

A Centrality Analysis of Transaction Relationship in Panasonic

Yousin Park¹ and Yunju Chen²

*1 Dept. of Business Administration, Ube National College of Technology, Yamaguchi, Japan
(Tel : 81-836-35-5028; Fax : 81-836-35-5028)*

(ecventure@ube-k.ac.jp)

*2 Faculty of Economics, Kyushu International University, Kitakyushu City, Japan
(Tel :81-93-671-8971)*

(shellyfight@yahoo.co.jp)

The strategy called Value Creation 21 had been undertaken by Panasonic in 2001. This strategy gave strong impact on the transaction relationship of Panasonic. Therefore, it is one of the important issues to analyze how transaction network of Panasonic has been changed during the period of Value Creation 21. In order to make transaction relationship visible and countable, we introduce graph theory and measure centrality index from viewpoints of degree, closeness, and betweenness, using the collected data in 2002 and 2005. The findings of this paper are as follows. First, the number of firms included in transaction network of Panasonic in 2005 is less than that in 2002. Second, not only the degree but also the closeness and betweenness of all firms in Panasonic Group and their suppliers decreased in 2005 compared that of 2002. Third, though the in-degree of Panasonic is decreased, the relative importance of Panasonic in network is increased. Fourth, the divisions of Components/Devices, and Digital AVC Network in Panasonic group are ranked higher than other firms in transaction network of Panasonic. Fifth, the out-degree of suppliers decreased in 2005 compared that of 2002. Based on these findings, we finally concluded how Panasonic arranged its transaction relationship during turnaround.

Keywords: Centrality Analysis, the Transaction Relationship, Panasonic, Turnaround

I. INTRODUCTION

In recent years, companies have been suffering from unexpected change of global market, technological innovation, hypercompetition, etc. These unfavorable phenomena have made companies in financial deficits and low profits. In order to successfully cope with these problems, company managers are surely interested in learning how to escape from these situations and reconfiguring their competitiveness, which it is called turnaround. So far many researchers have studied the various factors of crises and strategies/methods of turnarounds. However, the general theory of turnaround has not been established yet. In this paper, the definition of turnaround refers to a situation that companies recover their performance while they suffer serious profit decline, business crisis etc. [1, 2].

Regarding to the turnaround, a company has to carry out not only the internal reform, but also inter-firm reform. For example, it will be necessary that company have to change the transaction relationship between itself and its suppliers. We have observed such kind of transaction relationship change of Panasonic and its suppliers after turnaround. How company arranges its transaction relationships during turnaround is our interest.

II. BACKGROUND

Panasonic had many problems at the end of 1990s. Panasonic faced two serious problems were: first, Panasonic have not fallen a drastic decline of net profit

and its rate has been at a very low level for several years. Second, there is an overlap of resources between the Panasonic, divisions and affiliations. For instance, two companies of the Panasonic Group: Matsushita AVC and Matsushita Kotobuki have made the same products of audios, videos, video cameras. Though their middle managers had recognized such an overlap of the resources and cannibalization, they could not solve these problems for long times.

In order to solve these problems, Panasonic unveiled in "Value Creation 21" plan that the principal was "Deconstruct and Create" in 2001. The concept of the plan was based on a Super Manufacturing Company business model, which placed top priority on providing customer-oriented services and creating value for customers through the development and supply of tailored systems, equipment and components and devices.

As the principle presented, the core elements of the plan contained 1) structural reforms with an emphasis on profitability and efficiency improvements, which were referred to deconstruction strategies, and 2) the creation of a new growth strategies [3, 4]. Itami pointed out that these strategies were implemented to reform a wide range of functions and business areas such as employment, business structure, marketing, accounting, supply chain management etc. What Panasonic concerned was to build a unified platform to take full competitive advantage of its combined group-wide strengths. Based on the platform, Panasonic selected and focused its businesses on certain domains.

Because this project gave strong impact on the transaction relationship of Panasonic, we introduce

centrality analysis to make transaction relationship changed after enterprise's turnaround visible and countable, in order to provide precise insight to turnaround analysis [5, 6].

III. HYPOTHESIS

According to the strategies of “domain company” and building black-box technologies, the importance of Components/Devices and Digital Network domain of Panasonic Group will be enhanced. Thus, Hypothesis 1 was set as follows.

Hypothesis 1: The Components & Devices and Digital Network domain of Panasonic Group will be more important than the situation before turnaround.

The strategy of building black-box technologies will bring the change of transaction relationships between Panasonic Group and its suppliers. It is hypothesized.

Hypothesis 2: The degree of Panasonic suppliers will be more decreased than before turnaround.

IV. RESEARCH METHOD

1. Data

In this paper, we use centrality analysis as the methodology based on graph theory. Centrality is one of the well known index in this field. Freeman proposed three distinct conceptions of centrality: degree, betweenness and closeness [7, 8].

The data on transactions relationship of Panasonic was collected from IRC's *The Actual Situation of Panasonic Group* [9]. These data shows the situation before and after “Value Creation 21” reform. We use the item “Main purchaser” and define data as 1 if Panasonic Group companies have transaction with other companies, otherwise 0. Next, we input the data into matrix table. Finally, the data was analyzed by the software UCINET 6.0. Table 1 is the list of transaction relationship of Panasonic. Panasonic transaction network consists of Panasonic, Panasonic affiliated firms, their suppliers.

Table 1 The list of transaction network of Panasonic in 2002 and in 2005

2002 year			2005 year		
Number	Class	Firms	Number	Class	Firms
1-59 (59)	Panasonic Group	Panasonic, Matsushita Electric Works etc.	1-65 (65)	Panasonic Group	Panasonic, Matsushita Electric Works etc.
60-640 (581)	Panasonic suppliers	KOA, Kyosha, TAMURA, Shimoda, etc.	66-625 (569)	Panasonic suppliers	Alps Electric, Kyosera, Seiko Instruments, etc.

2. Analysis

Figure 1 is the transaction networks of Panasonic in 2002 and that of Panasonic in 2005. When two transaction networks are compared, it revealed five points of differences.

First, the number of firms included in transaction network of Panasonic in 2005 is less than that in 2003. The number of firms included in transaction network of Panasonic in 2003 was 536 companies and that in 2005 was 385 companies. It means that 184 companies had been isolated nodes and they had lost transaction relationship with Panasonic and Panasonic Group.

Second, not only the in-degree but also the closeness and betweenness of all firms in Panasonic Group decreased in 2005 compared that of 2002. Although Panasonic had transactions with 445 suppliers in 2002, the number of transactions with suppliers dropped to 197 in 2005 (See Figure 2).

Third, the relative importance of Panasonic in network was enhanced although the degree of it decreased. As mentioned above, Panasonic had transactions with 197 suppliers in 2005, but Panasonic had much more supplier than Panasonic affiliated firms.

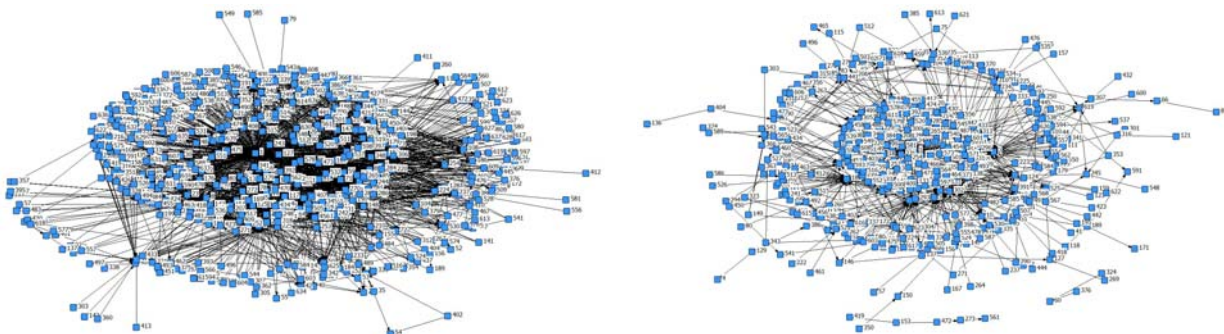


Figure 1 The transaction Network of Panasonic in 2002(left) and that of Panasonic in 2005(right)

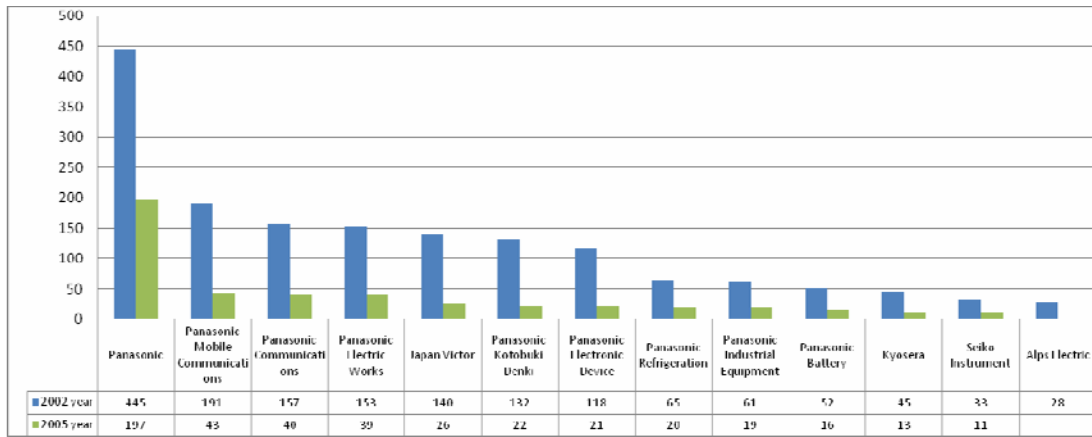


Figure 2 The top 10 in-degree firms of Panasonic transaction network in 2002 and in 2005

Table 2 The top 10 out-degree firms of Panasonic transaction network in 2002 and 2005

2002 year			2005 year		
Node	Firms	Out-degree	Node	Firms	Out-degree
71	Koa Corp.	28	302	Sony Chemical & Information Device Corp.	11
228	Kyosha Co., Ltd.	21	12	Sansha Electric Manufacturing Co., Ltd.	11
94	Tamura Corp.	18	155	Okaya Electric Industries Co., Ltd.	8
225	Shimoda Kougyo Co., Ltd.	18	493	Hitachi Metals, Ltd.	8
318	Taiyo Stainless Spring Co., Ltd.	17	482	Hamamatsu Photonics K. K.	7
187	Nippon Mektron, Ltd.	17	506	Priken Corp.	7
125	Daishinku Corp.	16	138	Enplas Corp.	6
511	Echo Electric Co., Ltd.	15	447	Optical Coatings Japan	6
222	Eta Electric Industry Co., Ltd.	14	133	SDK Corp.	6
231	Ishizuka Electronics Corp.	14	131	Echo Electric Co., Ltd.	6

Fourth, from the figure 2, we can see that affiliated firms related to Component & Devices and Digital AVC Networks in Panasonic group are ranked higher than other firms in transaction network of Panasonic. Especially, Panasonic Mobile Communications, Panasonic Communications and Panasonic Electronic Device occupied higher ranking in 2005.

Fifth, the out-degree of suppliers decreased in 2005 compared that of 2002. Main suppliers changed from the components to material/commodity manufactures (See table 2).

V. DISCUSSION

From the result of analysis, it is showed that the importance of affiliated firms of Component & Devices

and Digital AVC network in the group increased and the number of firms included in transaction network decreased. Therefore, Hypothesis 1 is supported. In addition, the out-degree of Panasonic's suppliers will be decreased after the turnaround, and the spices of suppliers shifted from components to material/commodity manufactures. We can say Hypothesis 2 is also supported.

Based on the findings above, the change of Panasonic's transaction network can show how Panasonic form its technology platform. Figure 3 is the image of how Panasonic arranged it transaction network to construct its technology platform during the "Value Creation 21" reform.

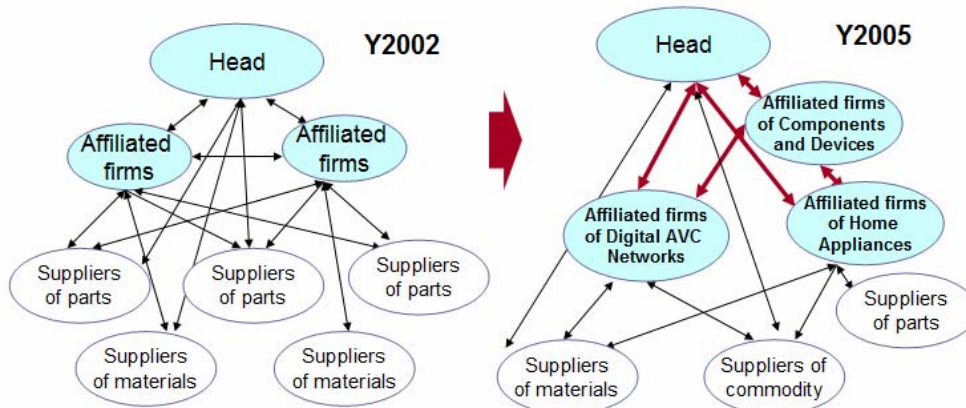


Figure 3 The change of Panasonic transaction network

By reducing the number of transactions, Panasonic reduced purchase cost and centralized transactions to some important affiliated firms such as Panasonic Mobile Communications, Panasonic Communications and Panasonic Electronic Device in 2002. It means that Panasonic Group shares important resources only inside the group and prevents a technology spillover from the group.

VI. CONCLUSION AND FUTURE WORKS

We calculated the centrality of transaction network of Panasonic, and found the change of transaction relationship of Panasonic after turnaround. By introducing the centrality analysis to make the result of turnaround visible and countable, the turnaround results are consistent with the objectives of business structural reform strategies. Also, we can finally explain how Panasonic managed its transaction relationships to form its technology platform, and conclude how Panasonic arranged its transaction relationship during turnaround. In the near future, we plan to figure out how the profit of companies in network (not only Panasonic group but also its suppliers) changed after turnaround [10, 11].

ACKNOWLEDGMENTS

This research was supported by the Grants-in-Aid for Scientific Research <KAKENHI> Scientific Research (B) 21330095, Grant-in-Aid for Young Scientists (B) 21730335. The authors would like to thank the support.

REFERENCE

- [1] Imura, N. & Chen, Y.J., (2008), "Corporate Recovery in Asia: The Japanese and Taiwanese Perspective", *Proceedings for 21th Annual Conference*, Association of Japanese Business Studies.
- [2] Chen, Y.J. et al., (2009), "The Reconfiguration of Competitiveness through Turnaround Process in Taiwan: The Case Study of Acer/Wistron", *KIU Journal of Economics & Business Studies*, 15 (2&3), pp. 1-30.
- [3] Matsushita Electric Industrial Co., Ltd., *Annual Report*, 2001 edition.
- [4] Itami, H., (2007), *The Management innovation of Matsushita*, Yuhikaku.
- [5] Chen, Y.J. & Park, Y.S., (2009), "How to Analyze Corporate Turnarounds: The Application of Social Network Analysis in Panasonic Group's Case", *KIU Journal of Economics & Business Studies*, 16 (1), pp. 25-49.
- [6] Ito, T. (2004), "Quantitative analysis of a firm's relationship in the Keiretsu of Toyota group," *Proceedings of the 2004 Information Resources Management Association*, Innovations through Information Technology, pp. 1078-1079.
- [7] Freeman, L.C. (1977) "A Set of Measures of Centrality Based on Betweenness", *Sociometry*, 40, 1, pp. 35-41.
- [8] Freeman, L.C. (1978/79) "Centrality in Social Networks Conceptual Clarification", *Social Networks*, 1, pp. 215-239.
- [9] IRC, *The Actual Situation of Panasonic Group*, 2003 & 2006 edition.
- [10] Ito, T. (2002), *Network organization and information* (in Japanese), Hakuto Shobo
- [11] Ito, T., Fukuda, K., Passerini, K., and Sakamoto, S. (2008), "Centrality analysis in the Keiretsu of Mazda," *Proceedings of the 9th International Business Information Management Association*, International Conference on Information Management in Modern Organizations, pp. 504-510.