



The Reliability of the New Economic Platform: “Mobile Value Exchange Alliance Network”

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Introduction

In Japan, the platform environments of electronic value circulates via mobile phones equipped with **noncontact IC chips** are widely used. This services and **mobile phones** are called "**Osaifu-Keitai**".

- Mobile phone contracts with Osaifu-Keitai support:
Over 34,800,000
- Stores accepting Osaifu-Keitai usage:
Over 900,000
- Active users is approximately:
About 10,200,000



And many point services on Internet, some flight mileage programs etc...

History of Development

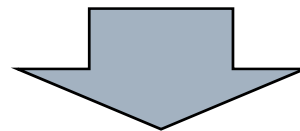
1. "Super Cash" demonstration experiment

NTT and 24 major banks implemented an electronic money in 1999. It could be used in the shopping districts of central Tokyo, and in an Internet shopping mall.

2. The noncontact IC chip technology "FeliCa" by SONY

The noncontact IC chip "FeliCa" was implemented in Hong Kong's transportation ticket systems in 1997.

The largest Japanese railway "JR East" adopted "FeliCa" in their transportation ticket systems in 2001.



NTT DOCOMO mounted "FeliCa" on a mobile phone in 2004.

Kinds of Electronic Values

1. Mobile Use

- **Electronic Money(Pre-paid)**: Edy, Mobile Suica, nanaco, WAON
- Electronic Money(Post-paid): QUIC Pay, VISA TOUCH, Smart plus
- **Credit Card**: iD(DCMX, VISA, Master, etc...)
- **Point service**: Cmode Money, Bic Point, Yodobashi Gold Point, etc...
- Coupon: JAL IC Coupon, ToruCa*

**White Paper of Keitai-Communication which was distributed in ITS2010 has some use cases of ToruCa.*

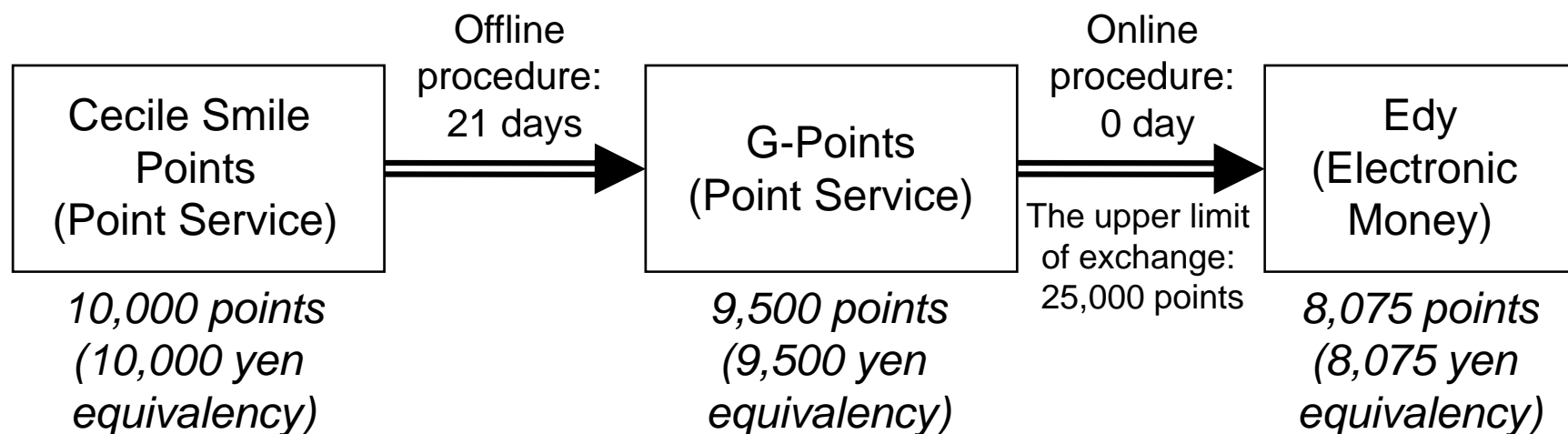
2. Non Mobile Use

- **Flight Mileage**: JAL Mileage, ANA Mileage, etc...
- **Point Service**: Rakuten Points, T-Points, PONTA, VISA, JCB, etc...

Value Exchange

There are many value services can be exchanged to another electronic value through their **value exchange partnerships**. And these value exchanges have some brokers: G-Point, PeX and Net Mile.

[Example of Value Exchange]



Value Exchange

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G-Point



PeX

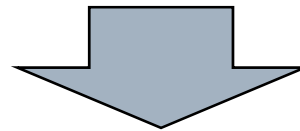


NetMile

Mobile Value

The social phenomena of value exchanges has the two principal characteristics as:

- (1) The **economic value circulating** with its properties change through the value exchange.
- (2) The **principal intermediary** for the electronic value having migrated to the **mobile phone**.



Yuhashi proposed to capture the social phenomena of value exchanges in the concept of "**mobile value**" (Yuhashi, 2008, 2009).

Related Works 1 (Network Effect)

There are researches that regarding the **network effect** and **switching costs** for telecommunications services has been conducted.

Nakamura has estimated that a **switching cost** of approximately 90,000 yen exists in the selection of a mobile phone operator.
(Nakamura, 2008)

Yasuda et al. showed that the **network effect** (positive feedback) is gaining strength through its diffusion process in the case of "Edy" and "Suica" mobile value.

(Yasuda et al., 2008)

Related Works 2 (Business Method)

Case studies are numerous for the social phenomena of mobile value, because it is a good case for the business method of vertical integration.

Whitehead et al. introduce the NTT DOCOMO/Sony business tie-up as an example of the potentiality of mobile value application services. (Whitehead et al., 2008)

Lehdonvirta et al. indicated that a balance between usability and strength of security is important for small payments with the case of NTT DOCOMO's Osaifu-Keitai. (Lehdonvirta et al., 2009)

Ondrus et al. note that NFC technology contained in the noncontact IC chip "FeliCa" is promising as the electronic payment, according to the case of NTT DOCOMO's Osaifu-Keitai. (Ondrus et al., 2008)

Hong et al. explain that the provision of mobile value services can become a business opportunity for mobile phone. (Hong et al., 2009)

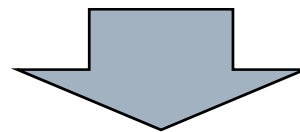
Related Works 3 (Advanced Analysis)

Several researches exist that is not limited to simple case studies and a **more in-depth analysis** is carried out.

Kitamura et al. verified the impact electronic money was having on the quantity of money in circulation. (Kitamura et al., 2009)

Watanabe et al. performed a factor analysis concerning consumer sentiment with regards to electronic money and clarified three latent primary factors necessary for diffusion. (Watanabe, 2009)

Yasuoka evaluated the mobile value services from the three perspectives of user merit, service provider business merit and cooperating business merit. (Yasuoka, 2009b)



There is not a research that treats the distribution platform for the **mobile value exchange**.

Social Phenomena of Mobile Value Exchanges

The mobile value exchange alliance network was constructed by the **155 from within 164 varieties of service** registered with "Poitan".

- Poitan is a **CGM** website that introduce the information of all value services
- Our research treated its data period **from February 2007 to January 2010**

Characteristic of Network

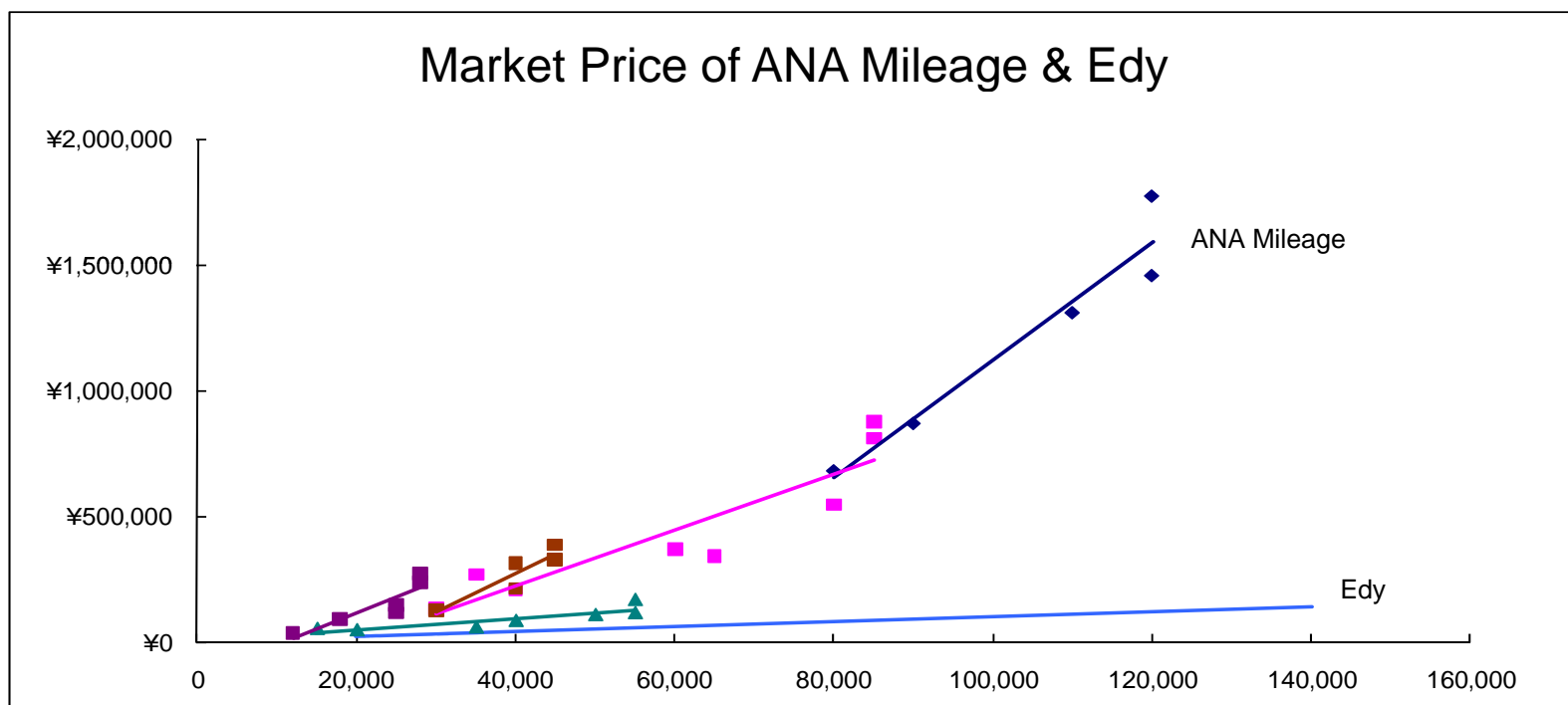
This network has a relatively high a clustering factor and short average path length at the same time.

- The **clustering coefficient** of this network: 0.428
- The **average path length** of this network: 2.848

Small-world network is a structure suitable for the exchange of mobile value.

The Biggest Problem: Alchemy

Now, we want to evaluate the mobile value exchange alliance as a social system. Therefore, we discuss the framework of analysis for the biggest problem. It is a **unequal exchange like an alchemy**.



[Research Question]

How can we let the **appropriate exchange rate** be clear?

Framework

Yasutomi proposes “hypothesis of qualitative purchasing power” which explains disparity of monetary value in the international market from the viewpoint of diversity of products/services exchangeable with money.

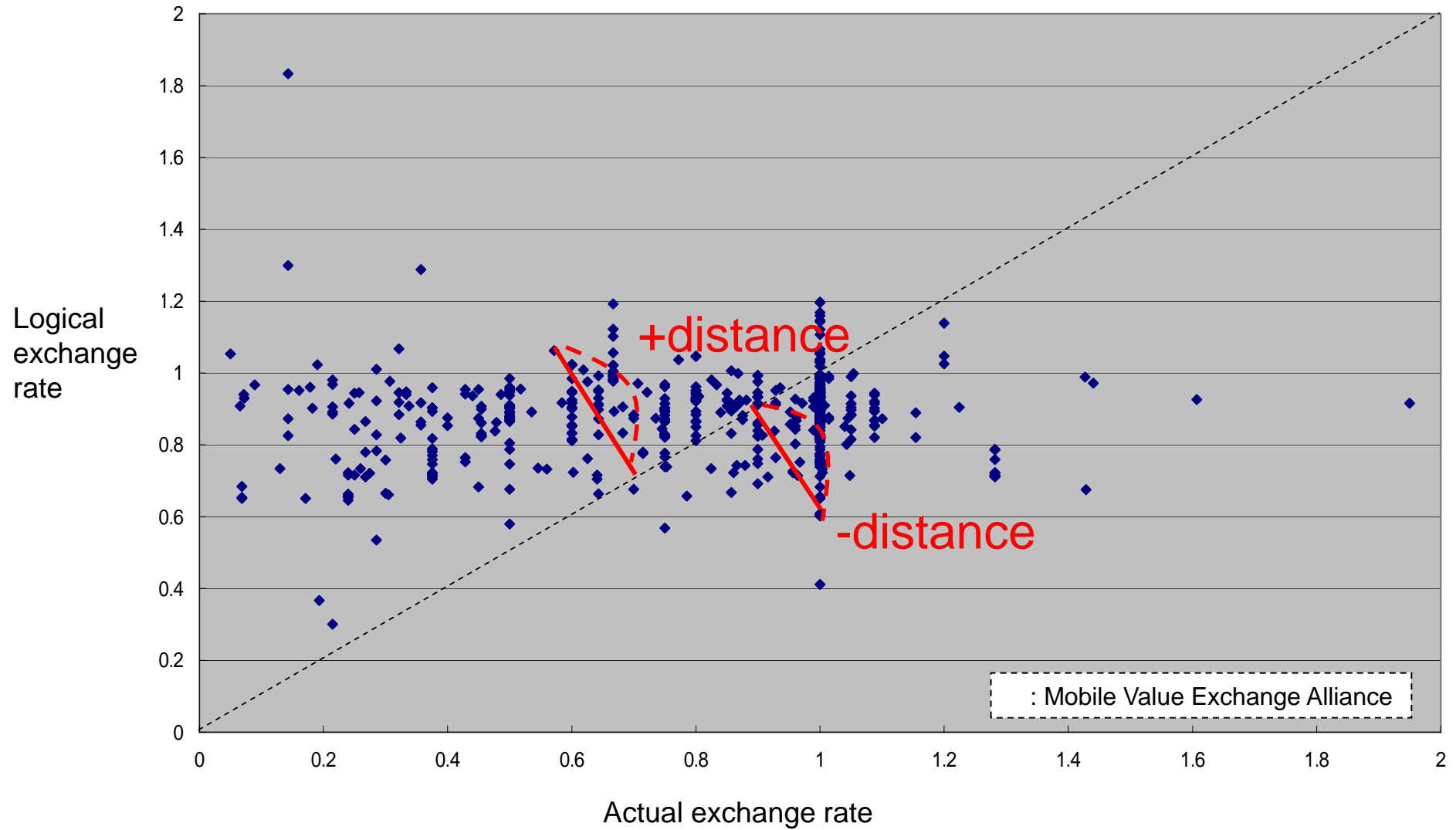
(Yasutomi, 2000)

Based on Yasutomi, we propose the introduction of “Link Assets Closeness Centrality” as the index representing diversity of mobile value service. We add up this value every service.

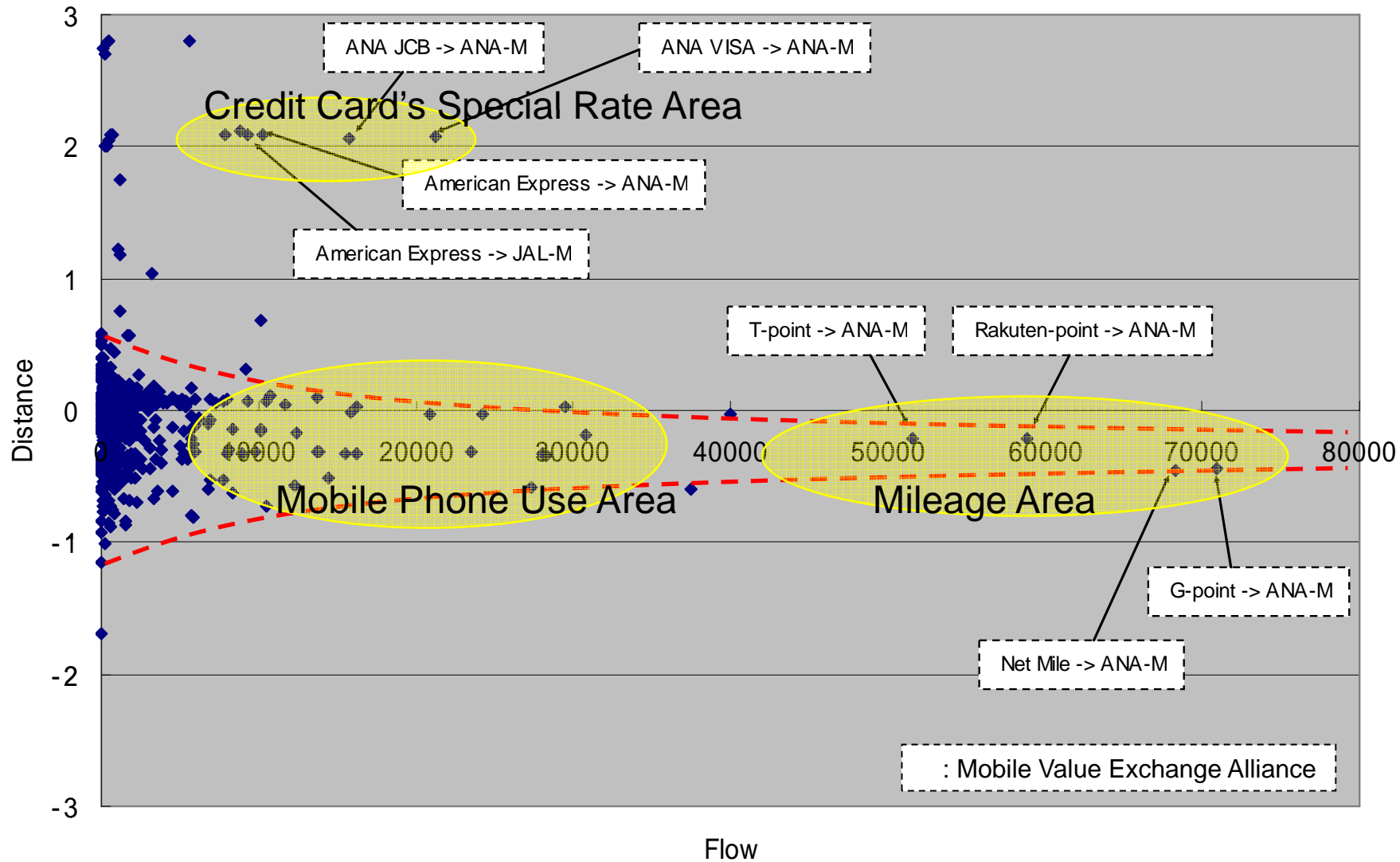
$$\text{Link Asset Closeness Centrality} = \frac{\text{Total number of links} - 1}{\text{Summation of the shortest path length}} \times \frac{\log(\text{Number of virtual users of services connecting to the target link})}{\log(\text{Summation of “number of virtual users” of all services})} \quad \dots (\text{Formula 1})$$

By obtaining the difference between the actual exchange rate determined by exchange partnerships and the logical exchange rate, we can evaluate exchange partnerships.

Comparison of Exchange Rate



Exchange Rate & Flow



Conclusion & Future Work

Conclusion

This research proposes a model to evaluate ensured **reliability** against mobile values constantly changing via exchange alliance. This **evaluation model** enables us to figure out potential risks and the size of their impacts.

Future Work

It is necessary to examine the effectiveness of the evaluation model with the cases which **cancel alliance**.



Thank you for your listening!

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