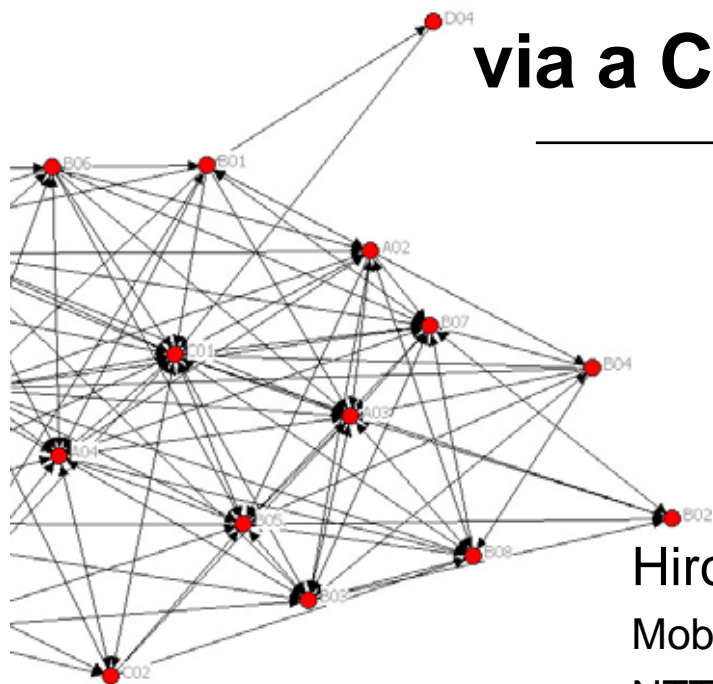


How to Activate a Collaboration Network via a Core Employee's Communication?



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Outline

- 1. Introduction**
- 2. Case of Company & Framework**
- 3. Analysis of Experiment**
- 4. Conclusion & Future works**

Introduction

Drucker commented that “**knowledge**” would gain power as an important resource of production in the future against land, capital and workforce (Drucker, 1993).

*How do we manage
knowledge?*

Davenport found that competent knowledge workers gather most of their important information from their **social networks** (Davenport, 2005).

*Focus of
this paper*

Whether is it possible to foster **collaborations** in which **communications** of employees are developed through social networks?

Related Works

Burt investigated relationships between the **social networks** of managers and the speed of their **promotions**, in high-tech companies (Burt, 1992).

Cross et al. evaluated the social networks of companies at some different industries, and classified them into **three categories**. (Cross et al., 2005)

Gloor showed that social networks can **lead the innovation**, and defined the social network “**COIN**” to enhance business activities (Gloor, 2006).

Most of existing researches are static analysis.

Yuhashi et al. analyzed the a group whose members are **structurally equivalent** changes collaboration networks **dynamically** with a case of the certain company (Yuhashi et al., 2008).

It found that communication precedes collaboration.

Analogy in Marketing

Word-of-mouth communication occurs when three kinds of people with specific attributes become involved in distributing information (Gladwell, 2000).

[Three kinds of people for word-of-mouth communication]

- **Maven**: High levels of communication and stored knowledge
- **Connector**: Many acquaintances over various different communities
- **Salesman**: Giving the information reliability and persuading people

A key person in a company organization should have three properties.

Purpose of Analysis

Nishiguchi points out to utilize all the resources available above employees' awareness, it is important for an organization to have a "**Small-world network**" (Nishiguchi, 2007).

A company's small world is created when two phenomena (a high clustering coefficient and a short average path length) occur at once.

Therefore

A person who has these three properties seems to play an **important role** in a company organization **as a whole**.

Case Company

The Company belongs to a major **mobile phone operator group**. Its business is development and maintenance of **corporate information systems**.

Capital fund: 652.6 million JPY and Employees: 696 (March 31, 2009)

[Characteristic]

- Strength is using **mobile devices** for information systems
- **Sales staffs** and **system developers** belong to the **same division**



Figure: The Company's Office

*The analysis treated **27 employees** in one group of the system integration division.*

Communication

Theoretical Definition

Communication is defined as "the **interactive processes** employed by human beings in order to communicate their psychological content between one another, using symbols such as body languages, words, texts, images, and so on, as mediational means".

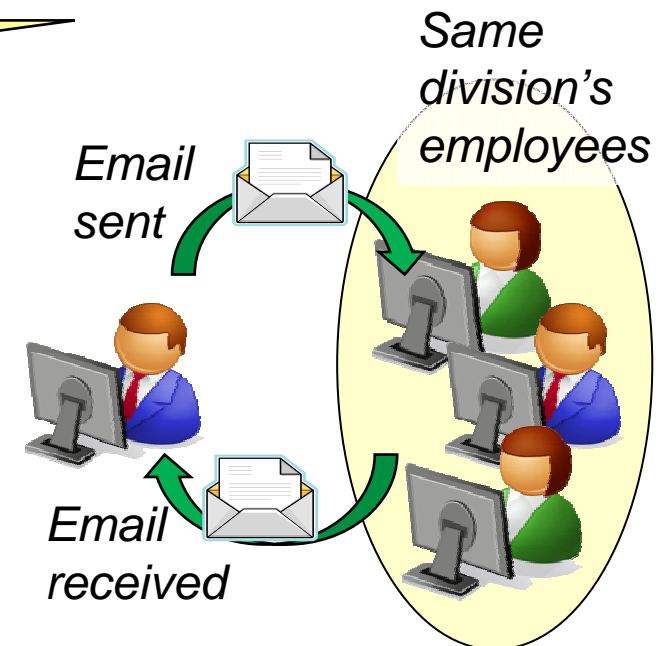
In the company

Operational Definition in this Case

An **exchange of email** is communication implemented using indirect media.

The average number of emails sent from other employees in the same division was **25.91** per week.

The average number of emails received to other employees in the same division was **22.08** per week.



Collaboration

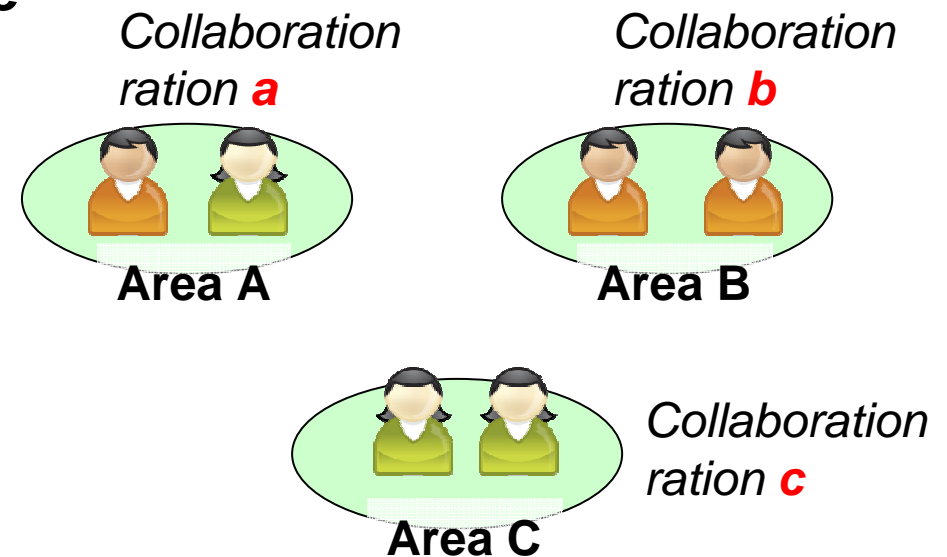
Theoretical definition

Collaboration is defined as “an activity that leads to **an emergent result**, which takes place alongside **an act of communication** within a group that has a mutually beneficial **relationship**”.

In the company

Operational Definition in this Case

The **collaboration** occurs from the communication in a specific ratio depending on the use of the place, because there are many employees in the office. Those collaborative relations are expressed by a **network**.



RFID System

In this research, a collaboration network is visualized by using an **RFID** system. Each employee wears an RFID tag for **positional information**.

[Characteristic]

- An RFID tag has a **unique ID** number.
- An RFID tag sends a signal **every 30 seconds**.
- There are **17 receivers** in the office.



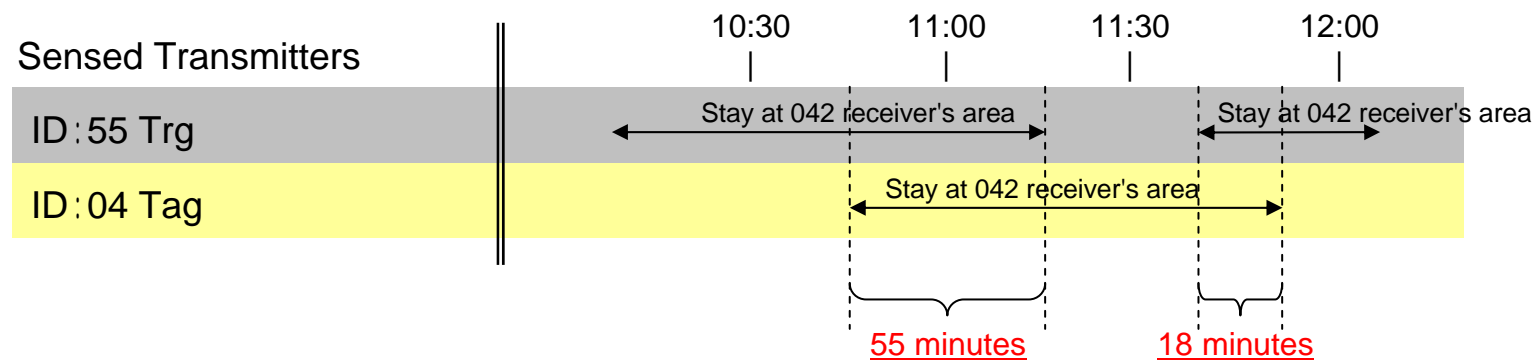
Figure: RFID System (Transmitter and Receiver)

Collaboration Net: Sojourn Time

STEP-1

We measured the time period when employees were **staying** in the perception area (a diameter of around **5m**) of the **same receiver** (9:30AM-6:00PM).

Example: Sojourn Time in the area of the receiver (ID: 042)



There were 2 employees (ID:55 and ID 04) at same receiver area for 73 minutes.

Collaboration Net: Weighting for Each Place

STEP-2

We decided the **virtual outbreak value** of collaborations that is a weighting account by multiplication **sojourn time** and **induction ratios** of each place.

Table: The number of times that RFID tag's buttons were pushed

	RFID tag ID				
	04	18	55	Total	
Area ID	42	5	4	7	16
	43	15	8	11	34
	44	3	5	8	16
Total	23	17	26	66	



Collaboration Button

{The **sojourn time** when the tag (ID:04) and the tag (ID:55) stayed at the same time on the receiver (ID: 42)} × {(The number of times that RFID tag's buttons were pushed on the receiver (ID:42) = 16) / (The total number of times that RFID tag's buttons were pushed on all receivers= 66)}

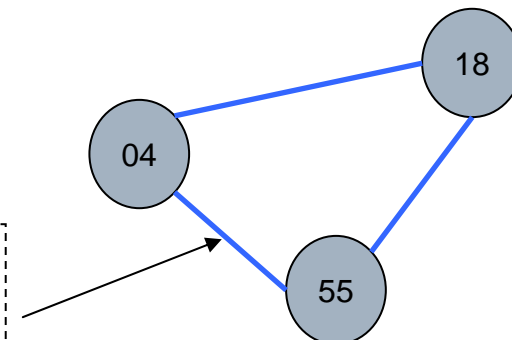
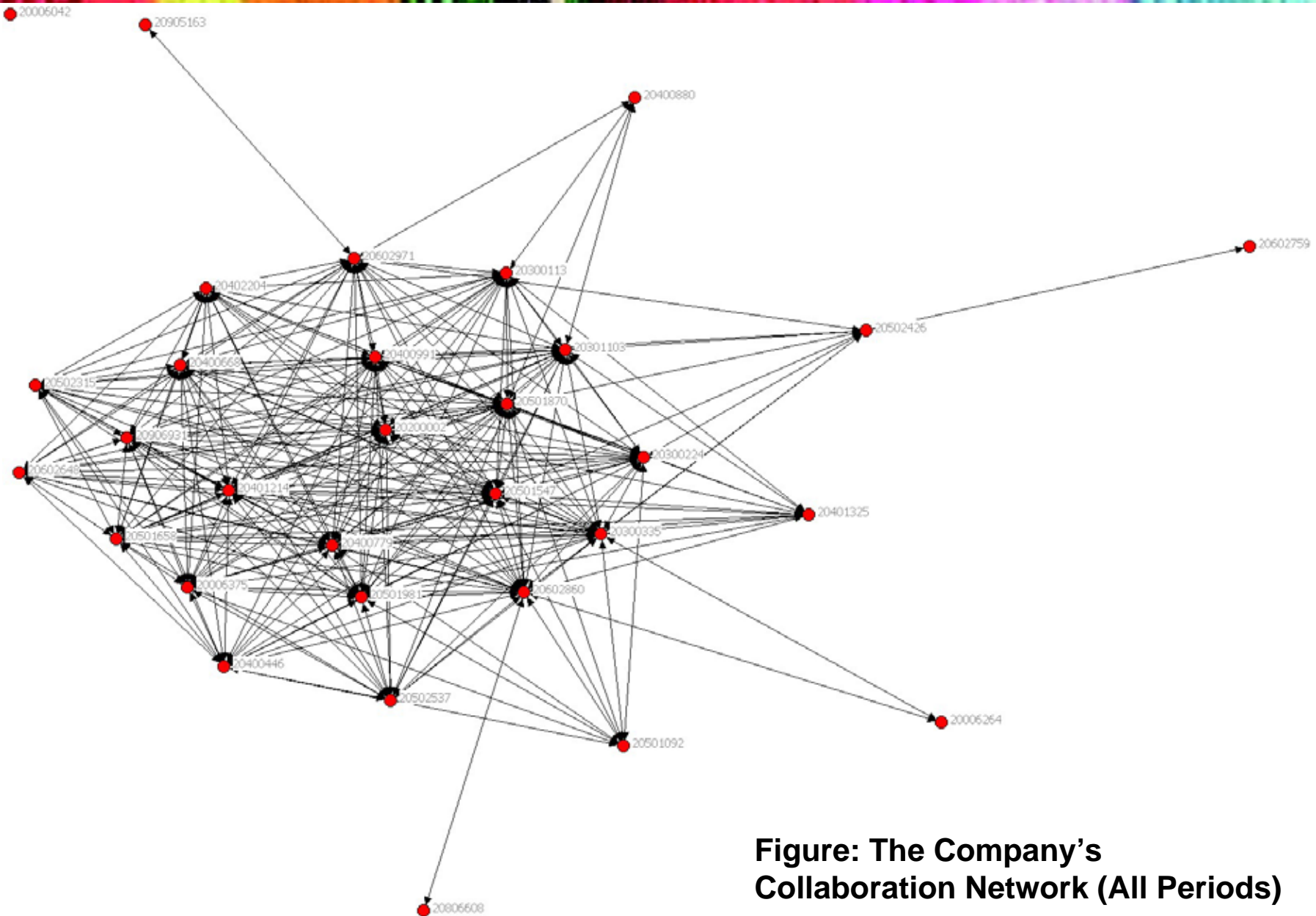


Figure: Generated Network

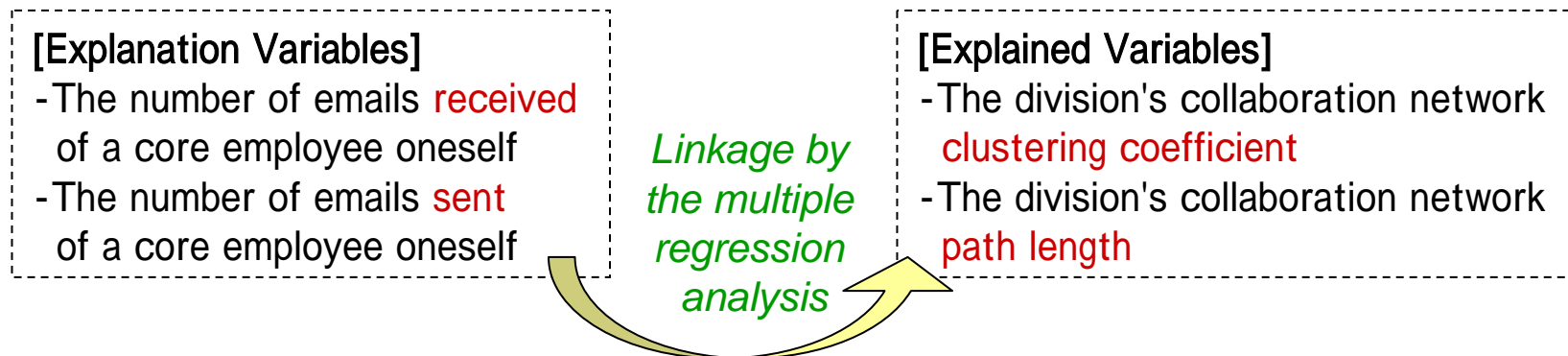
Collaboration Network



**Figure: The Company's
Collaboration Network (All Periods)**

Research Framework

- (1) We extracted some **core employees** (Maven, Connector, and Salesman) from the case, based on the data of the **first stage** (for 4 weeks).
- (2) We conducted an **experiment** which are discussions of new solutions on the mailing list and the increase in information sharing from the **executive manager**, in the **second stage** (for 3 weeks).
- (3) We examine the management method of a **collaboration network** via a **core employee's communication activities** by using a multiple regression analysis of Bayesian statistics.



Core Employees

We chose core employees as a key person for the information sharing. Each **core employee** has all attributes of three types (**Maven**, **Connector**, and **Salesman**).

Table: Attributes of Core Employees

ID	<i>Property of Maven</i>				<i>Property of Connector</i>		<i>Property of Salesman</i>
	Level of technical skill	Level of development experience	Total number of email sent	Total number of email received	Degree of ego network	Betweenness of ego network	Post
20200002	B	A	32	169	434	3.51	General manager
20006375	C	A	0	0	414	2.18	Manager
20300224	B	A	307	172	394	3.8	Manager
20300113	B	D	190	503	332	4.73	Manager
20400446	A	A	456	357	314	1.39	Manager
20300335	A	A	210	469	452	16.93	Manager
20401325	A	A	28	66	132	0	Staff
20400880	B	B	147	73	12	0	Staff
20006264	B	A	8	70	2	0	Staff
20501547	C	A	214	51	450	5.43	Staff
20400991	A	C	226	158	434	3.51	Staff
20501870	C	B	0	23	442	9.62	Staff
20301103	D	C	286	83	440	9.43	Staff
20501658	C	D	80	54	420	1.54	Staff
20501981	A	C	138	79	436	3.21	Staff
20400779	D	E	232	95	436	3.21	Staff
20400668	A	B	88	61	398	0.68	Staff

Multiple Regression Analysis

About the RFID tag ID20100224, Core employee's **communication activity** may contribute for making the collaboration network **small**.

Table: Regression Coefficient of Explanatory Variables

ID	Explained variable	Explanatory variable	Coefficient	Standard margin of error	t-value	P-value
20300224	collaboration network clustering coefficient	No. of emails received	0.954	0.051	18.616	0.034
		No. of emails sent	-0.001	0.001	-0.532	0.689
		Intercept	-0.001	0.001	-1.041	0.487
	collaboration network path length	No. of emails received	0.048	0.001	4.393	0.012
		No. of emails sent	0.076	0.001	12.353	0.000
		Intercept	0.834	0.048	17.294	0.000

Explained Variables: Average Path Length of Collaboration Network

The mean of correlation coefficient of emails received is **0.048** and the **confidence interval of 95.0%** is **from 0.009 to 0.085**.

The mean of correlation coefficient of emails sent is **0.077** and the **confidence interval of 95.0%** is **from 0.055 to 0.098**.

Result of Operations

The division's collaboration network had some changes by intentional operation.

[Operations to Activate Communication]

- **Discussions** of new solutions on the mailing list
- Increase in **information sharing** from the executive manager

Results

For ID:20300224,

The average number of emails sent per week: **27.0** → **35.3**

The division's collaborative network path length: **1.29** → **1.26**

[From Interview]

Communication Pattern to other employees of the core employee (ID: 20300224) can be classified into two kinds.

- (1) Communication with **employees** in the project
- (2) Communication as a liaison **for the whole division**

Conclusion

Within an organization that has to utilize **knowledge creation**, it is important that the **management method** of collaboration which arises by communication.

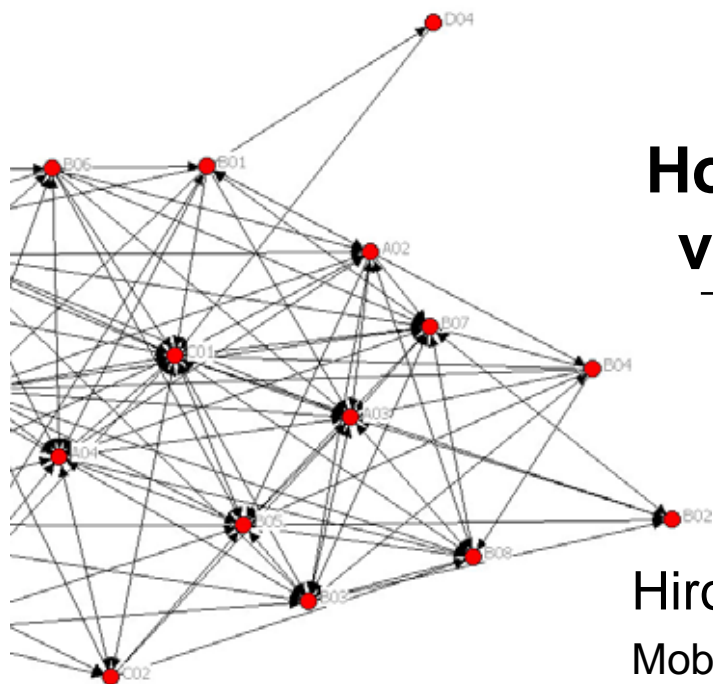
Suggestion for Management

This work found that **sending email with core employee** shortened the average path length and increased communication between other employees. We can **activate a collaboration network** by this approach.

Future Issues

- To generalize the management method, it is necessary to **add further cases**.
- Further considerations are needed about the **mechanisms** of the correlation between communication and collaboration.

Thank you for your listening!



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