inside communities is prioritized for the economic activities of the community.

•Traditionally, the members of a community were restricted by their geography.

•The improvements in the networks and transportation have, however, broken down these barriers.

•The entities can now belong to multiple communities all over the world.



★

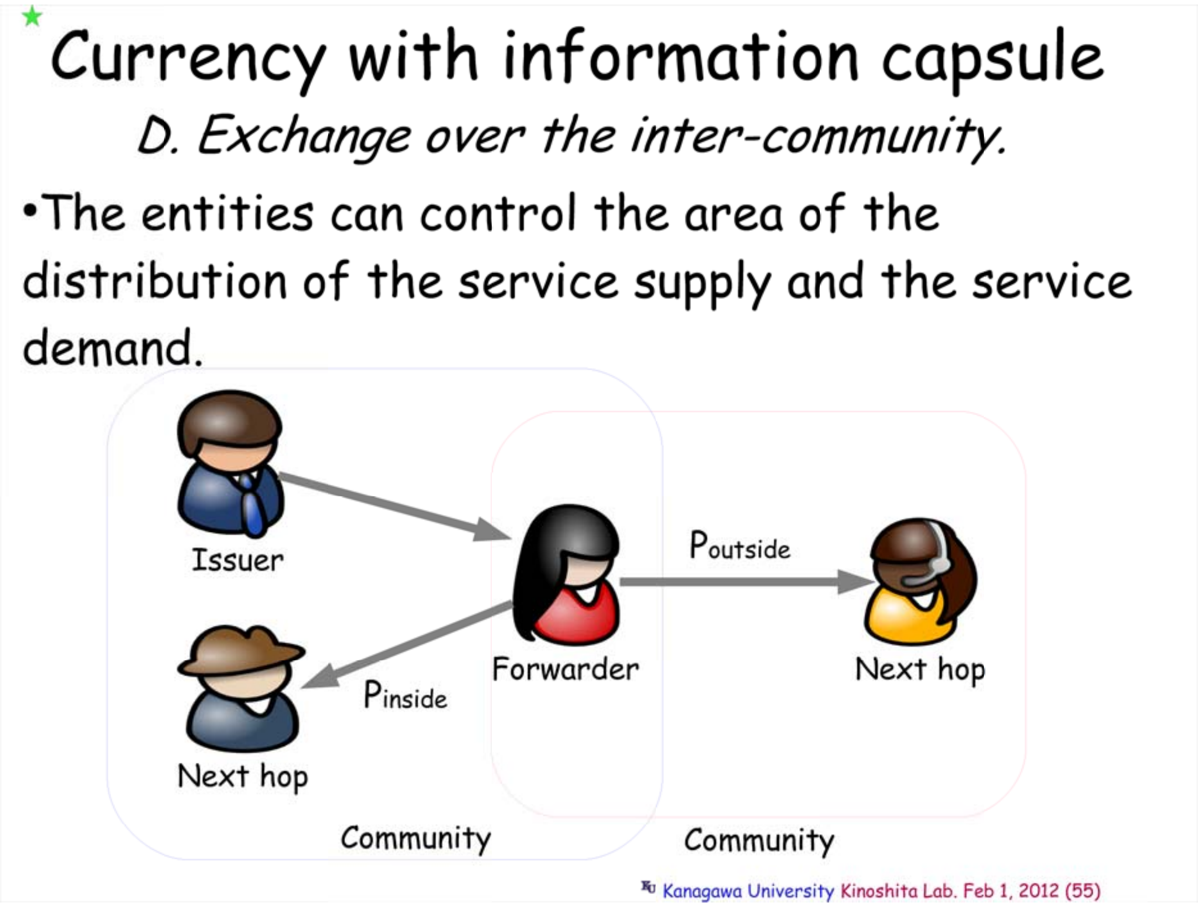
Currency with information capsule

D. Exchange over the inter-community.

- In our system, the routing is a kind of the probabilistic flooding.

Issuer
Forwarder
$P_{outside}$
Next hop
P_{inside}
Next hop
Community
Community

Kanagawa University Kinoshita Lab. Feb 1, 2012 (54)



★

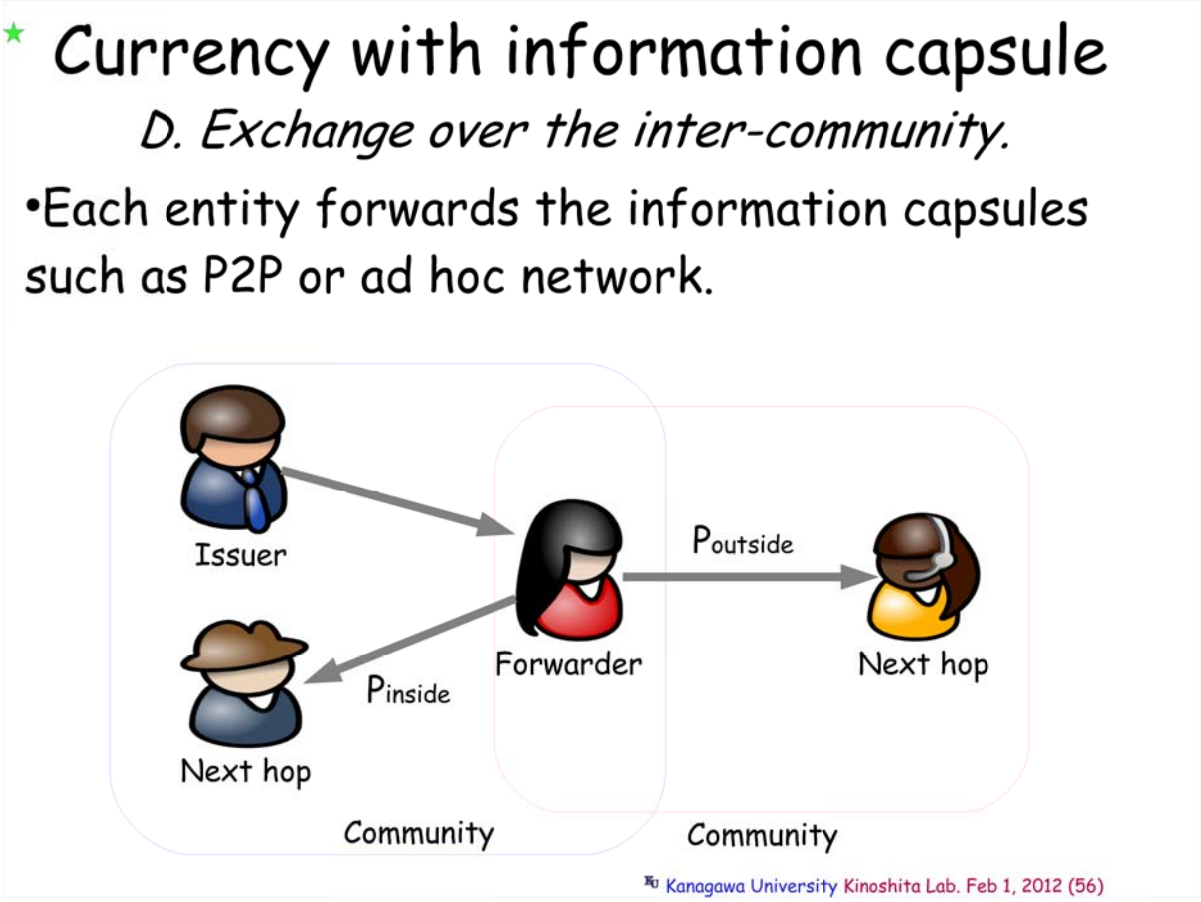
Currency with information capsule

D. Exchange over the inter-community.

- The entities can control the area of the distribution of the service supply and the service demand.

Issuer
Forwarder
$P_{outside}$
Next hop
P_{inside}
Next hop
Community
Community

Kanagawa University Kinoshita Lab. Feb 1, 2012 (55)



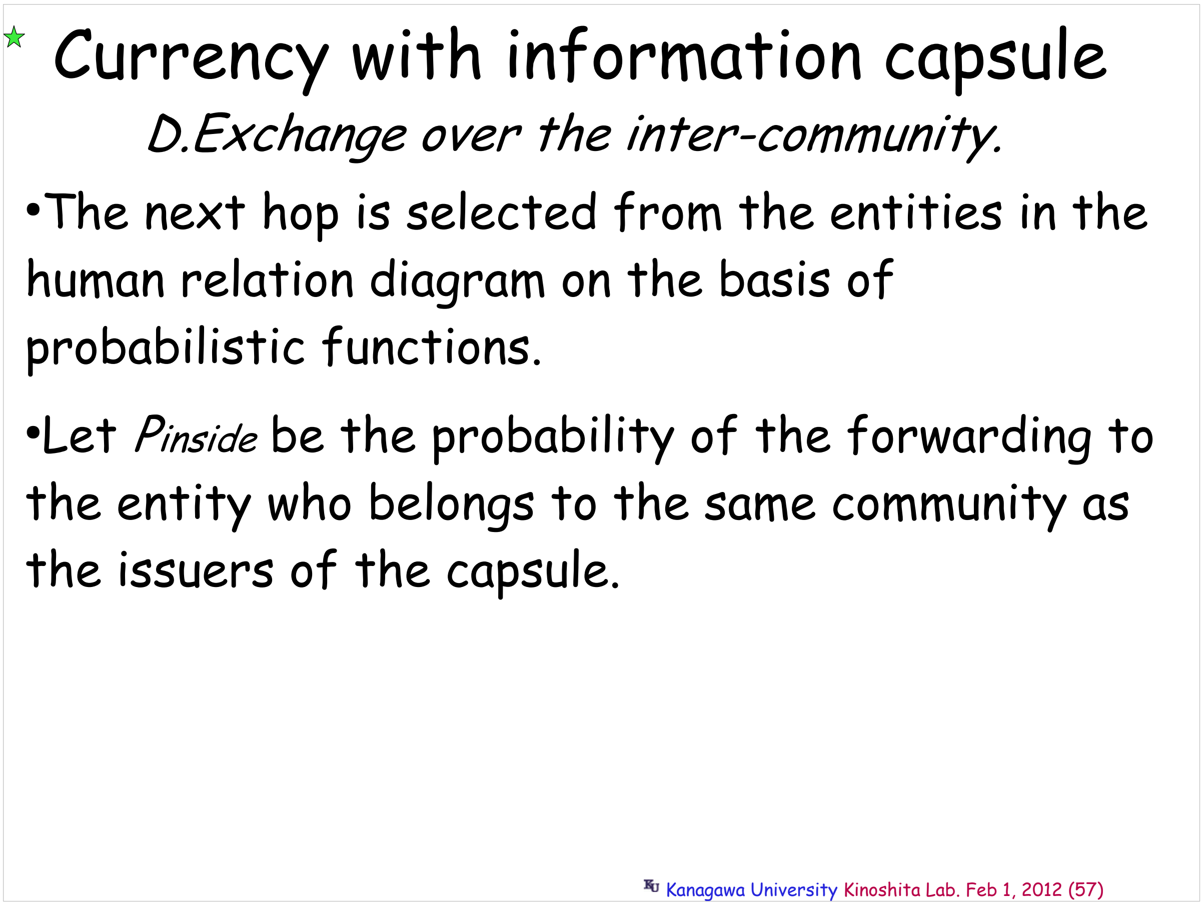
Currency with information capsule

D. Exchange over the inter-community.

- Each entity forwards the information capsules such as P2P or ad hoc network.

Issuer
Forwarder
Poutside
Next hop
Pinside
Next hop
Community
Community

Kanagawa University Kinoshita Lab. Feb 1, 2012 (56)



Currency with information capsule

D.Exchange over the inter-community.

- The next hop is selected from the entities in the human relation diagram on the basis of probabilistic functions.
- Let P_{inside} be the probability of the forwarding to the entity who belongs to the same community as the issuers of the capsule.

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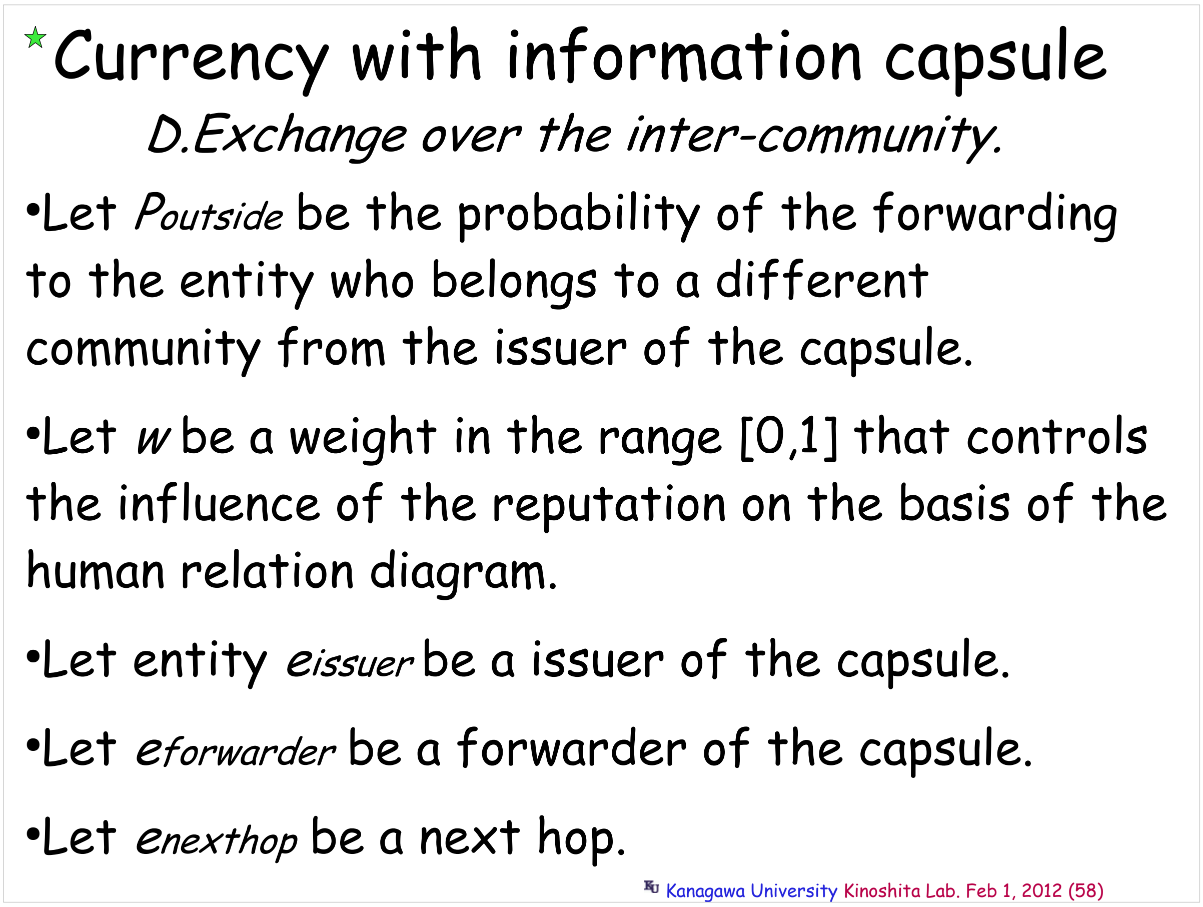
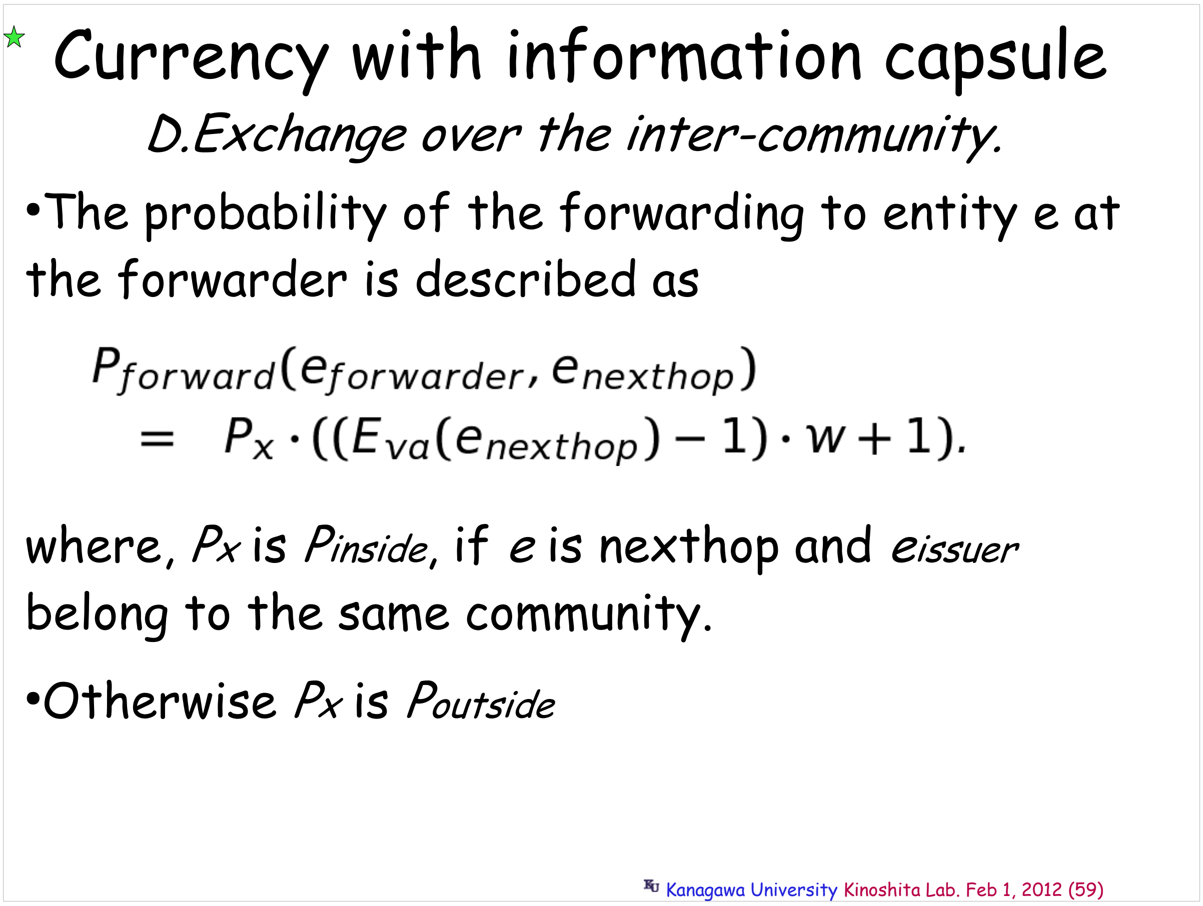


Currency with information capsule

D.Exchange over the inter-community.

- Let $P_{outside}$ be the probability of the forwarding to the entity who belongs to a different community from the issuer of the capsule.
- Let w be a weight in the range [0,1] that controls the influence of the reputation on the basis of the human relation diagram.
- Let entity e_{issuer} be a issuer of the capsule.
- Let $e_{forwarder}$ be a forwarder of the capsule.
- Let $e_{nexthop}$ be a next hop.



Currency with information capsule

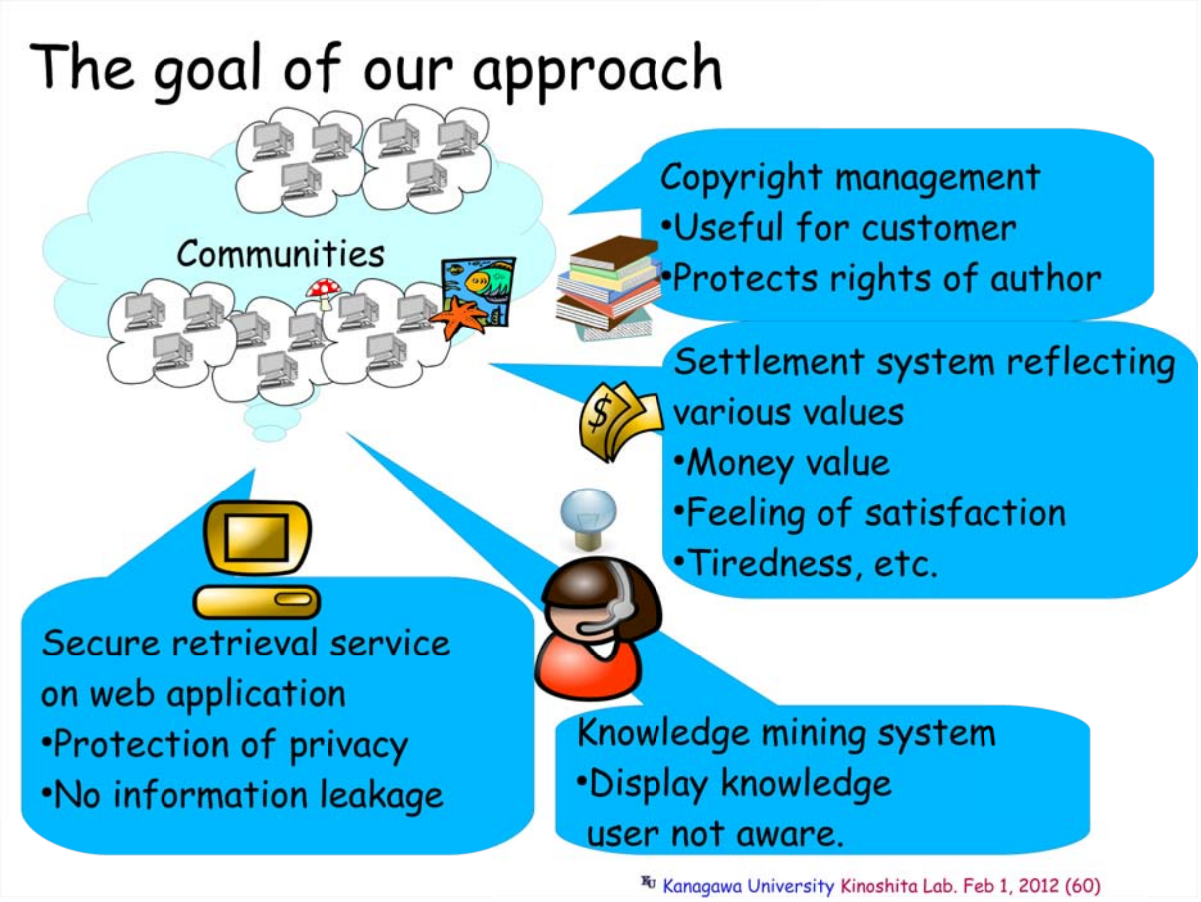
D.Exchange over the inter-community.

- The probability of the forwarding to entity e at the forwarder is described as

$$\begin{aligned} P_{forward}(e_{forwarder}, e_{nexthop}) \\ = \quad P_x \cdot ((E_{va}(e_{nexthop}) - 1) \cdot w + 1). \end{aligned}$$

where, P_x is P_{inside}, if e is nexthop and e_{issuer} belong to the same community.

- Otherwise P_x is $P_{outside}$



The goal of our approach

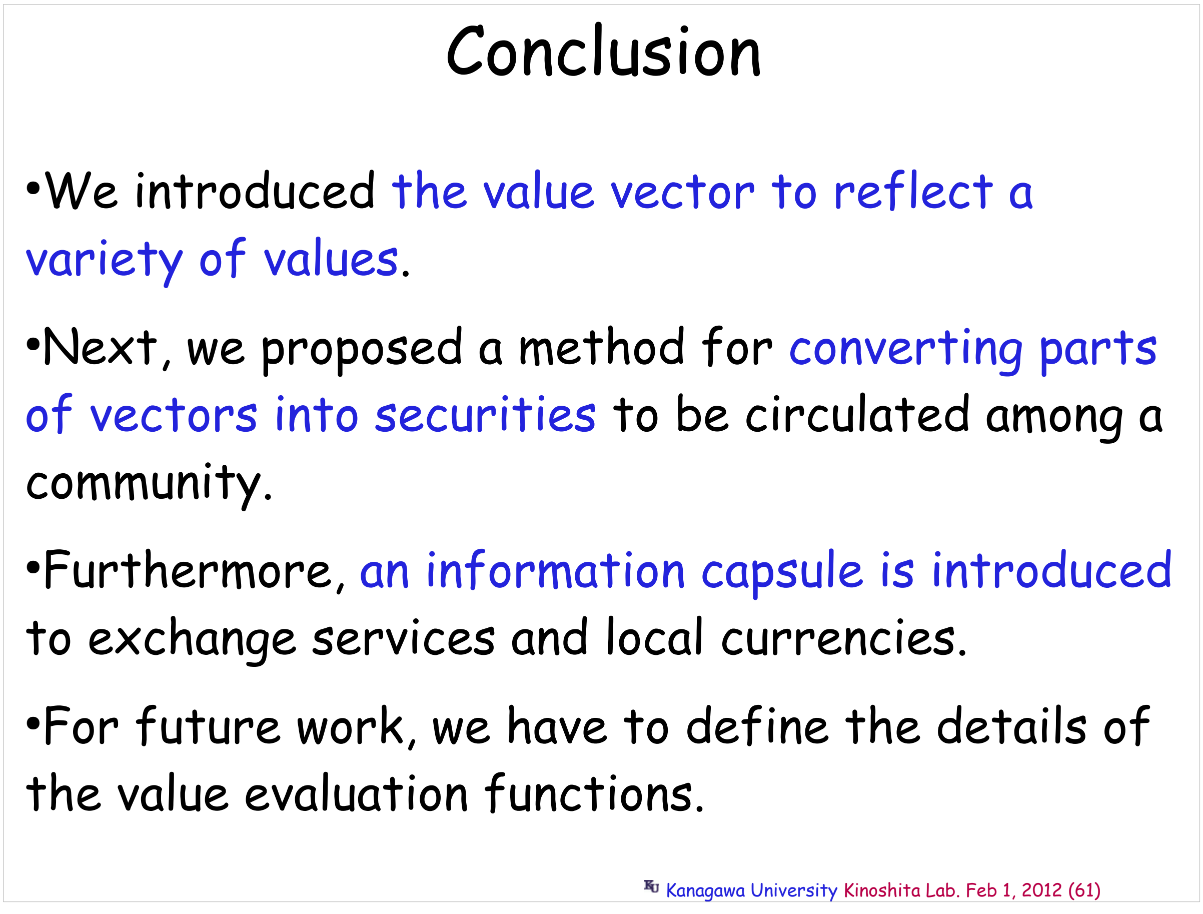
Communities

Copyright management
- Useful for customer
- Protects rights of author

Settlement system reflecting various values
- Money value
- Feeling of satisfaction
- Tiredness, etc.

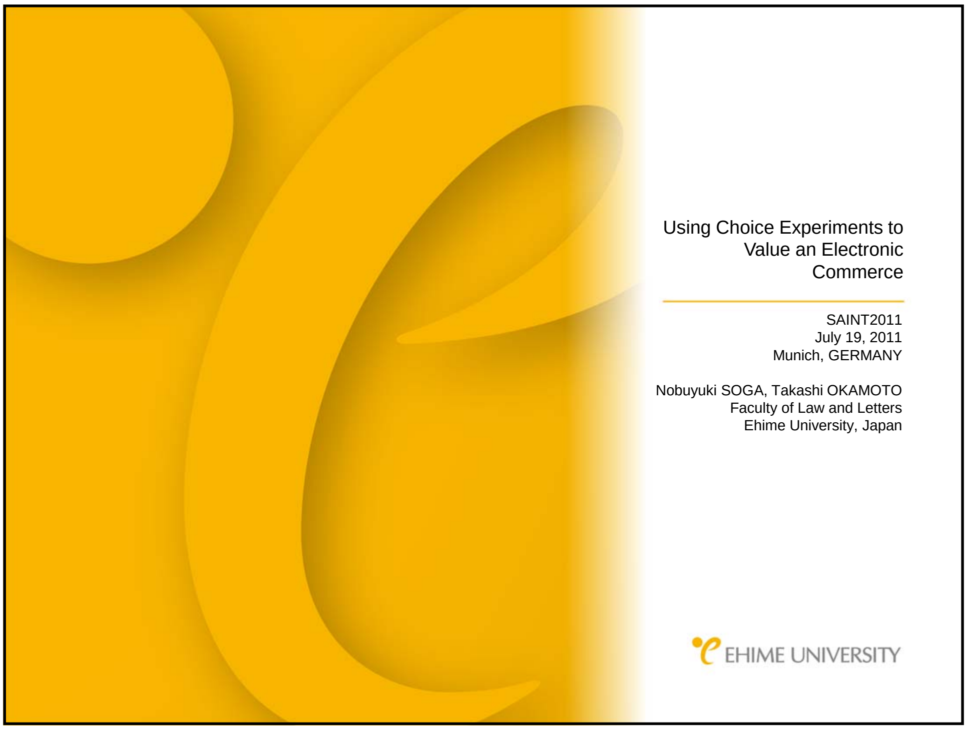
Secure retrieval service on web application
- Protection of privacy
- No information leakage

Knowledge mining system
- Display knowledge user not aware.



Conclusion

- We introduced the value vector to reflect a variety of values.
- Next, we proposed a method for converting parts of vectors into securities to be circulated among a community.
- Furthermore, an information capsule is introduced to exchange services and local currencies.
- For future work, we have to define the details of the value evaluation functions.

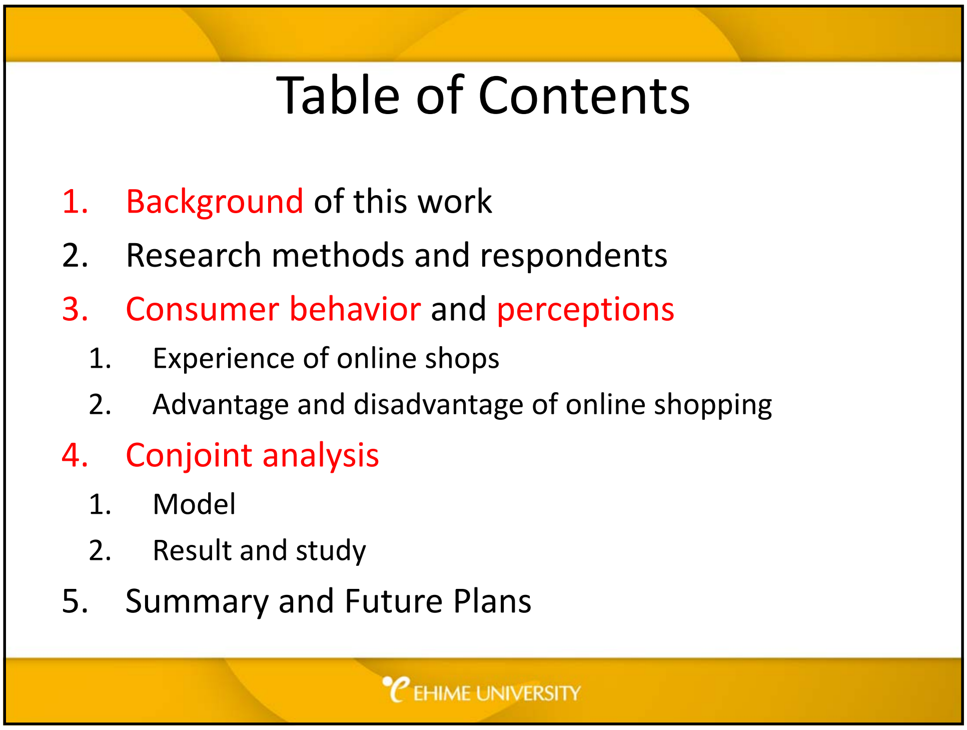


Using Choice Experiments to
Value an Electronic
Commerce

SAINT2011
July 19, 2011
Munich, GERMANY

Nobuyuki SOGA, Takashi OKAMOTO
Faculty of Law and Letters
Ehime University, Japan

EHIME UNIVERSITY



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2. Research methods and respondents
3. Consumer behavior and perceptions
    1. Experience of online shops
    2. Advantage and disadvantage of online shopping
4. Conjoint analysis
    1. Model
    2. Result and study
5. Summary and Future Plans

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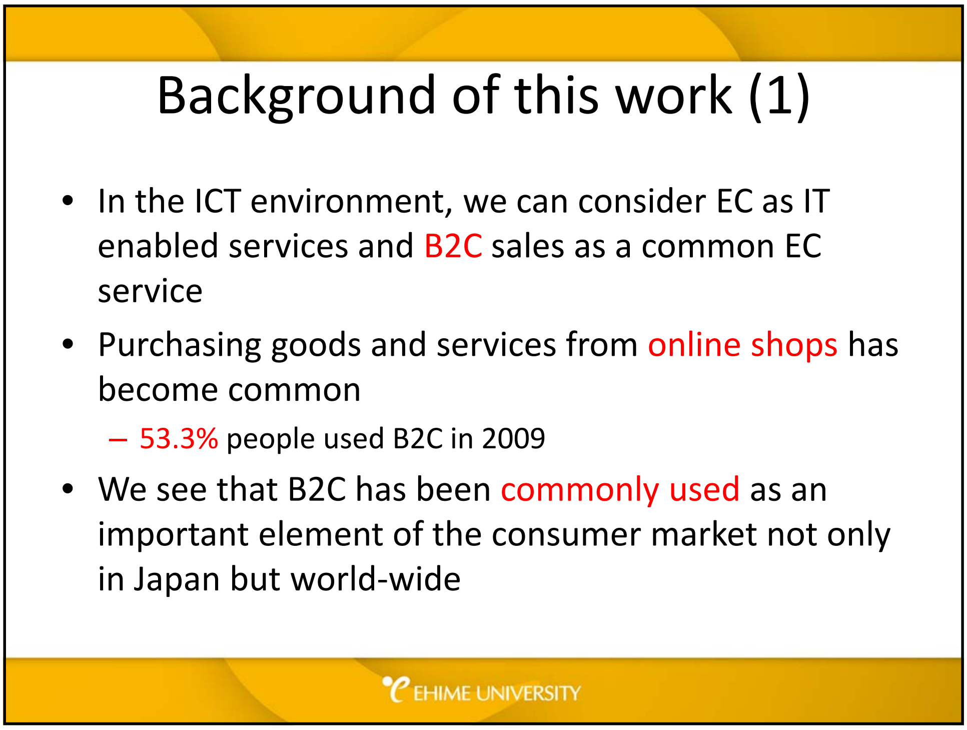

Background of this work (1)

- In the ICT environment, we can consider EC as IT enabled services and B2C sales as a common EC service
- Purchasing goods and services from online shops has become common
  - 53.3% people used B2C in 2009
- We see that B2C has been commonly used as an important element of the consumer market not only in Japan but world-wide

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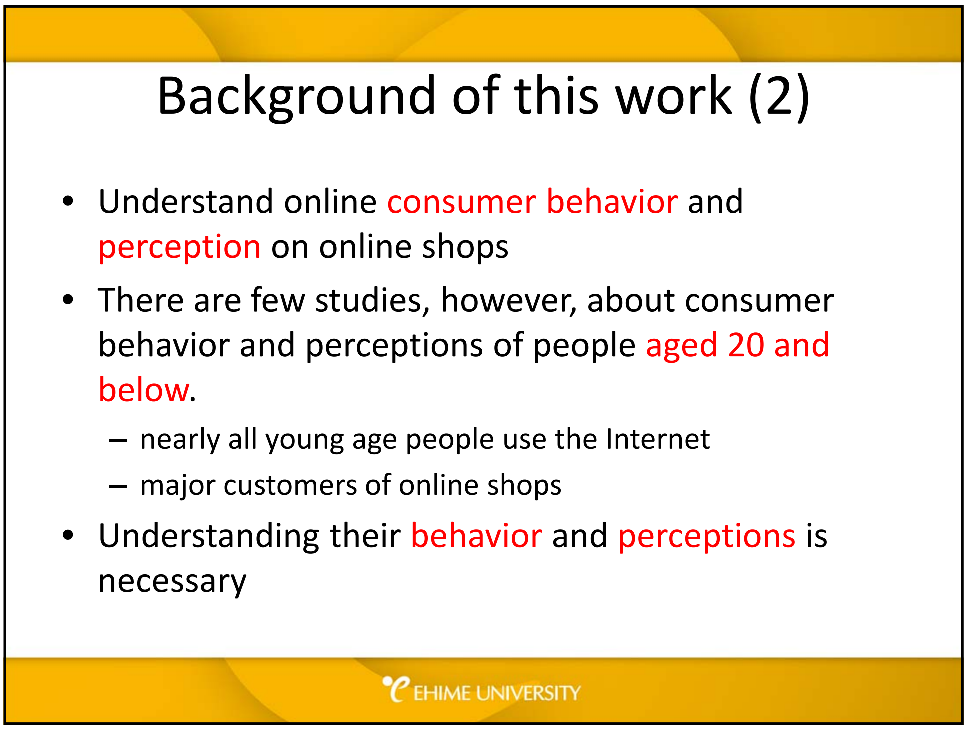

Background of this work (2)

- Understand online consumer behavior and perception on online shops
- There are few studies, however, about consumer behavior and perceptions of people aged 20 and below.
  - nearly all young age people use the Internet
  - major customers of online shops
- Understanding their behavior and perceptions is necessary

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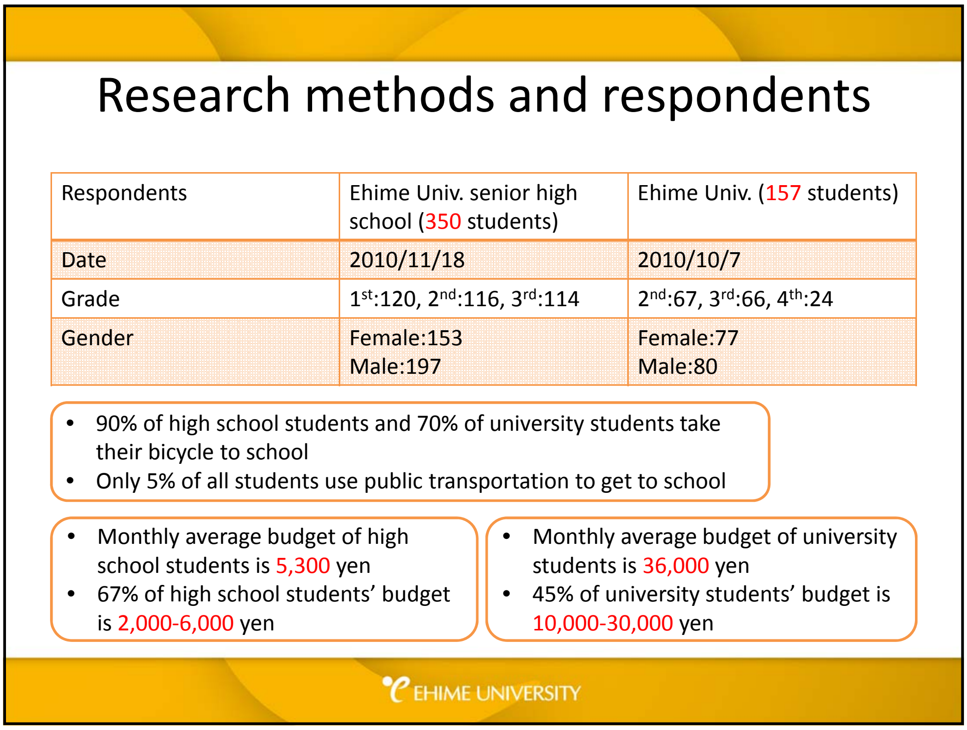

Research methods and respondents

Respondents	Ehime Univ. senior high school (350 students)	Ehime Univ. (157 students)
Date	2010/11/18	2010/10/7
Grade	1st:120, 2nd:116, 3rd:114	2nd:67, 3rd:66, 4th:24
Gender	Female:153 Male:197	Female:77 Male:80

- 90% of high school students and 70% of university students take their bicycle to school
- Only 5% of all students use public transportation to get to school

- Monthly average budget of high school students is 5,300 yen
- 67% of high school students' budget is 2,000-6,000 yen

- Monthly average budget of university students is 36,000 yen
- 45% of university students' budget is 10,000-30,000 yen

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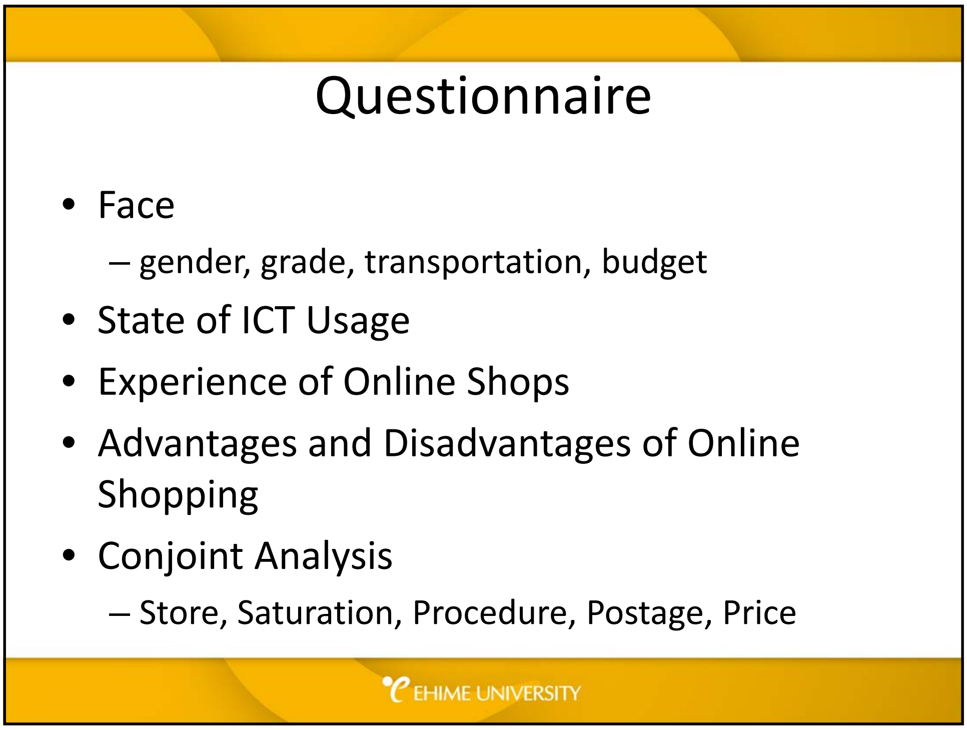

Questionnaire

- Face
  - gender, grade, transportation, budget
- State of ICT Usage
- Experience of Online Shops
- Advantages and Disadvantages of Online Shopping
- Conjoint Analysis
  - Store, Saturation, Procedure, Postage, Price

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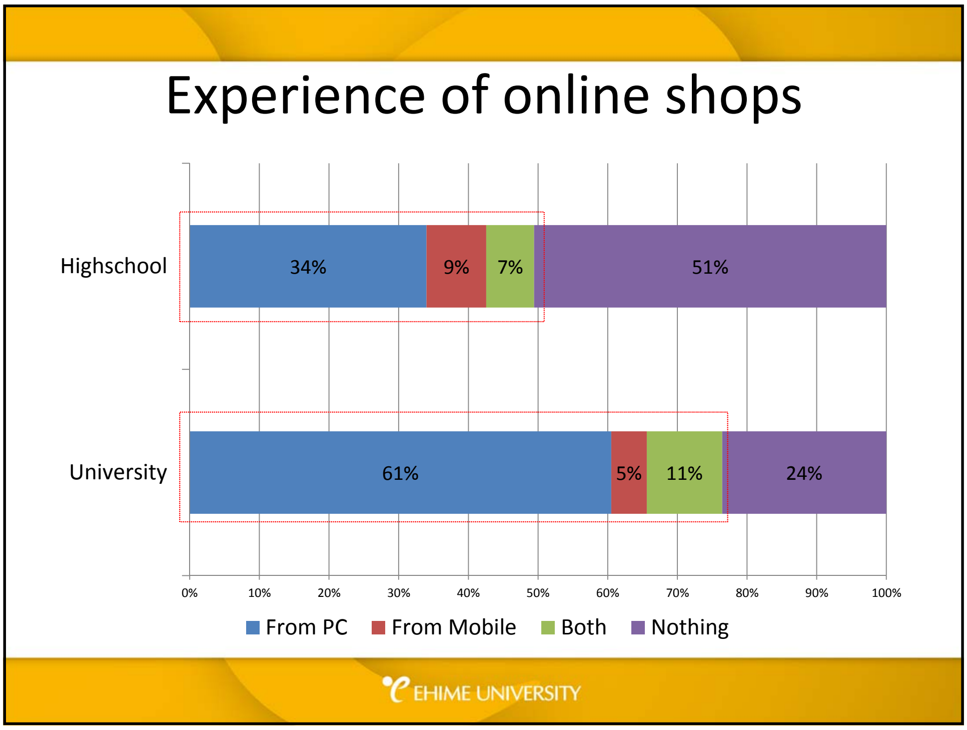
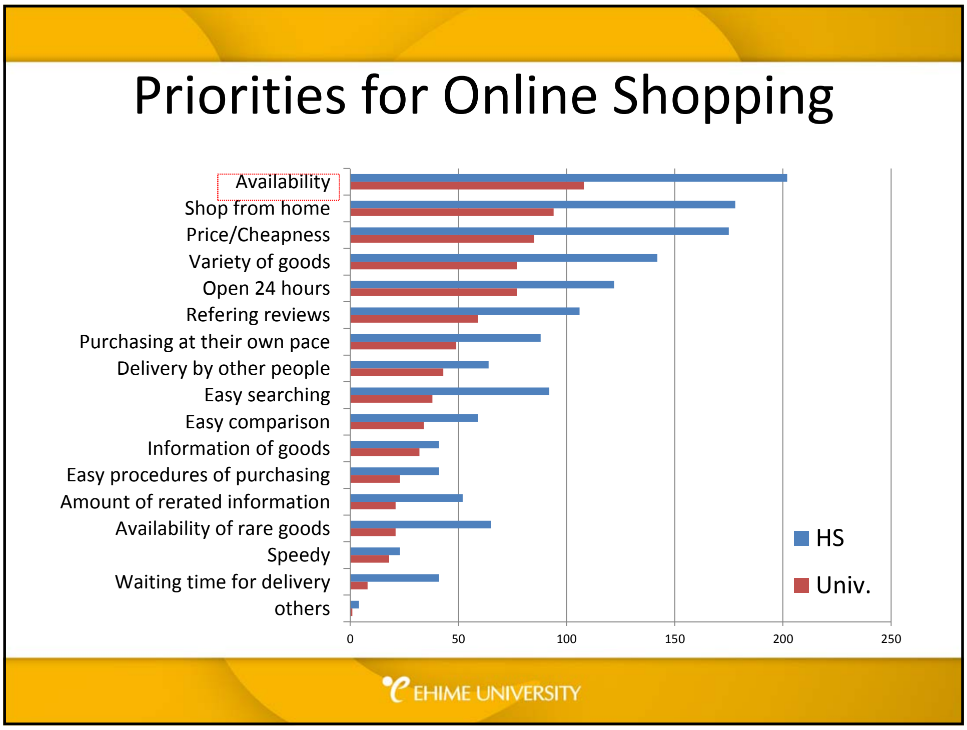
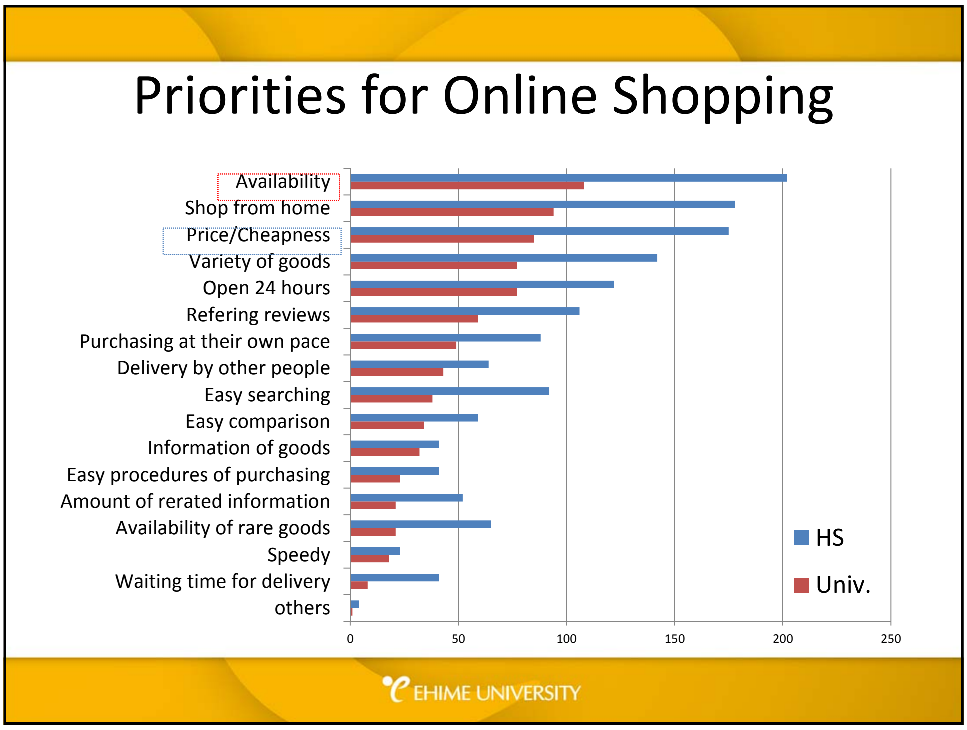


Experience of online shops



Priorities for Online Shopping



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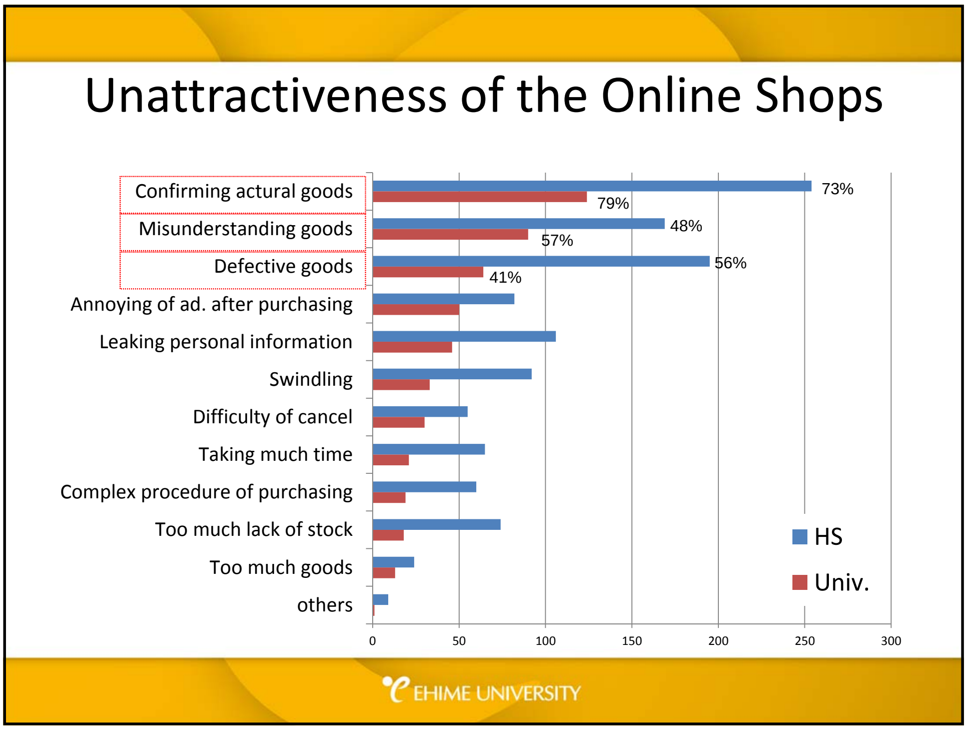
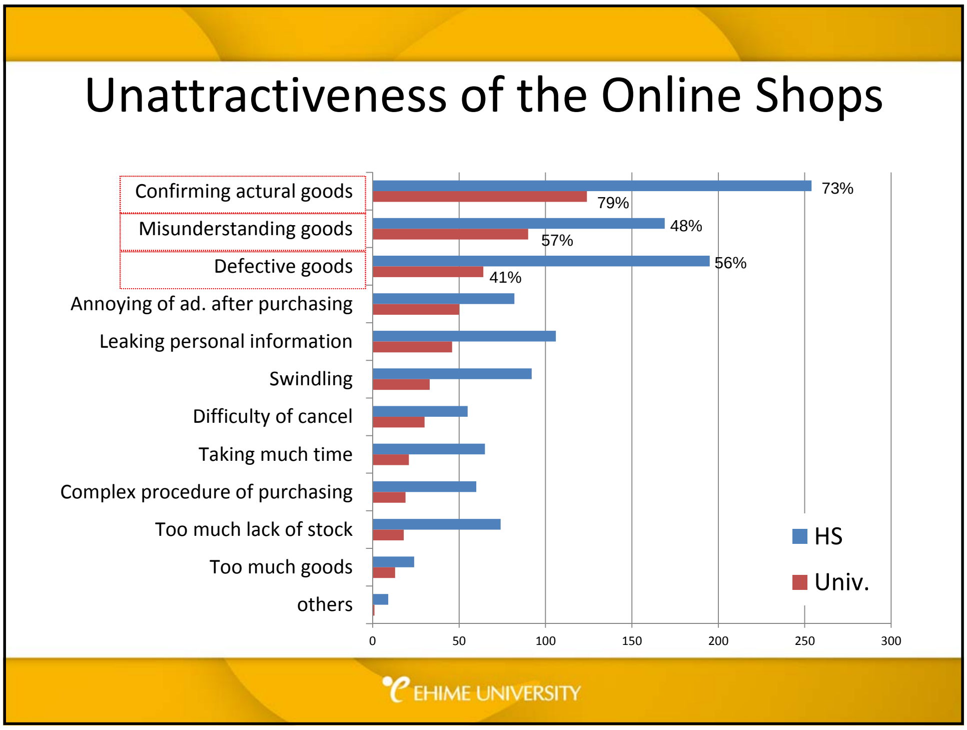
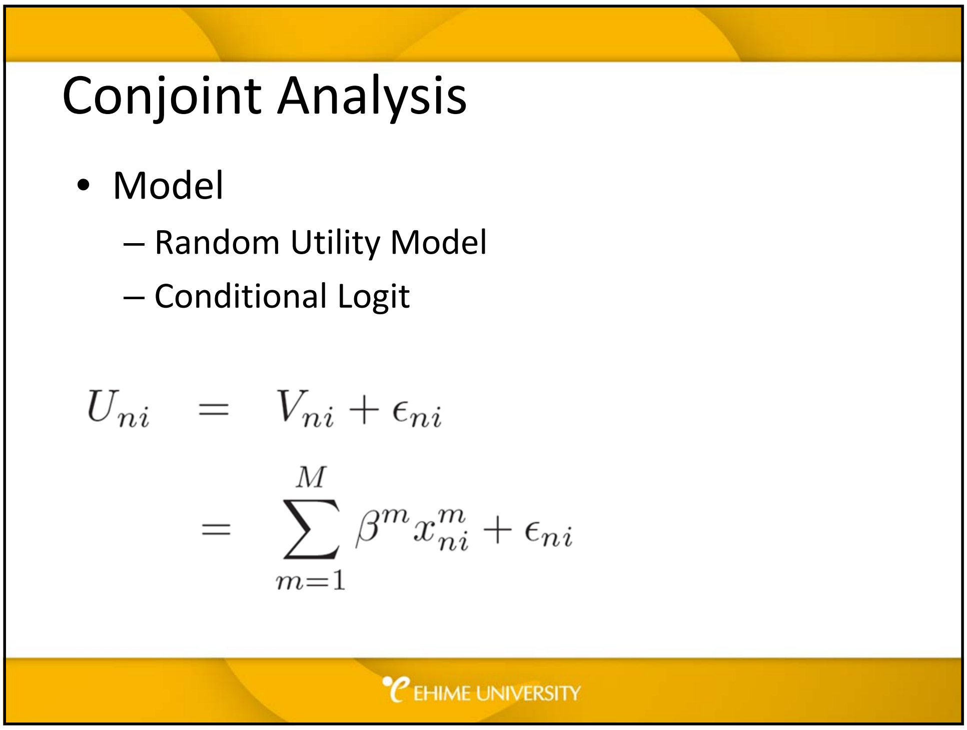


Unattractiveness of the Online Shops



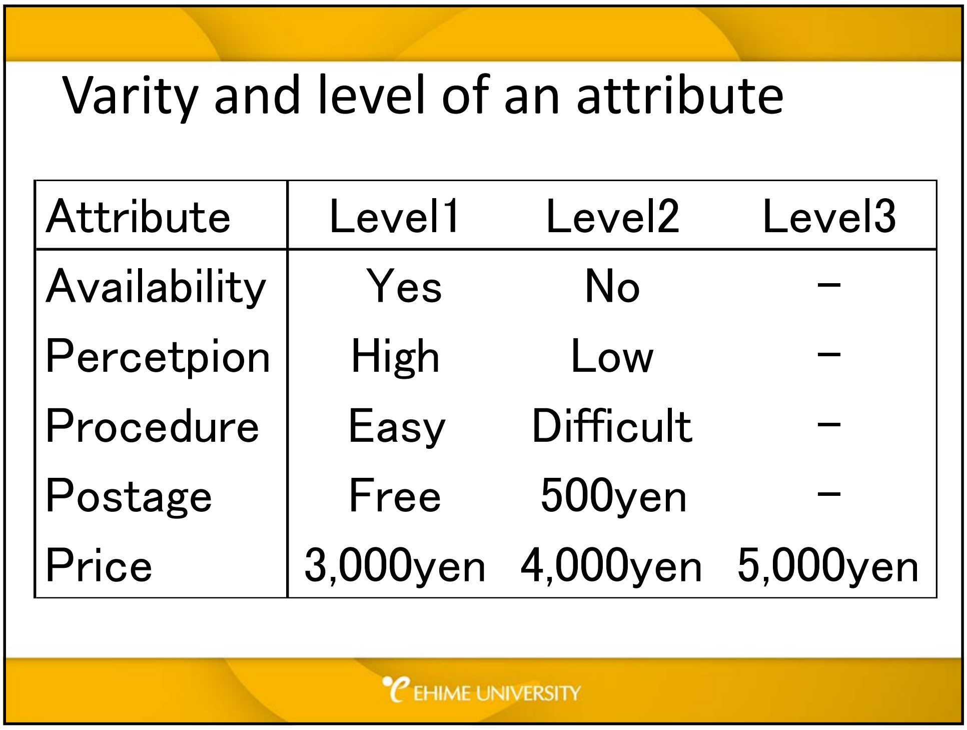
Unattractiveness of the Online Shops



Conjoint Analysis

- Model
  - Random Utility Model
  - Conditional Logit

$$\begin{aligned} U_{ni} &= V_{ni} + \epsilon_{ni} \\ &= \sum_{m=1}^{M} \beta^m x_{ni}^m + \epsilon_{ni} \end{aligned}$$



Varity and level of an attribute

Attribute	Level1	Level2	Level3
Availability	Yes	No	－
Percetpion	High	Low	－
Procedure	Easy	Difficult	－
Postage	Free	500yen	－
Price	3,000yen	4,000yen	5,000yen

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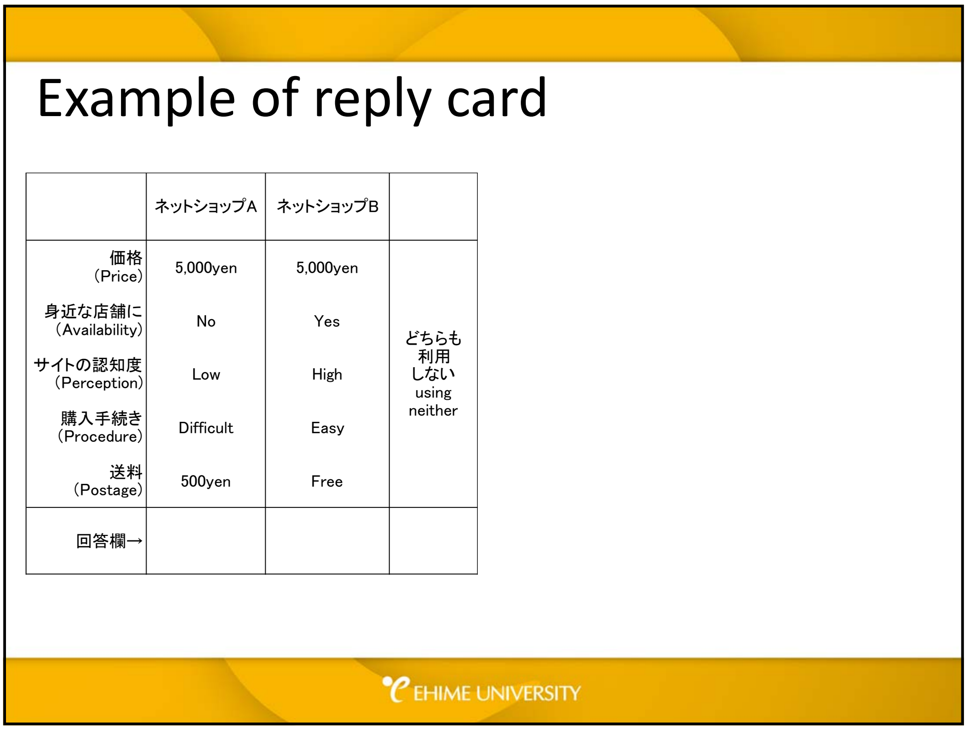

Example of reply card

	ネットショップA	ネットショップB	
価格 （Price）	5,000yen	5,000yen	どちらも 利用 しない using neither
身近な店舗に （Availability）	No	Yes	
サイトの認知度 （Perception）	Low	High	
購入手続き （Procedure）	Difficult	Easy	
送料 （Postage）	500yen	Free	
回答欄→			

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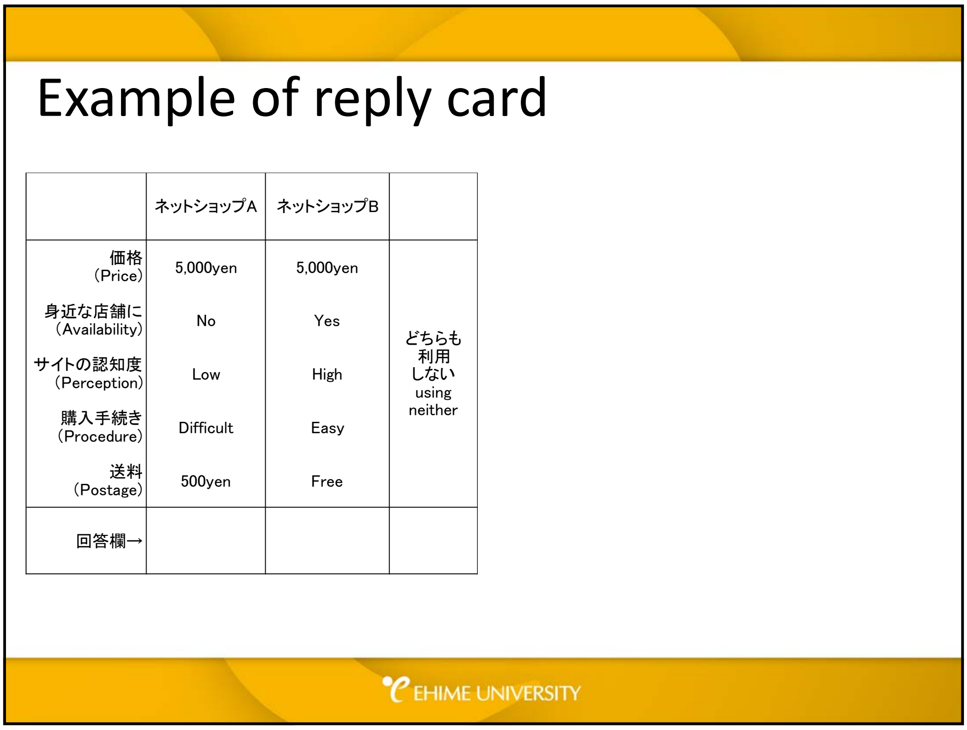

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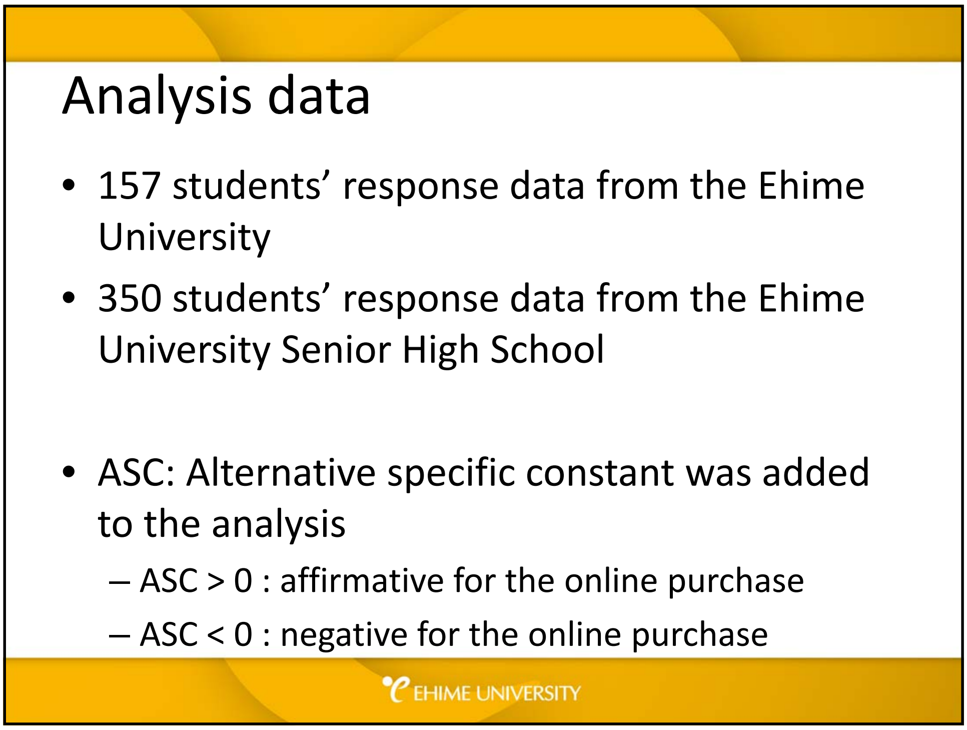

Analysis data

- 157 students’ response data from the Ehime University
- 350 students’ response data from the Ehime University Senior High School

- ASC: Alternative specific constant was added to the analysis
  - ASC > 0 : affirmative for the online purchase
  - ASC < 0 : negative for the online purchase

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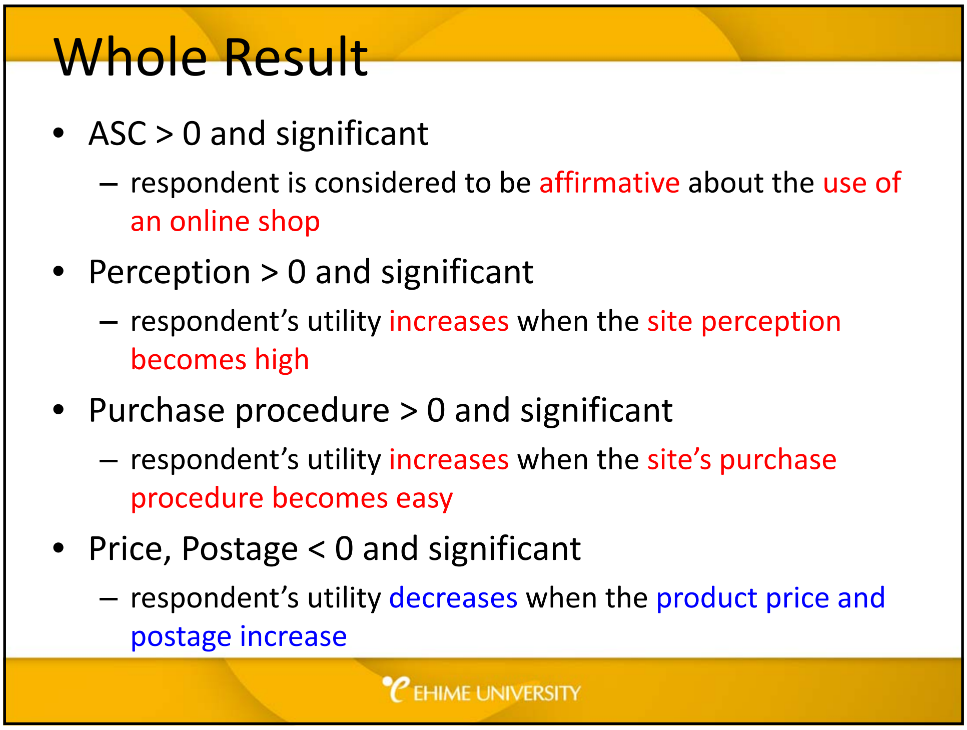

Whole Result

- ASC > 0 and significant
  - respondent is considered to be affirmative about the use of an online shop
- Perception > 0 and significant
  - respondent’s utility increases when the site perception becomes high
- Purchase procedure > 0 and significant
  - respondent’s utility increases when the site’s purchase procedure becomes easy
- Price, Postage < 0 and significant
  - respondent’s utility decreases when the product price and postage increase

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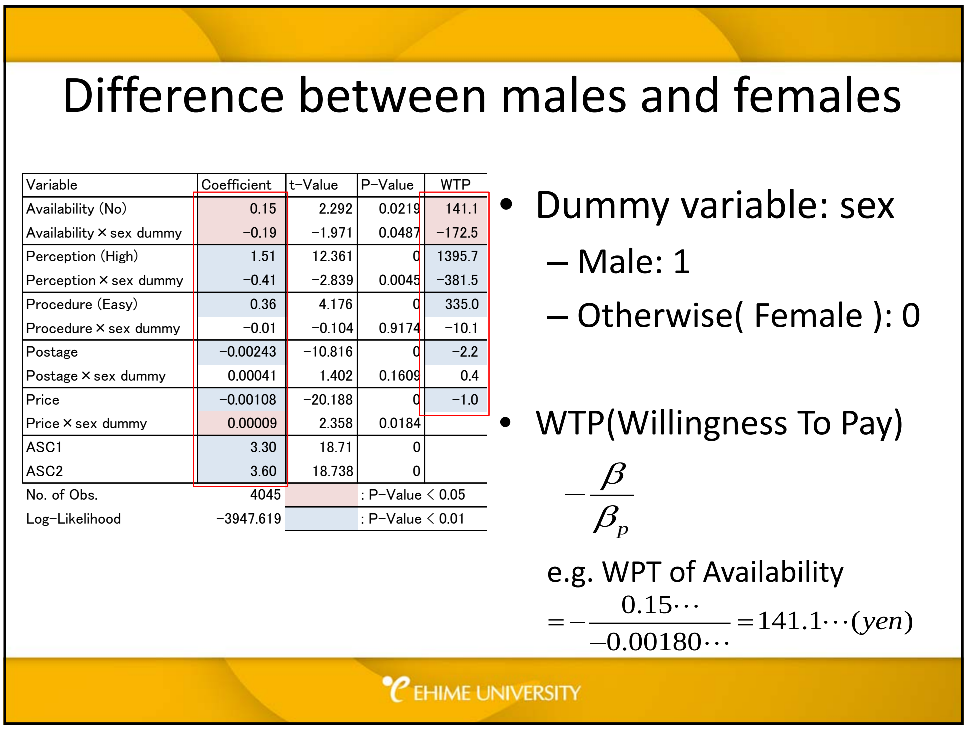


Difference between males and females

Variable	Coefficient	t-Value	P-Value	WTP
Availability (No)	0.15	2.292	0.0219	141.1
Availability × sex dummy	−0.19	−1.971	0.0487	−172.5
Perception (High)	1.51	12.361	0	1395.7
Perception × sex dummy	−0.41	−2.839	0.0045	−381.5
Procedure (Easy)	0.36	4.176	0	335.0
Procedure × sex dummy	−0.01	−0.104	0.9174	−10.1
Postage	−0.00243	−10.816	0	−2.2
Postage × sex dummy	0.00041	1.402	0.1609	0.4
Price	−0.00108	−20.188	0	−1.0
Price × sex dummy	0.00009	2.358	0.0184	
ASC1	3.30	18.71	0	
ASC2	3.60	18.738	0	
No. of Obs.	4045	🟥	: P-Value < 0.05	
Log-Likelihood	−3947.619	🟦	: P-Value < 0.01	

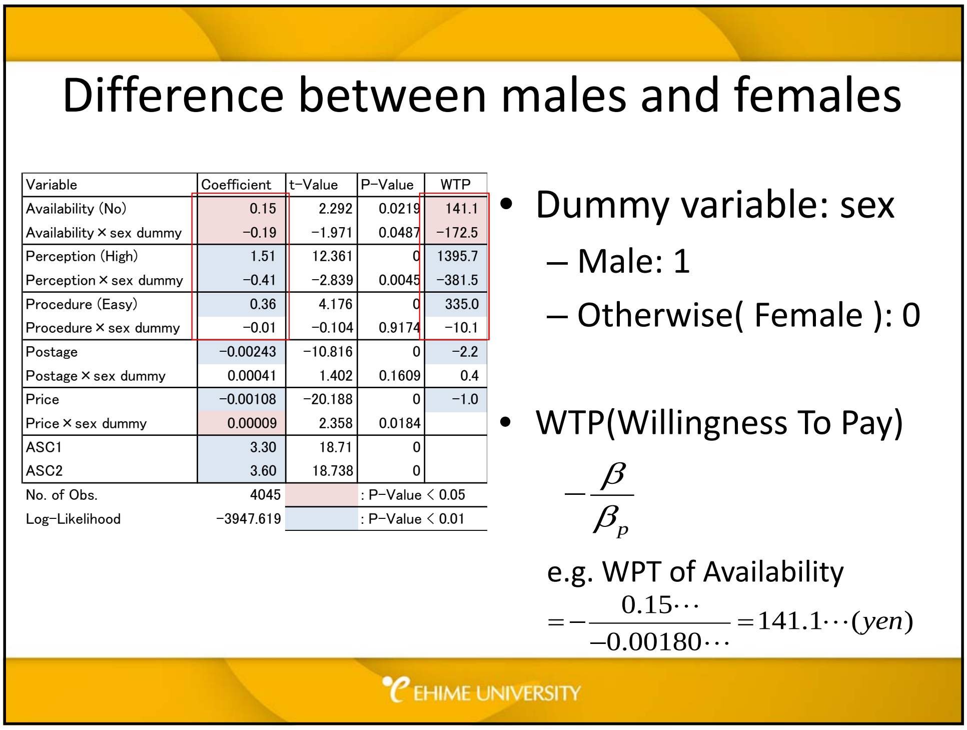
- Dummy variable: sex
  - Male: 1
  - Otherwise(Female): 0
- WTP(Willingness To Pay)

$$-\frac{\beta}{\beta_p}$$

e.g. WPT of Availability

$$=-\frac{0.15\cdots}{-0.00180\cdots}=141.1\cdots(yen)$$

EHIME UNIVERSITY



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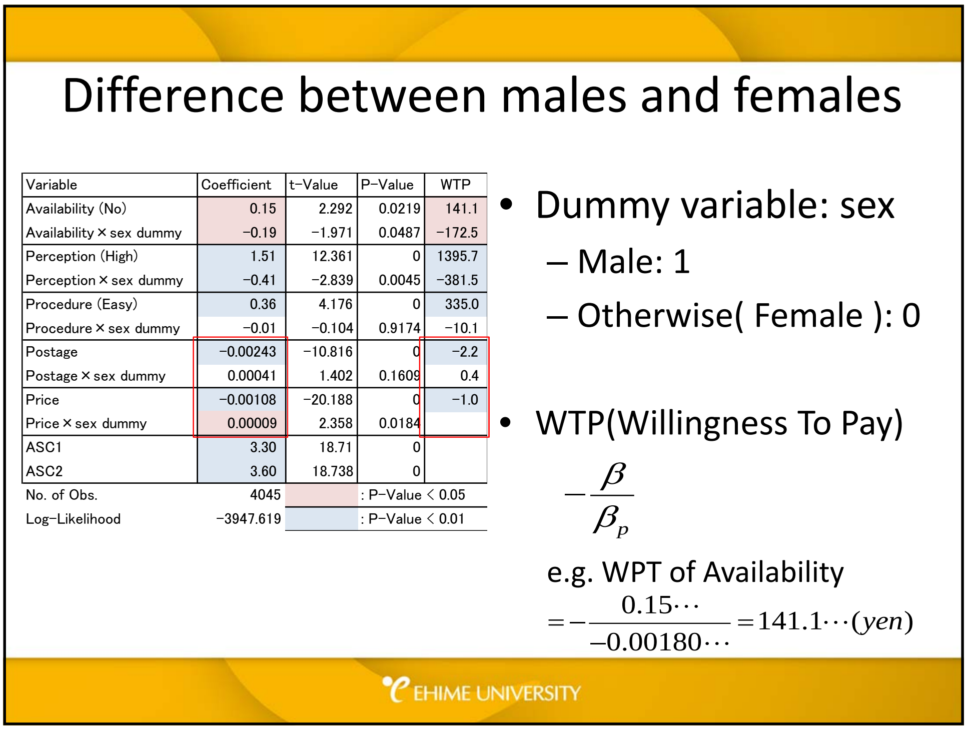

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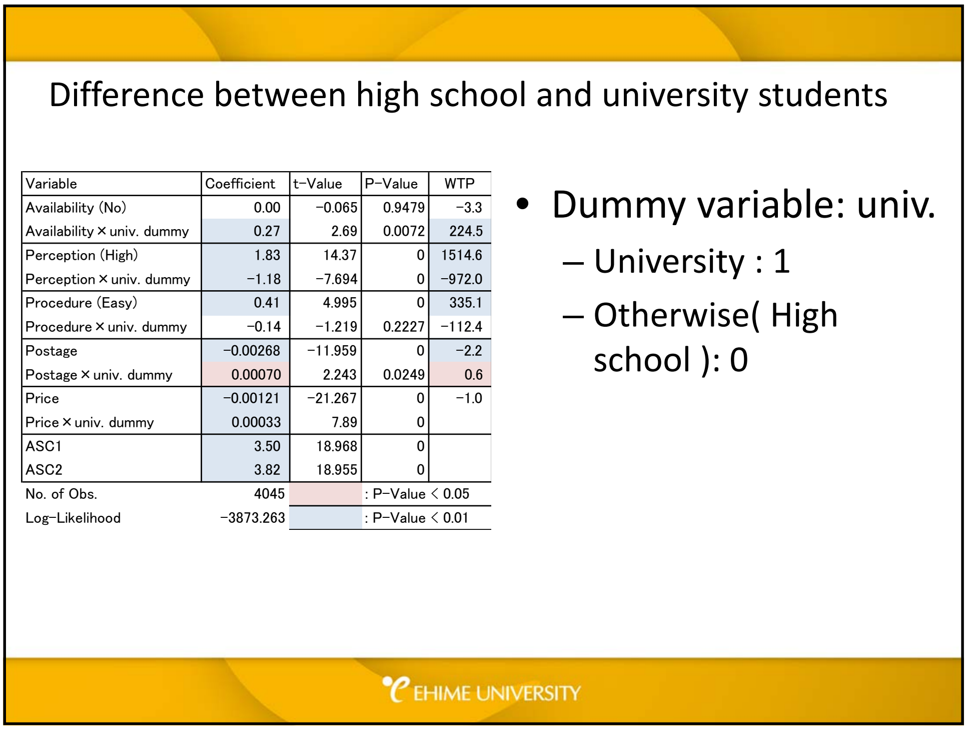

Difference between high school and university students

Variable	Coefficient	t-Value	P-Value	WTP
Availability (No)	0.00	-0.065	0.9479	-3.3
Availability × univ. dummy	0.27	2.69	0.0072	224.5
Perception (High)	1.83	14.37	0	1514.6
Perception × univ. dummy	-1.18	-7.694	0	-972.0
Procedure (Easy)	0.41	4.995	0	335.1
Procedure × univ. dummy	-0.14	-1.219	0.2227	-112.4
Postage	-0.00268	-11.959	0	-2.2
Postage × univ. dummy	0.00070	2.243	0.0249	0.6
Price	-0.00121	-21.267	0	-1.0
Price × univ. dummy	0.00033	7.89	0	
ASC1	3.50	18.968	0	
ASC2	3.82	18.955	0	
No. of Obs.	4045	🟥	: P-Value < 0.05	
Log-Likelihood	-3873.263	🟦	: P-Value < 0.01	

- Dummy variable: univ.
  - University : 1
  - Otherwise(High school): 0

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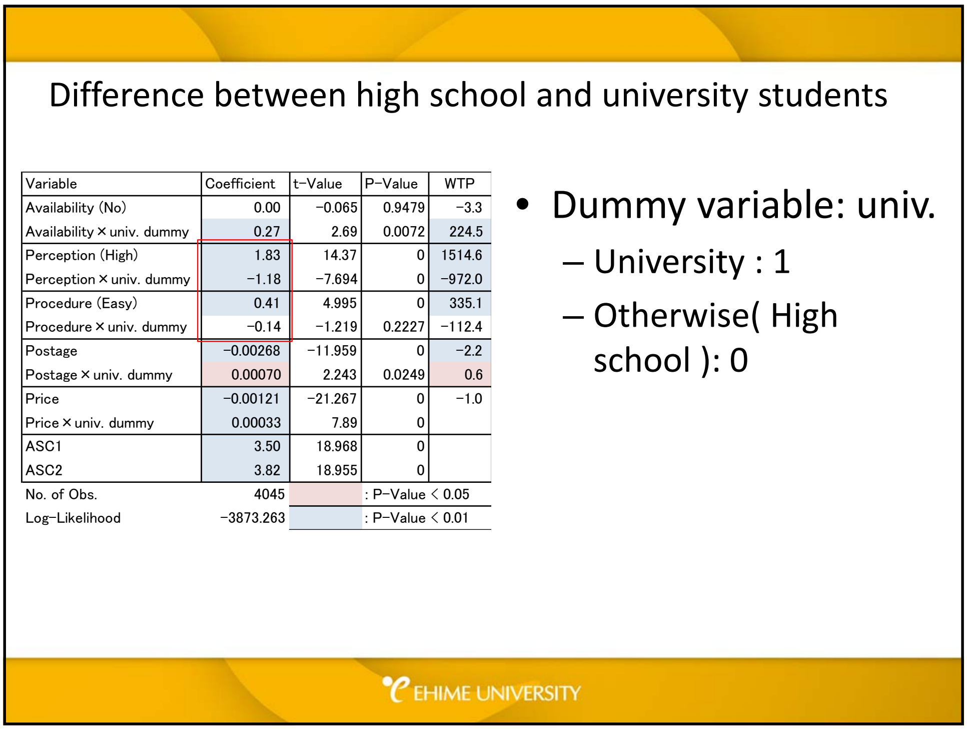

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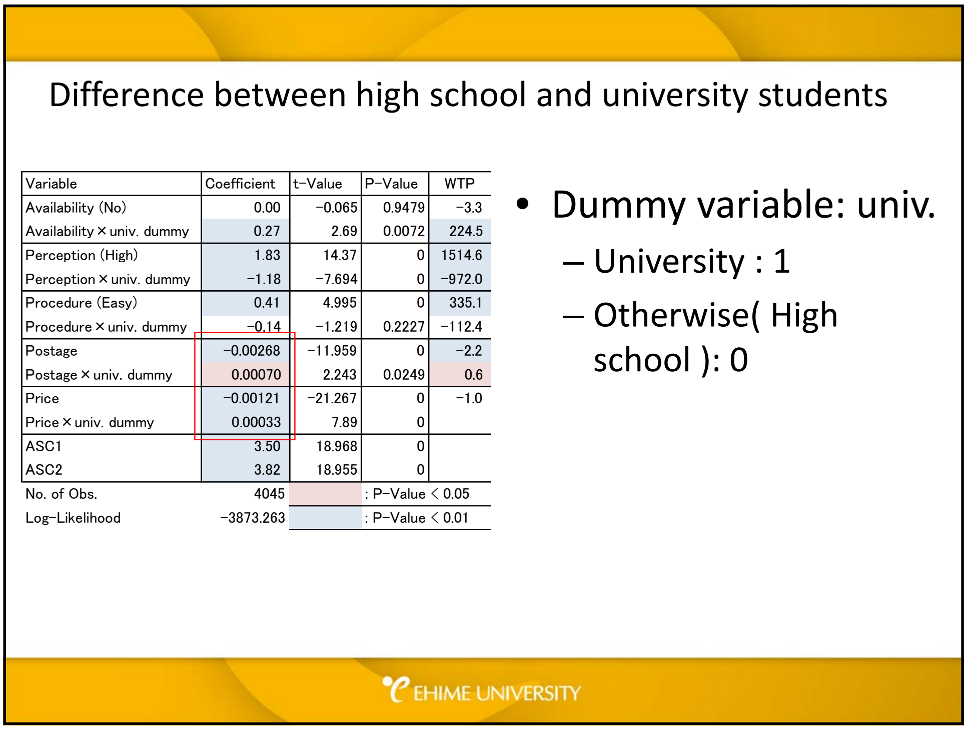

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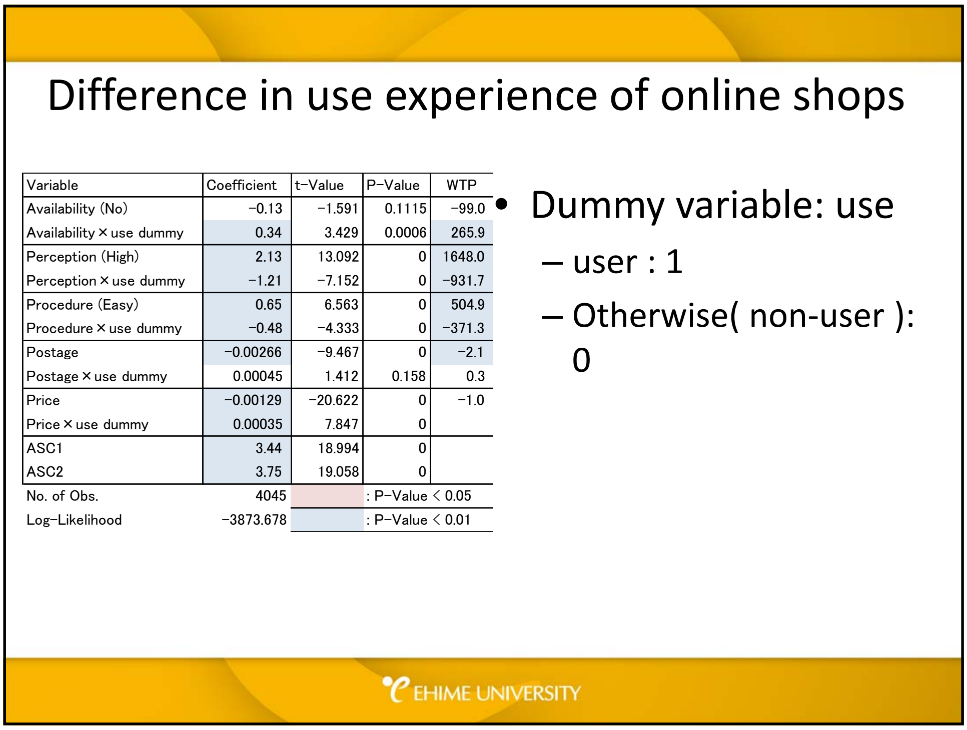

Difference in use experience of online shops

Variable	Coefficient	t-Value	P-Value	WTP
Availability (No)	−0.13	−1.591	0.1115	−99.0
Availability × use dummy	0.34	3.429	0.0006	265.9
Perception (High)	2.13	13.092	0	1648.0
Perception × use dummy	−1.21	−7.152	0	−931.7
Procedure (Easy)	0.65	6.563	0	504.9
Procedure × use dummy	−0.48	−4.333	0	−371.3
Postage	−0.00266	−9.467	0	−2.1
Postage × use dummy	0.00045	1.412	0.158	0.3
Price	−0.00129	−20.622	0	−1.0
Price × use dummy	0.00035	7.847	0	
ASC1	3.44	18.994	0	
ASC2	3.75	19.058	0	
No. of Obs.	4045	🟥	: P-Value < 0.05	
Log-Likelihood	−3873.678	🟦	: P-Value < 0.01	

- Dummy variable: use
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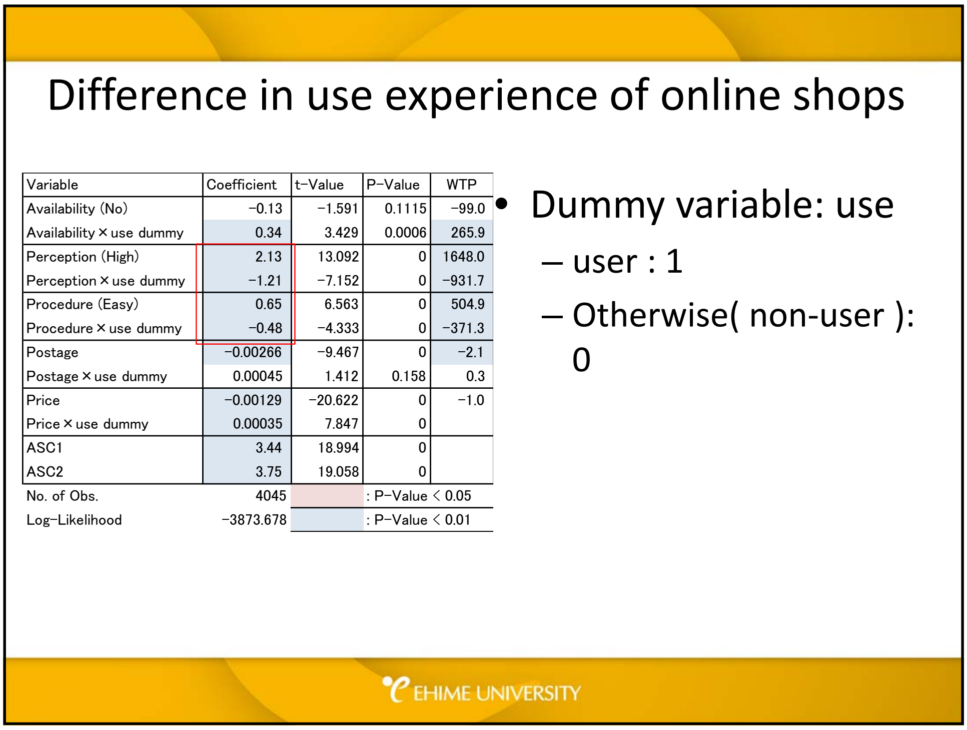

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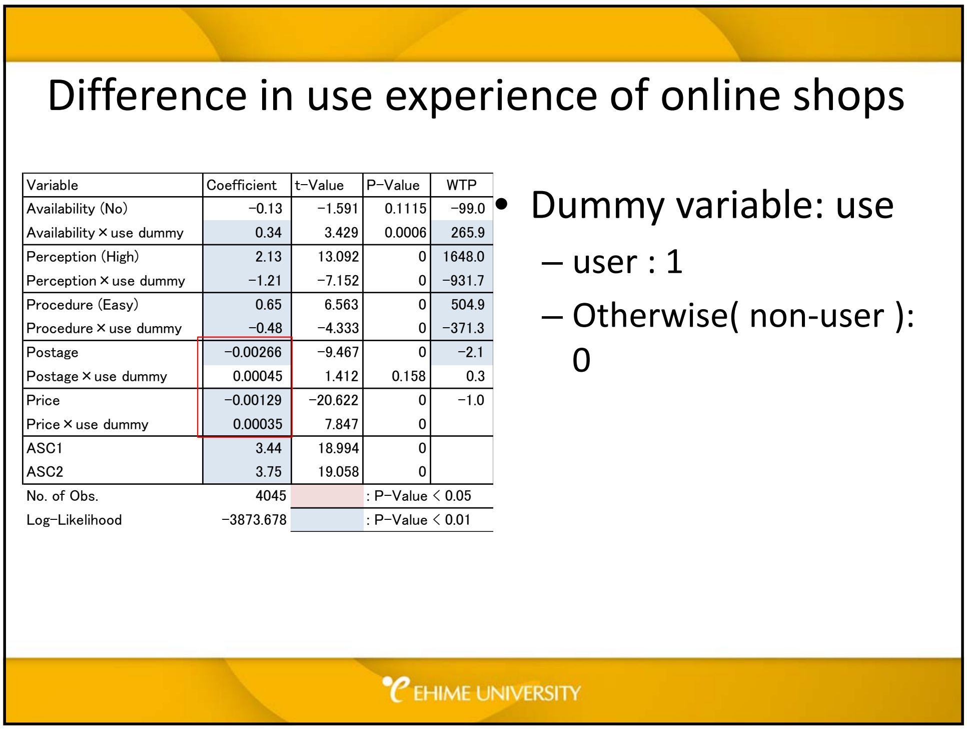

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Further Analysis

- Conditional Logit
  - IIA (independence form irrelevant alternatives)
  - homogeneous preference
- Mixed Logit
  - the variety of a preference
  - the assumption of IIA (independence form irrelevant alternatives)
  - the parameter according to individual

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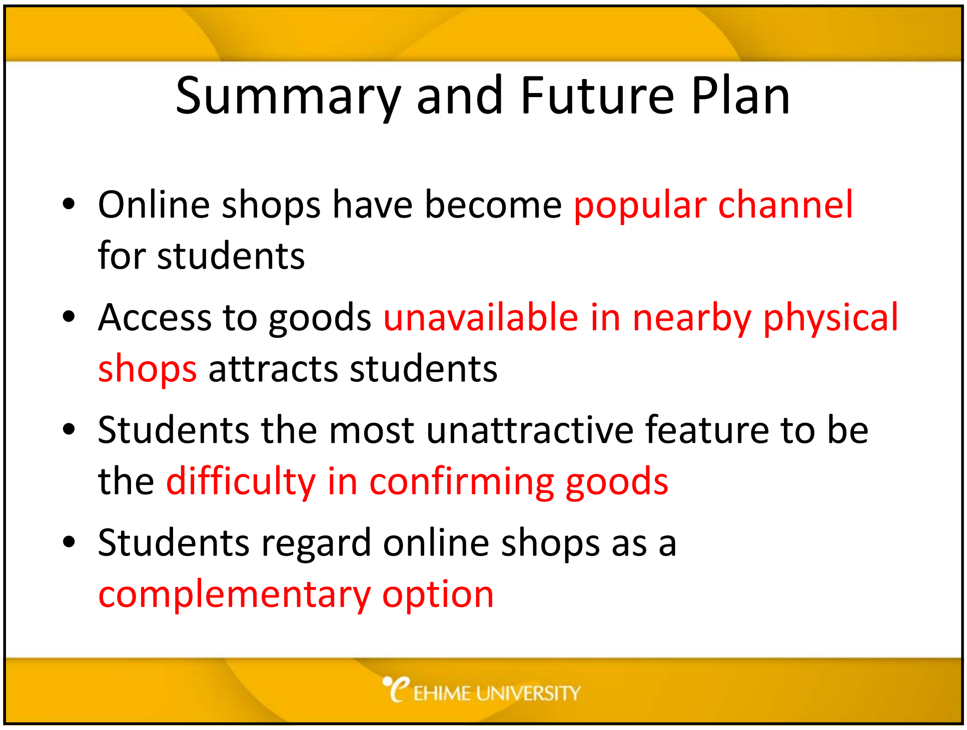

Summary and Future Plan

- Online shops have become popular channel for students
- Access to goods unavailable in nearby physical shops attracts students
- Students the most unattractive feature to be the difficulty in confirming goods
- Students regard online shops as a complementary option

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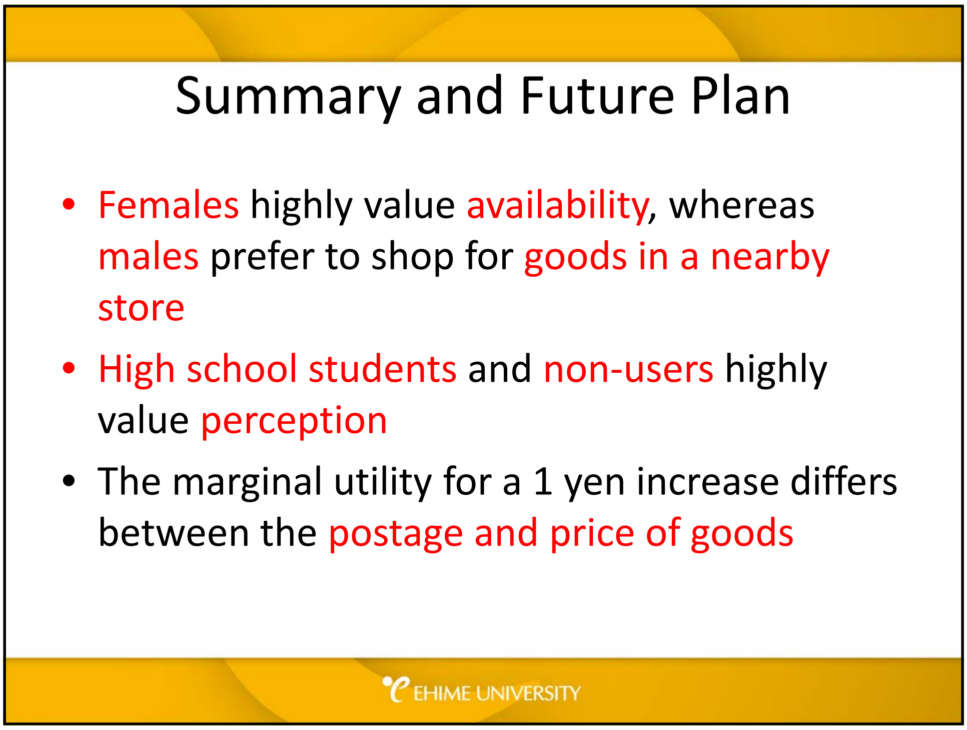

Summary and Future Plan

- Females highly value availability, whereas males prefer to shop for goods in a nearby store
- High school students and non-users highly value perception
- The marginal utility for a 1 yen increase differs between the postage and price of goods

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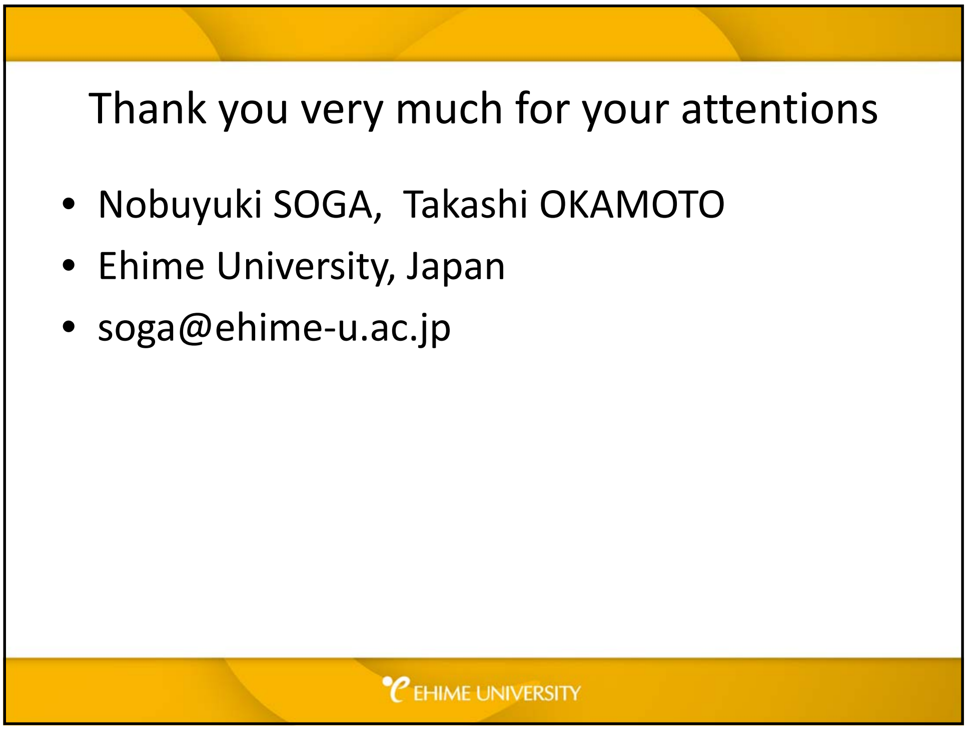

Thank you very much for your attentions

- Nobuyuki SOGA, Takashi OKAMOTO
- Ehime University, Japan
- soga@ehime-u.ac.jp

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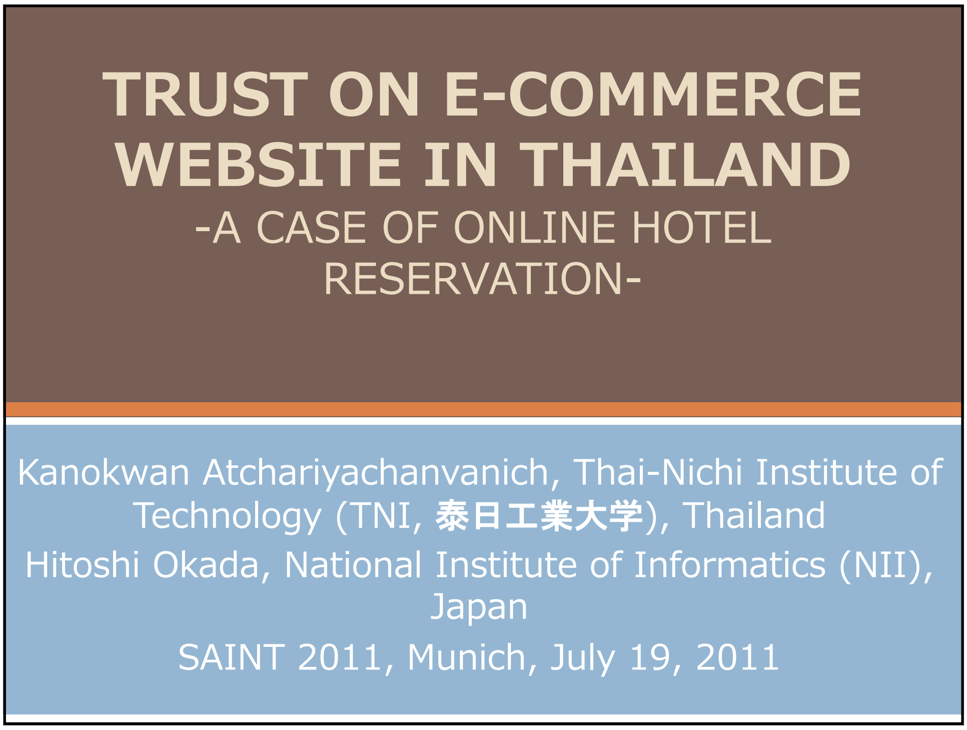
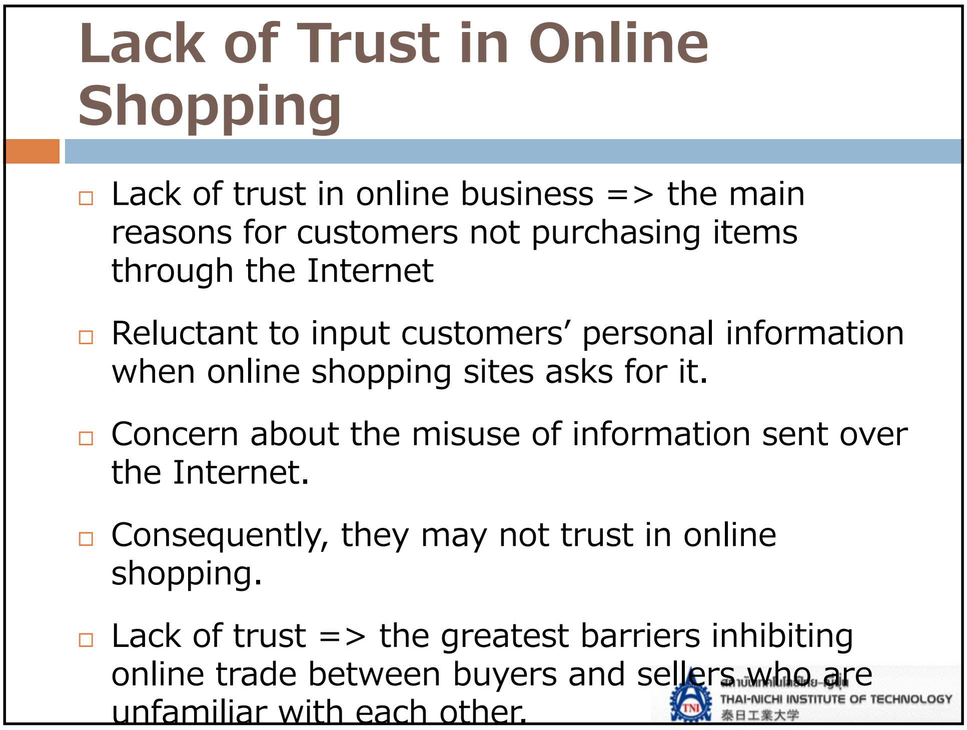


TRUST ON E-COMMERCE WEBSITE IN THAILAND

-A CASE OF ONLINE HOTEL RESERVATION-

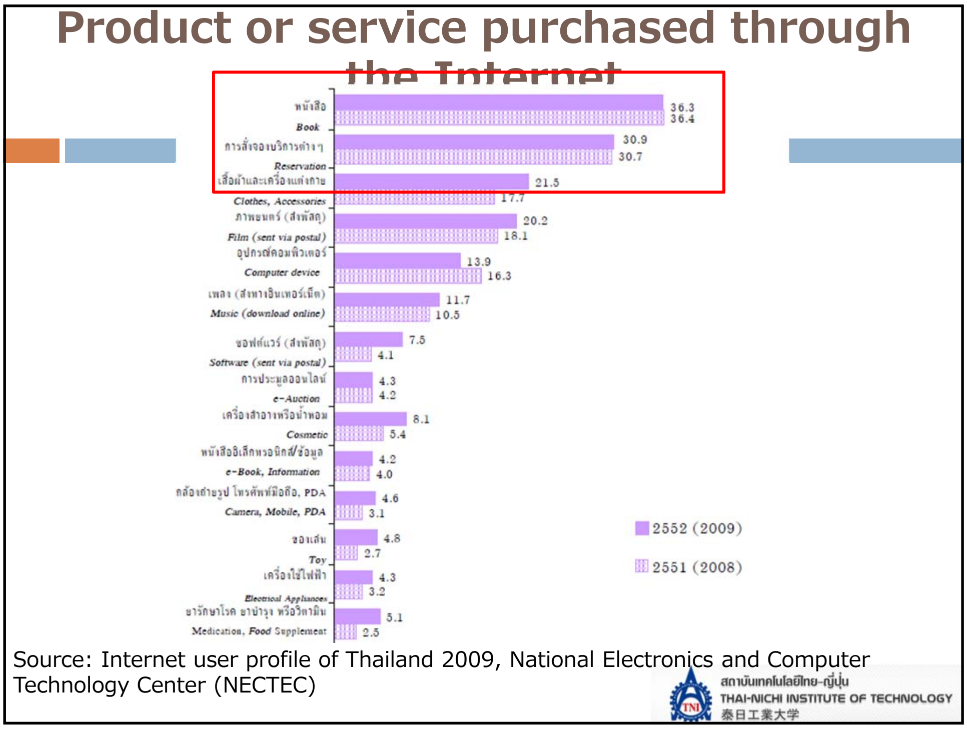
Kanokwan Atchariyachanvanich, Thai-Nichi Institute of Technology (TNI, 泰日工業大学), Thailand
Hitoshi Okada, National Institute of Informatics (NII), Japan

SAINT 2011, Munich, July 19, 2011



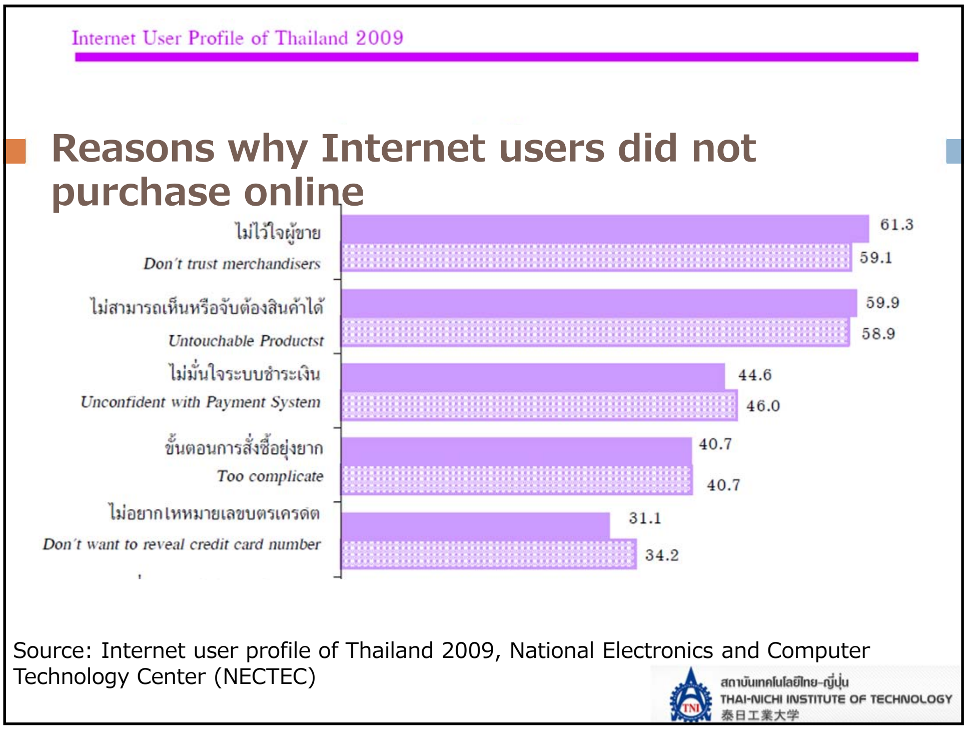
Lack of Trust in Online Shopping

- Lack of trust in online business => the main reasons for customers not purchasing items through the Internet
- Reluctant to input customers’ personal information when online shopping sites asks for it.
- Concern about the misuse of information sent over the Internet.
- Consequently, they may not trust in online shopping.
- Lack of trust => the greatest barriers inhibiting online trade between buyers and sellers who are unfamiliar with each other.



Product or service purchased through the Internet

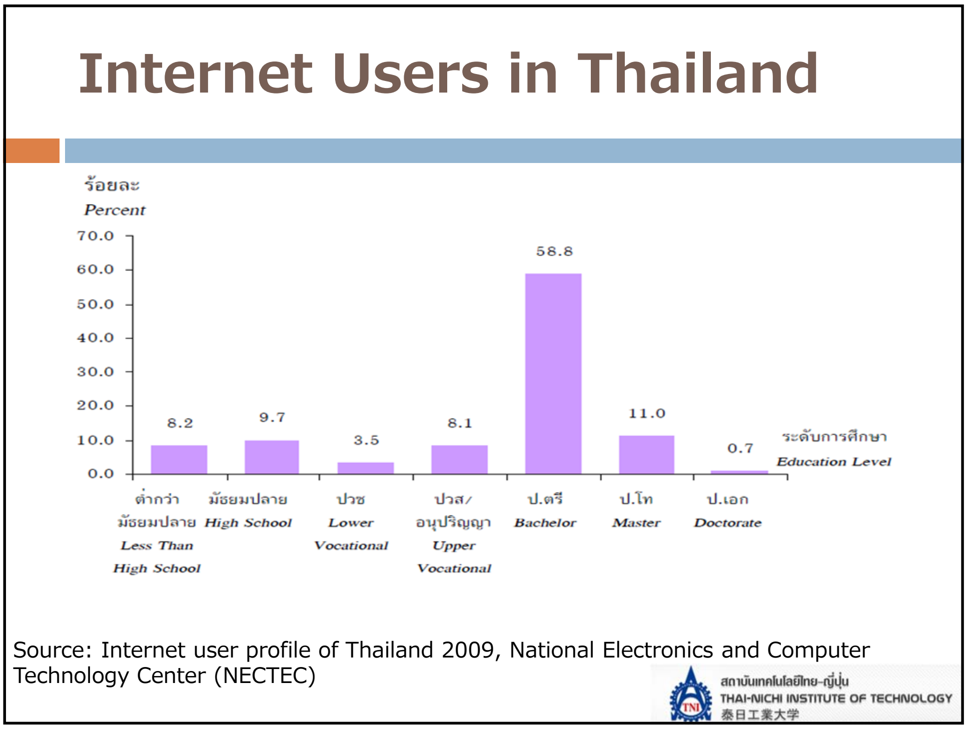
Source: Internet user profile of Thailand 2009, National Electronics and Computer Technology Center (NECTEC)



Internet User Profile of Thailand 2009

Reasons why Internet users did not purchase online

Source: Internet user profile of Thailand 2009, National Electronics and Computer Technology Center (NECTEC)



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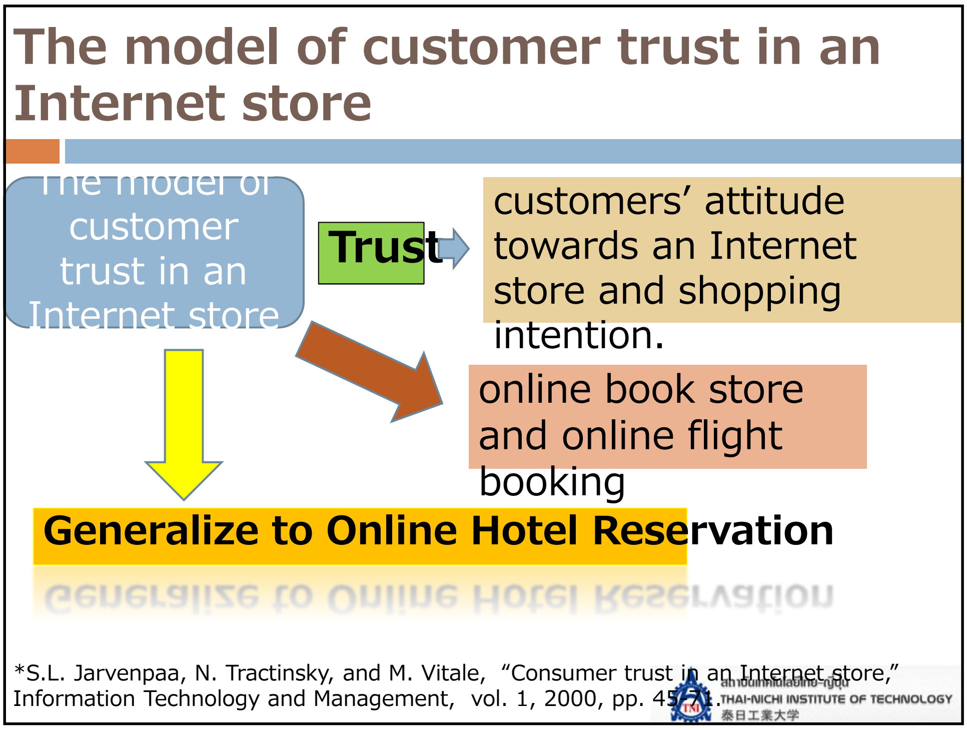


The model of customer trust in an Internet store

The model of customer trust in an Internet store

Trust

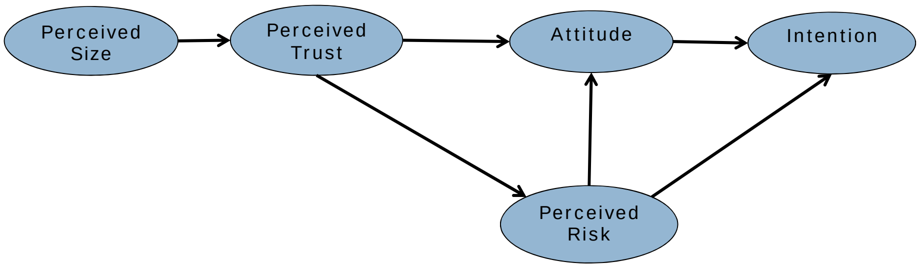
customers' attitude towards an Internet store and shopping intention.

online book store and online flight booking

Generalize to Online Hotel Reservation

*S.L. Jarvenpaa, N. Tractinsky, and M. Vitale, "Consumer trust in an Internet store," Information Technology and Management, vol. 1, 2000, pp. 45-71.

Model of Trust on Online Hotel Reservation


Perceived Size

Perceived Trust

Attitude

Intention

Perceived Risk

All paths are significant at $p = 0.001$, except paths marked with ^{ns}, which indicates insignificant path.

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泰日工業大学

Objective of Study

- to investigate whether or not the perceived trust and perceived risk would affect the customer's attitude towards using online hotel reservation and intention to use it in Thailand.

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Hypotheses

Perceived Size of online hotel reservation website:

- H1: A customer's perceived size of company positively influences a customer's perceived trust.

Perceived Trust:

- H2: A customer's perceived trust in online hotel reservation positively influences his or her attitude towards using it.
- H3: A customer's perceived trust negatively influences his or her risk perception.

Perceived Risk:

- H4: A customer's perceived risk negatively influences his or her attitude towards using online hotel reservation.
- H5: A customer's perceived risk negatively influences his or her intention to use online hotel reservation.

Intention to use Online hotel reservation

- H6: A customer's attitude toward using online hotel reservation positively influences his or her behavioral intention to use it.

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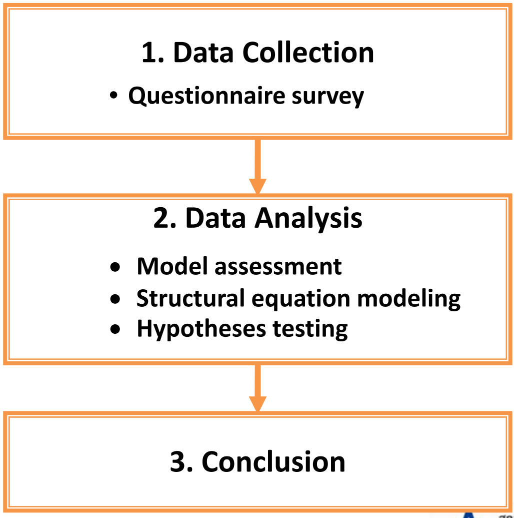
Research Methodology



1. Data Collection

- **Questionnaire survey**

2. Data Analysis

- **Model assessment**
- **Structural equation modeling**
- **Hypotheses testing**

3. Conclusion

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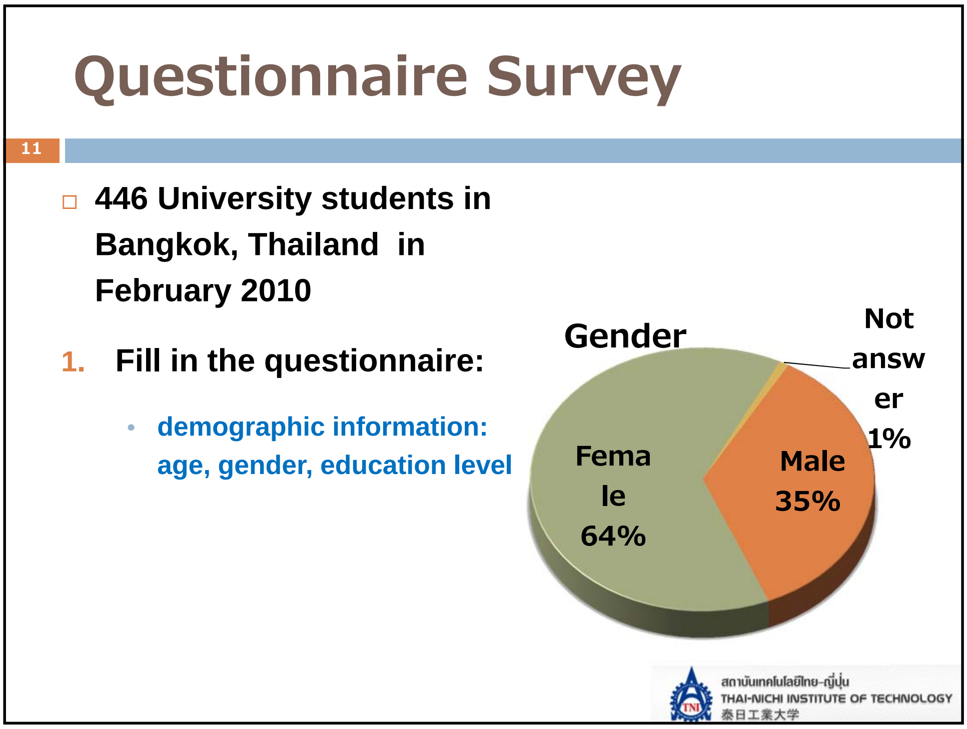
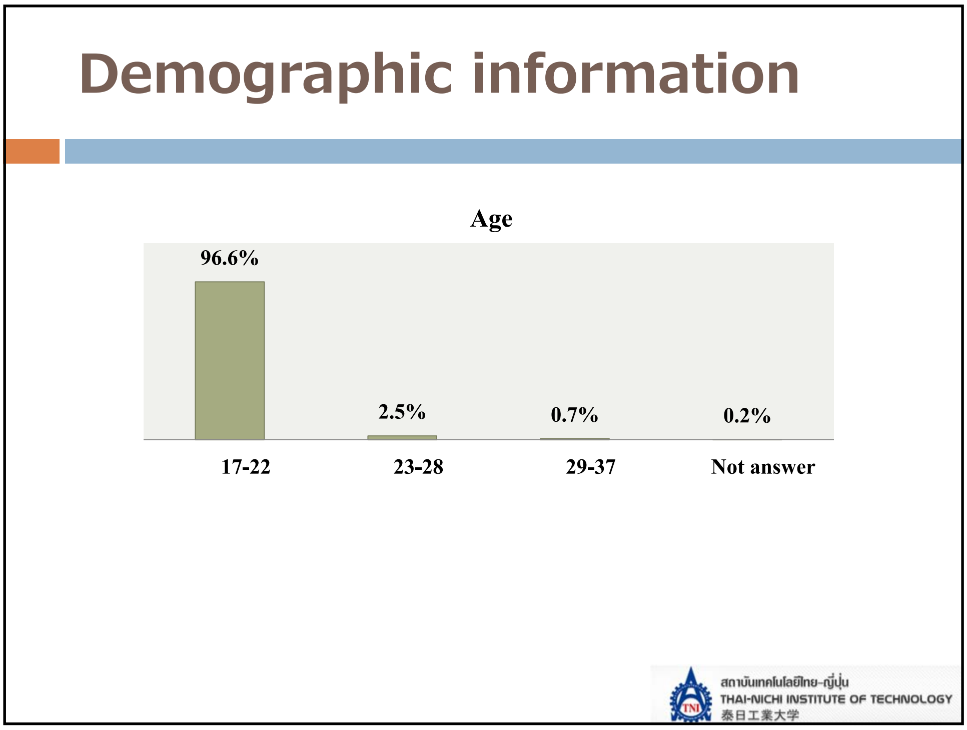


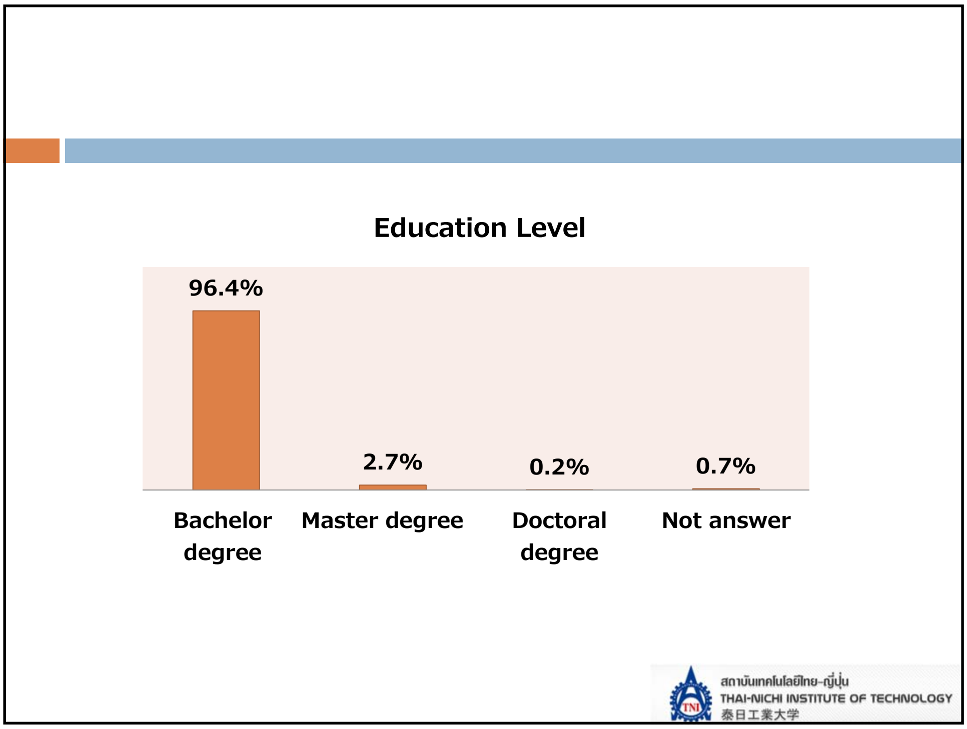
Questionnaire Survey

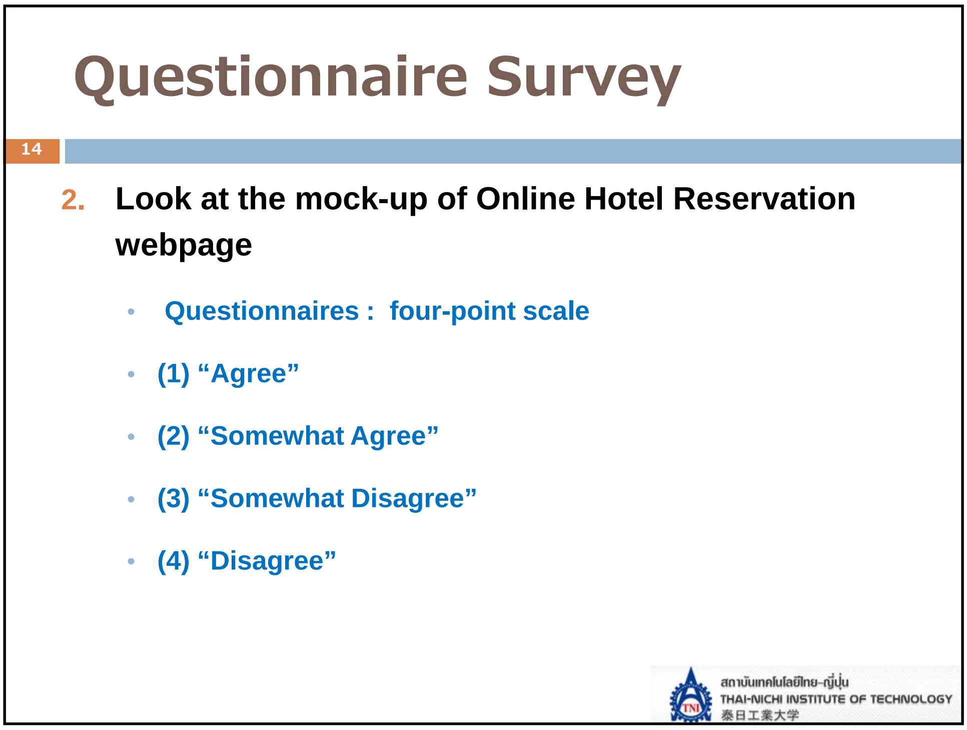
- 446 University students in Bangkok, Thailand in February 2010

1. Fill in the questionnaire:
   - demographic information: age, gender, education level



Demographic information





Questionnaire Survey

2. **Look at the mock-up of Online Hotel Reservation webpage**
   - **Questionnaires : four-point scale**
   - **(1) “Agree”**
   - **(2) “Somewhat Agree”**
   - **(3) “Somewhat Disagree”**
   - **(4) “Disagree”**

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Experiment: Scenario in Questionnaire

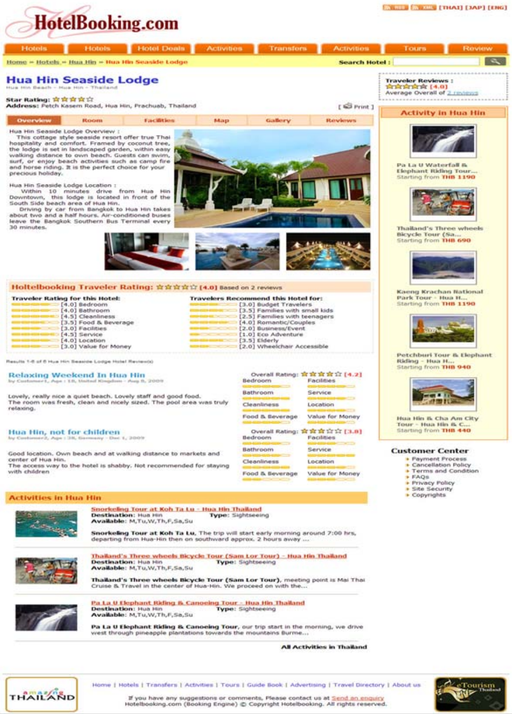
You and your good friends make a plan to go to Hua Hin in consecutive holidays and you are going to book a hotel.

According to your friends, it is now very convenient to book a hotel via the Internet.

So you decide to book your hotel via a booking service on the Internet.

After browsing some booking services around, you narrow down your choices to a number of hotels that you think you would be satisfied with in terms of price and taste.

You and your friends are looking for a casual hotel with reasonable price which can be afforded by



Home » Hotels » Hua Hin » Hua Hin Seaside Lodge

Hua Hin Seaside Lodge

Hua Hin Beach - Hua Hin - Thailand

Star Rating: ☆☆☆☆☆

Address: Petch Kasem Road, Hua Hin, Prachuab, Thailand

Traveler Reviews : ☆☆☆☆☆ [4.0]

Average Overall of 2 reviews

Hua Hin Seaside Lodge Overview :

This cottage style seaside resort offer true Thai hospitality and comfort. Framed by coconut tree, the lodge is set in landscaped garden, within easy walking distance to own beach. Guests can swim, surf, or enjoy beach activities such as camp fire and horse riding. It is the perfect choice for your precious holiday.

Hua Hin Seaside Lodge Location :

Within 10 minutes drive from Hua Hin Downtown, this lodge is located in front of the South Side beach area of Hua Hin.

Driving by car from Bangkok to Hua Hin takes about two and a half hours. Air-conditioned buses leave the Bangkok Southern Bus Terminal every 30 minutes.

Holtelbooking Traveler Rating: ☆☆☆☆☆ [4.0] Based on 2 reviews

Traveler Rating for this Hotel:	Travelers Recommend this Hotel for:
[4.0] Bedroom	[3.0] Budget Travelers
[4.0] Bathroom	[3.5] Families with small kids
[4.5] Cleanliness	[2.5] Families with teenagers
[3.5] Food & Beverage	[4.0] Romantic/Couples
[3.0] Facilities	[2.0] Business/Event
[4.5] Service	[1.0] Eco Adventure
[4.0] Location	[3.5] Elderly
[3.0] Value for Money	[2.0] Wheelchair Accessible

Results 1-8 of 8 Hua Hin Seaside Lodge Hotel Review(s)

Relaxing Weekend In Hua Hin

by Customer1, Age : 18, United Kingdom - Aug 5, 2009

Lovely, really nice a quiet beach. Lovely staff and good food.
The room was fresh, clean and nicely sized. The pool area was truly relaxing.

Overall Rating: ☆☆☆☆☆ [4.2]

Bedroom, Facilities, Bathroom, Service, Cleanliness, Location, Food & Beverage, Value for Money

Hua Hin, not for children

by Customer2, Age : 38, Germany - Dec 1, 2009

Good location. Own beach and at walking distance to markets and center of Hua Hin.
The access way to the hotel is shabby. Not recommended for staying with children

Overall Rating: ☆☆☆☆☆ [3.8]

Bedroom, Facilities, Bathroom, Service, Cleanliness, Location, Food & Beverage, Value for Money

Activities in Hua Hin

Snorkeling Tour at Koh Ta Lu - Hua Hin Thailand
Destination: Hua Hin **Type:** Sightseeing
Available: M,Tu,W,Th,F,Sa,Su

Snorkeling Tour at Koh Ta Lu, The trip will start early morning around 7:00 hrs, departing from Hua-Hin then on southward approx. 2 hours away ...

Thailand's Three wheels Bicycle Tour (Sam Lor Tour) - Hua Hin Thailand
Destination: Hua Hin **Type:** Sightseeing
Available: M,Tu,W,Th,F,Sa,Su

Thailand's Three wheels Bicycle Tour (Sam Lor Tour), meeting point is Mai Thai Cruise & Travel in the center of Hua-Hin. We proceed on with the...

Pa La U Elephant Riding & Canoeing Tour - Hua Hin Thailand
Destination: Hua Hin **Type:** Sightseeing
Available: M,Tu,W,Th,F,Sa,Su

Pa La U Elephant Riding & Canoeing Tour, our trip start in the morning, we drive west through pineapple plantations towards the mountains Burme...

All Activities in Thailand

Activity in Hua Hin

Pa La U Waterfall & Elephant Riding Tour...
Starting from THB 1190

Thailand's Three wheels Bicycle Tour (Sa...
Starting from THB 690

Kaeng Krachan National Park Tour - Hua H...
Starting from THB 1190

Petchburi Tour & Elephant Riding - Hua H...
Starting from THB 940

Hua Hin & Cha Am City Tour - Hua Hin & C...
Starting from THB 440

Customer Center
- Payment Process
- Cancellation Policy
- Terms and Condition
- FAQs
- Privacy Policy
- Site Security
- Copyrights

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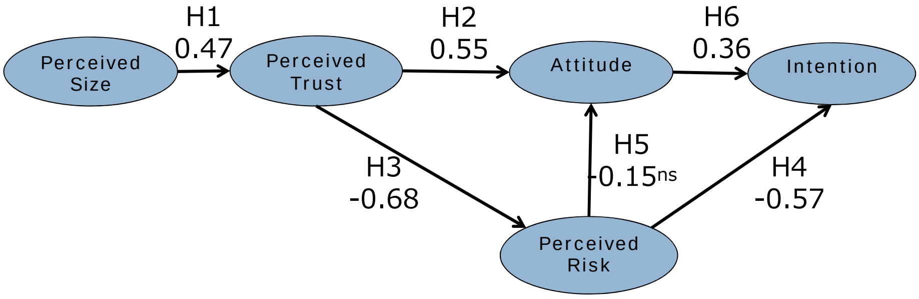
Analysis Result: Model of Trust on Online Hotel Reservation



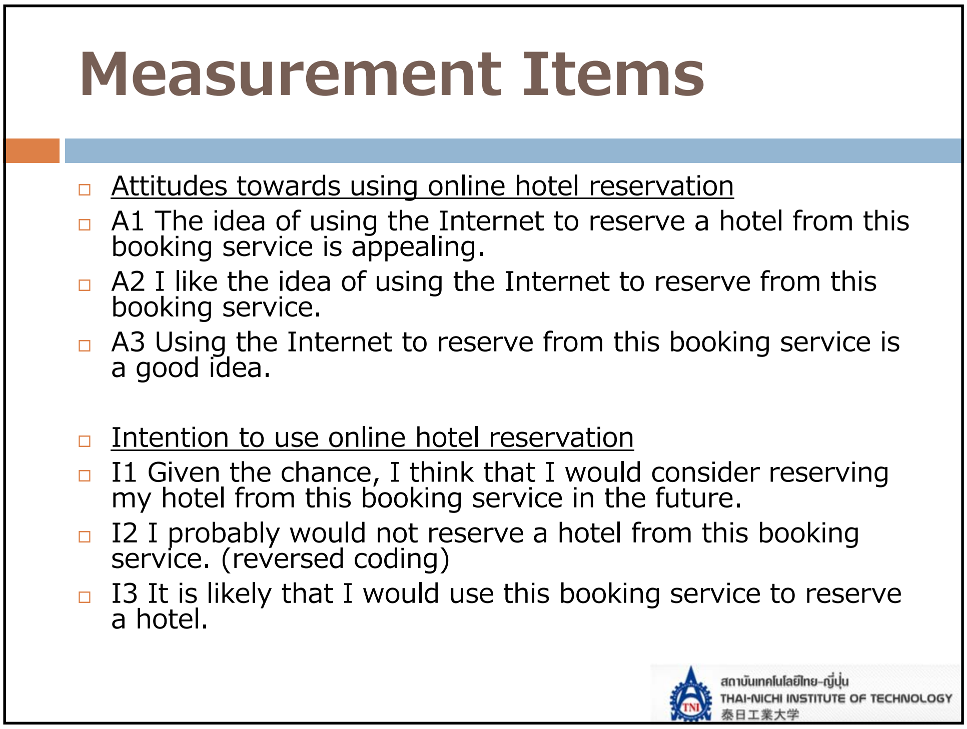
All paths are significant at $p = 0.001$, except paths marked with ^{ns}, which indicates insignificant path.

Measurement Items

- Perceived size of online hotel reservation website
- S1 This booking service is that of a very large company.
- S2 This booking service is the industry's biggest supplier on the web.

- Perceived store trustworthiness
- T1 This booking service is trustworthy.
- T2 This booking service wants to be known as one that keeps promises and commitments.
- T3 I trust this booking service keeps my best interests in mind.
- T6 This booking service behaves in a way that meets my expectations.

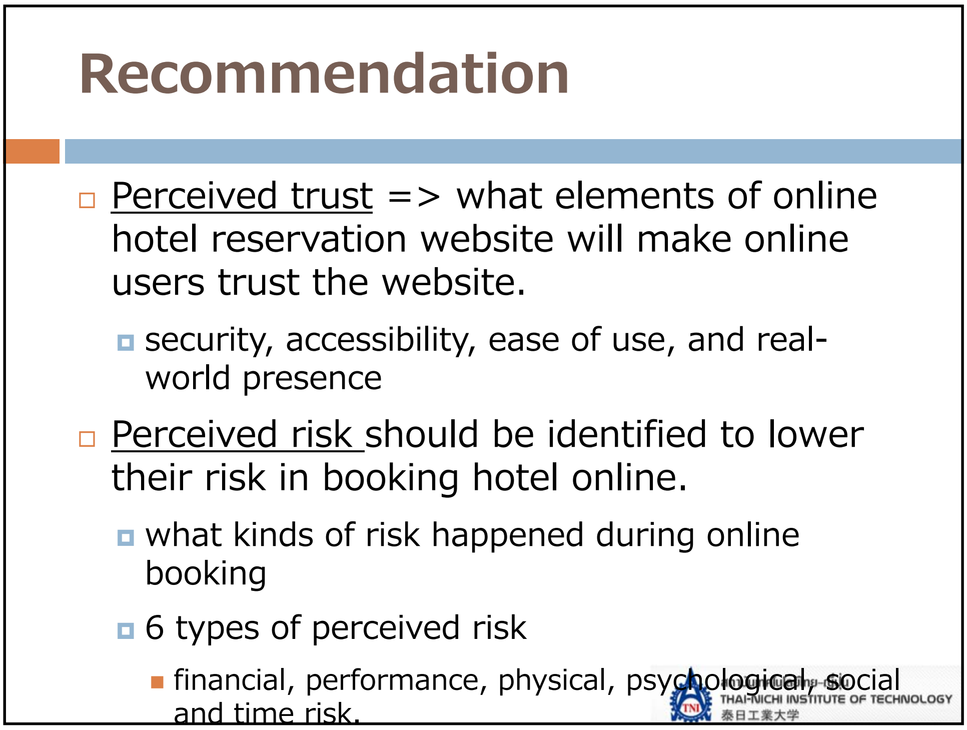
- Perceived risk
- R1 There is a considerable risk involved in reserving a hotel from this booking service.
- R2 There is a high potential for loss involved in reserving a hotel from this booking service.
- R3 My decision to reserve a hotel from this booking service is risky.



Measurement Items

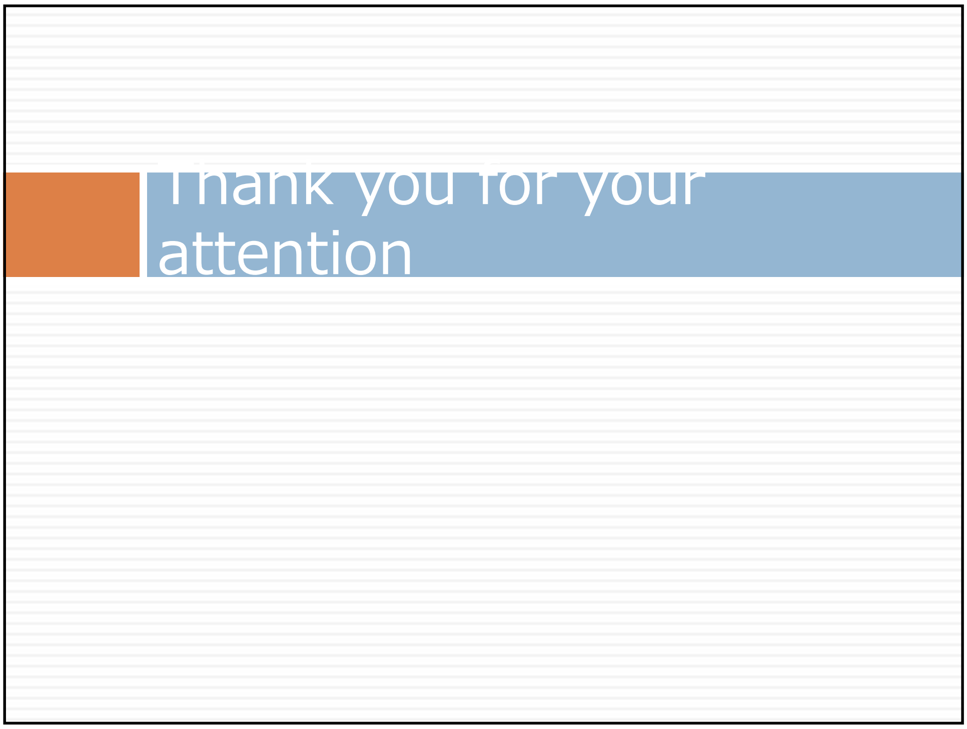
- Attitudes towards using online hotel reservation
- A1 The idea of using the Internet to reserve a hotel from this booking service is appealing.
- A2 I like the idea of using the Internet to reserve from this booking service.
- A3 Using the Internet to reserve from this booking service is a good idea.

- Intention to use online hotel reservation
- I1 Given the chance, I think that I would consider reserving my hotel from this booking service in the future.
- I2 I probably would not reserve a hotel from this booking service. (reversed coding)
- I3 It is likely that I would use this booking service to reserve a hotel.



Recommendation

- Perceived trust => what elements of online hotel reservation website will make online users trust the website.
  - security, accessibility, ease of use, and real-world presence
- Perceived risk should be identified to lower their risk in booking hotel online.
  - what kinds of risk happened during online booking
  - 6 types of perceived risk
    - financial, performance, physical, psychological, social and time risk.



Thank you for your attention

A Trust Rating Method
for Information Providers
over the Social Web Service

A Pragmatic Protocol for Trust
among Information Explorers and Information Providers

Shigeichiro Yamasaki
Kinki University

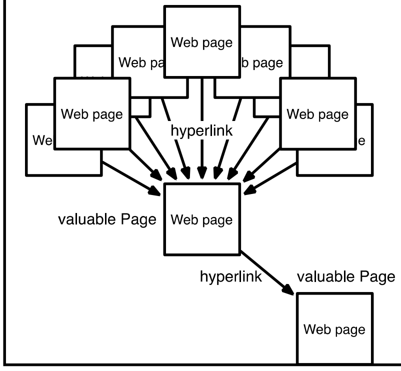
The era of search engine

- The center of information resource was a web page

The value of a web page is determined from the hyper-link structure of web pages

Google equation
(PageRank)

$$\mathbf{G} = \alpha\mathbf{H} + (\alpha\mathbf{a} + (1-\alpha)\mathbf{e})\frac{1}{n\mathbf{e}^T}$$


Web page
Web page
Web page
hyperlink
valuable Page
Web page
hyperlink
valuable Page
Web page

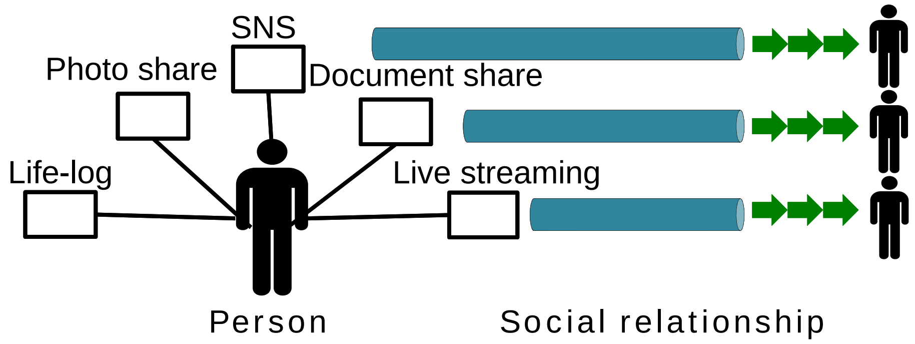
(1) A hyperlink of a web page is considered to be a recommendation of it.

(2) A web page that is referred to by many web pages will be a valuable page.

(3) A page which is referred to by valuable pages must also be a valuable page.

The era of the social web

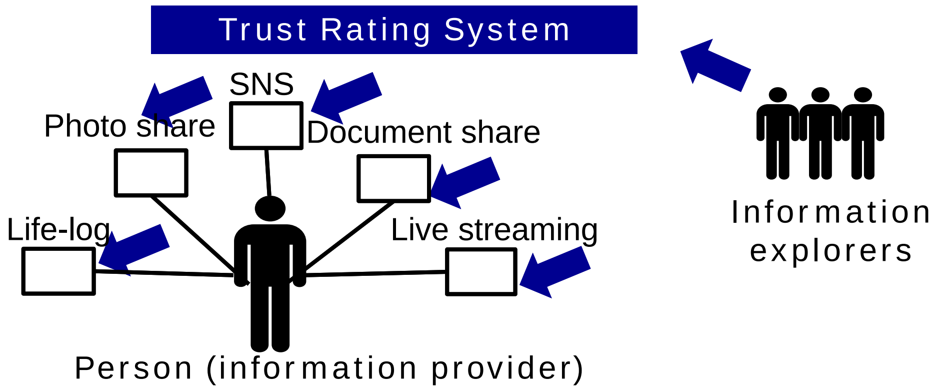
- The center of information resource becomes a person
  - Ordinary people become an information provider
  - Information flows along by the social relationship
  - But those are mixture of trustworthy and doubtful



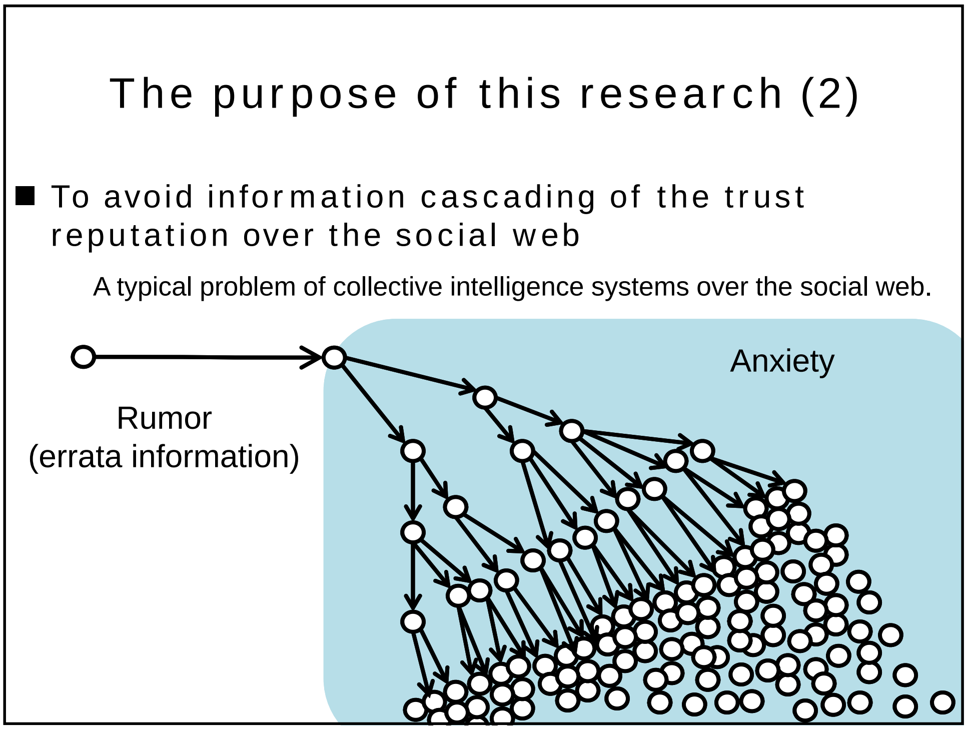
SNS
Photo share
Document share
Life-log
Live streaming
Person
Social relationship

The purpose of this research (1)

- To construct a trust rating system for information providers over the social web
  - Like a Google equation.
  - It is a service to evaluate the reputation of information providers.



Trust Rating System
SNS
Photo share
Document share
Life-log
Live streaming
Information explorers
Person (information provider)



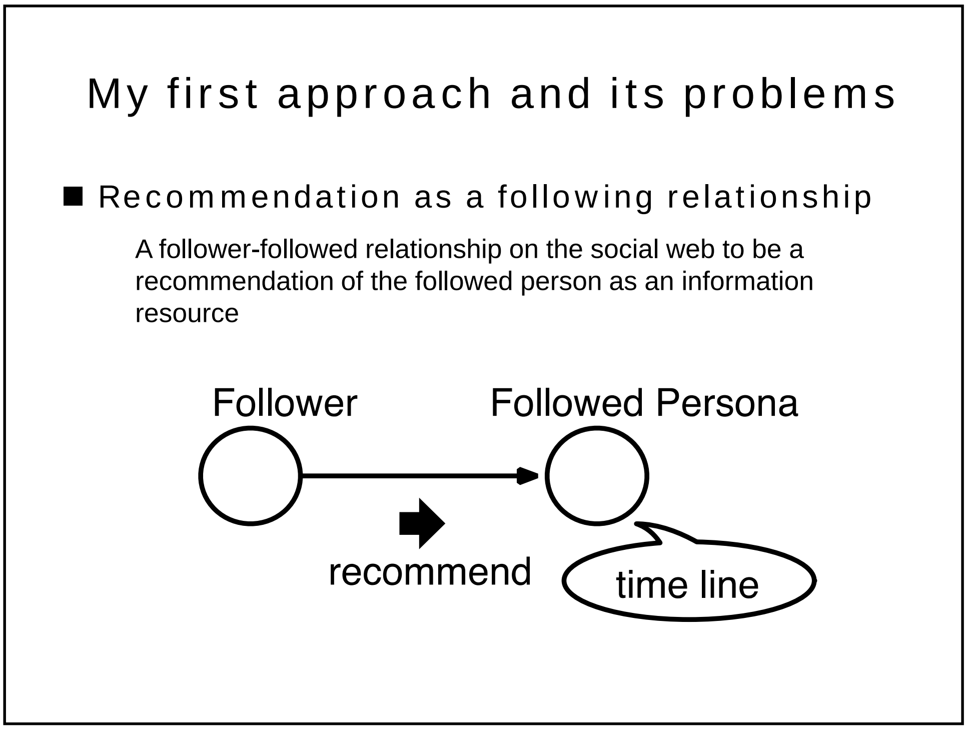
The purpose of this research (2)

- To avoid information cascading of the trust reputation over the social web

A typical problem of collective intelligence systems over the social web.

Anxiety

Rumor
(errata information)



My first approach and its problems

- Recommendation as a following relationship

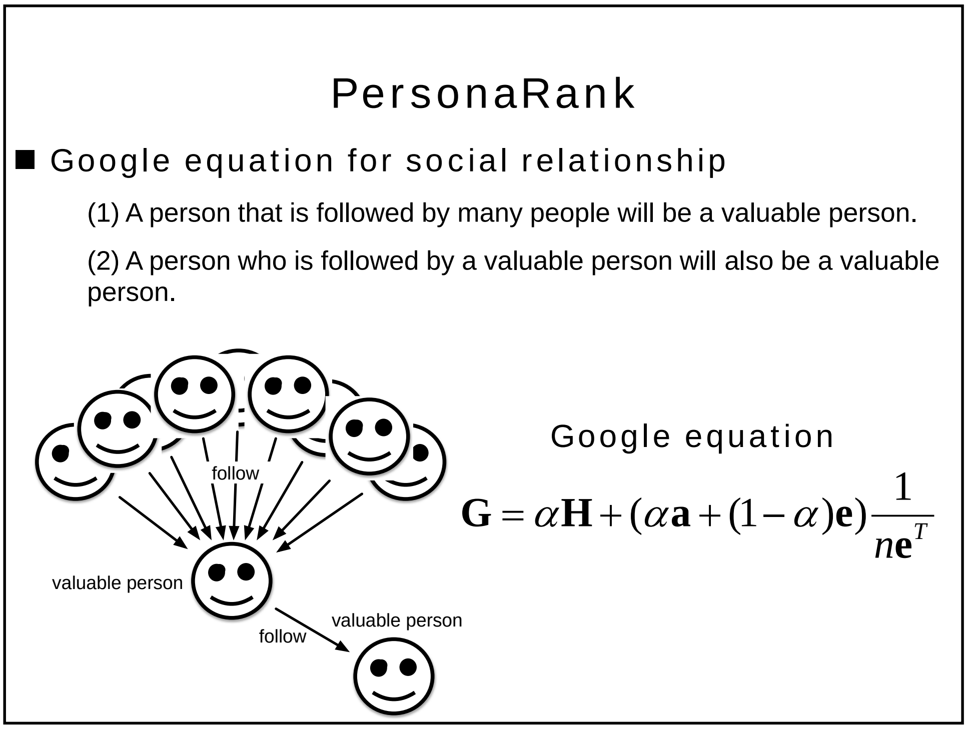
A follower-followed relationship on the social web to be a recommendation of the followed person as an information resource

Follower

Followed Persona

recommend

time line



PersonaRank

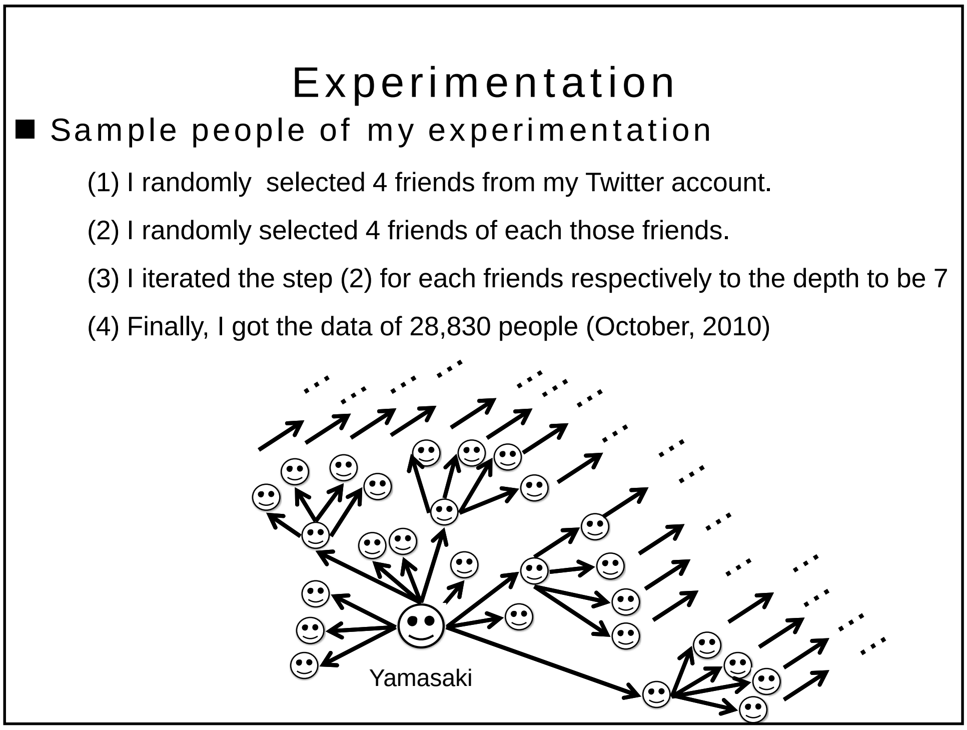
- Google equation for social relationship

(1) A person that is followed by many people will be a valuable person.

(2) A person who is followed by a valuable person will also be a valuable person.

Google equation

$$\mathbf{G} = \alpha\mathbf{H} + (\alpha\mathbf{a} + (1-\alpha)\mathbf{e})\frac{1}{n\mathbf{e}^{T}}$$



Experimentation

- Sample people of my experimentation

(1) I randomly selected 4 friends from my Twitter account.

(2) I randomly selected 4 friends of each those friends.

(3) I iterated the step (2) for each friends respectively to the depth to be 7

(4) Finally, I got the data of 28,830 people (October, 2010)

The result of PersonaRank

- Top 100 of the 28,830 people

  Almost all of them are entertainers or big names

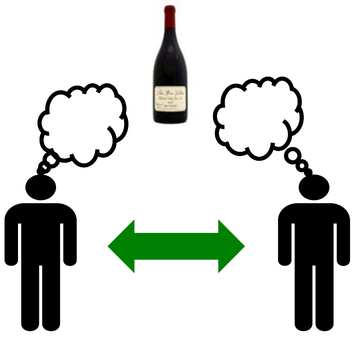
  Those are not particularly valuable or trustable information resources

  I don't say it is useless. However, more conditions will be required.

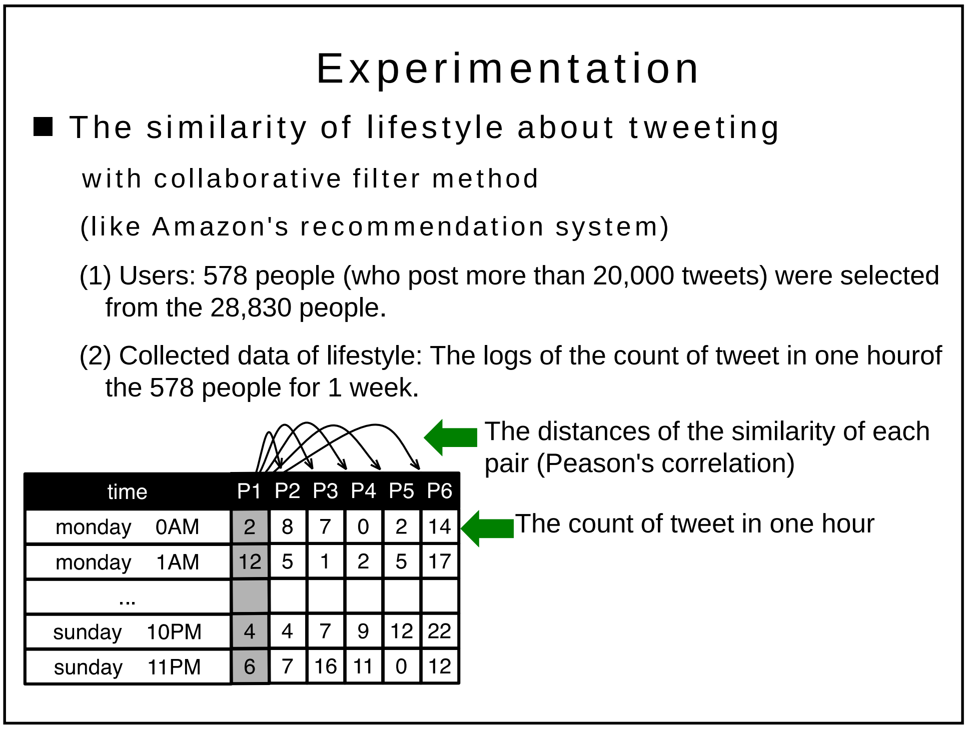
"Britney Spears", "ashton kutcher", "Ellen DeGeneres", "Lady Gaga", "Barack Obama", "Oprah Winfrey", "taylorswift13", "John Mayer", "Twitter", "Justin Bieber", "Ryan Seacrest", "Ashley Tisdale", "CNN Breaking News", "THE_REAL_SHAQ", "Mariah Carey", "Coldplay", "Demi Moore", "Katy Perry", "50cent", "iamdiddy", "jimmy fallon", "Jessica Simpson", "Lance Armstrong", "The New York Times", "Justin Timberlake ", "A Googler", "The Onion", "Chelsea Handler", "Soulja Boy", "lilyroseallen", "Al Gore", "Paris Hilton", "Tony Hawk", "Selena Gomez", "TIME.com", "Perez Hilton", "Pete Wentz", "Pete Cashmore", "demetria lovato", "Luciano Huck", "Mandy Moore", "RainnWilson", "Martha Stewart", "NBA", "Dr. Drew", "John Legend", "Lenny Kravitz", "Shakira", "Jonas Brothers", "Joel McHale", "Giuliana Rancic", "The White House", "Breaking News", "Brooke Burke", "Felicia Day", "Alicia Keys", "John McCain", "Gov. Schwarzenegger", "Denise Richards", "Kevin Spacey", "Rachel Maddow MSNBC", "Wil Wheaton", "GeorgeStephanopoulos", "Larry King ", "NFL", "Biz Stone", "Alison Sudol", "woot.com", "Peter Facinelli", "twt.fm", "Penn Jillette", "Veronica Belmont", "Dwight Howard", "someecards", "LeVar Burton", "Stephen Colbert", "Jack Dorsey", "P!nk", "Stephen Fry", "Eddie Izzard", "Paul Pierce", "Michael Ian Black", "Ryan Sheckler", "Fred Durst", "Ustream", "samantha ronson", "Threadless", "World Economic Forum", "Sockamillion", "Nightline", "adventuregirl", "David Gregory", "Snoop Dogg", "Pitchfork", "Amazon MP3", "iTunes Trailers", "Funny Or Die", "Neil Gaiman", "Ryan Penagos", "FragDolls", "Justin"

My first assumption of trust
"Trust by similarity"

- I added an assumption : The most similar pair of people will trust each other on common themes.



The most similar pair on the theme of wine
will think the party is valuable information resource of wine



Experimentation

- The similarity of lifestyle about tweeting

  with collaborative filter method

  (like Amazon's recommendation system)

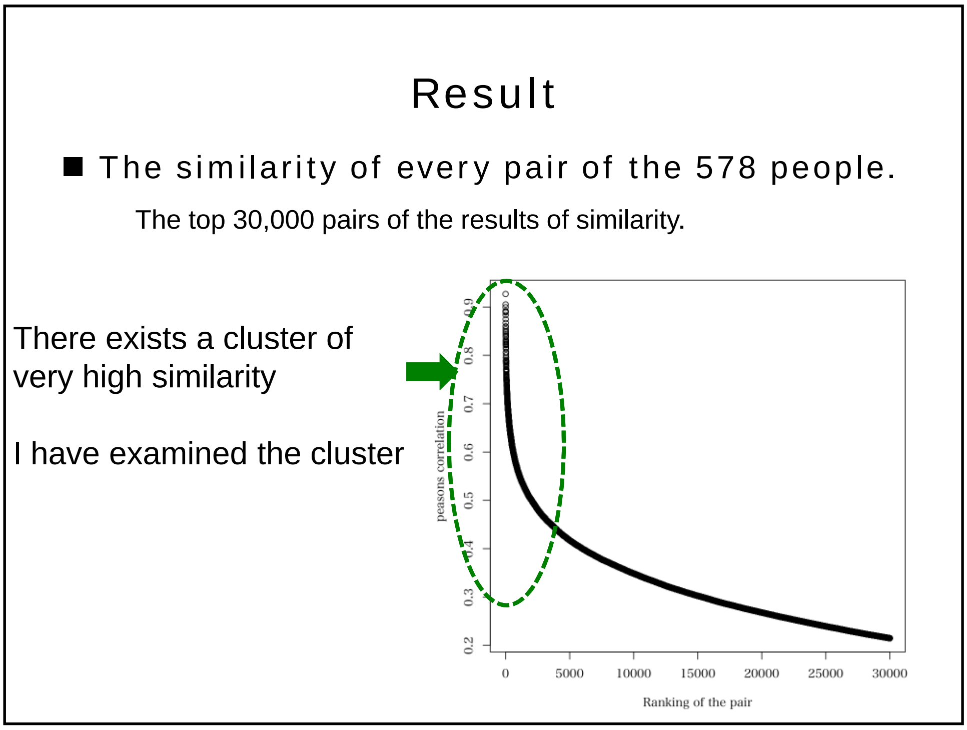
  (1) Users: 578 people (who post more than 20,000 tweets) were selected from the 28,830 people.

  (2) Collected data of lifestyle: The logs of the count of tweet in one hourof the 578 people for 1 week.

The distances of the similarity of each pair (Peason's correlation)

time	P1	P2	P3	P4	P5	P6
monday 0AM	2	8	7	0	2	14
monday 1AM	12	5	1	2	5	17
...						
sunday 10PM	4	4	7	9	12	22
sunday 11PM	6	7	16	11	0	12

The count of tweet in one hour



Result

- The similarity of every pair of the 578 people.

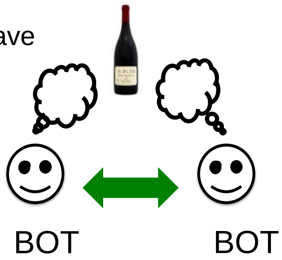
  The top 30,000 pairs of the results of similarity.

There exists a cluster of very high similarity

I have examined the cluster

The problem of my first assumption of trust

- Almost all pairs of high similarity turned out to be BOTs
    - A BOT is a software robot
    - So many clever BOTs are prevalent among the social web services
    - Because, my assumption is already understood by many clever people
- This problem is not restricted to similarity of lifestyle
    - (1) The technologies that imitate human activity have become very sophisticated.
    - (2) The clever BOTs would skew the data and get high rating in any statistical approach
    - Turing Test problem



My second approach

- The essential problem of my first approach
    - I considered trust to be statistical information over the social relationship
    - The human race, over time, has designed various social methods and social devices to establish trust.
    - A trust rating method requires more precise evidence of trust.

My second approach

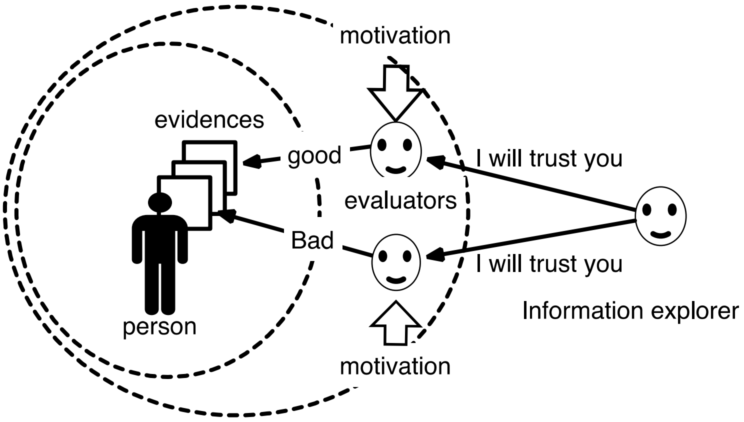
- The essential problem of my first approach
    - I considered trust to be statistical information over the social relationship
    - The human race, over time, has designed various social methods and social devices to establish trust.
    - A trust rating method requires more precise evidence of trust.

Important factors of my second approach

- Three aspects of trust
    - (1) Trust in a persons ability
        - example of finance his/her income
    - (2) Trust in a persons motivation
        - example of finance mortgage
    - (3) Trust in a persons meta-communication
        - example of finance financial contract
- The trust of evaluators
    - These conditions of trust should be applied not only to the person who is the object of the trust rating but also to the evaluator of the trust rating

Areas suitable for this approach is limited

- ■The existence of fair motivation on behalf of the evaluators


motivation
evidences
good
I will trust you
evaluators
Bad
I will trust you
Information explorer
person
motivation

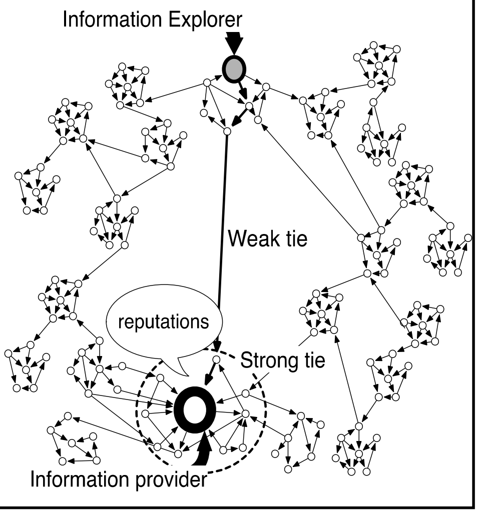
The object and the subject of this model

- ■Evaluators must have the ability to perform evaluation of the information provider

(1) A person who is strongly tied to the object can influence the reputation of the object.

(2) The subject is the information explorer who tries to hunt for a reliable information provider not only amongst people with whom they have strong ties but also amongst people with whom they share weaker ties.

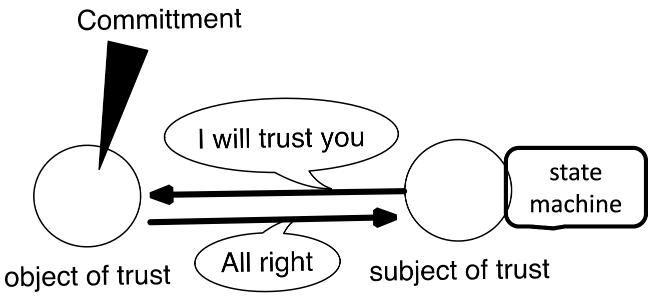
.


Information Explorer
Weak tie
reputations
Strong tie
Information provider

Meta-communication protocol for trust

- Parties who commence trusting each other confirm it explicitly

In the real world, not only legal contracts but also various kinds of social ceremony, like a declaration of marriage, require a strong mental commitment from their explicit statement of trust.

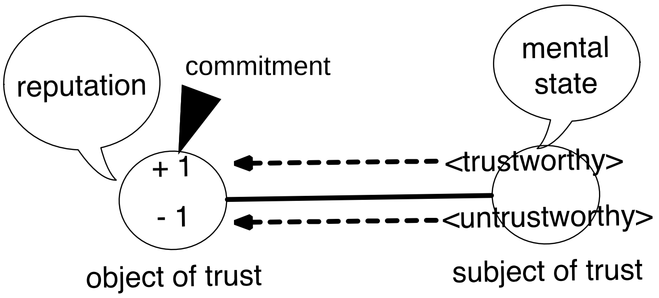

Committment
I will trust you
state machine
object of trust
All right
subject of trust

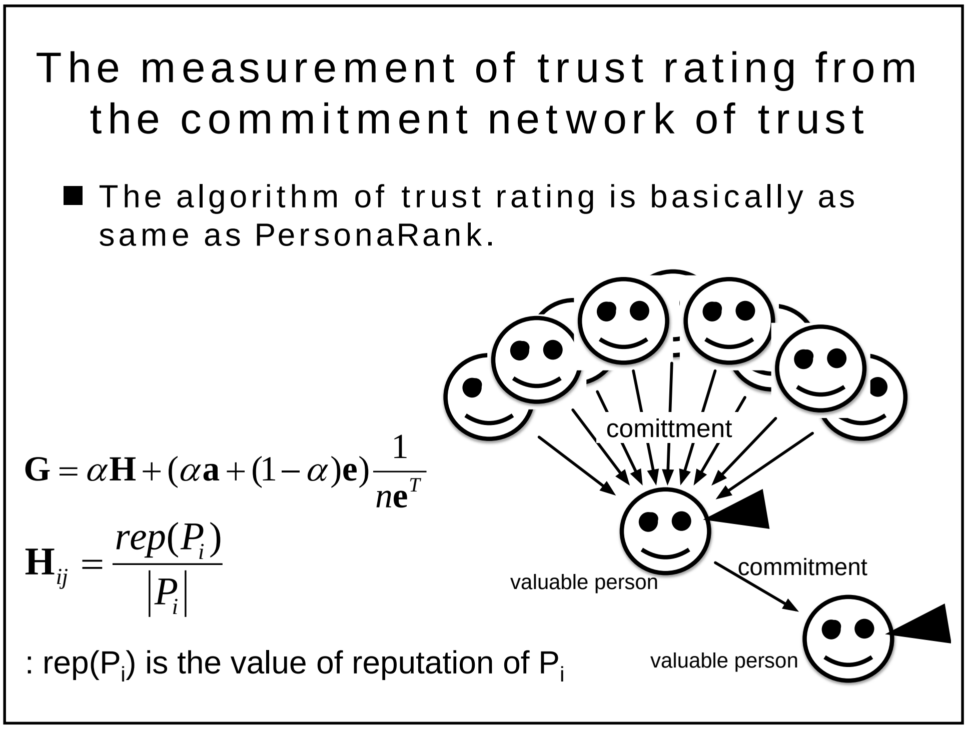
The mental states of the subject and the reputation of the object of trust

- After the meta-communication of trust

(1) When the state of the subject becomes 'trustworthy' the value of the reputation of the object of trust goes up.

(2)When the state of the subject becomes 'untrustworthy' the value of the reputation of the object of trust goes down.


reputation
commitment
mental state
+ 1
- 1
<trustworthy>
<untrustworthy>
object of trust
subject of trust



The measurement of trust rating from the commitment network of trust

- The algorithm of trust rating is basically as same as PersonaRank.

$$\mathbf{G} = \alpha\mathbf{H} + (\alpha\mathbf{a} + (1-\alpha)\mathbf{e})\frac{1}{n\mathbf{e}^T}$$

$$\mathbf{H}_{ij} = \frac{rep(P_i)}{|P_i|}$$

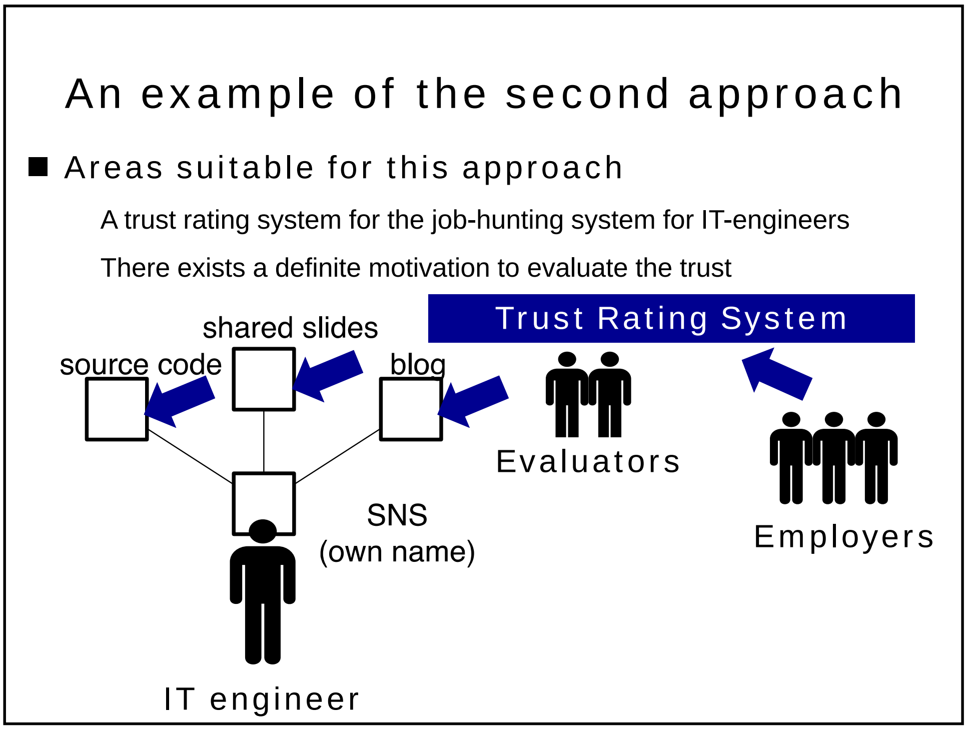
: rep(P_i) is the value of reputation of P_i

comittment

valuable person

commitment

valuable person



An example of the second approach

- Areas suitable for this approach

A trust rating system for the job-hunting system for IT-engineers

There exists a definite motivation to evaluate the trust

Trust Rating System

shared slides

source code

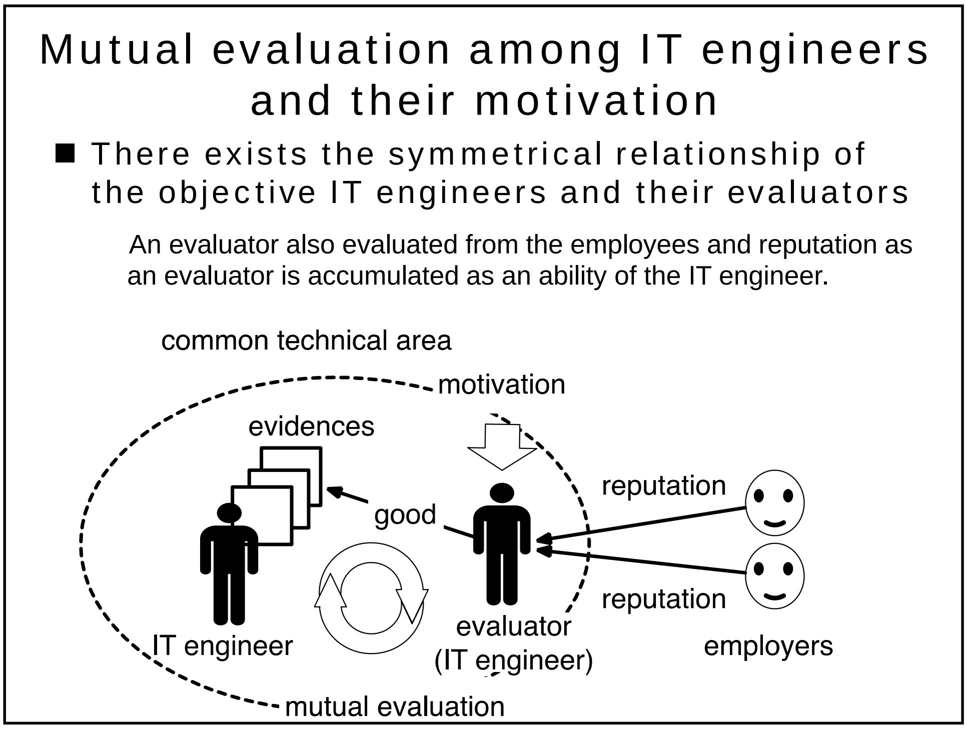
blog

Evaluators

Employers

SNS
(own name)

IT engineer

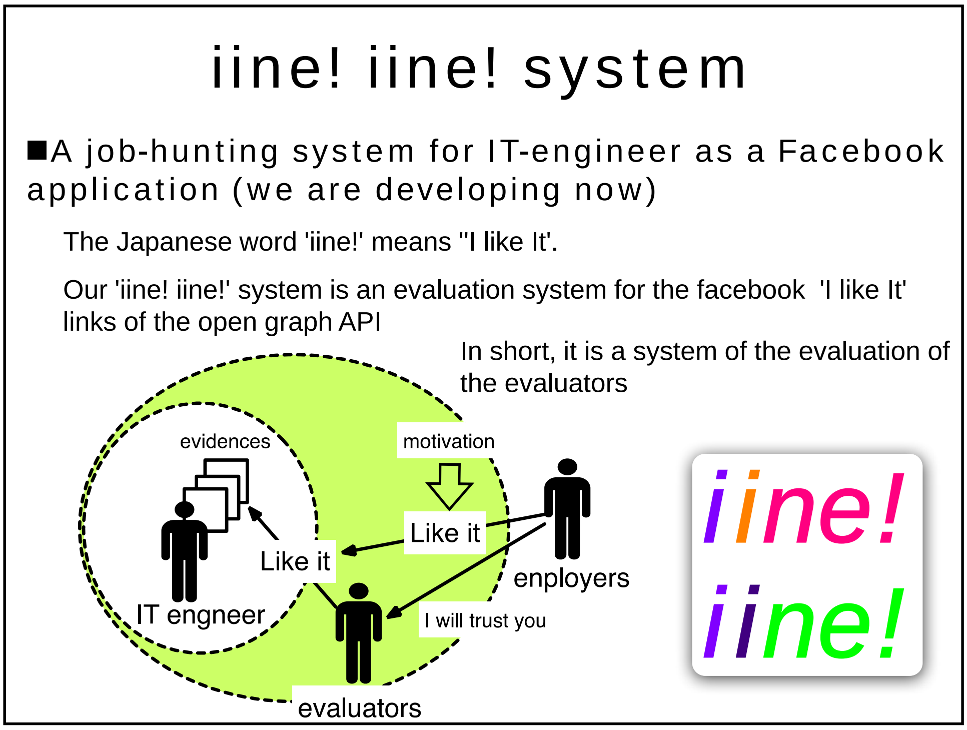


Mutual evaluation among IT engineers and their motivation

- There exists the symmetrical relationship of the objective IT engineers and their evaluators

An evaluator also evaluated from the employees and reputation as an evaluator is accumulated as an ability of the IT engineer.

common technical area
motivation
evidences
good
reputation
reputation
IT engineer
evaluator
(IT engineer)
employers
mutual evaluation



iine! iine! system

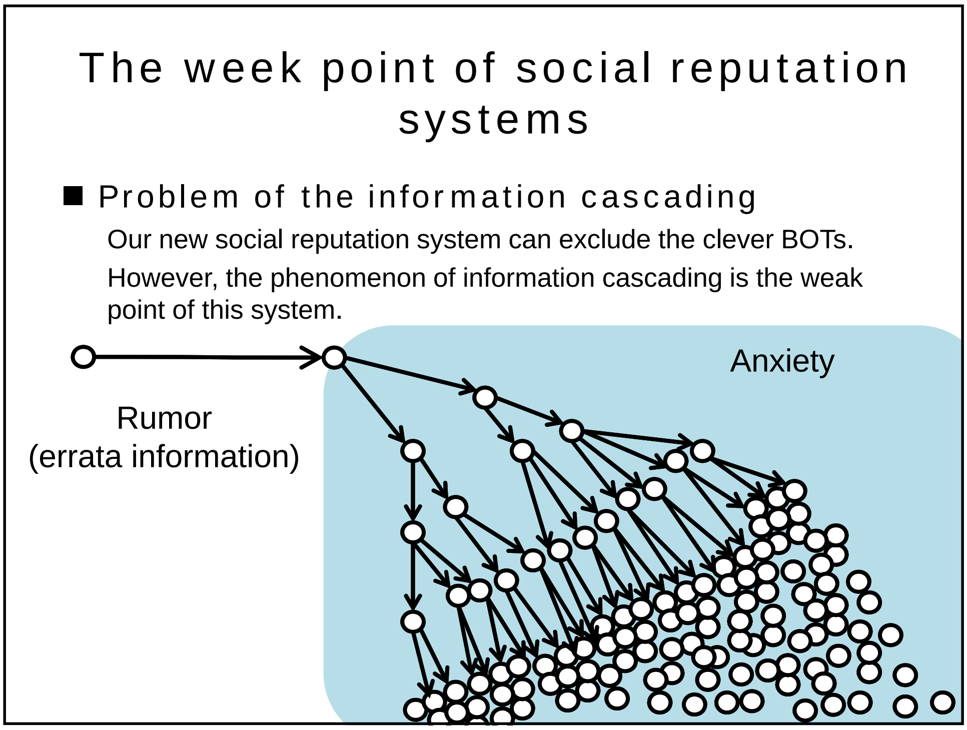
- A job-hunting system for IT-engineer as a Facebook application (we are developing now)

The Japanese word 'iine!' means "I like It'.

Our 'iine! iine!' system is an evaluation system for the facebook 'I like It' links of the open graph API

In short, it is a system of the evaluation of the evaluators

evidences
motivation
Like it
Like it
IT engneer
enployers
I will trust you
evaluators
iine!
iine!



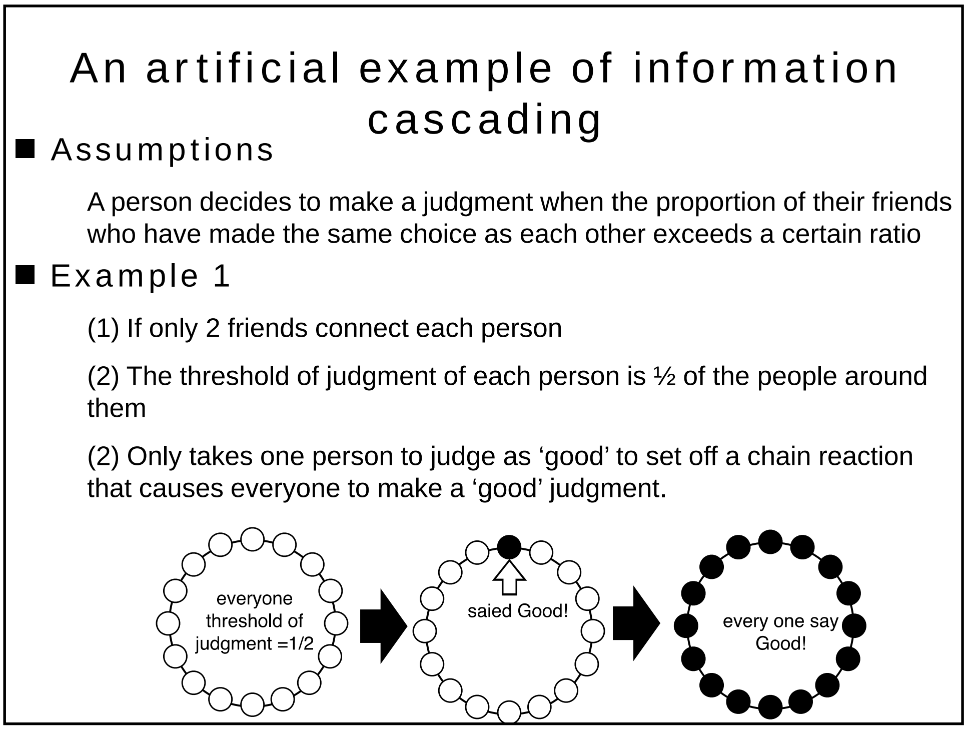
The week point of social reputation systems

- Problem of the information cascading

Our new social reputation system can exclude the clever BOTs.

However, the phenomenon of information cascading is the weak point of this system.

Anxiety
Rumor
(errata information)



An artificial example of information cascading

- Assumptions

A person decides to make a judgment when the proportion of their friends who have made the same choice as each other exceeds a certain ratio

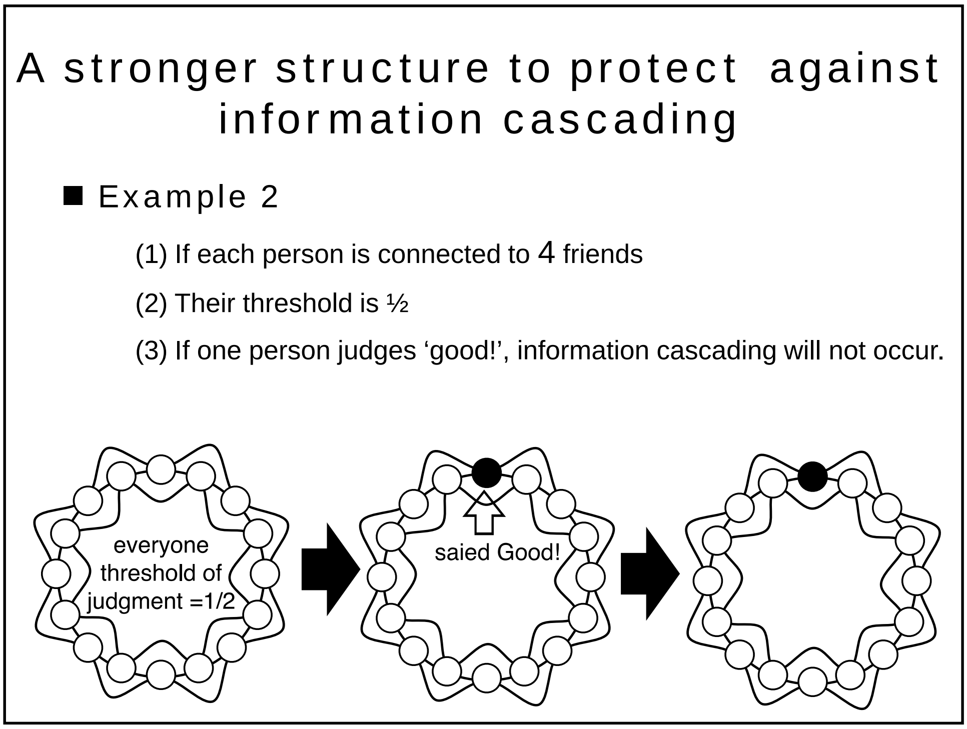
- Example 1

(1) If only 2 friends connect each person

(2) The threshold of judgment of each person is ½ of the people around them

(2) Only takes one person to judge as ‘good’ to set off a chain reaction that causes everyone to make a ‘good’ judgment.

everyone
threshold of
judgment =1/2
saied Good!
every one say
Good!



A stronger structure to protect against information cascading

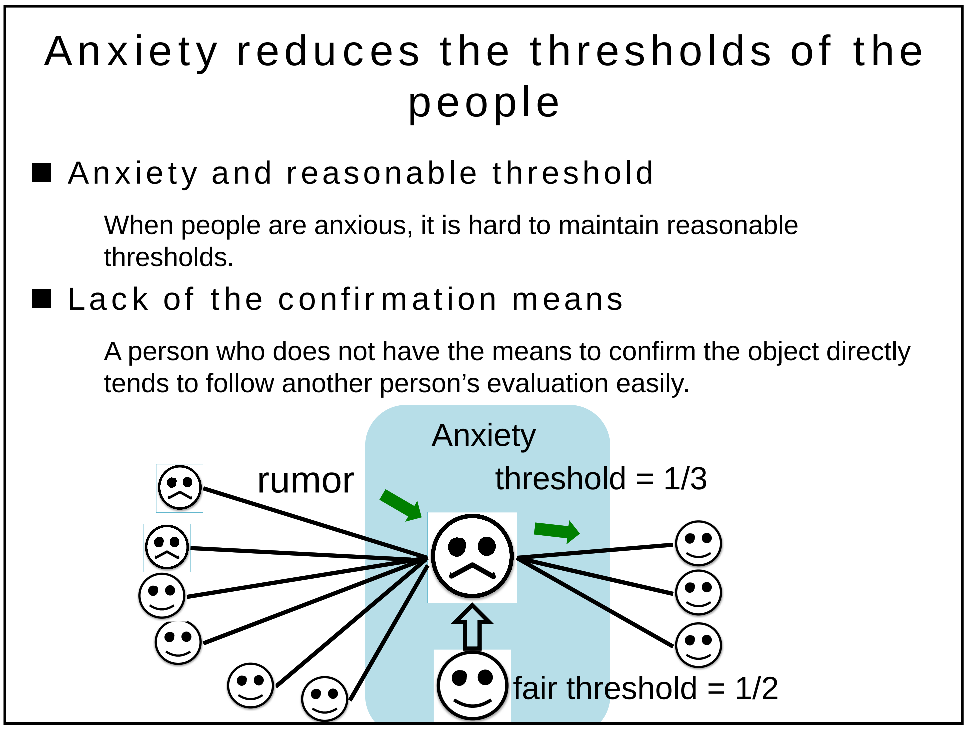
- Example 2

  (1) If each person is connected to 4 friends

  (2) Their threshold is ½

  (3) If one person judges ‘good!’, information cascading will not occur.

everyone
threshold of
judgment =1/2
saied Good!



Anxiety reduces the thresholds of the people

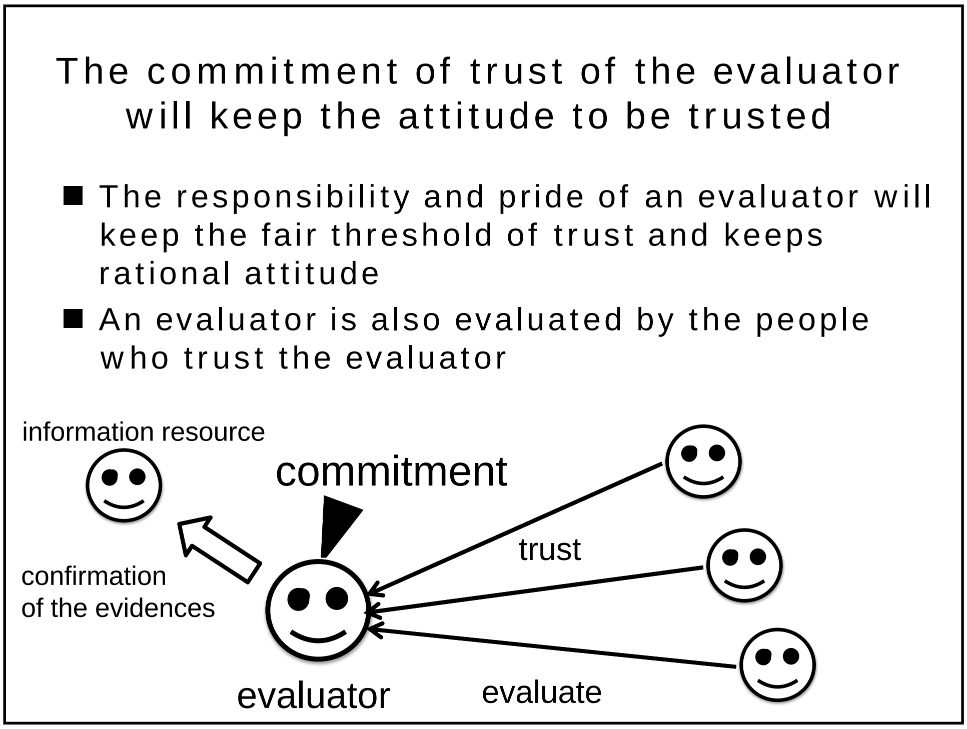
- Anxiety and reasonable threshold

  When people are anxious, it is hard to maintain reasonable thresholds.

- Lack of the confirmation means

  A person who does not have the means to confirm the object directly tends to follow another person’s evaluation easily.

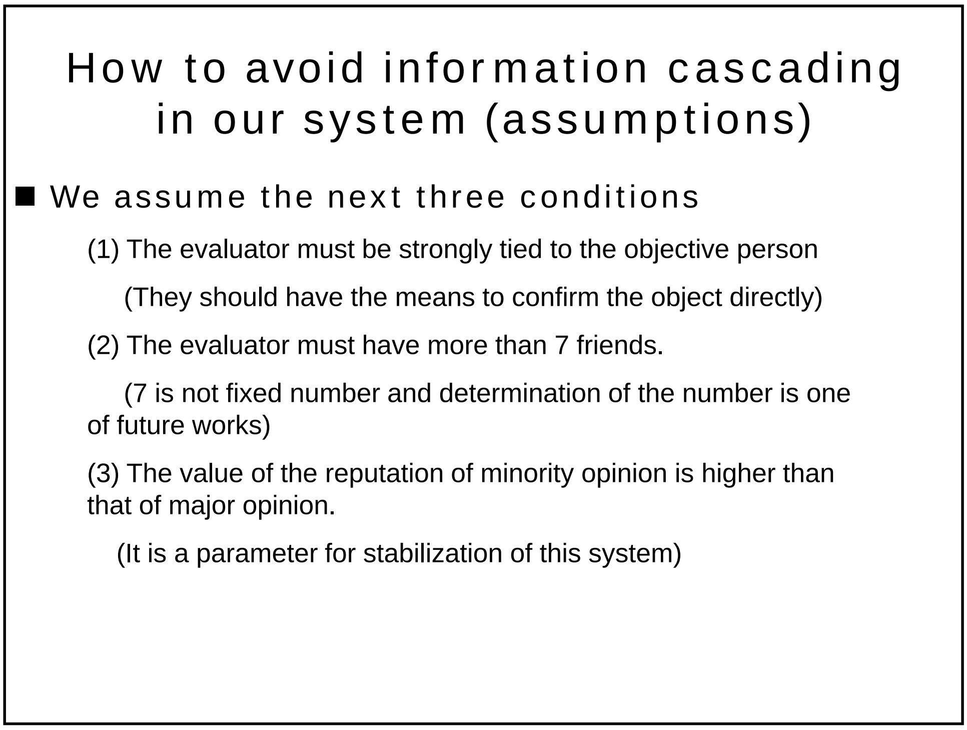
Anxiety
rumor
threshold = 1/3
fair threshold = 1/2



The commitment of trust of the evaluator will keep the attitude to be trusted

- The responsibility and pride of an evaluator will keep the fair threshold of trust and keeps rational attitude
- An evaluator is also evaluated by the people who trust the evaluator

information resource
commitment
trust
confirmation
of the evidences
evaluator
evaluate



How to avoid information cascading in our system (assumptions)

- We assume the next three conditions

(1) The evaluator must be strongly tied to the objective person

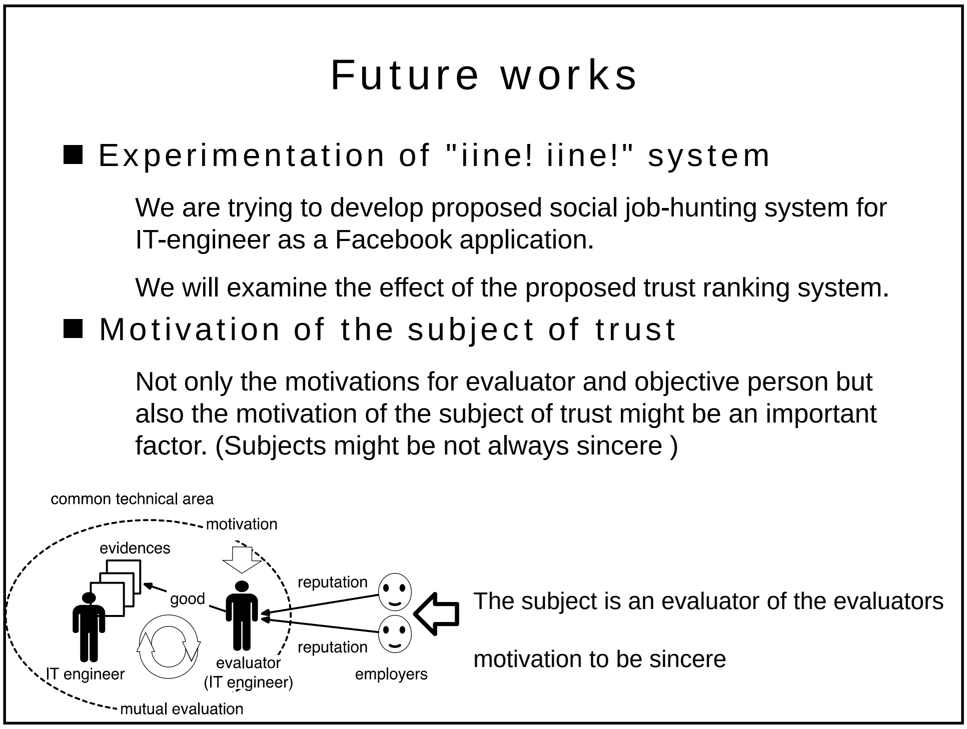
(They should have the means to confirm the object directly)

(2) The evaluator must have more than 7 friends.

(7 is not fixed number and determination of the number is one of future works)

(3) The value of the reputation of minority opinion is higher than that of major opinion.

(It is a parameter for stabilization of this system)



Future works

- Experimentation of "iine! iine!" system

  We are trying to develop proposed social job-hunting system for IT-engineer as a Facebook application.

  We will examine the effect of the proposed trust ranking system.

- Motivation of the subject of trust

  Not only the motivations for evaluator and objective person but also the motivation of the subject of trust might be an important factor. (Subjects might be not always sincere)

common technical area
motivation
evidences
good
reputation
reputation
IT engineer
evaluator
(IT engineer)
employers
mutual evaluation

The subject is an evaluator of the evaluators

motivation to be sincere

"A framework for an authorization system with spatial reasoning capacity"

Workshop ITeS on SAINT 2011
July 19-23, 2011 Munich, Germany

Eizen Kimura, Shinji Kobayashi, Takeki Yoshikawa,
Ken Ishihara
Medical School of Ehime University

Table of Contents

- **Background & Motivation**
  - Current issues in healthcare domain
- **Method: The security framework**
  - Actors and walkthrough with an example scenario
- **Summary and future plans**

Table of Contents

- **Background & Motivation**
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- **Method: The security framework**
  - Actors and walkthrough with an example scenario
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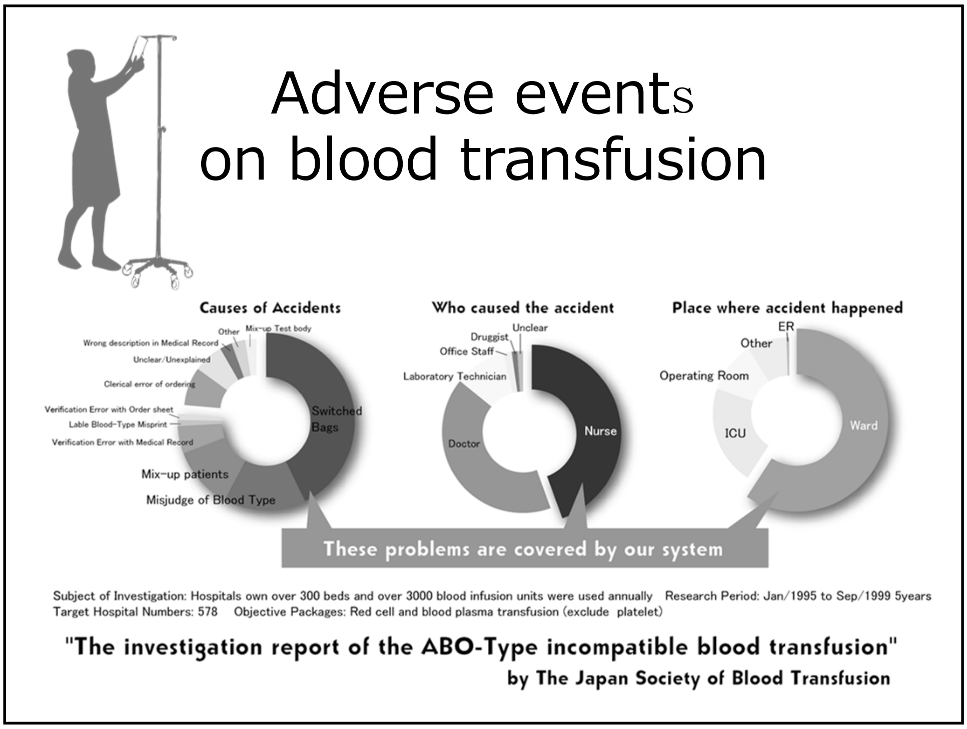
Background

Conflict between risk management and information security

- In “To Err is Human: Building a Safe Health System” reported by Committee on Quality of Health Care in America ;
- Between 440,000 and 980,000 Americans die each year from preventable medical errors in hospitals alone.

ICT support as prevention method for adverse event in healthcare is expected

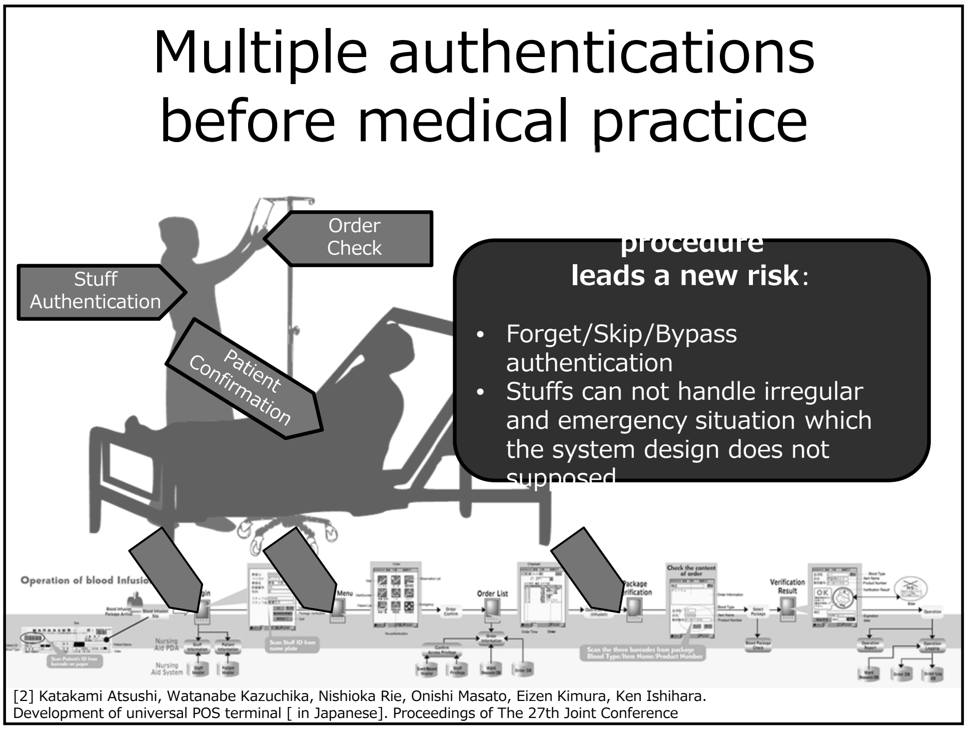
[1] Kohn L.T., Corrigan J.M., Donaldson M.S. To err is human: building a safer health system. Washington, DC: National Academy Press, 1999



Adverse events on blood transfusion

Subject of Investigation: Hospitals own over 300 beds and over 3000 blood infusion units were used annually Research Period: Jan/1995 to Sep/1999 5years
Target Hospital Numbers: 578 Objective Packages: Red cell and blood plasma transfusion (exclude platelet)

"The investigation report of the ABO-Type incompatible blood transfusion"
by The Japan Society of Blood Transfusion



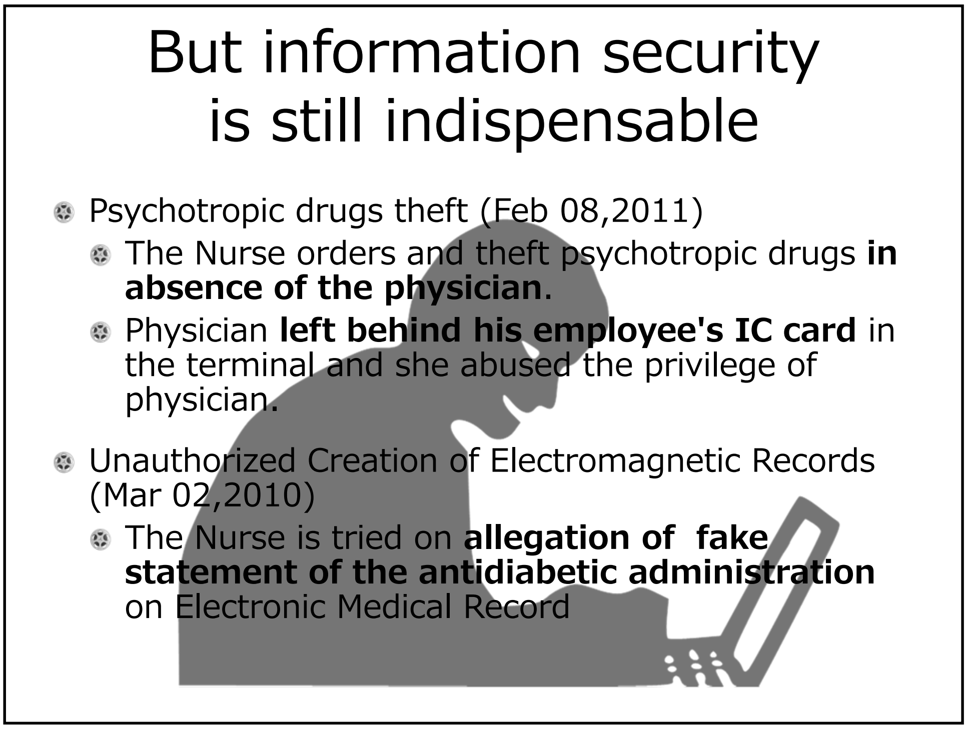
Multiple authentications before medical practice

Order Check
Stuff Authentication
Patient Confirmation
Operation of blood Infusion
Menu
Order List
Package Verification
Check the content of order
Verification Result
Nursing Aid PDA
Nursing Aid System
Scan Stuff ID from name plate
Scan the three barcodes from package Blood Type/Item Name/Product Number
OK
NG
Operation

procedure leads a new risk:

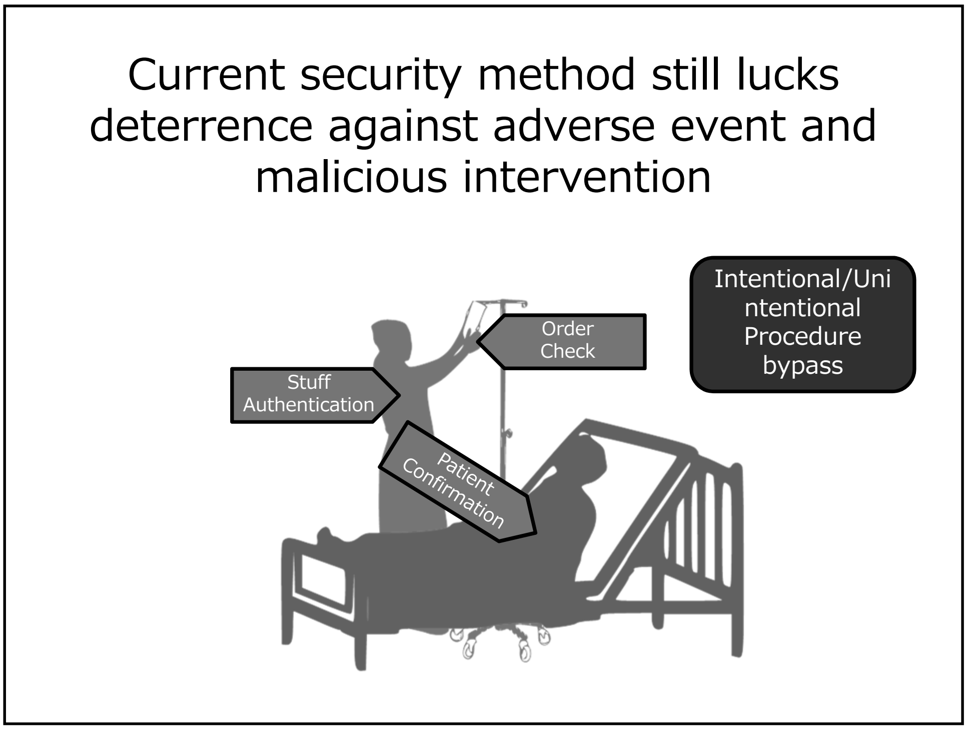
- Forget/Skip/Bypass authentication
- Stuffs can not handle irregular and emergency situation which the system design does not supposed

[2] Katakami Atsushi, Watanabe Kazuchika, Nishioka Rie, Onishi Masato, Eizen Kimura, Ken Ishihara. Development of universal POS terminal [in Japanese]. Proceedings of The 27th Joint Conference



But information security is still indispensable

- Psychotropic drugs theft (Feb 08,2011)
  - The Nurse orders and theft psychotropic drugs **in absence of the physician**.
  - Physician **left behind his employee's IC card** in the terminal and she abused the privilege of physician.
- Unauthorized Creation of Electromagnetic Records (Mar 02,2010)
  - The Nurse is tried on **allegation of fake statement of the antidiabetic administration** on Electronic Medical Record



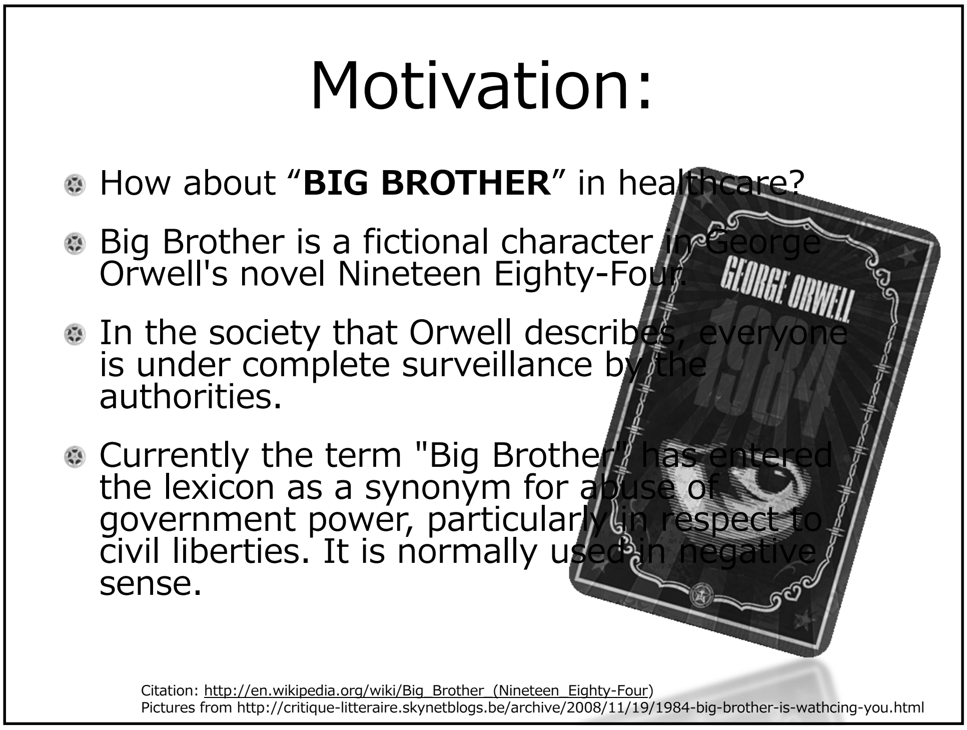
Current security method still lucks deterrence against adverse event and malicious intervention

Intentional/Unintentional Procedure bypass

Order Check

Stuff Authentication

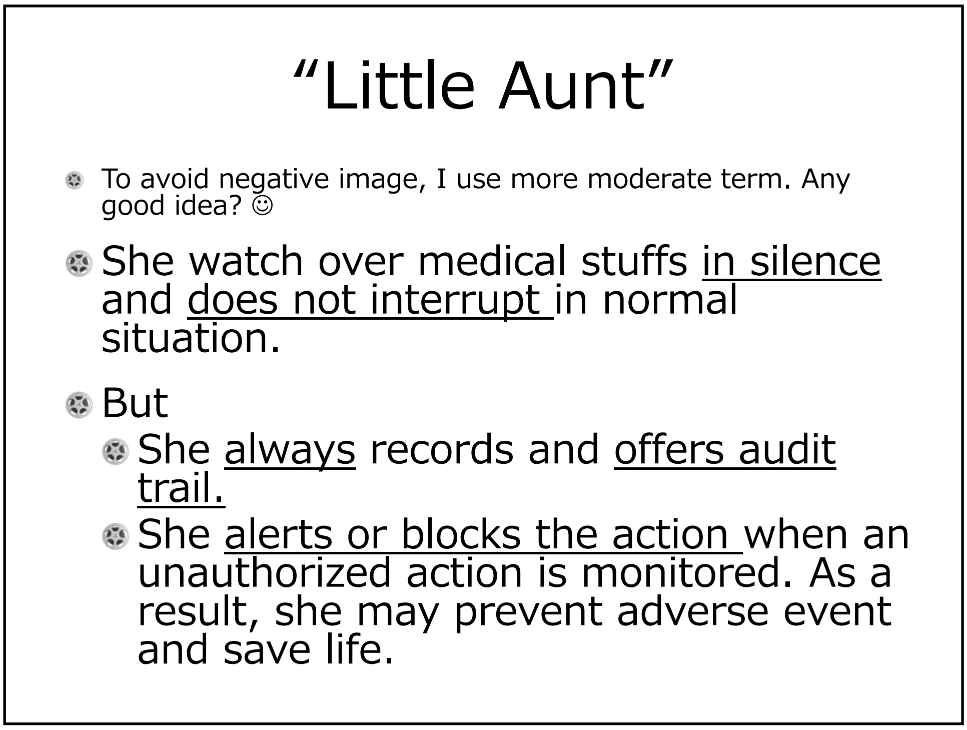
Patient Confirmation



Motivation:

- How about “**BIG BROTHER**” in healthcare?
- Big Brother is a fictional character in George Orwell's novel Nineteen Eighty-Four.
- In the society that Orwell describes, everyone is under complete surveillance by the authorities.
- Currently the term "Big Brother" has entered the lexicon as a synonym for abuse of government power, particularly in respect to civil liberties. It is normally used in negative sense.

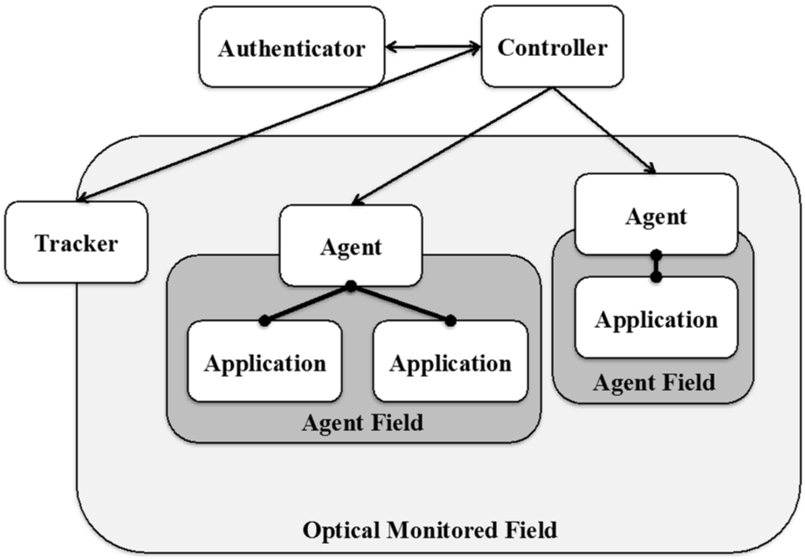
Citation: http://en.wikipedia.org/wiki/Big_Brother_(Nineteen_Eighty-Four)
Pictures from http://critique-litteraire.skynetblogs.be/archive/2008/11/19/1984-big-brother-is-wathcing-you.html



“Little Aunt”

- To avoid negative image, I use more moderate term. Any good idea? ☺
- She watch over medical stuffs in silence and does not interrupt in normal situation.
- But
  - She always records and offers audit trail.
  - She alerts or blocks the action when an unauthorized action is monitored. As a result, she may prevent adverse event and save life.

The security framework


Authenticator
Controller
Tracker
Agent
Agent
Application
Application
Application
Agent Field
Agent Field
Optical Monitored Field

Security framework components

Actors

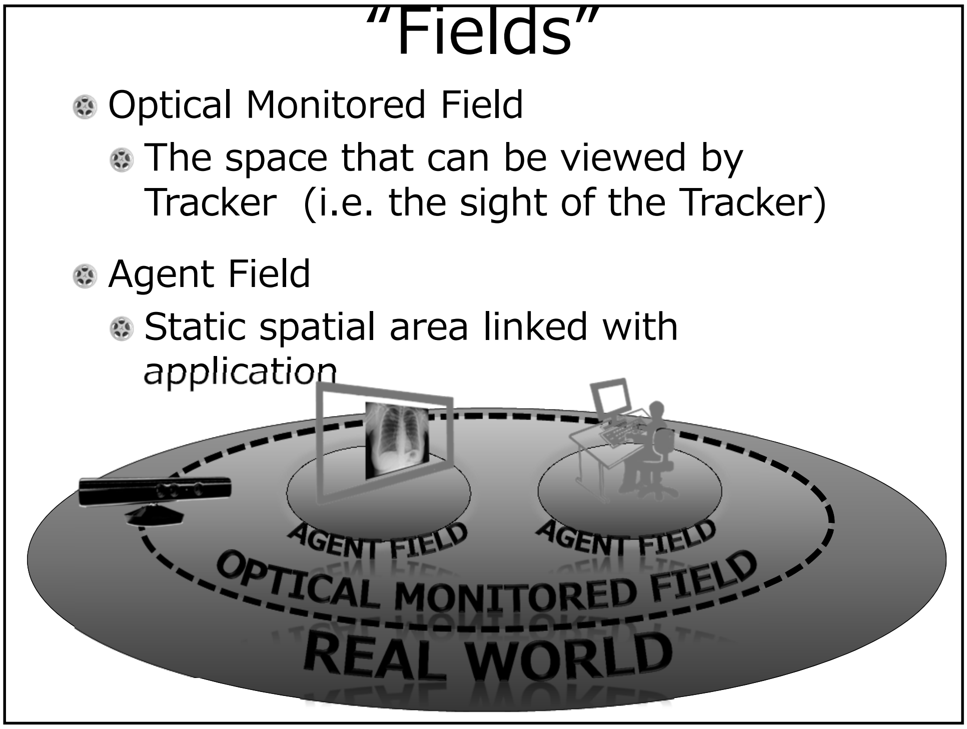
- **Tracker**
- **Agent**
- **Optical Monitored Field**
- **Agent Field**
- Application
- Controller
- Authenticator

Process

- **Installation**
- **Authentication Process**
  - Optical Recognition
  - Authentication
- **Authorization Process**
  - Application oriented
  - Tracker oriented
  - Tracker triggered events

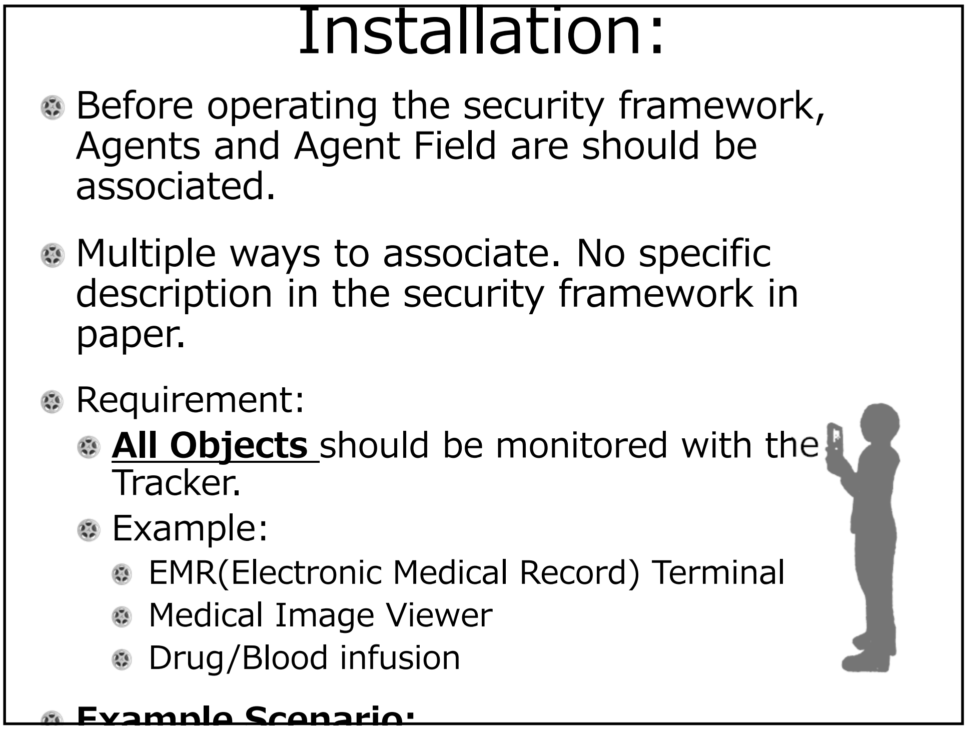
What "***Tracker"*** is it?

- The definition in paper:
  - Tracker is installed on the static place and **optically chases a target object**. Tracker can confirm an existence and a movement of a person (or object).
- Picture is worth a thousand words:
- See '**Kinect**' introduction movie as an one of the implementation of a device with spatial reasoning



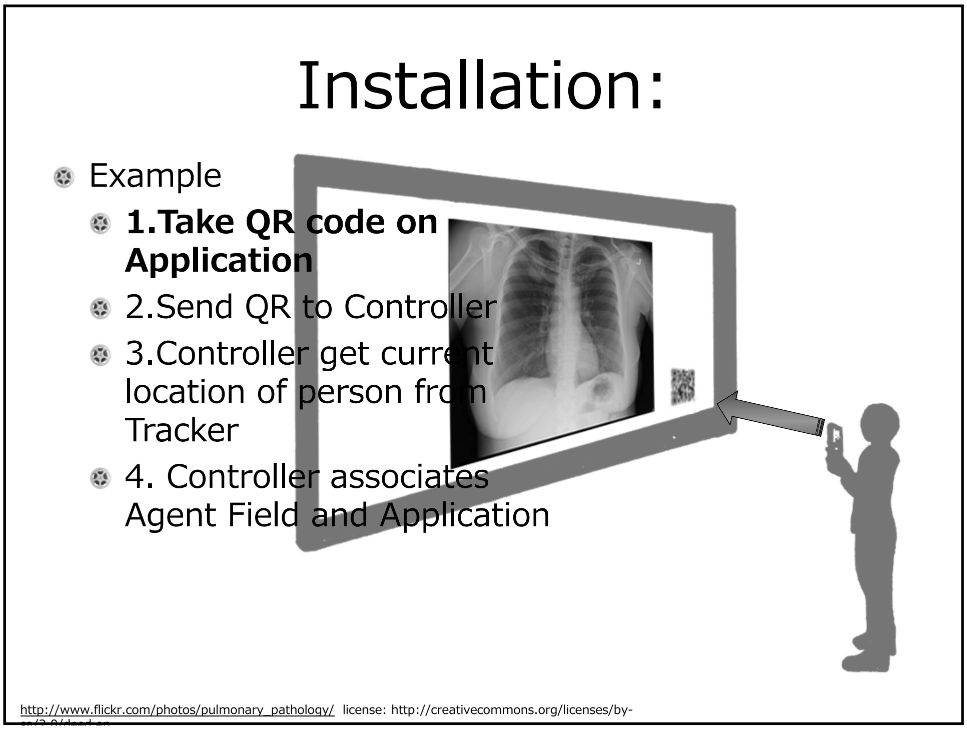
“Fields”

- Optical Monitored Field
  - The space that can be viewed by Tracker (i.e. the sight of the Tracker)
- Agent Field
  - Static spatial area linked with application



Installation:

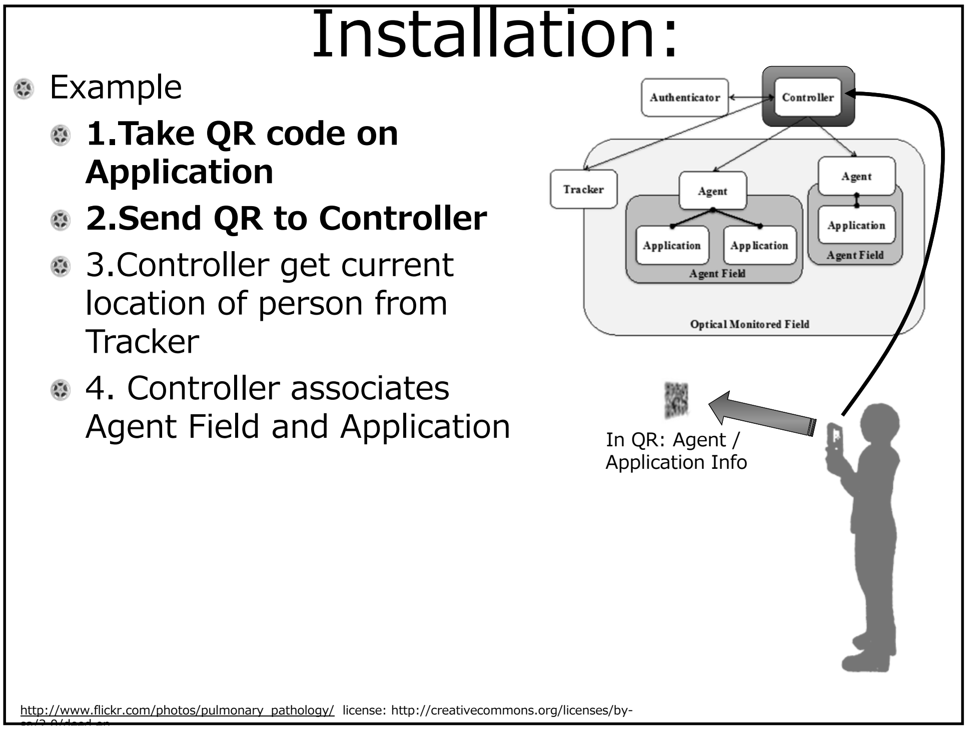
- Before operating the security framework, Agents and Agent Field are should be associated.
- Multiple ways to associate. No specific description in the security framework in paper.
- Requirement:
  - **All Objects** should be monitored with the Tracker.
  - Example:
    - EMR(Electronic Medical Record) Terminal
    - Medical Image Viewer
    - Drug/Blood infusion
- **Example Scenario:**



Installation:

- Example
  - **1.Take QR code on Application**
  - 2.Send QR to Controller
  - 3.Controller get current location of person from Tracker
  - 4. Controller associates Agent Field and Application

http://www.flickr.com/photos/pulmonary_pathology/ license: http://creativecommons.org/licenses/by-



Installation:

- Example
  - **1.Take QR code on Application**
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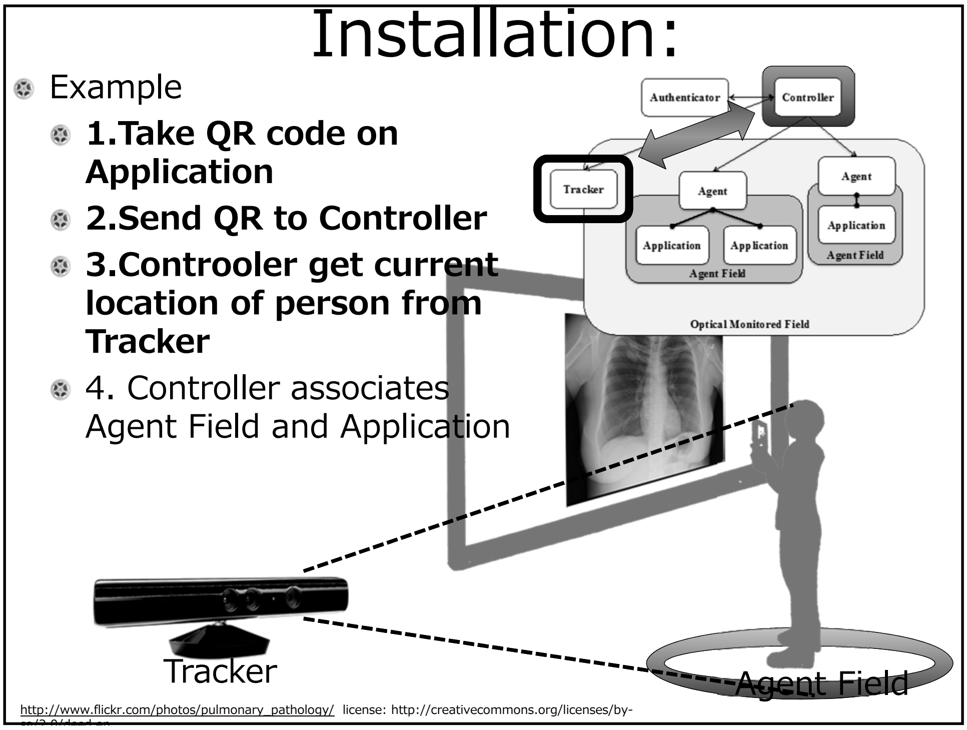
  - 4. Controller associates Agent Field and Application

Authenticator
Controller
Tracker
Agent
Agent
Application
Application
Application
Agent Field
Agent Field
Optical Monitored Field

In QR: Agent / Application Info

http://www.flickr.com/photos/pulmonary_pathology/ license: http://creativecommons.org/licenses/by-



Installation:

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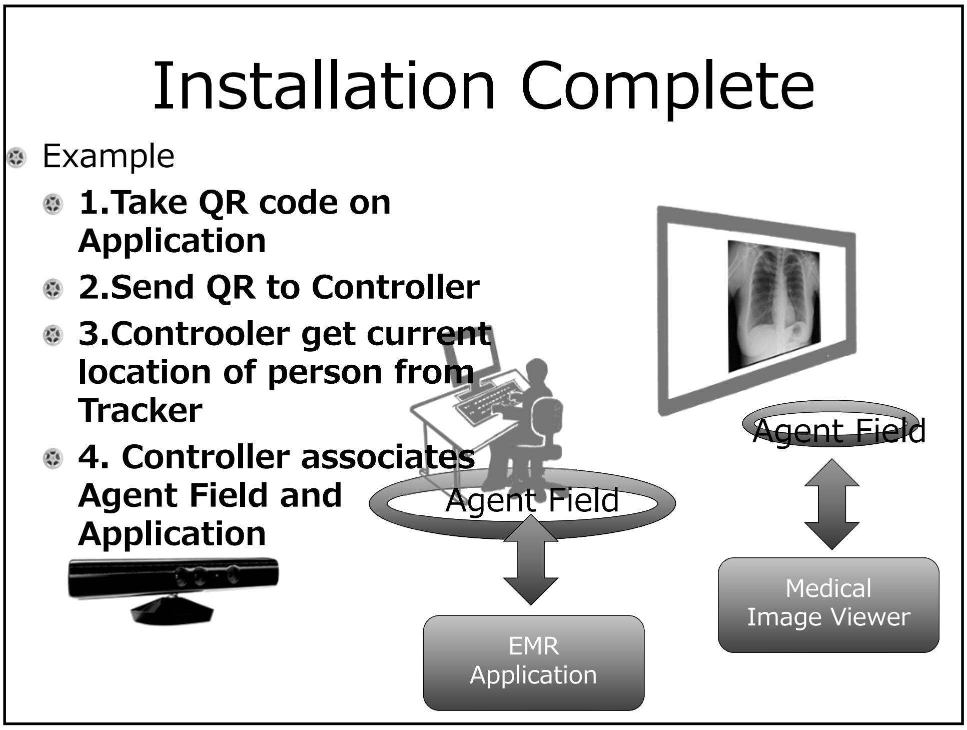
  - 4. Controller associates Agent Field and Application

Authenticator
Controller
Tracker
Agent
Agent
Application
Application
Application
Agent Field
Agent Field
Optical Monitored Field
Tracker
Agent Field

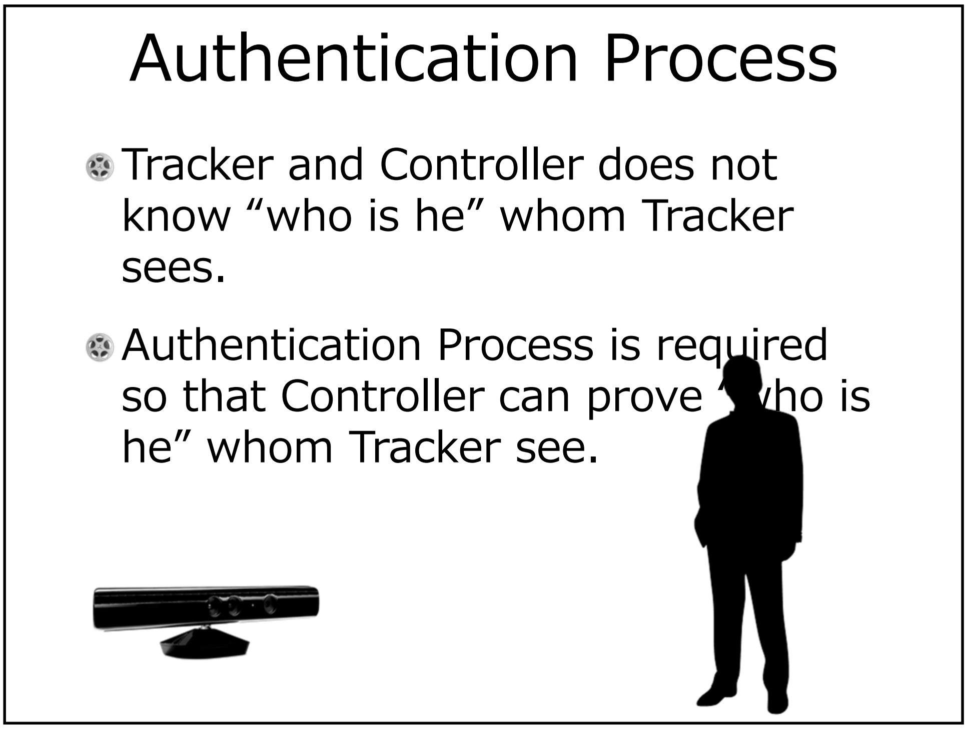
http://www.flickr.com/photos/pulmonary_pathology/ license: http://creativecommons.org/licenses/by-



Installation Complete

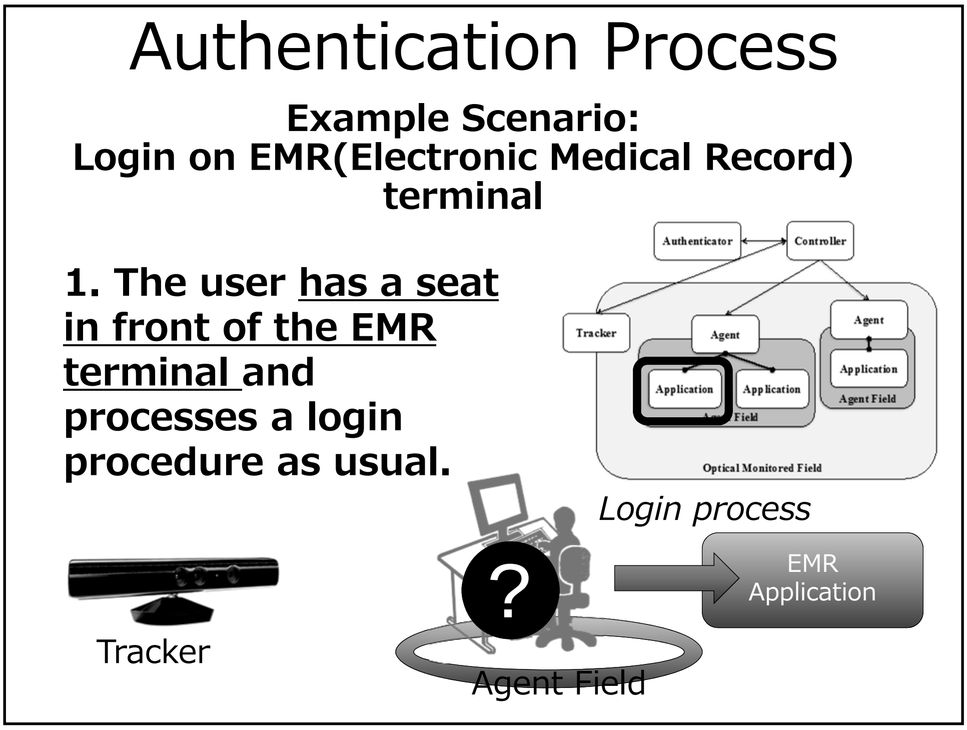
- Example
  - **1.Take QR code on Application**
  - **2.Send QR to Controller**
  - **3.Controoler get current location of person from Tracker**
  - **4. Controller associates Agent Field and Application**

Agent Field
Agent Field
EMR Application
Medical Image Viewer



Authentication Process

- Tracker and Controller does not know “who is he” whom Tracker sees.
- Authentication Process is required so that Controller can prove “who is he” whom Tracker see.

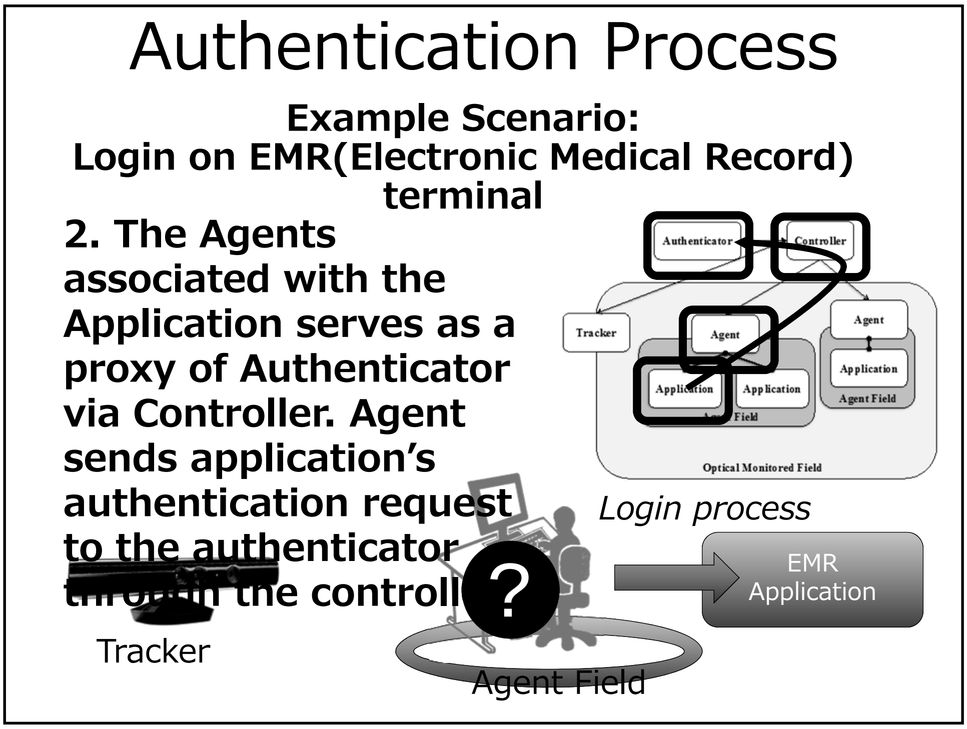


Authentication Process

Example Scenario:
Login on EMR(Electronic Medical Record) terminal

1. The user has a seat in front of the EMR terminal and processes a login procedure as usual.

Authenticator
Controller
Tracker
Agent
Agent
Application
Application
Application
Agent Field
Agent Field
Optical Monitored Field
Login process
?
EMR Application
Tracker
Agent Field



Authentication Process

Example Scenario:
Login on EMR(Electronic Medical Record) terminal

2. The Agents associated with the Application serves as a proxy of Authenticator via Controller. Agent sends application's authentication request to the authenticator through the controll

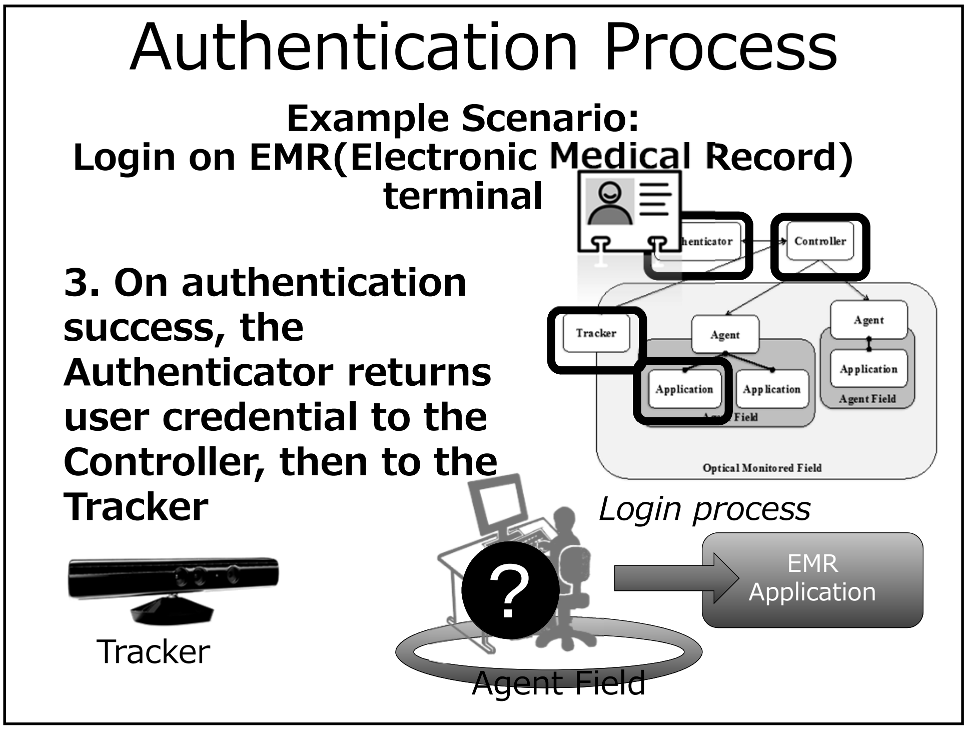
Login process

EMR Application

Tracker

Agent Field

Authenticator
Controller
Tracker
Agent
Agent
Application
Application
Application
Agent Field
Agent Field
Optical Monitored Field
?



Authentication Process

Example Scenario:
Login on EMR(Electronic Medical Record) terminal

3. On authentication success, the Authenticator returns user credential to the Controller, then to the Tracker

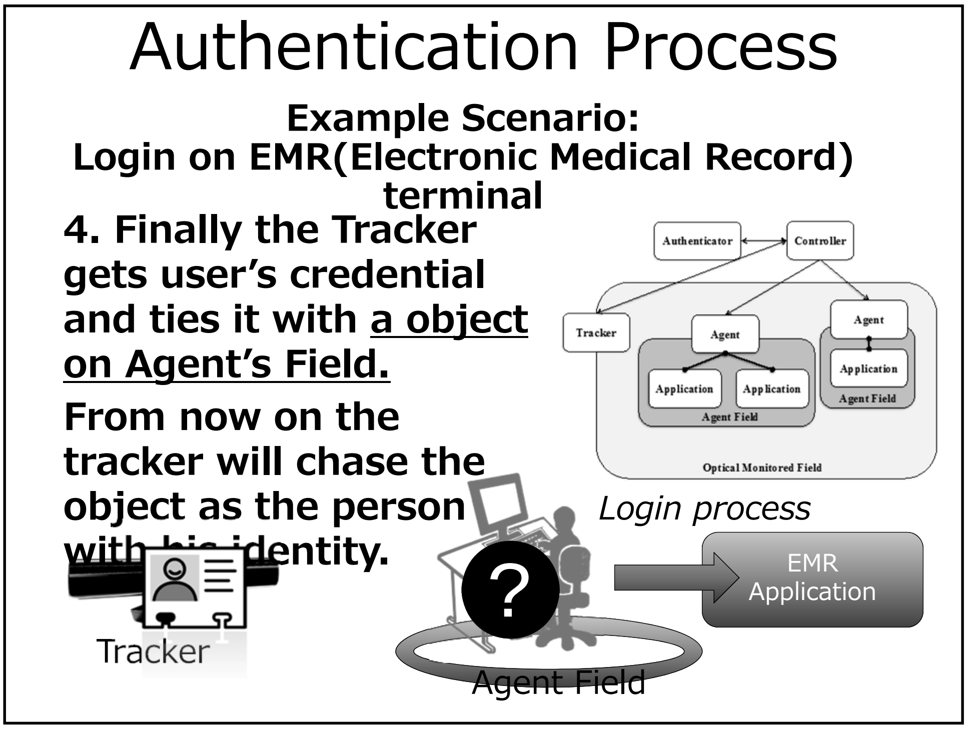
Login process

EMR Application

Tracker

Agent Field

henticator
Controller
Tracker
Agent
Agent
Application
Application
Application
Agent Field
Agent Field
Optical Monitored Field
?



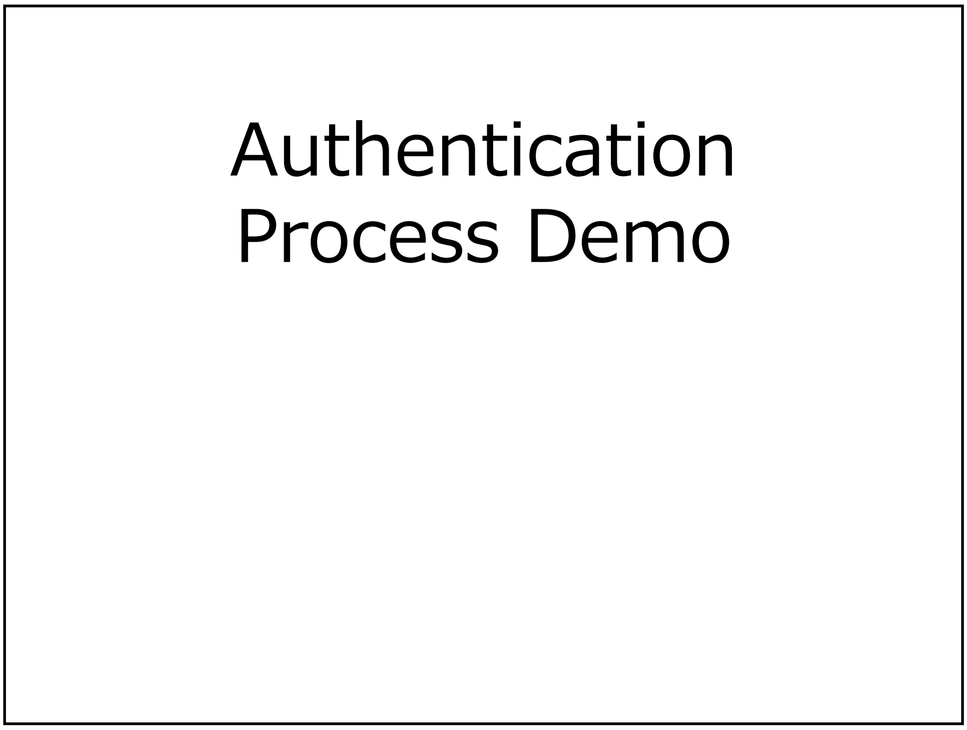
Authentication Process

Example Scenario:
Login on EMR(Electronic Medical Record) terminal

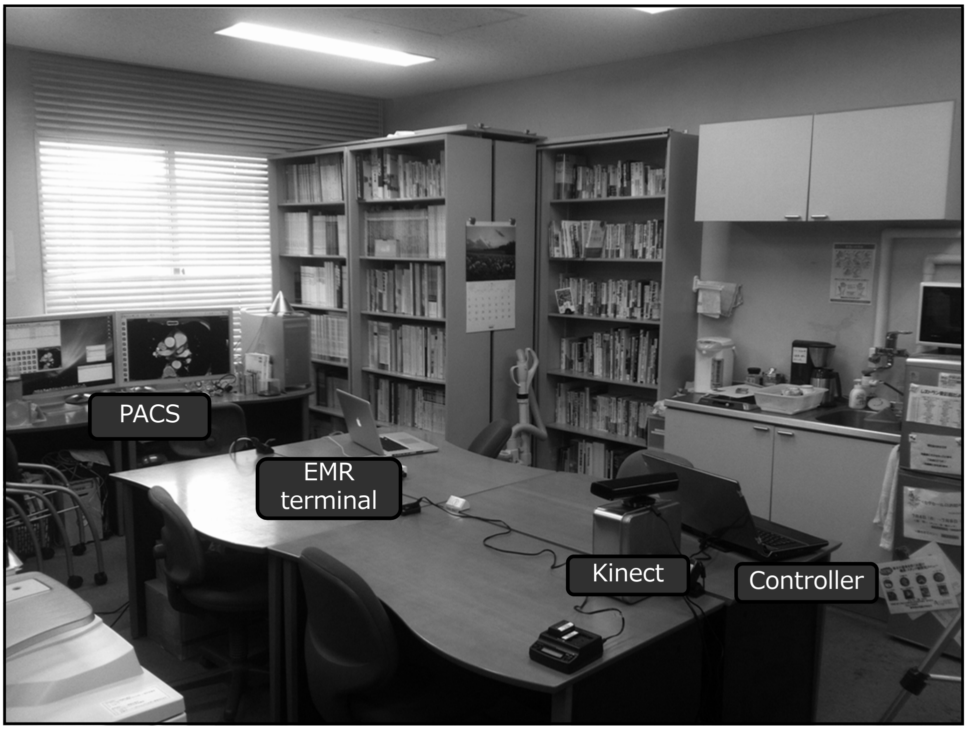
4. Finally the Tracker gets user's credential and ties it with a object on Agent's Field.

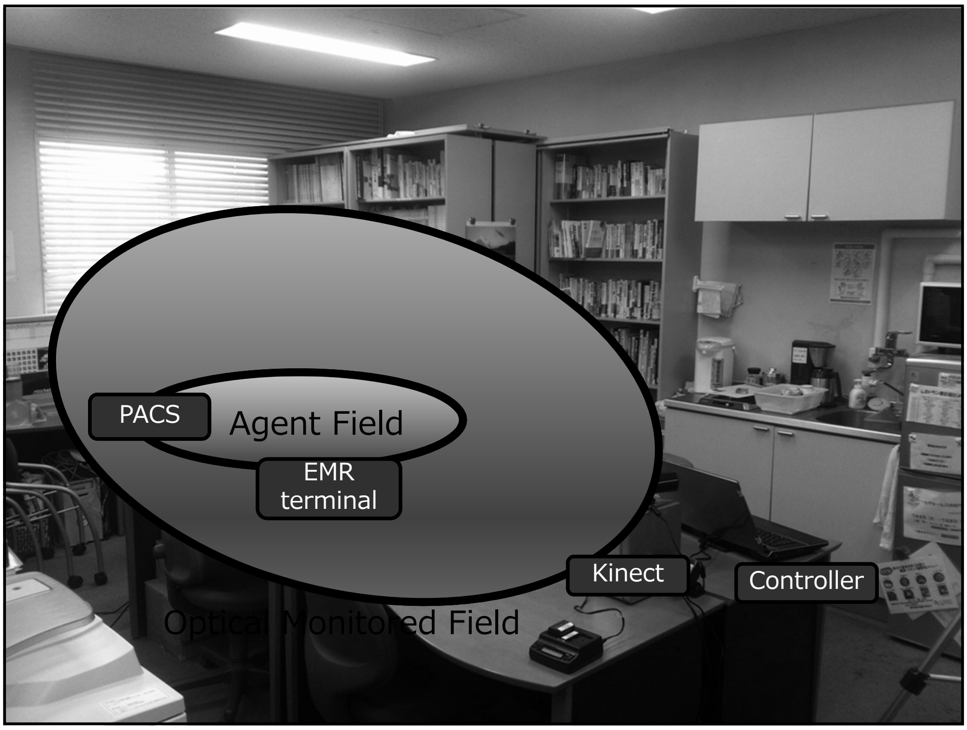
From now on the tracker will chase the object as the person with his identity.

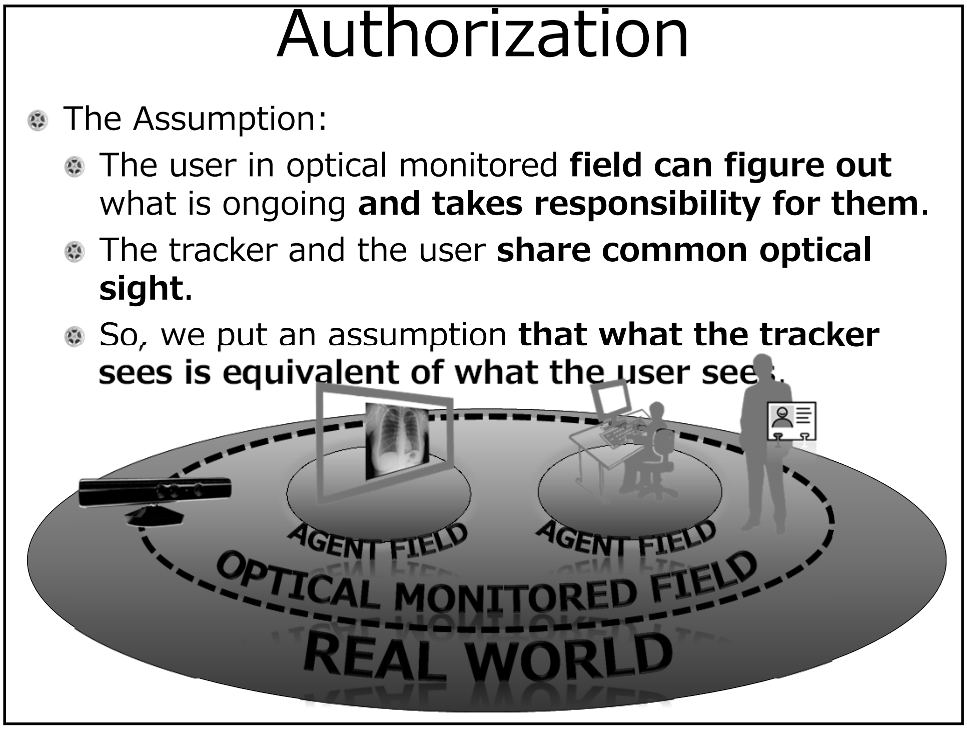
Authenticator
Controller
Tracker
Agent
Agent
Application
Application
Application
Agent Field
Agent Field
Optical Monitored Field
Login process
?
EMR Application
Tracker
Agent Field



Authentication Process Demo


PACS
EMR terminal
Kinect
Controller

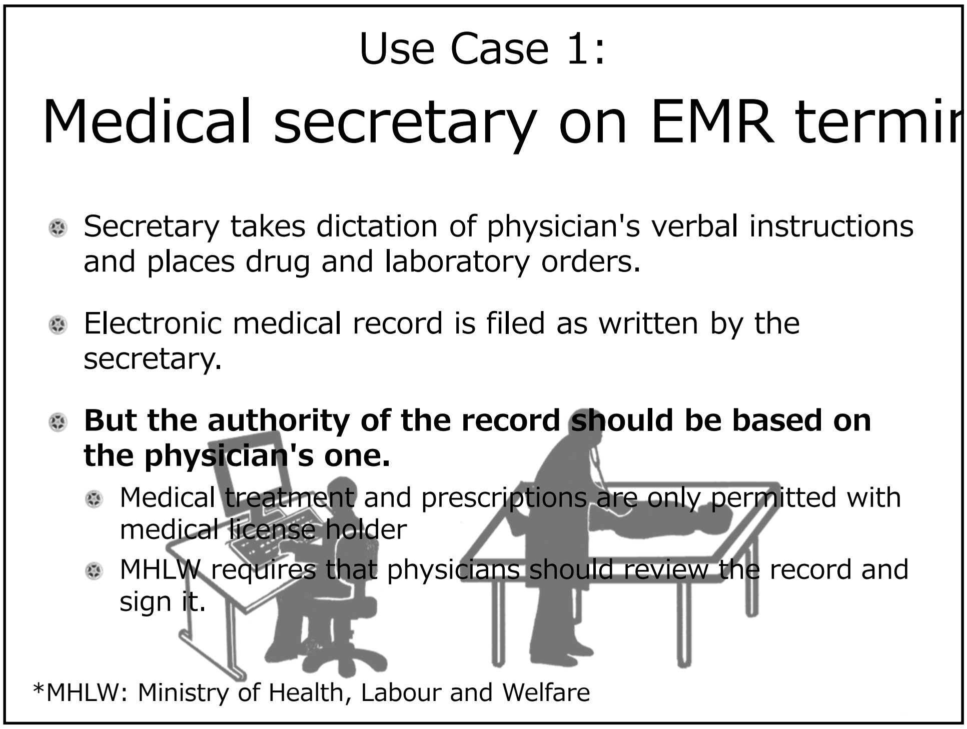

Agent Field
PACS
EMR terminal
Kinect
Controller
Optical Monitored Field



Authorization

- The Assumption:
  - The user in optical monitored **field can figure out** what is ongoing **and takes responsibility for them**.
  - The tracker and the user **share common optical sight**.
  - So, we put an assumption **that what the tracker sees is equivalent of what the user sees.**

AGENT FIELD
AGENT FIELD
OPTICAL MONITORED FIELD
REAL WORLD

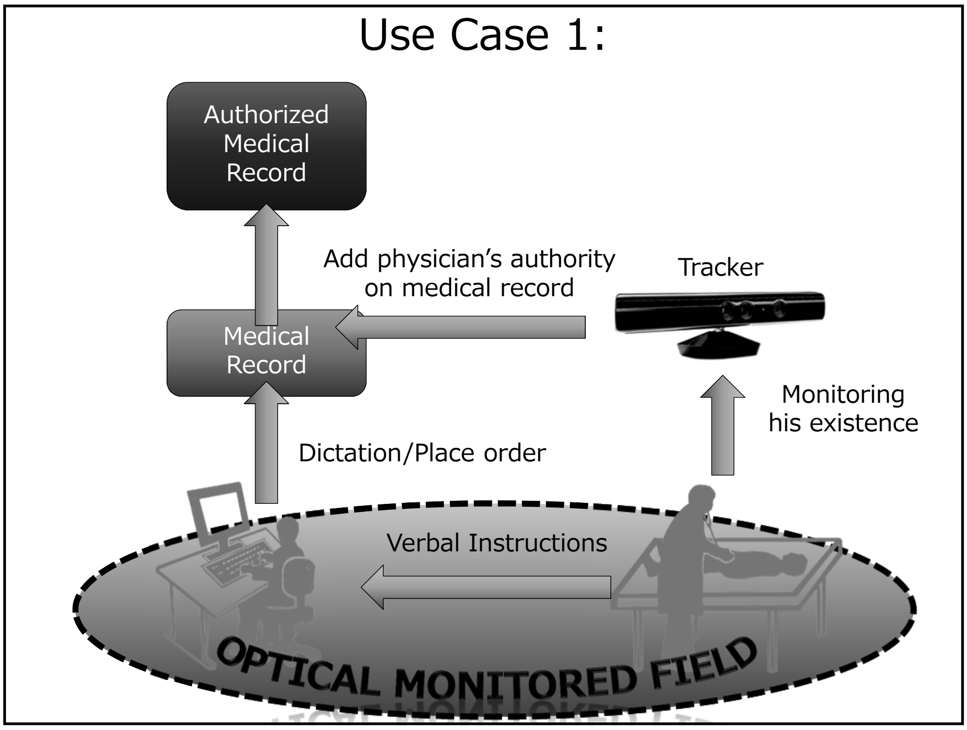


Use Case 1:

Medical secretary on EMR termi

- Secretary takes dictation of physician's verbal instructions and places drug and laboratory orders.
- Electronic medical record is filed as written by the secretary.
- **But the authority of the record should be based on the physician's one.**
  - Medical treatment and prescriptions are only permitted with medical license holder
  - MHLW requires that physicians should review the record and sign it.

*MHLW: Ministry of Health, Labour and Welfare



Use Case 1:

Authorized Medical Record

Add physician’s authority on medical record

Tracker

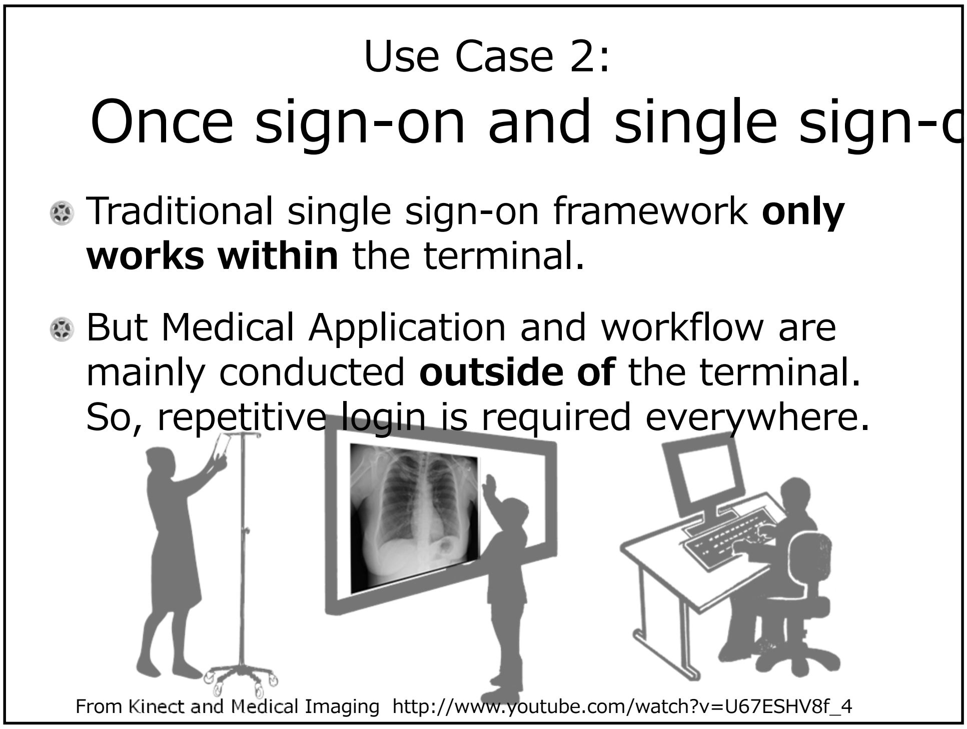
Medical Record

Monitoring his existence

Dictation/Place order

Verbal Instructions

OPTICAL MONITORED FIELD

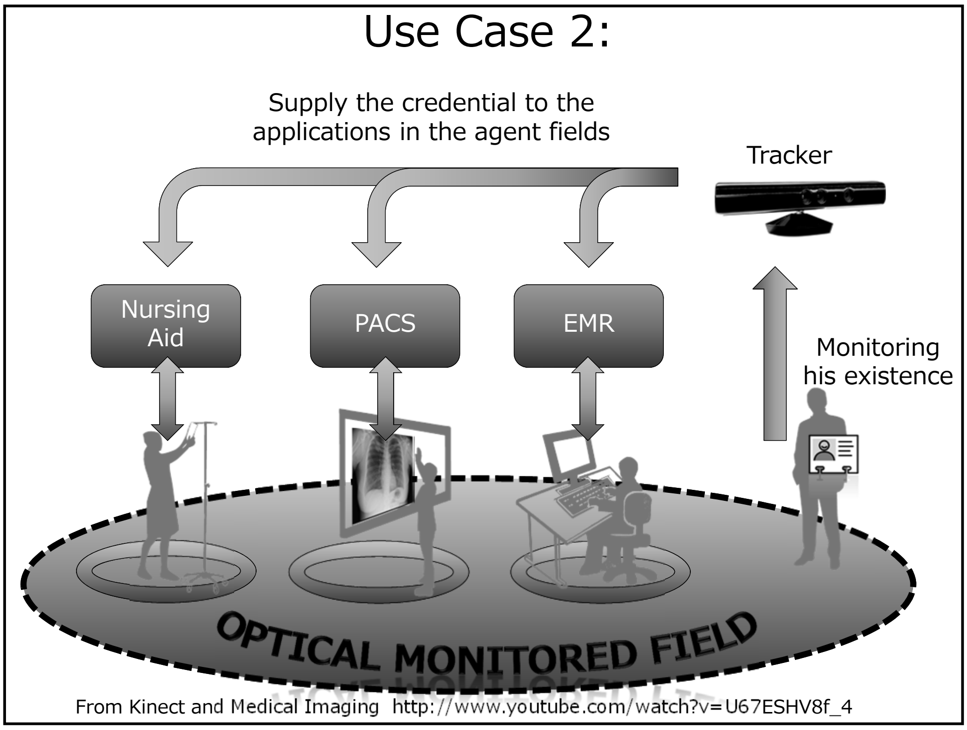


Use Case 2:

Once sign-on and single sign-

- Traditional single sign-on framework **only works within** the terminal.
- But Medical Application and workflow are mainly conducted **outside of** the terminal. So, repetitive login is required everywhere.

From Kinect and Medical Imaging http://www.youtube.com/watch?v=U67ESHV8f_4



Use Case 2:

Supply the credential to the applications in the agent fields

Tracker

Nursing Aid

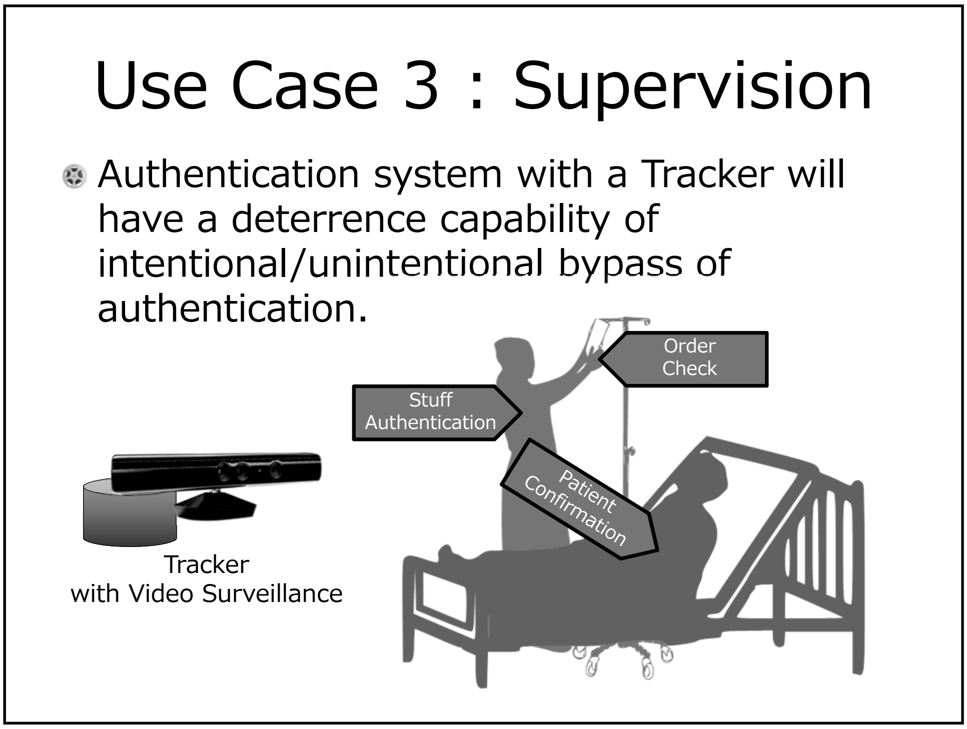
PACS

EMR

Monitoring his existence

OPTICAL MONITORED FIELD

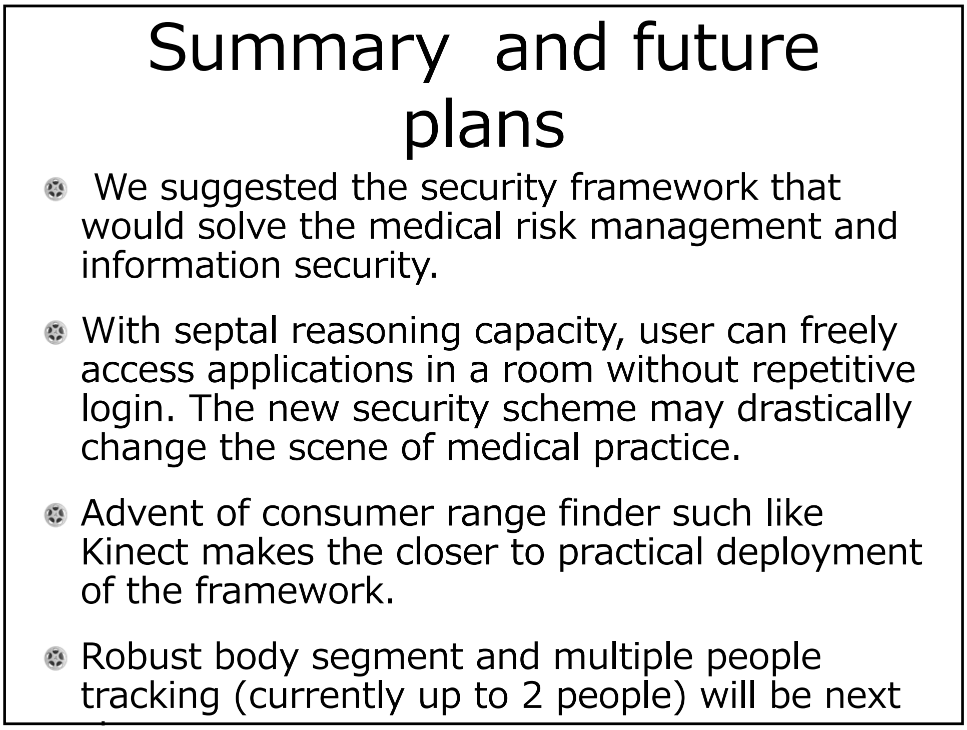
From Kinect and Medical Imaging http://www.youtube.com/watch?v=U67ESHV8f_4



Use Case 3 : Supervision

- Authentication system with a Tracker will have a deterrence capability of intentional/unintentional bypass of authentication.

Order Check
Stuff Authentication
Patient Confirmation
Tracker with Video Surveillance



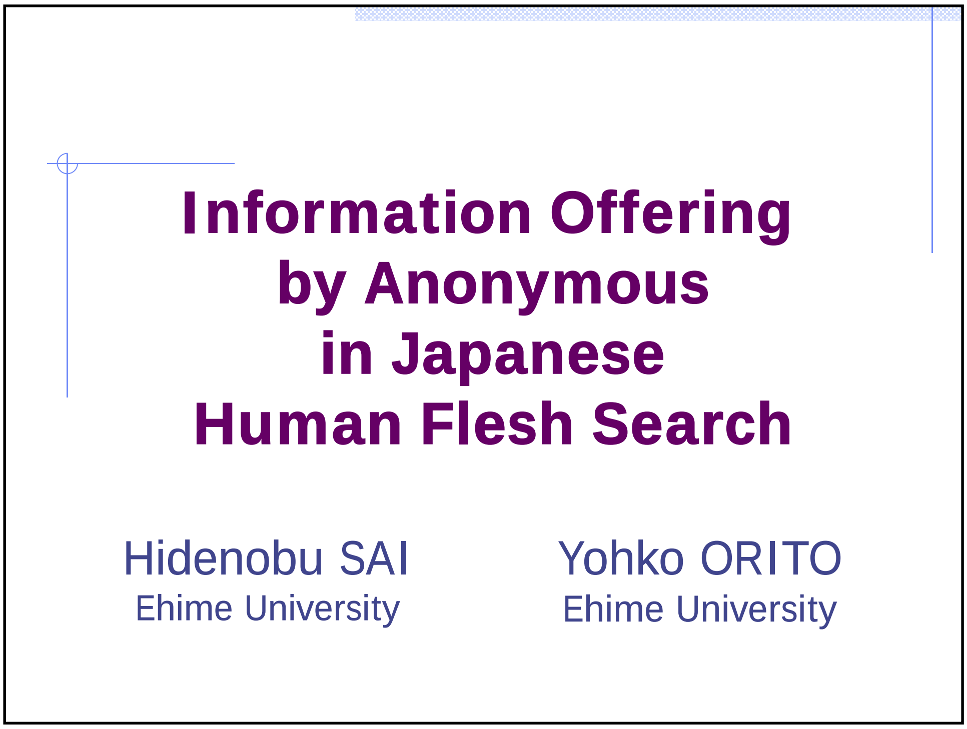
Summary and future plans

- We suggested the security framework that would solve the medical risk management and information security.
- With septal reasoning capacity, user can freely access applications in a room without repetitive login. The new security scheme may drastically change the scene of medical practice.
- Advent of consumer range finder such like Kinect makes the closer to practical deployment of the framework.
- Robust body segment and multiple people tracking (currently up to 2 people) will be next

Reconsideration of security in healthcare domain

- **“AAA” in security** [*1]
  - Authentication
  - Authorization
  - Accounting
- **The CIA Triad**
  - Confidentiality
  - Integrity
  - Availability

*1) Bernard Aboba, Jari Arkko, David Harrington, "Introduction to Accounting Management", RFC 2975, IETF, Oct. 2000.



Information Offering by Anonymous in Japanese Human Flesh Search

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Ehime University

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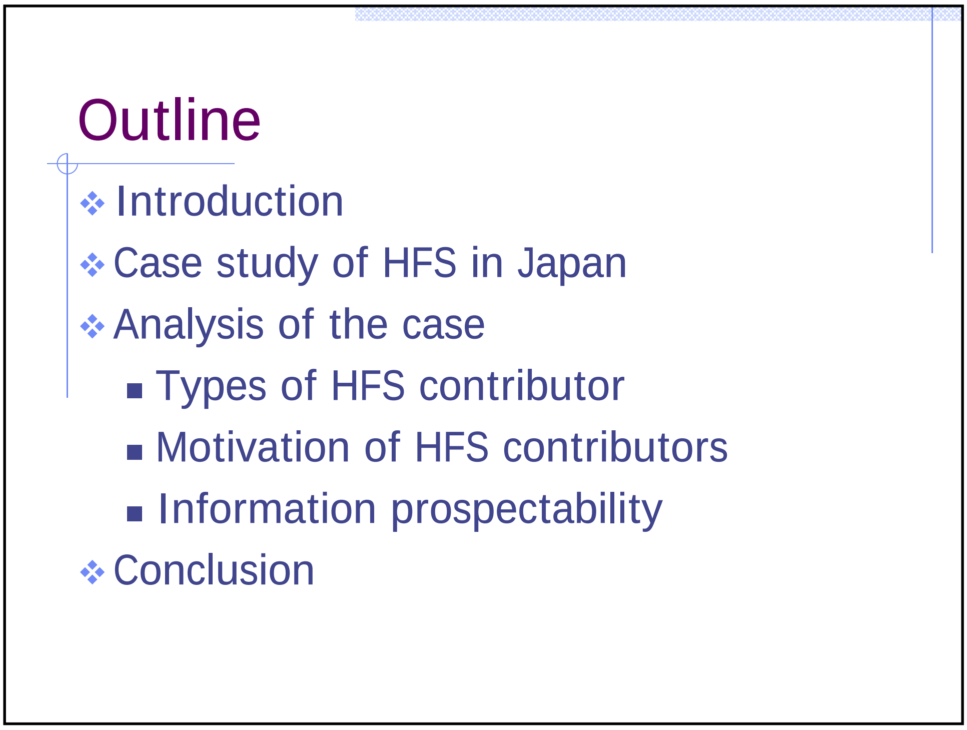
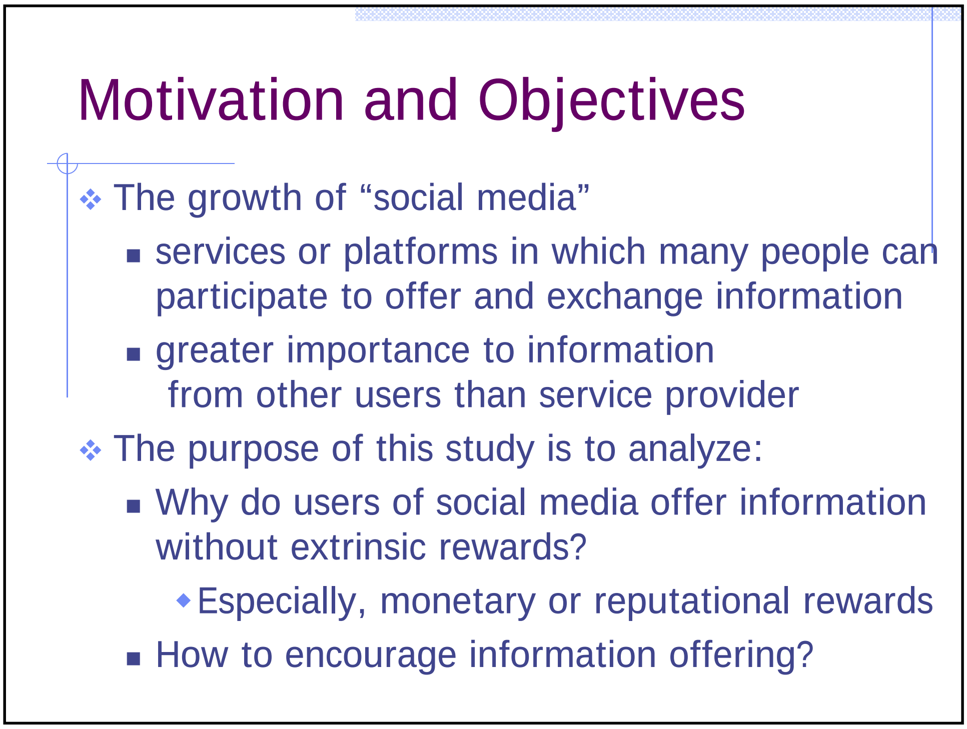
Ehime University



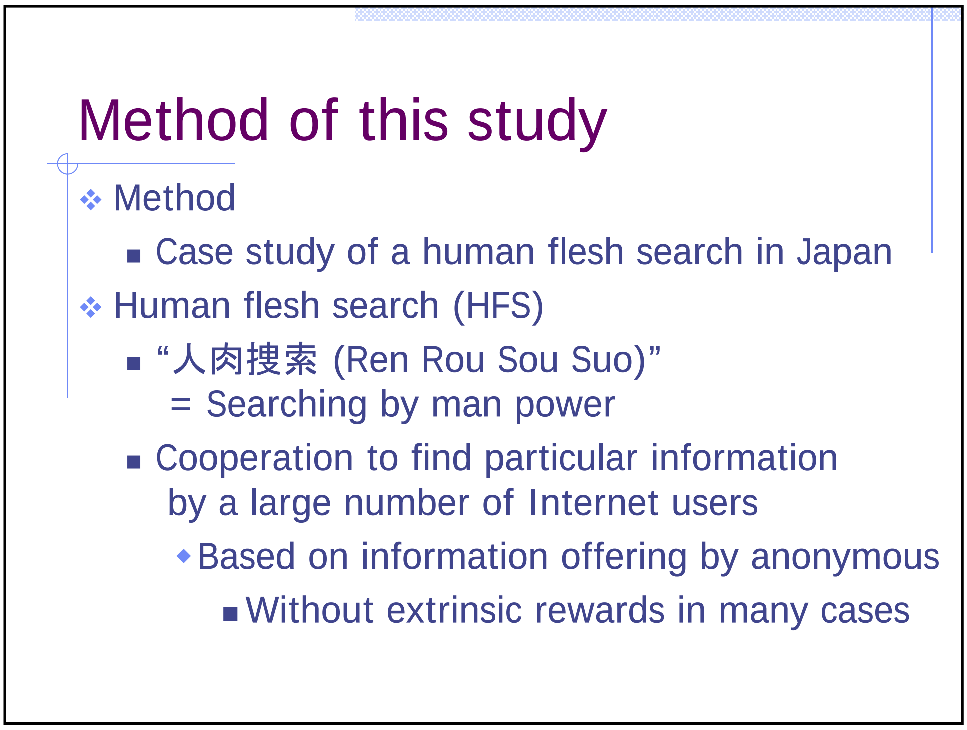
Outline

- Introduction
- Case study of HFS in Japan
- Analysis of the case
  - Types of HFS contributor
  - Motivation of HFS contributors
  - Information prospectability
- Conclusion



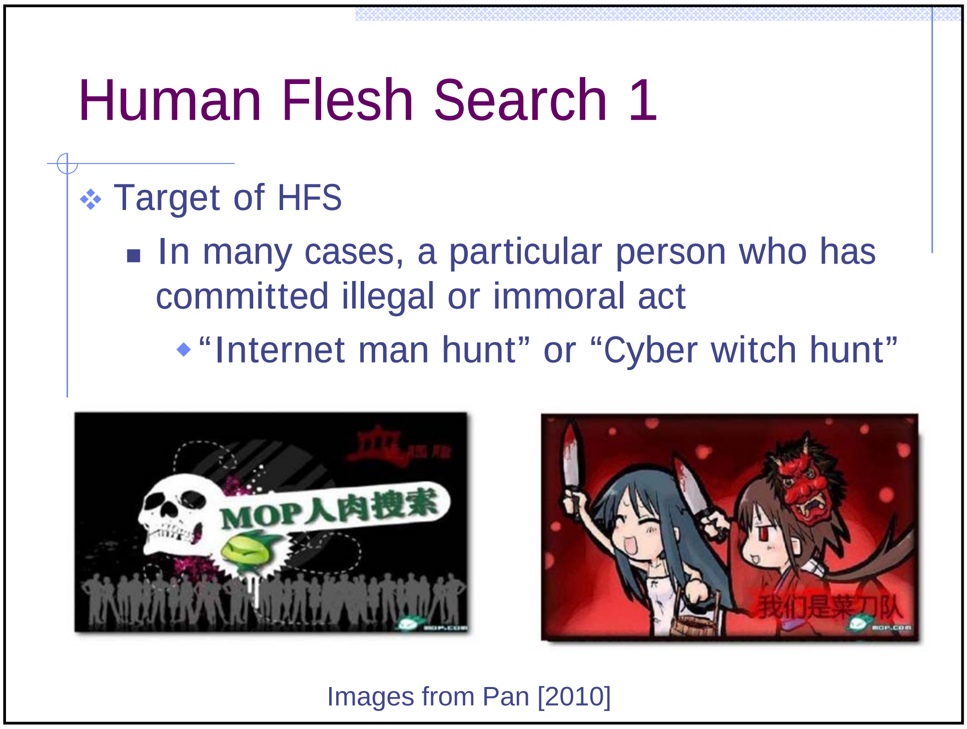
Motivation and Objectives

- The growth of “social media”
  - services or platforms in which many people can participate to offer and exchange information
  - greater importance to information from other users than service provider
- The purpose of this study is to analyze:
  - Why do users of social media offer information without extrinsic rewards?
    - Especially, monetary or reputational rewards
  - How to encourage information offering?



Method of this study

- Method
  - Case study of a human flesh search in Japan
- Human flesh search (HFS)
  - “人肉搜索 (Ren Rou Sou Suo)” = Searching by man power
  - Cooperation to find particular information by a large number of Internet users
    - Based on information offering by anonymous
      - Without extrinsic rewards in many cases

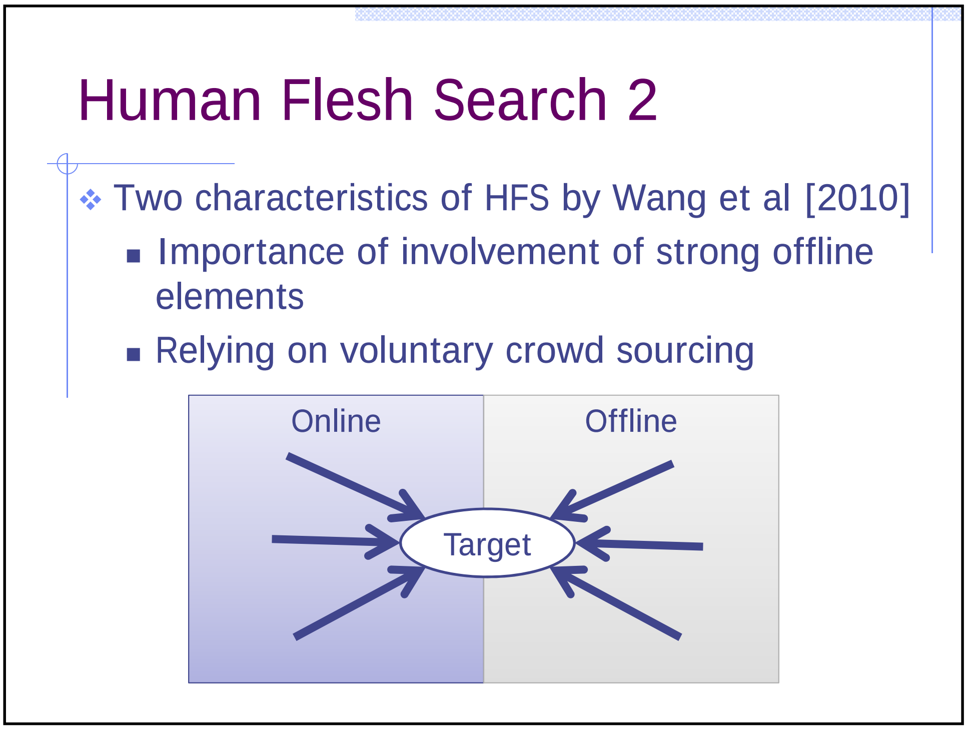


Human Flesh Search 1

- Target of HFS
  - In many cases, a particular person who has committed illegal or immoral act
    - “Internet man hunt” or “Cyber witch hunt”

MOP人肉搜索
我们是菜刀队

Images from Pan [2010]



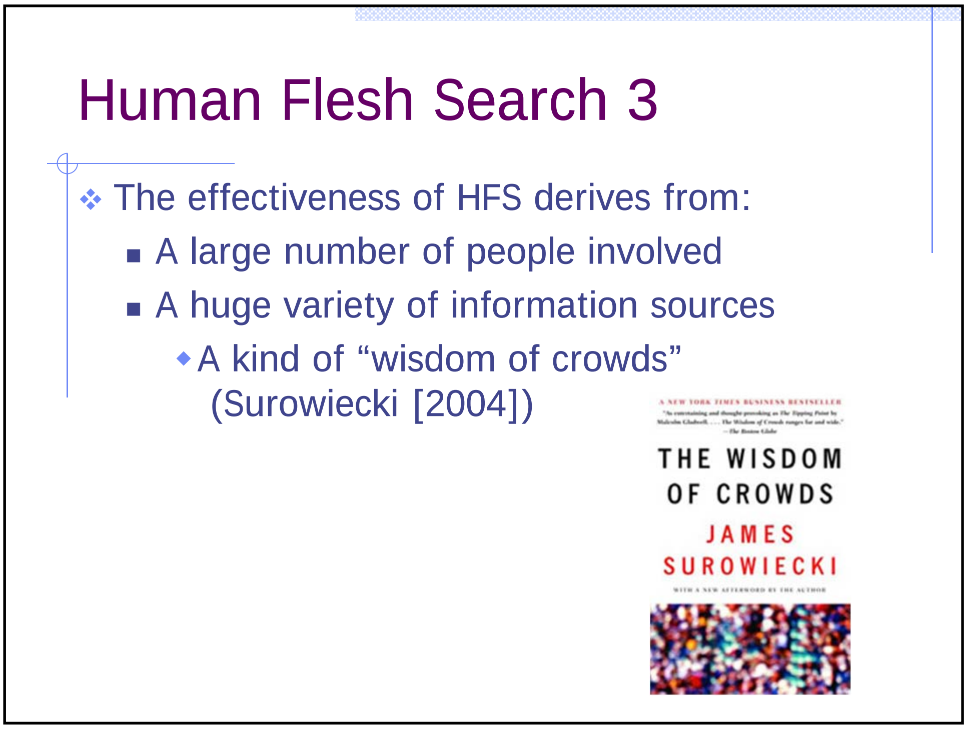
Human Flesh Search 2

- Two characteristics of HFS by Wang et al [2010]
  - Importance of involvement of strong offline elements
  - Relying on voluntary crowd sourcing

Online

Offline

Target



Human Flesh Search 3

- The effectiveness of HFS derives from:
  - A large number of people involved
  - A huge variety of information sources
    - A kind of “wisdom of crowds” (Surowiecki [2004])

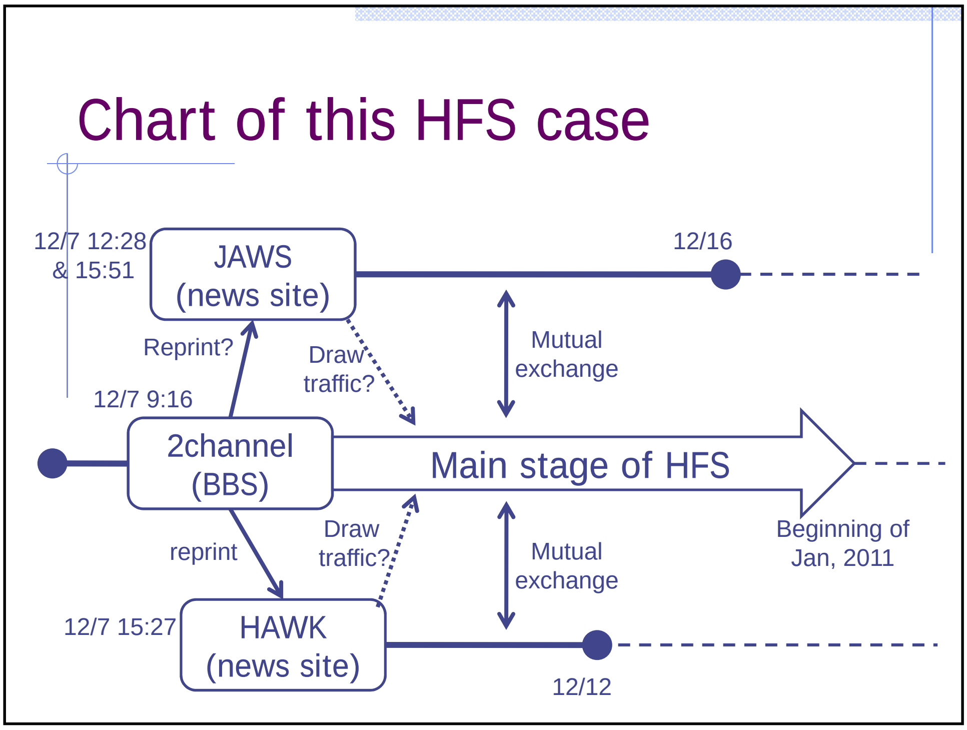


Chart of this HFS case

12/7 12:28 & 15:51

JAWS (news site)

12/16

Reprint?

Draw traffic?

Mutual exchange

12/7 9:16

2channel (BBS)

Main stage of HFS

reprint

Draw traffic?

Mutual exchange

Beginning of Jan, 2011

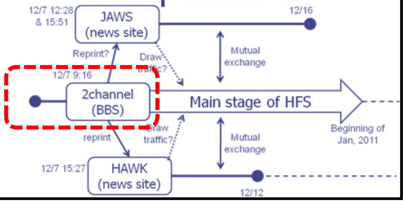
12/7 15:27

HAWK (news site)

12/12

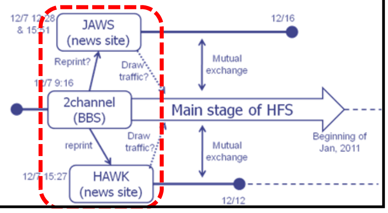
Case Study of HFS in Japan
#1 Beginning of HFS

- December 6-7, 2010
  - ALOHA (junior high school student)
    - tweeted about his illegal copied game
    - asked for help about it on a popular Japanese Q&A website
  - 2channel (BBS)
    - a thread related to ALOHA was posted on
    - HFS began


12/7 12:28
& 15:51
JAWS
(news site)
12/16
Reprint?
Draw
traffic?
Mutual
exchange
12/7 9:16
2channel
(BBS)
Main stage of HFS
Beginning of
Jan, 2011
reprint
Draw
traffic?
Mutual
exchange
12/7 15:27
HAWK
(news site)
12/12

Case Study of HFS in Japan
#2 Spreading to other platforms

- December 7, 2010
  - JAWS (news site)
    - reported ALOHA with screenshots of his tweets and his blog
  - Comment on HAWK (news site)
    - provided ambiguous information about ALOHA's place of residence


12/7 12:28
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JAWS
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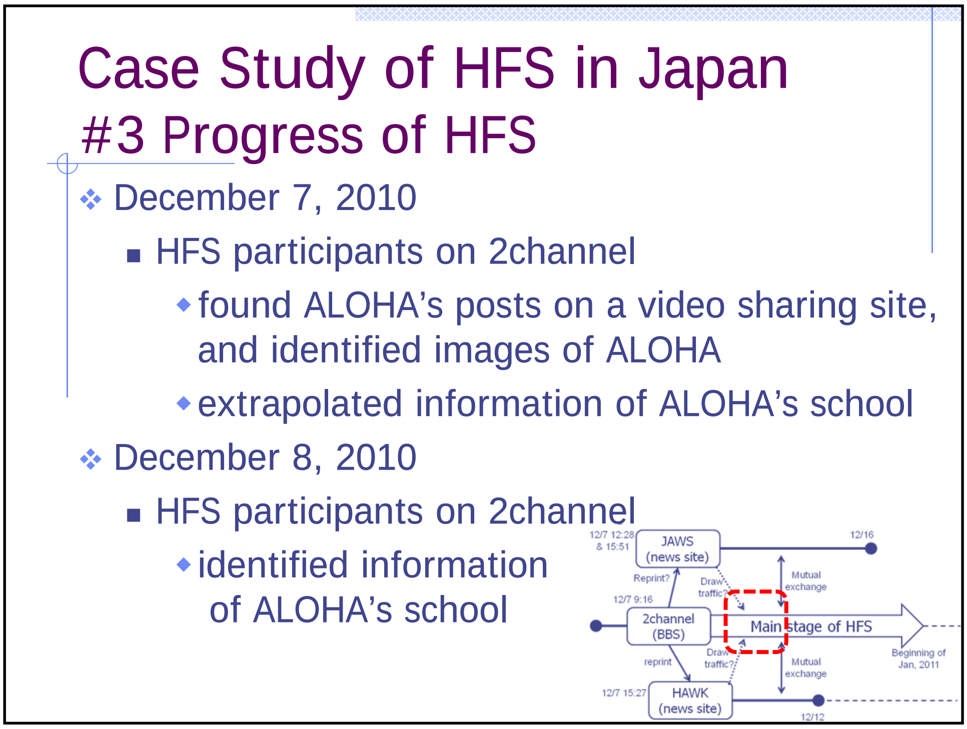

Case Study of HFS in Japan
#3 Progress of HFS

- December 7, 2010
  - HFS participants on 2channel
    - found ALOHA's posts on a video sharing site, and identified images of ALOHA
    - extrapolated information of ALOHA's school
- December 8, 2010
  - HFS participants on 2channel
    - identified information of ALOHA's school

12/7 12:28 & 15:51
JAWS (news site)
12/16
Reprint?
Draw traffic?
Mutual exchange
12/7 9:16
2channel (BBS)
Main stage of HFS
Beginning of Jan, 2011
reprint
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12/7 15:27
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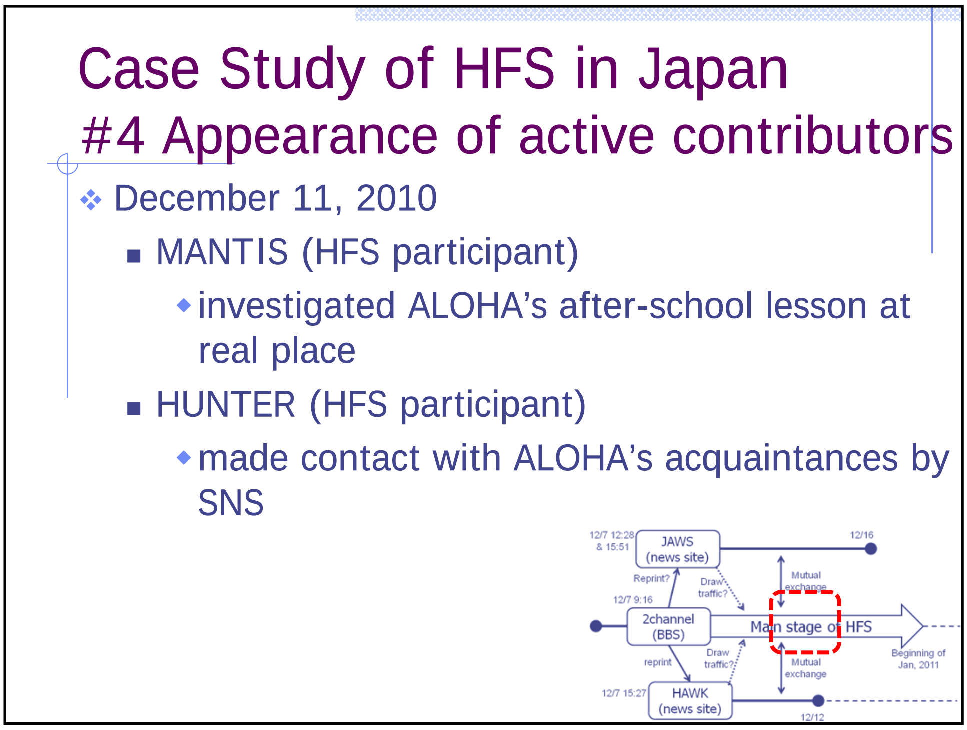
12/12



Case Study of HFS in Japan
#4 Appearance of active contributors

- December 11, 2010
  - MANTIS (HFS participant)
    - investigated ALOHA's after-school lesson at real place
  - HUNTER (HFS participant)
    - made contact with ALOHA's acquaintances by SNS

12/7 12:28 & 15:51
JAWS (news site)
12/16
Reprint?
Draw traffic?
Mutual exchange
12/7 9:16
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Main stage of HFS
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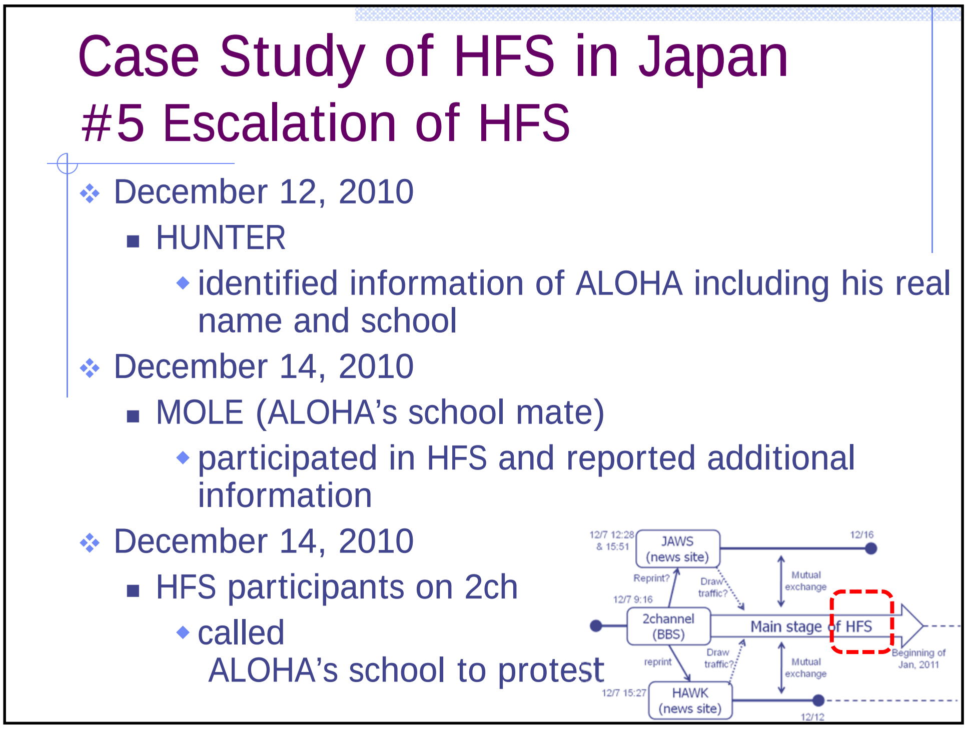
12/12



Case Study of HFS in Japan
#5 Escalation of HFS

- December 12, 2010
  - HUNTER
    - identified information of ALOHA including his real name and school
- December 14, 2010
  - MOLE (ALOHA's school mate)
    - participated in HFS and reported additional information
- December 14, 2010
  - HFS participants on 2ch
    - called ALOHA's school to protest

12/7 12:28 & 15:51
JAWS (news site)
12/16
Reprint?
Draw traffic?
Mutual exchange
12/7 9:16
2channel (BBS)
Main stage of HFS
Beginning of Jan, 2011
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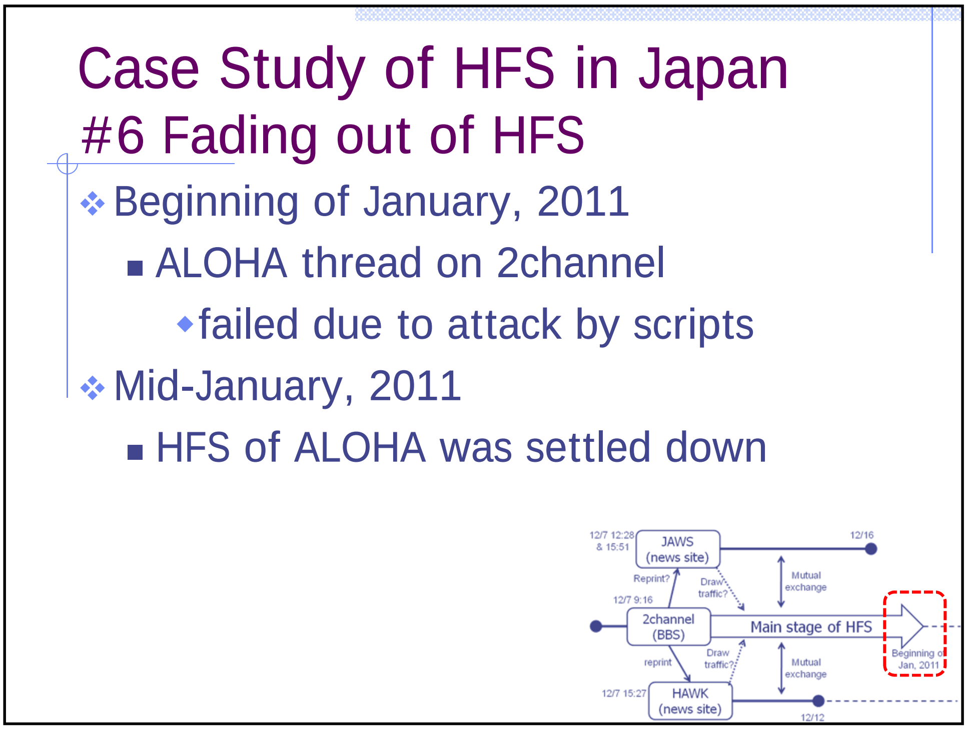
12/12



Case Study of HFS in Japan
#6 Fading out of HFS

- Beginning of January, 2011
  - ALOHA thread on 2channel
    - failed due to attack by scripts
- Mid-January, 2011
  - HFS of ALOHA was settled down

12/7 12:28 & 15:51
JAWS (news site)
12/16
Reprint?
Draw traffic?
Mutual exchange
12/7 9:16
2channel (BBS)
Main stage of HFS
Beginning of Jan, 2011
reprint
Draw traffic?
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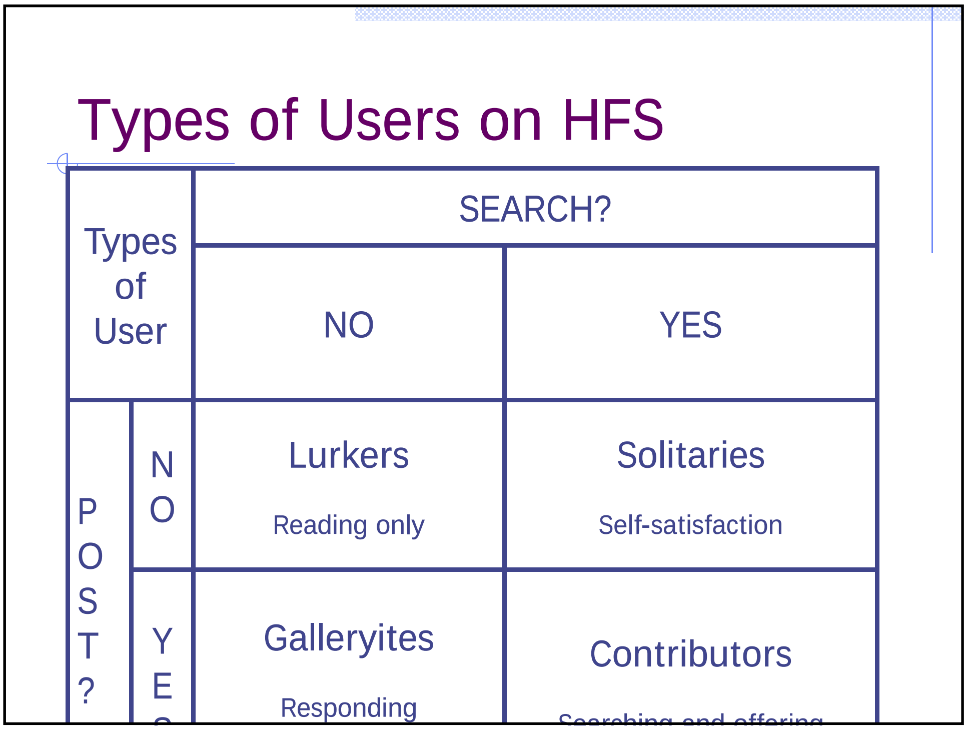
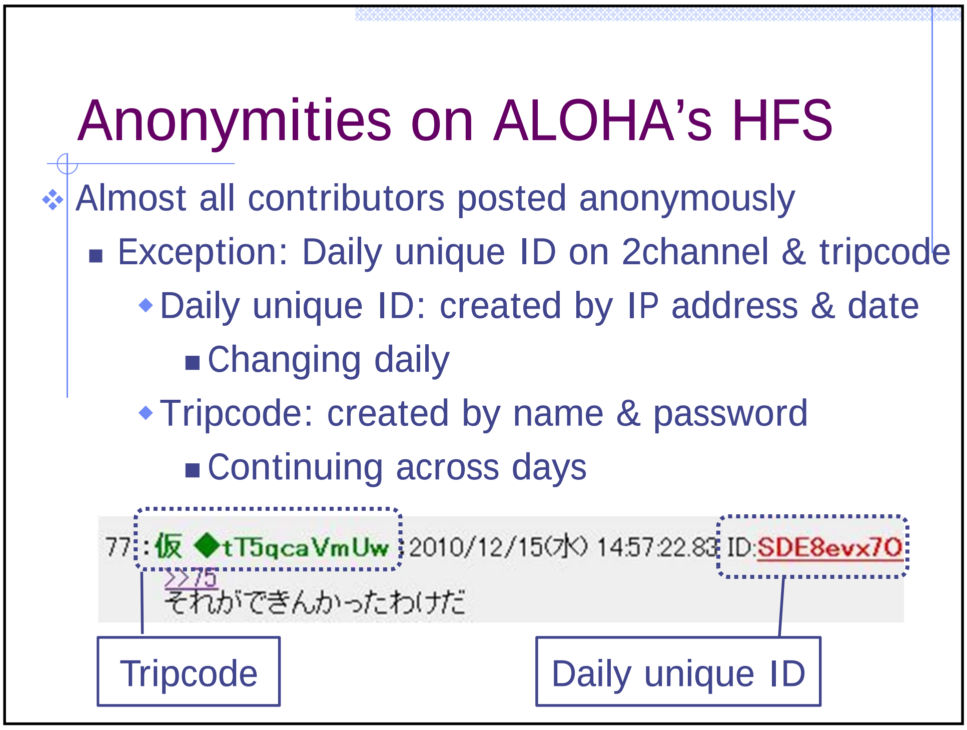
HAWK (news site)
12/12



Types of Users on HFS

Types of User		SEARCH?	
		NO	YES
POST?	NO	Lurkers Reading only	Solitaries Self-satisfaction
	YE	Galleryites Responding	Contributors Searching and offering



Anonymities on ALOHA's HFS

- Almost all contributors posted anonymously
  - Exception: Daily unique ID on 2channel & tripcode
    - Daily unique ID: created by IP address & date
      - Changing daily
    - Tripcode: created by name & password
      - Continuing across days

77：仮 ◆tT5qcaVmUw：2010/12/15(水) 14:57:22.83 ID:SDE8evx7O

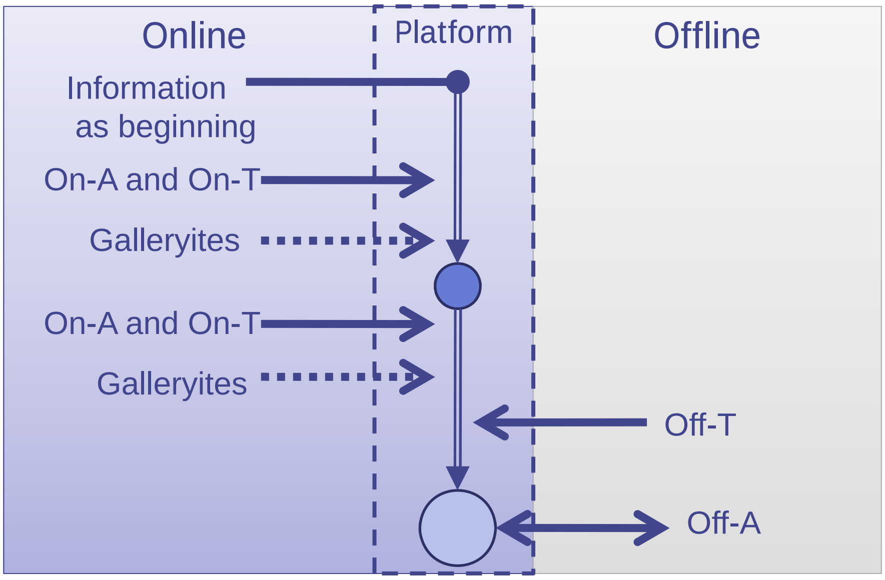
>>75

それができんかったわけだ

Components of HFS: Platform users

Types of Contributor		Source of Information	
		Online	Offline
Continuity of contribution	Active	On-A HUNTER	Off-A MANTIS MOLE
	Temporal	On-T	Off-T

General process of HFS



Online

Platform

Offline

Information as beginning

On-A and On-T

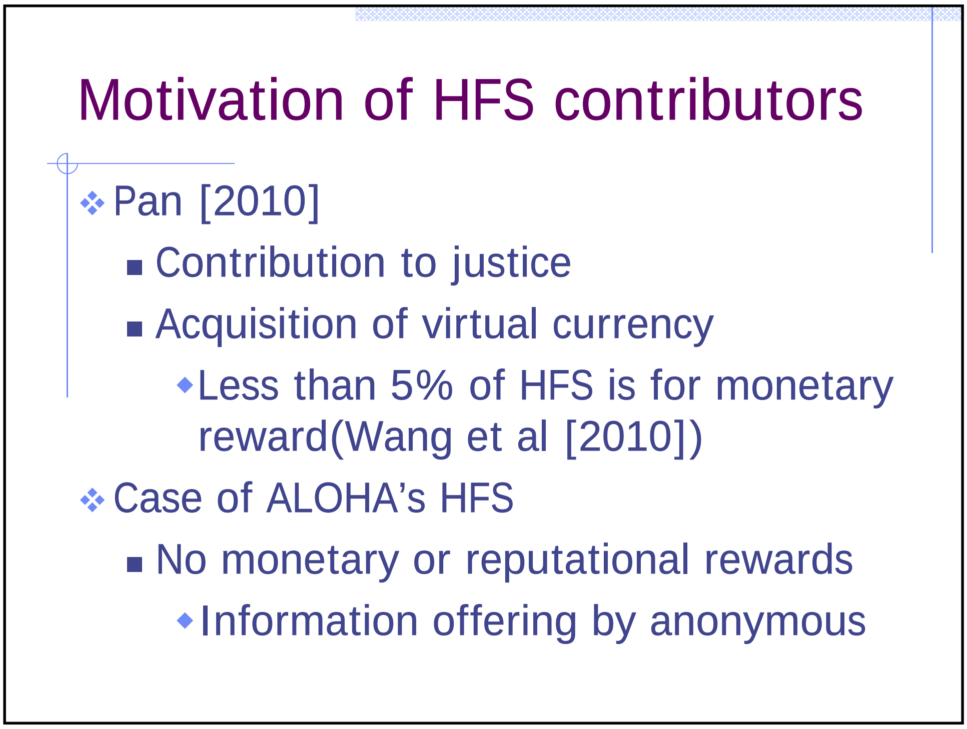
Galleryites

On-A and On-T

Galleryites

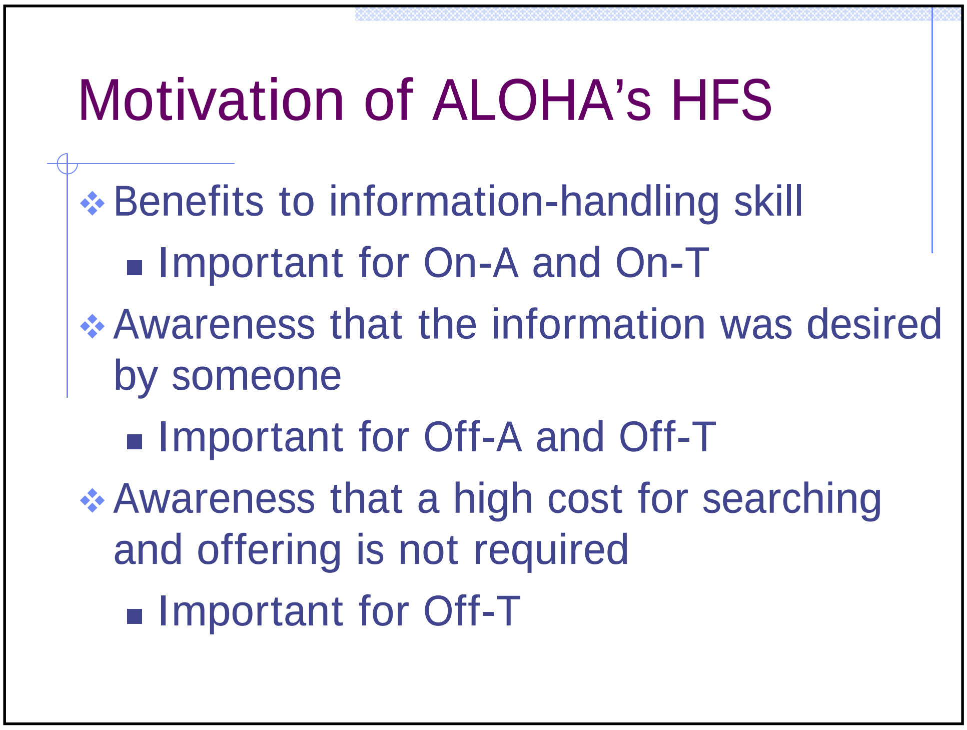
Off-T

Off-A



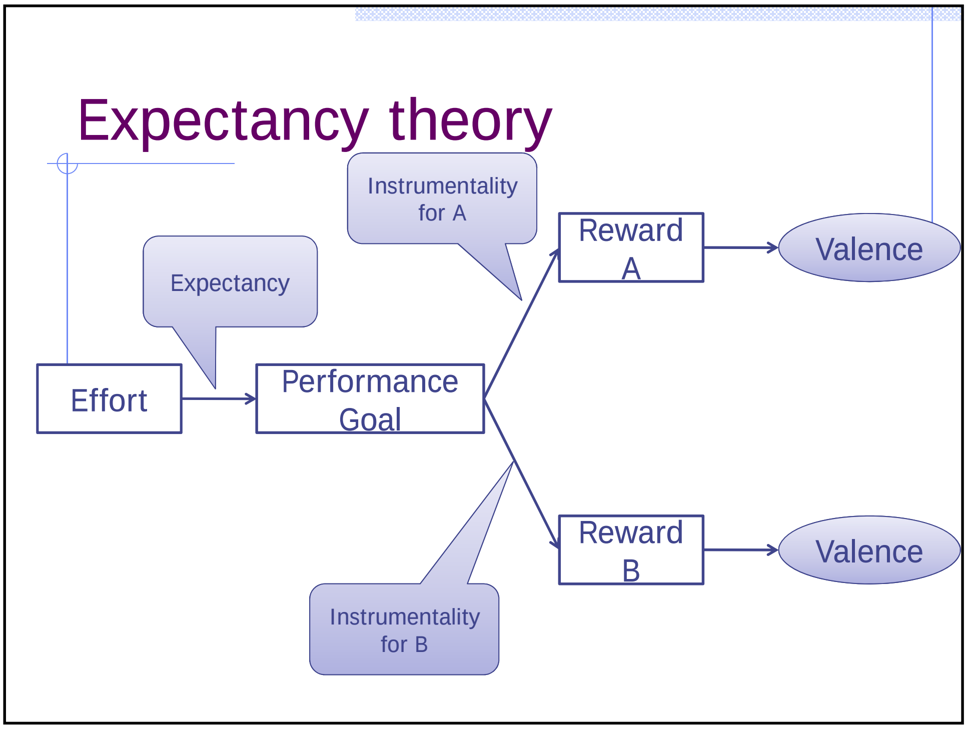
Motivation of HFS contributors

- Pan [2010]
  - Contribution to justice
  - Acquisition of virtual currency
    - Less than 5% of HFS is for monetary reward(Wang et al [2010])
- Case of ALOHA's HFS
  - No monetary or reputational rewards
    - Information offering by anonymous



Motivation of ALOHA's HFS

- Benefits to information-handling skill
  - Important for On-A and On-T
- Awareness that the information was desired by someone
  - Important for Off-A and Off-T
- Awareness that a high cost for searching and offering is not required
  - Important for Off-T



Expectancy theory

Instrumentality for A

Expectancy

Effort

Performance Goal

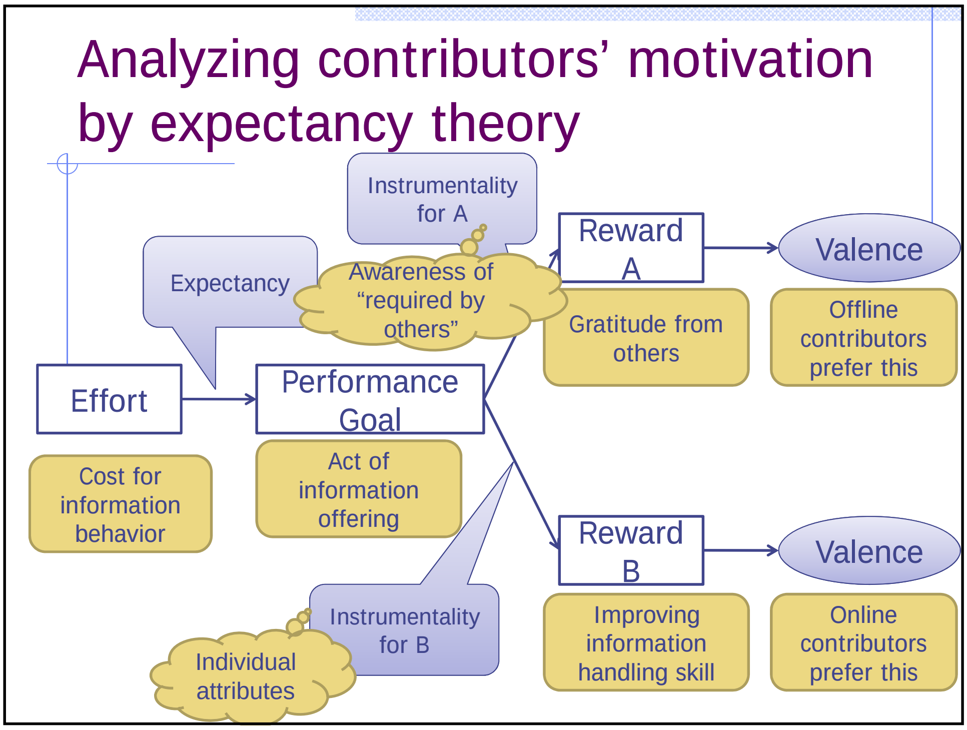
Reward A

Valence

Reward B

Valence

Instrumentality for B



Analyzing contributors' motivation by expectancy theory

Instrumentality for A

Expectancy

Awareness of "required by others"

Reward A

Valence

Gratitude from others

Offline contributors prefer this

Effort

Performance Goal

Cost for information behavior

Act of information offering

Reward B

Valence

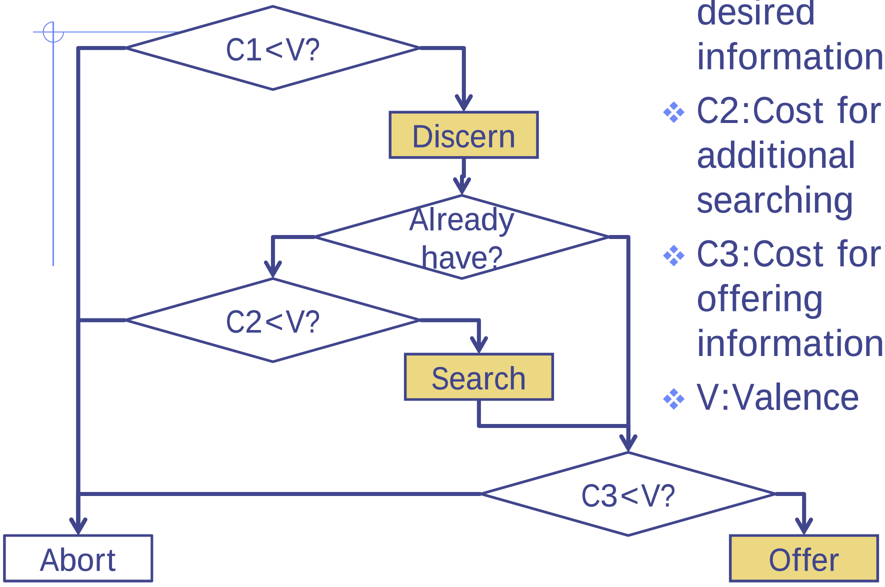
Improving information handling skill

Online contributors prefer this

Instrumentality for B

Individual attributes

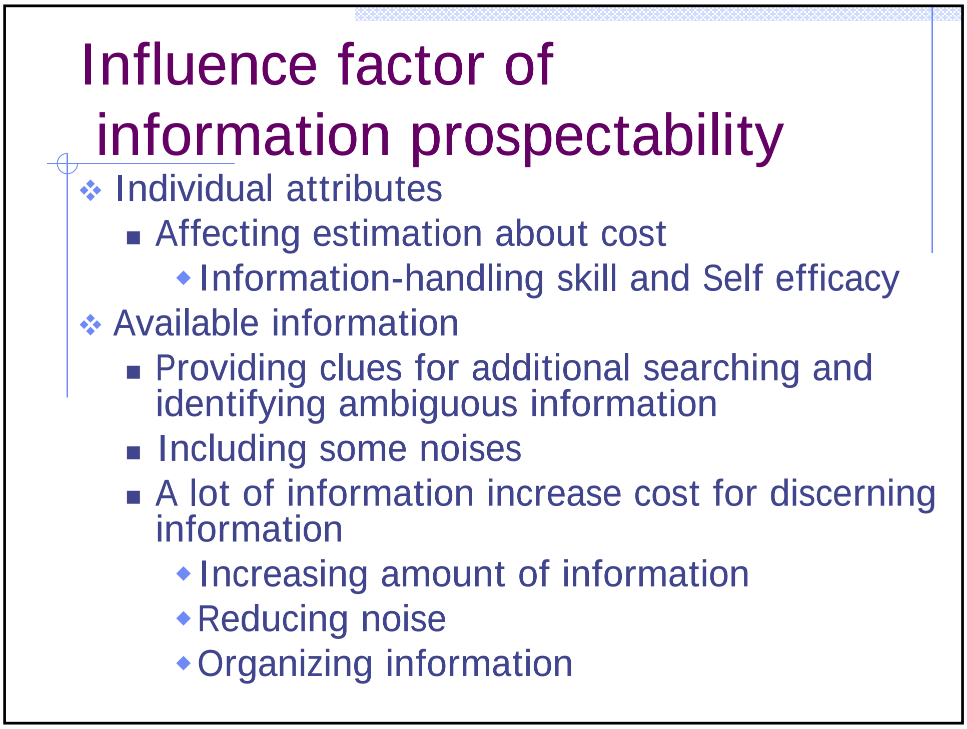
Information behavior and its costs for HFS



- C1:Cost for discerning desired information
- C2:Cost for additional searching
- C3:Cost for offering information
- V:Valence

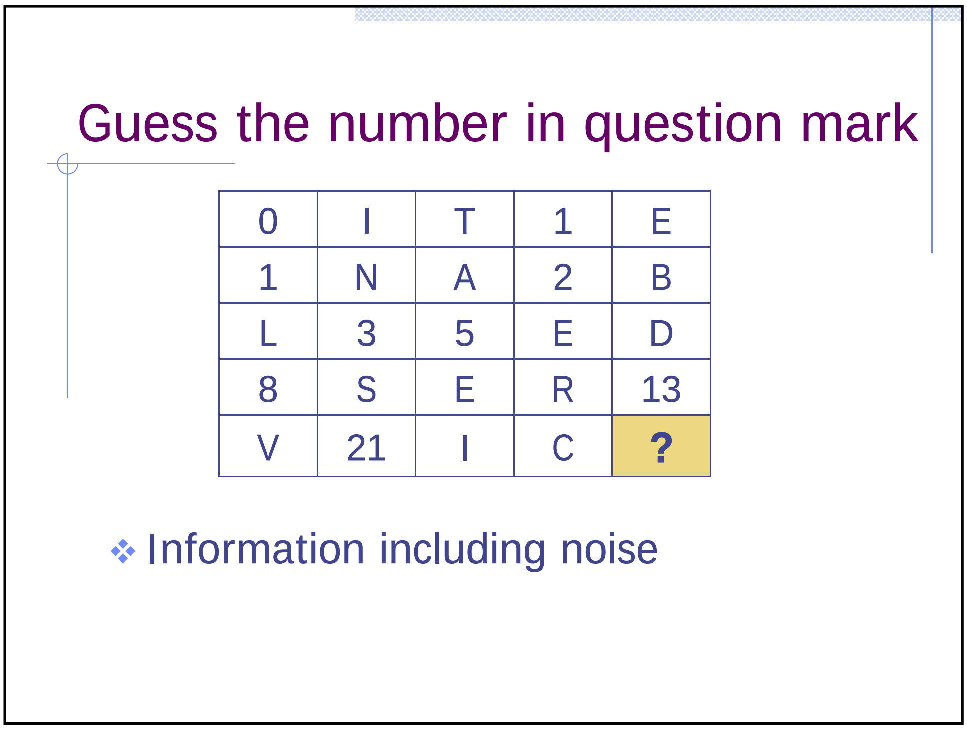
Information prospectability

- Information prospectability
  - as a factor affecting decision whether participant do information behavior or not
    - a subjective expectancy about the cost of information behavior required to obtain and offer information about a target



Influence factor of information prospectability

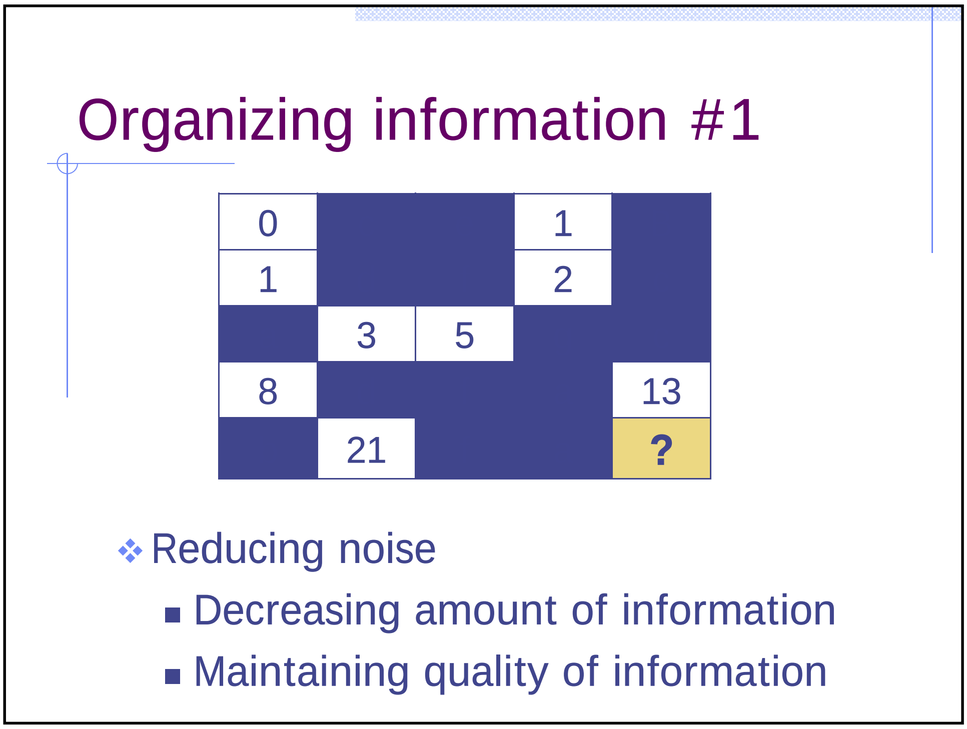
- Individual attributes
  - Affecting estimation about cost
    - Information-handling skill and Self efficacy
- Available information
  - Providing clues for additional searching and identifying ambiguous information
  - Including some noises
  - A lot of information increase cost for discerning information
    - Increasing amount of information
    - Reducing noise
    - Organizing information



Guess the number in question mark

0	I	T	1	E
1	N	A	2	B
L	3	5	E	D
8	S	E	R	13
V	21	I	C	**?**

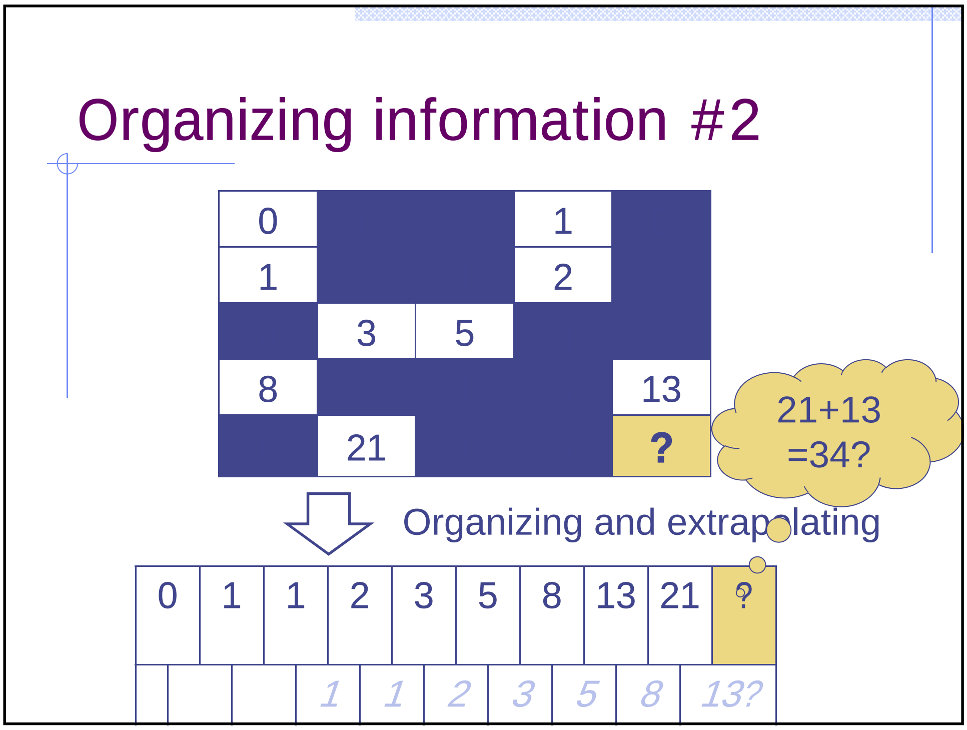
- Information including noise



Organizing information #1

0			1	
1			2	
	3	5		
8				13
	21			**?**

- Reducing noise
  - Decreasing amount of information
  - Maintaining quality of information



Organizing information #2

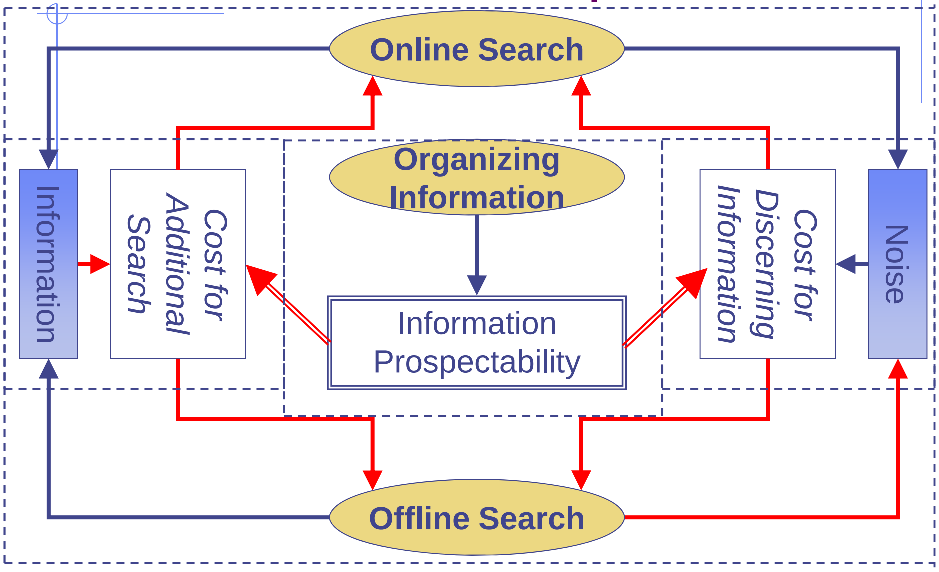
0			1	
1			2	
	3	5		
8				13
	21			**?**

21+13
=34?

Organizing and extrapolating

0	1	1	2	3	5	8	13	21	?
			1	*1*	*2*	*3*	*5*	*8*	*13?*

Online & Offline Loop



Online Search

Information

Cost for Additional Search

Organizing Information

Information Prospectability

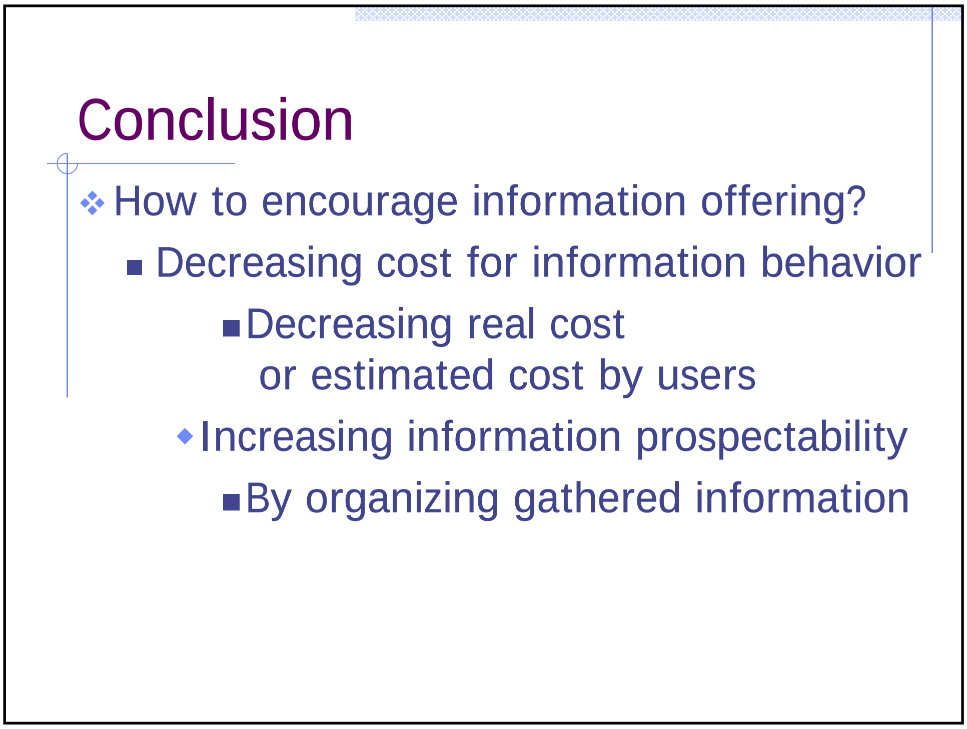
Cost for Discerning Information

Noise

Offline Search

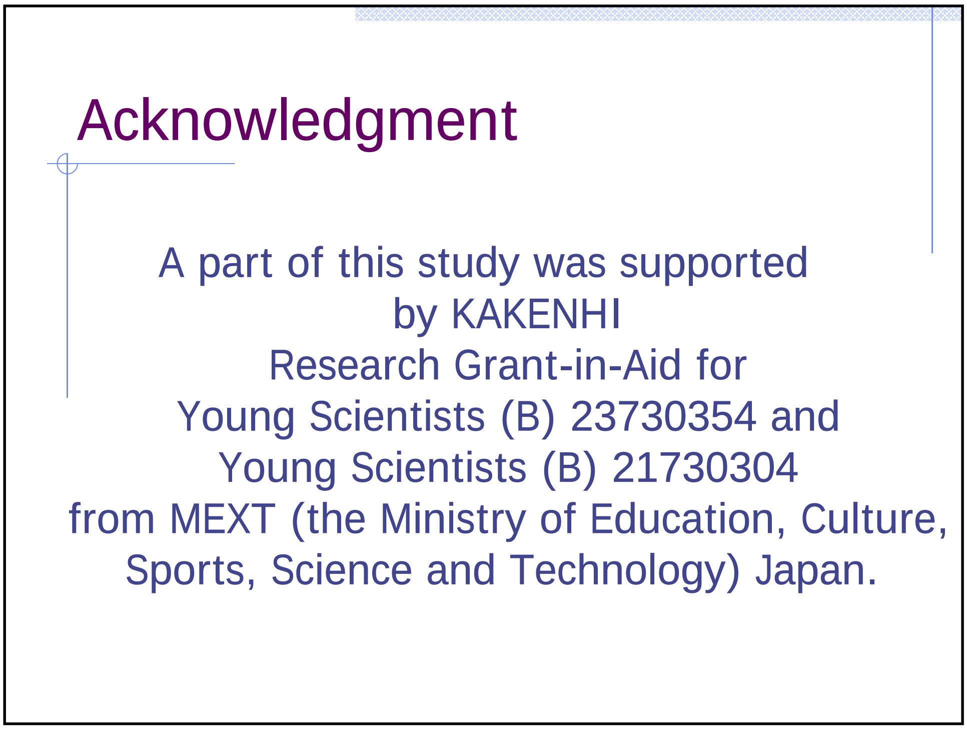
Conclusion

- Why do users of social media offer information without extrinsic rewards?
  - Benefits to information-handling skill
  - User’s awareness that
    - Information was desired by someone
    - High cost for searching and offering is not required



Conclusion

- How to encourage information offering?
  - Decreasing cost for information behavior
    - Decreasing real cost
      or estimated cost by users
  - Increasing information prospectability
    - By organizing gathered information



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