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Doctoral Thesis

**Cross-National Comparative Study on Operational
Performances and Their Influential Factors between
Japan and China**

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ABSTRACT

With the development of IT and globalization activities, in order to respond quickly to the diversification of consumer demand and market change, the individual business in the 21st century, have no longer competed as a solely independent entity, but rather as a supply chain. Meanwhile, develop and launch new products continuously is regarded very important to sustain company performance, NPD efficiency is considered to be one of the most vital performances to determine firm's competitiveness and survival. Therefore, this research intends to investigate the NPD and SCM operational performance as well as their potential influential factors which constitute an efficient NPD and SCM structure in Japan and China respectively. In addition, it is very important to understand the culture differences among different countries in order to improve the competitive capabilities for multinational business.

As for the NPD section, in order to verify the research objectives, there are 454 data samples obtained from Japan and 99 data from China. The primary comparison indicates that Japanese outperform Chinese on NPD performance. Subsequently, factor analysis reveals that there are several influential factors which impact the NPD structure, but different between Japan and China. Then, the correlation analysis indicates that human resources and firm size have a significantly positive relationship with NPD success except the cost of NPD. The result reveals that human resources are more important than financial investment for implementing NPD. As well, the correlation analysis also reveals that NPD performance has a positive significantly impact on financial performance except with the financial index of ROI, which may be on account of time lagging effect.

As for the SCM section, in order to verify the research objectives, there are 554 data collected from Japan and 236 data from China. The primary comparison indicates that Chinese scores are significantly higher than Japanese. This unexpected result may be explained by the culture differences. Then, the comparative analysis reveals that, industry type, firm size, ownership status and regional disparity have significant influences on SCM performance as well as structure. In addition, factor analysis shows that the potential factors which impact Japanese SCM structure are similar to the Chinese, but different from previous research. The most significant difference is that the IT utilization was not identified as a unique factor from Thai and Finnish data set, but as an independent factor in Japan and China. Meanwhile, the correlation analysis point out

SCM performance has a significantly positive relationship with financial indices. However, the IT utilization cooperate with SCM organization strategy shows stronger influence on financial outcomes than conduct them separately. Moreover, national culture has a significant relationship with SCM performance, which suggests that in order to improve cross-national SCM performance, culture difference must be taken seriously.

As for culture section, this research is not only to discuss the culture difference between Japan and China, but also between Chinese people at home and abroad. The comparison shows two Chinese groups share more similarities than Japanese on national culture dimensions but not on Guanxi. The results may conclude that compared Guanxi, national culture is more ingrain and robust, which is more difficult to be changed by a different culture and business environment. The correlation analysis between culture and Guanxi indicates that collectivism has significant influence on Guanxi. Since Guanxi plays a moderating role between in-group and out-group in the collectivism society, thus, understand and establish Guanxi as a foundation for business activities is an essential key for foreigners to do business in China.

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CHAPTER 1 INTRODUCTION

Chapter Overview

This chapter exposits the research background of this dissertation that with the development of economy, in order to improve the international competitiveness, China have to improve their new product development (NPD) and supply chain management (SCM) operational performance. However, with the more increasing of the international cooperation, the more cultural conflicts have been emerged, which have brought adverse effect to the development of the enterprise cooperation. Therefore, the research objectives of this dissertation are formulated: (1) investigate the similarities and differences between Japan and China on NPD and SCM performance, as well as clarify the successful approach to NPD and SCM for Japan and China respectively in order to improve the multinational companies' operational performance; (2) analyze the current situation of SCM performance in China according to the different industry, firm size, ownership status and regional disparity perspective in order to improve SCM performance in China; (3) discuss the culture influences on SCM performance and compare the culture differences between Japan and China as well as Chinese people at home and aboard in order to deal with the culture conflicts and improve the international cooperation.

1.1 Research Background

After China's accession to the WTO, China has become one of the most open markets in the world during these ten years, as well as China's economy has changed dramatically, who also changed the landscape of the world economy. More than a decade in the process of integration into the world economy, China's gross domestic product (GDP) has improved from 11 trillion RMB to nearly 57 trillion RMB from 2001 to 2013, which has increased more than five times. In addition to that, the account of imports and exports in China has increased from more than 510 billion US dollars to 4.16 trillion US dollars from 2001 to 2013, which also has increased more than eight times. All of these developments make China's economy have jumped to the second position in the world after the year of 2010.

With the development of economy, the market economic system and modern enterprise system have been gradually established and become better and better in China, as well as the larger market size and the high GDP growth rate during these 30 years, which make China have successfully attracted the attention from the world's investment, especially from Japan, America, Germany and other developed countries. With the increasing of international cooperation, many advanced management methods, knowledge, experiences, techniques and know-how have been introduced into China, and which also improve China's operational performance efficiency and competitive advantages in a further step.

However, under the globalization business environment, in order to adapt to the rapid development of technology, shorten product life cycles as well as quickly respond to the diversification of consumer needs and market changes, Chinese companies confront more and more significant competition and tremendous pressure. In order to cope with these challenges, Chinese companies must enhance their management level to improve their operational performance and then improve their core competitiveness. The core competitiveness refers to that enterprises possess more unique or distinctive skills, technologies or knowledge systems in some key process or links than their competitors, which are also very difficult to be imitated and can help the enterprises develop and launch new products to respond to the market changes as soon as possible (Leonard-Barton, 1992).

The core competence is considered to include four kinds of competition abilities, such as time, price, quality and innovation, however the innovation is the precondition, the strategic partnership with supply chain partners is the guarantee to improve core competitiveness. Therefore, new product development (NPD) and supply chain management (SCM) have been considered as the most important way to improve companies' core operational performance. Because develop and launch new products into the market continuously is regarded very important to sustain company performances (Blundell et al., 1999); and the individual business in the 21st century, have no longer competed as a solely independent entity, but rather as a supply chain.

After the reform and opening policy, China's manufacturing has been developed very fast, which makes China become the "world factory". However, because of environment pollution, rising labor costs and other reasons, China's manufacturing has to accelerate their industrial upgrading. Product and service innovation ability is the biggest challenge to China's manufacturing competitiveness, which is also the main

vulnerability for transformation and upgrading of China's manufacturing industry. NPD efficiency is considered to be one of the most vital performances to determine firm's competitiveness and survival (Godener and Soderquist, 2004). Therefore, improving the study and management of NPD performance is an important strategy for China's industrial upgrading.

In addition, all of companies in every industry have faced with a growing global competition, as well as the requirement to product innovation and quality is higher and higher, however, the ability and resources in one independent company are limited, they can't response to market immediately by themselves alone. Therefore, enterprises must change their relationship with suppliers and customers from competition to cooperation, integrate their internal and external information flows, materials flows and financial flows in the same network require to create an efficient supply chain integration to cooperate together in order to optimize their overall performance and achieve maximum benefits as a whole. According to PRTM's research, enterprise can achieve the following benefits by implementing the complete SCM, such as: the delivery capacity increases 16% ~ 18%, inventory reduces 25% ~ 60%, the order to complete the cycle shortens 30% ~ 50%, predictive accuracy improves 25% ~ 80%, the overall productivity increases 10% ~ 16%, supply chain cost reduces 25% ~ 50%, fulfillment rate improves 20% ~ 30%, filling rate enhances 20% ~ 30%, and production raises 10% ~ 20% (Zhang, 2013). Therefore, SCM has been considered as a vital foundation for improving business competence, which could play a key role in building sustainable competitive advantage for their products in a highly competitive market (Jones, 1998).

At the same time, during the development of multinational cooperation, the relationship between China and foreign countries is becoming more and more closed. However, with the more increasing of the international cooperation, the more cultural conflicts have been emerged in the management process, which have brought adverse effect to the development of the cooperative enterprise and influenced their operational performance. The predominant management tools that are being applied in the West may not necessarily fit well into the business models followed by companies in the East. Whitley (1999) also argues that management control systems may be closely associated with cultural norms.

Culture difference should be taken seriously, since managers with different cultural backgrounds may have different values and approaches in dealing with trust

and authority, and these mores and values may influence the relationship, commitment, and risk sharing between owners and managers (Chang and Hwang, 2002). Since management practices could be changed significantly among different countries, as well as can be society dependent (Kristensen, 1997), there is increasing recognition of the importance of carefully investigating practical management on operational performance and control systems in different countries and cultural environment.

Meanwhile, under the global development of economy, numerous cross-cultural researches have been studied, which demonstrated how people's communication styles in multinational business are influenced by their cultural expectations (Hui and Graen, 1997). According to Pan and Chen (2010), national culture influences on NPD collaboration by means of organizational culture and work values regarding six national culture dimensions between China and Sweden; Huang (2008) also indicated that national culture has a significant relationship with SCM operational performance based on five countries' data. Thus, in order to improve the competitive capability for multinational business, the culture differences among different countries have to be paid more attention by managers and researchers. Especially, pay attention to the East Asia, where is a vital and expanding area for the fast growing economics in the world.

As mentioned the East Asia, Japan and China are the most important countries in this area, who influence the Asia economy even the world economy in a significant level. Japan, as a developed country, is one of the most important sources of foreign investment in China. The relationship between Japan and China is very closed, not only the economic relationship, but also the culture relationship. Japan's management research and practice are in the top level of the world, which make tremendous contributions to Japan's economy. Japan also can be a reference model to be learnt by Chinese, especially in the operational performance. Thus, a comparative study between Japan and China in NPD and SCM performance as well as culture difference would help these two countries to understand each other in a further step and promote their business cooperation. Moreover, Chinese also can learn advanced researches and experiences in NPD and SCM performance from Japanese both on academic and practice.

As for the national culture, many definitions and concepts have been proposed, but Hofstede culture dimensions are arguably the most widely used in national comparative research. Hofstede (1993) believes that the spread of business into the global stage brings the issue of national and regional differences to the fore. According

to his research on cultural dimensions, culturally-based values systems comprise five dimensions, such as: (1) Power distance, (2) Individualism / Collectivism, (3) Masculinity / Femininity, (4) Uncertainty avoidance and (5) Long-term / Short-term orientation (Confucianism). Among these cultural dimensions, Individualism / Collectivism have served as a powerful theoretical construct for cross-cultural comparison of communication behavior.

It is very important to do a close examination of country-specific culture and core values for understanding business practice, especially for international companies to do business in different countries. Thus, in the research, a special Chinese culture has been introduced, which is called Guanxi. Guanxi is one of these kinds of specific culture in the Confucian society, which influences Chinese people's thinking, acting and daily life (The Chinese people mentioned the people who are not only living in China, but also living in abroad). Guanxi is the personal relations or social connections in the Confucian society, which refers to a network of informal interpersonal relationships and exchange of favors, established for the purpose of conducting business activities throughout China and East Asia (Lovett, et.al, 1999). Guanxi has been recognized as one of the major dynamics in the Chinese society where business behavior revolves around Guanxi, including not only the local firms, but also the foreign businesses (Luo, 1997). It is foremost a cultural concept that implies inter personal connections, but its underlying philosophy has dominated people's social and economic lives for a long time (Zhang and Zhang, 2006).

In order to conduct the comparative analysis between Japan and China, the New Product Development Scorecard (NPDSC) was utilized as a common self-evaluation tool for various industries which can measure a company's NPD performance based on the concrete operations (Irikura and Enkawa, 2005). As well, the SCM / Logistics Scorecard (LSC) have been developed by Tokyo Institute of Technology (Tokyo Tech) in collaboration with the Japan Institute of Logistics System (JILS) (Arashida, et al., 2004) which is also utilized as a data collection tool for this research. Finally, a questionnaire for culture dimension and Guanxi has been explored and developed, which is used as a data collection tool for the culture comparative analysis.

1.2 Purpose of This Dissertation

Not only the scientific research, but also the management practice, the Japanese experience in management domain is worth Chinese to learn and implementation.

Because in 2005 Irikura and Enkawa developed and proposed the New Product Development Scorecard (NPDSC), which is a very simple and useful self-evaluation tool to evaluate a company's NPD performance. And then, Anantana et al. (2009) and Suzuki et al. (2009) utilized this scorecard as a data collection tool to analyze the NPD operational performance and its influential factors as well as firm's financial performance for Japanese manufacturing industry. Therefore, the first purpose of this research is to analyze the NPD operational performance and explore their influential factors in a developing country China including cross-national comparison with the developed country Japan to improve Chinese NPD operational performance.

Similarly, the SCM / Logistics Scorecard (LSC) is also a very useful and efficient benchmarking tool, which has been used as a data collection tool by Arashida, et al. (2004) and Suzuki et al. (2005, 2009) to identify the factors which determine the SCM operational performance and analyze their impact on financial indices mainly by Japanese data. And then, Yaibuathet (2007, 2008) utilized it to make a cross-national comparative analysis on SCM performance and customized SCM assessment model for Thai industry. In the same time, Huang (2006, 2008) also used this scorecard to analyze the development situation of SCM performance in China and indicated that culture has a significant influence on SCM operational performance. Therefore, based on the previous research, the second purpose of this research is not only to analyze the SCM operational performance and explore their influential factors in a national level between Japan and China, but also focus on China by different industry, firm size, ownership status and regional disparity perspective in a further step.

As well, since national culture influence operational performance and which may impact on the efficiency of international cooperation, thus, in order to carry out the multinational cooperation more smoothly and efficiently, the last purpose of this research is to discuss the culture differences between Japan and China as well as Chinese people at home and abroad.

In order to achieve those main purposes, this research attempts to focus on the following central objectives:

- 1) Analyze and compare NPD operational performance between Japan and China. And then, explore its influential factors for successful NPD in China and Japan respectively.
- 2) Examine the influence of companies' R&D investment and firm size on their NPD operational performance.
- 3) Discuss the impact of NPD operational performance and implementation on corporate financial performance.
- 4) Compare SCM operational performance between Japan and China, as well as explore its influential factors for successful SCM in Japan and China respectively.
- 5) Investigate the effect of companies' industry type, firm size, ownership status and regional disparity on their SCM operational performance and SCM approach in China.
- 6) Analyze the influences of SCM operational performance and implementation on corporate financial performance.
- 7) Discuss the relationship between national culture and SCM operational performance by some new data.
- 8) Cultural comparison between Japan and China, and discuss the relationship between special Chinese culture -- Guanxi and collectivism orientation.

1.3 Structure of This Dissertation

This dissertation is organized into five chapters. Brief descriptions of each chapter are presented as the followings:

Chapter 1 presents the research background and purposes; introduces the structure of this dissertation.

Chapter 2 covers the research theories and methodological view of NPD through concerned literature reviews, and proposes the research hypotheses for this chapter. Contemporary, the NPDSC scorecard is introduced which is utilized as the main data collection tool in this dissertation. Data collection process and the attribute of total data are also revealed, which is utilized for analyzing NPD operational performance in this chapter. And then, reveals the comparison study results between Japan and China on NPD operational performance. Simultaneously, explores the influential factors for each country, as well as discusses the relationship between NPD operational performance, R&D investment and firm size, and the relationship between NPD operational performance and financial performance. Finally, make a brief conclusion for this chapter about NPD operational performance.

Chapter 3 presents the theoretical and methodological perspectives of SCM according to relevant literature and proposes the research hypotheses for this chapter. The LSC scorecard is introduced which is the data collection tool in this chapter. Then, discusses the comparative study between Japan and China on SCM operational performance, as well as explores the influential factors for each country. The effect of industry type, firm size, ownership status and regional disparity on SCM operational performance is examined. Investigate the relationship between SCM operational performances on financial performance. In addition, the cultural influences on SCM operational performance are also discussed and a brief conclusion for this chapter about SCM operational performance is summarized.

Chapter 4 introduces the theoretical and methodological view of national culture and a special Chinese culture -- Guanxi according to relevant literature and puts forward the research hypotheses for this chapter. Meanwhile, the data from questionnaire about the culture dimensions and Guanxi are used to conduct various analyses. Empirical analyses focus on the national culture and Guanxi comparative study among Chinese in China, Chinese in Japan and Japanese, as well as explore the relationship between Guanxi and collectivism orientation. Finally, make a brief conclusion for this chapter about national culture and Guanxi.

Chapter 5 concludes this dissertation with a summary of key findings and presents the contribution of this research as well as the managerial implications. The comment of this research and expected future work are also discussed.

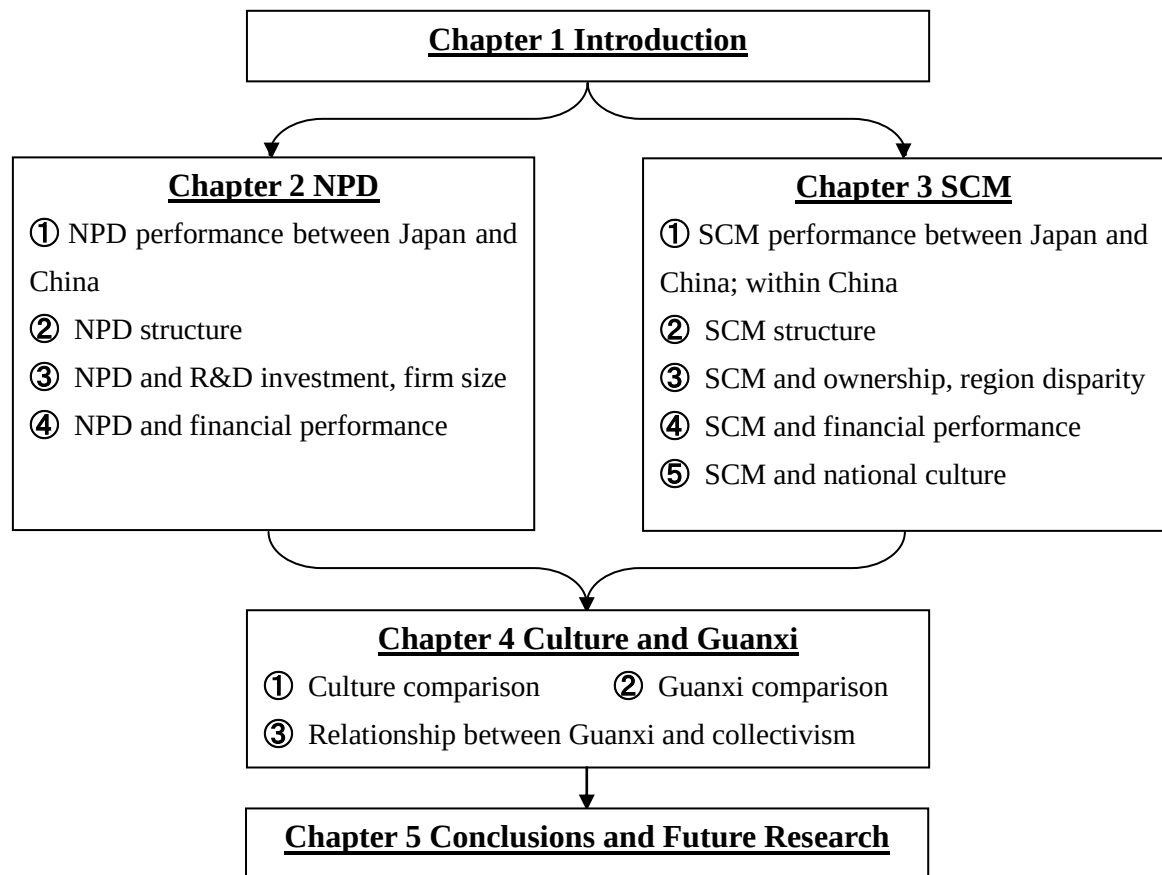


Figure 1.1: Framework for this dissertation

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CHAPTER 2 NEW PRODUCT DEVELOPMENT (NPD)

OPERATIONAL PERFORMANCE AND ITS

INFLUENTIAL FACTORS

Chapter Overview

This chapter, the New Product Development Scorecard (NPDSC) has been utilized as an evaluating instrument in this research, which is a very useful data collection tool and developed by Irikura and Enkawa (2005). Based on the contribution of Anantana (2007, 2008, and 2009) on NPD research by Japanese NPDSC data, this research also utilized the NPDSC data to investigate the NPD operational performance and its potential factors which constitute an efficient NPD in Japan and China, respectively. The results indicate that Japanese NPD perform better than Chinese but not significant, and the NPD structure between these two countries is different. And then, the relationship between NPD operational performance and R&D investment and firm size has been discussed, the results indicate that firm size has a significant relationship with NPD performance, as well as compared the financial investment, the human resource is more important for NPD success. Finally, the correlation analysis between NPD operational performance and financial outcome has been conducted based on Japanese data, and the result shows that NPD competencies has a significant correlation with financial performance.

2.1 Theoretical Background

Nowadays, most famous companies in the world, especially the leading companies from developed countries or areas, such as the US, Europe, and Japan have already set the NPD as their top priorities for business strategy (Ettlie, 2006). In order to improve the NPD operational performance, the performance measurement in the context of NPD is becoming very important. Companies can realize their existing level of NPD performance, identify their strength and weakness in NPD performance and set the appropriate NPD strategy and implementation according to the performance measurement.

2.1.1 A framework for new product management (NPD)

It has been known that successful development and commercialization of new product over time is essential to sustain and improve competitive advantages for companies. Although the new products open up new opportunities for companies, the success rate of NPD is not very high. The practice of NPD still involves a high risk of failure, which is also considered costly (Chan and Ip, 2010). During these 30 years, conceptual and empirical researches have been undertaken to identify the critical success factors of new product (Ernst, 2002).

Although NPD has been taken seriously for a long time, it still doesn't have a standard accepted definition or concept. Normally, NPD is considered to be a series of decision-making process that from the start of product designing, manufacture designing until to the end of normal production based on the research of customer needs. Cooper and Kleinschmidt (1986) focused on critically on the NPD process and proposed a set of 13 phase model which formed a general "skeleton" of a NPD process. They indicated that firms should consider placing more emphasis on market studies, initial screening activities and preliminary market assessment. After that, some more simple and efficient models have been explored and developed, such as 5 phase model that new product strategic planning, new product designing, new product development, testing and refinement, commercializing (Guo, et al., 2004), 3 phase model that concept development, engineering design and production (Lam et al., 2007) and so on.

All of those above models mainly focus on the process of NPD, however, with the purpose of improving NPD performance to be successful in business, the key factors contributing to NPD efficiency have been explored and then some evaluation methods have been applied. The results show that, the NPD process, the company organization structure, culture and strategy, the role and commitment of senior management are the success factors in NPD performance (Ernst, 2002; Guan and Ma, 2003; Song et al., 2009; Visser et al., 2010). Especially, technology is considered as one of the most essential factors which constitute successful NPD (Maylor, 1997).

However, success in NPD is very difficult to be defined and measured. Most of the existing researches on key factors of NPD mainly concentrate on a specific industry with small samples of representative firms, for example, high technology firms in Japan (Parry and Song, 1993), telecommunication industry in the USA (Barczak, 1995), steel industry in China (Huang et al., 2002), information technology and multimedia business

in Taiwan (Lee and Chen, 2007), toy industry in Hong Kong (Sun and Wing, 2005), and health care industry in the USA (Xin et al., 2010). But, little attention has been given to the issue of common factors for all industries types and the NPD structure for one country. This might be a lack of common measurement tool which can be used to measure NPD performance for several types of industry.

2.1.2 Measurement tool for NPD operational performance

After the development of new products, the most attention is concerned by companies is that whether the new product is accepted by the market or not. In order to measure it, the NPD performance should be taken seriously. The research on NPD performance is mainly concentrated in two aspects: NPD performance measurement and the influence factors for NPD operational performance. This might be considered as that the performance of these activities in NPD not only can determine a company's overall success and competitive advantage, but also decide its survival and development.

Huang et al. (2004) indicated that four factors which can be divided into financial factors and nonfinancial factors are commonly used to measure NPD success, those are: financial factors including financial performance, objective market acceptance, and nonfinancial factors including subjective market acceptance and product-level measures. However, they also indicated that the most frequently used specific measures in Australian SMEs are nonfinancial factors, such as customer acceptance, customer satisfaction, product performance and quality. Van Echtelt et al. (2008) concluded that the NPD performance should be divided into short-term operational performance and long-term strategic performance. The short-term arena contains process that is aimed at planning managing and evaluating the actual collaborations in a specific development project, which can be measured by the efficiency and effectiveness. As well, long-term arena contains process that together provide long-term strategic direction and operational support for project teams adopting supplier involvement, which can be measured by the ability that if a company can build long-term relationship with key suppliers and ensures that the capability sets of both parties are aligned and remain useful for future joint projects.

There are several mythologies used to evaluate the NPD performance, such as, the questionnaire or assessment check list and scorecard with simple description for each level of assessment. Especially, scorecard is one of the effective performance

measurement tools for NPD evaluation, such as the Innovation scorecard (Chiesa, 1996), Product innovation management scorecard (Cormican and O'Sullivan, 2004) and so on. However, referred to the existing NPD performance measurement tools, most of them are complicated and segmentary. In order to cope with this gap, the New Product Development Scorecard (NPDSC) was developed as a common self-evaluation tool for various industries which can measure a company's NPD performance based on the concrete operations (Irikura and Enkawa, 2005).

Additionally the NPDSC was found to be efficient to analyze the relationship between NPD performance and its managerial performance (Anantana et al., 2007), the correlation between NPD efficiency and financial performance based on the perspective of technology and moderating effect of product complexity and market uncertainty (Suzuki et al., 2009). Therefore, this scorecard could be considered as a data collection tool for this research, which also could support managers to identify their strength and weakness not only in one industry, but also across industries.

2.1.3 International comparison of NPD operational performance

Research has demonstrated that effective NPD integration is a major factor contributing to new product success in U.S., Japan, and China (Parry and Song, 1993; 1994; Song and Parry, 1997b). NPD is a complex process involving the integration of internal and external analyses. A successful NPD process meets market demands and needs with an appropriate technical solution. The voice of different customer should be heard by marketing suppliers in order to help the R&D department improve or launch new products to meet with market demands. While, in the global market in different countries, each country has their own capabilities to create a product with a differential competitive advantage and process. Thus, the comparative research among different countries for NPD performance is not only benefiting to exchange the approach to successful NPD according to the local environment, but also to improve the development of international companies' business.

As the world's workshop, with the rising cost of labor force and raw materials, China's traditional competitive advantage is replaced by other developing countries, such as Vietnam, Indonesia, Malaysia and so on. In order to deal with this situation and change the role of "Made in China" into "Created in China" or "Designed in China", China must pay attention to the NPD performance. Although in this field China has

some certain development, compared with their Western counterparts, Chinese firms are more resource deficiency (Matthews, 2002). How Chinese firms overcome their resource deficiency and then implement efficiency improvement in NPD is worth exploring in a further step (Li et al., 2006).

Whereas, as a neighbor, Japan can be a reference model learnt by China, because who has put more emphasis on innovation since 1980s, and then obtained almost half of the world's patent applications (Tatsuno, 1990). Prehalad and Hamel (1990) also indicated that western managers were once anxious about the low cost and high quality of Japanese imports; they are now overwhelmed by the pace at which Japanese rivals are inventing new markets, creating new products and enhancing them. Thus, successful NPD operational performance generates great contribution to the fast development of Japanese economy in the world. Consequently, comparative research on NPD operational performance between Japan and China is significant to the development of Chinese economy.

2.1.4 Relationship between NPD operational performance and financial performance

It is very essential to analyze the relationship between NPD operational performance and financial performance. Traditionally, most new product success has been measured by lots of subjective financial indicators, such as relative profits and sales, meeting profit and sales objectives, profitability level, and payback period (Cooper and Kleinschmidt, 1987), desired product quality and design standards, sales objectives, and the time required to reach breakeven (Olson, et al., 1995) and so on.

Brown and Eisenhardt (1995) concluded that the NPD success and failure were measured by 11 mostly financial measures, including profitability, payback, sales, and market share and so on, who also indicated that the most important determinant of NPD success was product advantage which was most strongly associated with financially successful products. However, Van Echtelt et al. (2008) emphasized that measure the NPD success, not only concern the short-term financial performance, but also pay more attention to the long-term benefits.

Anantana et al. (2007, 2008 and 2009) made a great contribution to the correlation analysis between NPD and financial performance, who analyzed the NPD efficiency

and firm financial performance from the moderating effect of product complexity and market uncertainty perspective, technology trajectories perspective, technology and R&D intensity perspective, respectively. The results indicated that both complexity and uncertainty could be considered as the requirements for successful NPD, especially, correspondence to the complexity could be a trigger to achieve higher NPD competencies which can lead to enhanced managerial and financial performance. Simultaneously, as mentioned the technology trajectories, improve NPD efficiency in science-based group can make larger contribution to financial performance than other ones (supplier-dominated, scale-intensive and specialized suppliers group). In addition to that, emphasize and implement tools and IT alone could not bring the positive effect on firm's financial performance, which should have to utilized incorporated with organization strategy and production technology, however, the R&D intensity affects on the ways of utilizing tools and IT as well as the impact on financial performance.

2.1.5 The influence of culture on the NPD operational performance

It has been known that people in different cultures often have different ideologies including thoughts and actions. Such differences are important to an organization and have significant influences on teamwork (Sivakumar and Nakata, 2003), and they also determine the basic assumptions shared by people in a particular society, which in turn form the basis for their interactions with others in the workplace (Xie, et al., 1998). Similarly, managers in different countries will make different strategic decisions and prefer different types of organizational structures because they hold different fundamental values about people and the way they should behave in organizations or groups (Shane, 1994). Therefore, because of cultural differences, successful NPD management practices might be different for each country.

Culture differences are generated from the national historical tradition and different social development process, performance in all aspects of the social culture. According to Hofstede (1994) culture dimensions, it can be concluded that the cultural differences between east and west is very significant, even though in the same oriental culture circle, the differences of culture in Chinese mainland, Hong Kong, Taiwan, Japan, Korea and Singapore are also obviously. In the new product context, some core NPD management principles maybe generally important to success, whereas others may be influenced by national cultures, which suggests in addition to the direct impact, culture has an indirect impact that is mediated by institutional management systems (Souder and Jenssen,

1999; Lee et al., 2000). Both positive effects and negative effects will be more influential in a collectivist culture than in an individualistic culture in the role of interfunctional conflict in NPD, and competition appears to be a counterproductive resolution method in NPD in Japan but a productive method in the West (Xie, et al., 1998).

Moreover, uncertainty avoidance and long-term orientation positively influence innovation performance, as well as high uncertainty avoidance and low power distance enhances process management in NPD (Lin, 2009). However, Siu et al., (2006) indicated that though SMEs in China, Hong Kong and Taiwan are “embedded” in the Chinese culture, the interplay among government intervention, manufacturing systems and business approaches contributes to the differences in NPD practices. Therefore, nowadays, under the globalization business environment, it has become more and more important to understand the management practices in different countries, and the exploration of NPD structure for each country might be helpful in understanding country-specific mechanisms of NPD management.

2.2 Research Purpose of This Chapter

Since organizational culture and company sophistication played an important role in the development of new product innovation management. In this section, the first objective mainly focuses on analyzing and comparing NPD operational performance between Japan and China in a national level.

The second objective of this study attempts to verify that different countries produce different weights on approaches to NPD structure. In order to explore these approaches, factor analysis is conducted by using the NPDSC data from each country.

Finally, correlation analysis is used to examine the relationship between extracted factors which represent as drivers in leading NPD operational performance and financial outcomes. As well, the relationship between R&D investment, firm size and NPD operational performance will be discussed too.

2.3 Previous Research and Hypotheses

2.3.1 Comparative analysis on NPD performance between Japan and China

According to Song and Thieme (2006), there are several similarities among China, U.S. and Japan on NPD success process, such as the information sharing between R&D and marketing department, both harmonious relationships between marketing and R&D and an environment that encourages participation in decision-making are associated with minimizing the marketing–information gap in all three countries. Souder and Jenssen, (1999); Lee et al., (2000) also confirmed that some core NPD management principles are similar among different countries, which take direct impact to success NPD.

However, Song and Thieme (2006) also indicated that there are also several interesting differences have been found, a large marketing–involvement gap is associated with overall NPD success in China but not found in U.S. and Japan, which maybe could be explained by the cultural background of Chinese businesses and the ideal and actual levels of marketing's involvement in R&D tasks across countries. Especially the Japanese seem to be able to simultaneously employ all integration mechanisms during NPD process to make sure the NPD success, whereas U.S. and Chinese managers are not.

Since, China is a fast industrialized developing country, who wants to shift their industry structure from low-cost manufacturing based on low labor cost to large-scale investment in development of high technology through the NPD integration. Many Chinese firms are seeking to be radically innovative, no longer following an imitative strategy consistent with China's limited product development experience (Zhou, 2006). While in Japan, with many years of researches and practices on NPD, there are many successful experiences accumulated by Japanese. Japan's success in NPD has attracted world-wide attention. As well, Japan's continuing success at minor product innovations together with their more recent success in the developing of breakthrough products, which makes it as an ideal setting for examining the impact of product innovativeness on the NPD process. Therefore, the hypothesis is proposed:

Hypothesis 2.1a: Japanese outperform Chinese on NPD operational performance in terms of their NPDSC assessment scores.

It has been known that success in NPD is considered as an ultimate goal of achievement in many companies, which can enhance a company's competitive advantage. Some research has been conducted to explore various critical factors which could contribute to successful NPD, such as a conceptual model offering a platform for theoretical and methodological criticism on NPD process (Lewis, 2001), market-based factors are ranked ahead of technical and organizational factors in terms of importance for NPD success (Huang et al., 2002), cross-functional issues are more important in the early stage of NPD, the individual issues become relatively more important while cross-functional issues get relatively less important in the later stage, cross-functional cooperation is listed as the least important factor in the last phase of NPD (Sun and Wing, 2005).

However, there is merely concrete measurement to define the NPD success. Several researchers focused on the determinants of success in NPD success, such as time-to-market and conformance quality have been directly and significantly related to all measures of NPD project success, the interactions of conformance quality and cost, conformance quality and time-to-market, as well product cost and time-to-market have been found to influence different measures for NPD project success (Jayaram and Narasimhan, 2007). Most studies on key success factors for NPD process mainly concentrate on a specific industry, but little attention has been given to the common factors for all industries.

According to Anantana et al. (2009), the NPDSCL has been used as a self-evaluation tool for 386 participating companies in Japan, and each assessment item can be used to measure a firm's NPD operational performance. Utilized the NPDSCL data from Japanese manufacturing firms, three common influential factors which contribute to success NPD were explored by the factor analysis method. Song and some other researchers also investigated some vital factors which impact the success of NPD (Song and Montoya-Weiss, 2001). While, the impact of national culture and environment on the NPD process and performances is significant, different country has different strategies on NPD performance (Parry and Song, 1994; Xie et al., 1998; Atuahene-Gima and Li, 2000; Beverland et al., 2006). Therefore, the hypothesis is put forward:

Hypothesis 2.1b: There are some common influential factors constitute the NPD performance structure, which could be considered as the approaches leading to success NPD performance, whereas the NPD structure between Japan and China is different.

2.3.2 Correlation analysis between NPD operational performance, R&D investment and firm size

Firm assets, number of employees, R&D spending, and firm ownership are added as control variables to account for the effects of extraneous factors on NPD performance (Mu et al., 2009). Higher R&D intensity and higher R&D manpower are found to be predictors of improved innovation activities and then firm performance (Sher and Yang, 2005). However, R&D intensity alone does not explain firm performance, whereas the proper alignment between R&D intensity (how much the firm invests) and NPD portfolio strategy (how the firm invests the money) that drives profitability (Chao and Kavadias, 2009). Guan and Ma (2003) also confirmed it that the core innovation assets (a set of R&D, manufacturing and marketing) alone cannot lead to sustainable export growth, on the contrary, the supplementary innovation assets (a set of learning, organizational, resource allocating and strategy planning) not only enable a firm's technology assets to permeate into the entire competency integration, but also make it possible for a firm to acquire sustainable international competitiveness.

It is always considered that the larger size of the company, the more actively and efficiently innovation is carried out, because larger firms master the market power, economies scope, technological knowledge and so on, who are also expected to have more advantages of competitiveness in innovation activities. Wakasugi and Koyata (1997) also confirmed that large firms in the Japanese electrical machinery industry have been more aggressive in their innovation efforts than small firms. However, Laforet (2008) claimed that small and medium-size companies are more innovative and market-oriented than large companies and they have to be proactive toward market opportunities, receptive to innovation and take the lead in new product innovation in order to succeed in an intense competitive environment.

Larger firms may have more resources to invest in NPD (Chandy and Tellis, 1998), and R&D spending is one of the largest contributors to NPD performance (Cooper and Kleinschmidt, 1995), as well, Laforet (2008) indicated that small and medium-size companies' weaknesses include a lack of flexibility, a partial open culture and an organizational structure that impedes sustained innovation. As Yam et al.'s research showed (2004), R&D and resources allocation capabilities are the two most important technological innovation capabilities, and strong R&D capability can safeguard innovation rate and product competitiveness in large and medium-size firms, whereas a resource allocation capability would enhance the sales growth in small firms in China.

Hence, the hypotheses are proposed as followed:

Hypothesis 2.2a: NPD efficiency is positively related to firm size.

Hypothesis 2.2b: NPD efficiency is positively related to R&D investment.

2.3.3 Correlation analysis between NPD operational performance and financial outcome

According to the existing researches, it is proved that the NPD competitive capabilities can enhance NPD success, which also has a positive relationship with the financial performance (Song and Parry, 1997; Huang et al., 2004; Sher and Yang, 2005; Anantana et al., 2008). Sher and Yang (2005) also indicated that, not all innovative efforts may result in quick financial boosts, but firms with higher R&D expenditures and richer R&D manpower can be expected to have better financial performance.

Song and Parry (1997) used four indices to measure the comparative success level for a manufacturer's new product, such as: (1) overall profit; (2) new product sales compared with competitors; (3) profit rate for new product compared with competitors; and (4) new product success compared with the expected. Guan and Ma (2003) adopted the (1) export ratio; (2) market share; and (3) productivity growth rate to express the financial performance. And then, Liu et al., (2005) employed: (1) the new product life cycle; (2) new product sales and profits; and (3) time to market for new product to measure NPD performance and financial performance. However, most of these measurements for success NPD in terms of financial performance are relied on the subjective measurements of Likert-type scale.

In addition, Sher and Yang (2005) indicated that innovative capabilities are mostly positively related to financial performance as measured by returns on assets (ROA). Anantana et al. (2009) and Suzuki et al. (2009) also directly utilized the financial index, such as the return on assets (ROA), return on investment (ROI), operating profit margin (OPM), operating profit (OP) and net sales (NS) to examine whether the factors represented as drivers in leading NPD operational performance can improve financial outcomes. This kind of external public source maybe could make more great contribution to the companies, because the more objective data to be used in analysis, the more influences will be worked in decision making to put effort to enhance the NPD

competency and then achieve the NPD business success. Therefore, in this research, the real and actual financial data from Japanese publicly opened financial data – Nikkei NEEDS has been used to do the correlation analysis between NPD performance and financial performance, which can represent the company's real or actual financial performance and can make sure the research more objectively. Consequently, the hypothesis is proposed:

Hypothesis 2.3: The common influential factors which represent as drivers in leading NPD operational performance can improve financial outcomes.

2.4 New Product Development Scorecard (NPDSC)

In order to test these hypotheses, a questionnaire survey research method has been used to obtain responses from some companies in Japan and China, respectively. As a data collection tool, a questionnaire has been utilized, which is called the New Product Development Scorecard (NPDSC). The NPDSC was initiated by the Japanese Organization for Quality Innovation (JOQI), and established by the Tokyo Institute of Technology (Tokyo Tech) in 2001, in order to reactive Japanese manufacturing and then continue supporting Japan's global competitiveness in the 21st century. The scorecard was built after conducting surveys on various NPD scorecards and literatures by Irikura and Enkawa (2005). The goal of NPDSC is to be a simple, versatile and effective data collection tool in order to get an easy database building process for benchmarking purposes.

The NPDSC has been designed as a self-diagnosis tool for NPD management to help companies identify and understand their strengths and weakness. It encompasses 25 assessment items based on four core assessment areas, namely, (1) Organizational Systems of Development (6 items), (2) Planning and Execution Ability (7 items), (3) New Product Development Performance (6 items), and (4) Exploitation of Management Tools and Information Technology (6 items). The framework of the NPDSC is shown in Figure 2-1. Each of the 25 assessment items is rated according to the 5-point Likert scales, from 1 to 5, with the fifth level presumed to be the best practice.

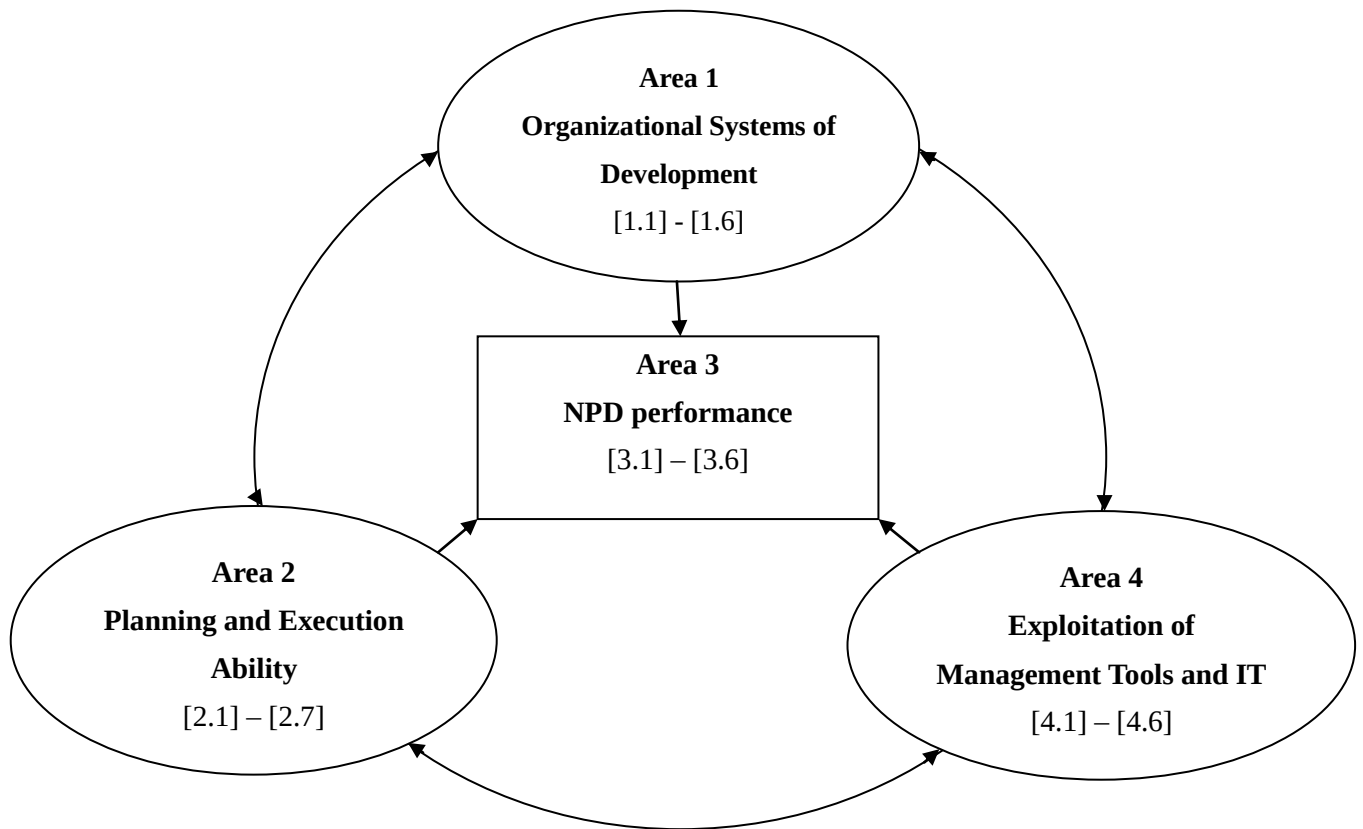


Figure 2.1: Framework of the NPDSC

(Source: Irikura and Enkawa, 2005)

In this scorecard, a detailed description of each level is given for each assessment item. The score of one integer and a half (for example 2.5) is also acceptable in case of a company or division's level is considered to fall between two levels. The scope of utilization of the NPDSC for an individual company can be compared against competitors in the same industry category as well as across industries. Additionally, each assessment item can be considered as either the NPD operation or the NPD performance index for using as the variable in the statistical analysis to explore the NPD operations contributing to the specific NPD performance (Anantana et al., 2009). The NPDSC will be shown in the Appendix A.

2.5 Data Collection Process and Attributes

2.5.1 Data collection process

The NPDSC has been used to collect data from participating companies in Japan since 2003 and then extended to China in order to expand the scope of NPDSC research

to international comparisons. Accordingly, the NPDSC has been translated into English and Chinese from its original version in Japanese. Both in Japan and China, in order to minimize the possibility of misinterpretation of the questions, the responders were required not only to read the detailed description of each level seriously, but also be explained the objective of this study and trained how to fill the questionnaire.

As for the Japanese data, the first data collection from 2003 by the NPDSC with small samples at 37 divisions of 22 companies though it was covered all types of industries (Irikura and Enkawa, 2005). And then from May to June in 2007, with the cooperation of Japan Standard Association (JSA) and Tokyo Tech, data collection by a mailing system was conducted about 6000 members of the JSA (Anantana et al., 2007).

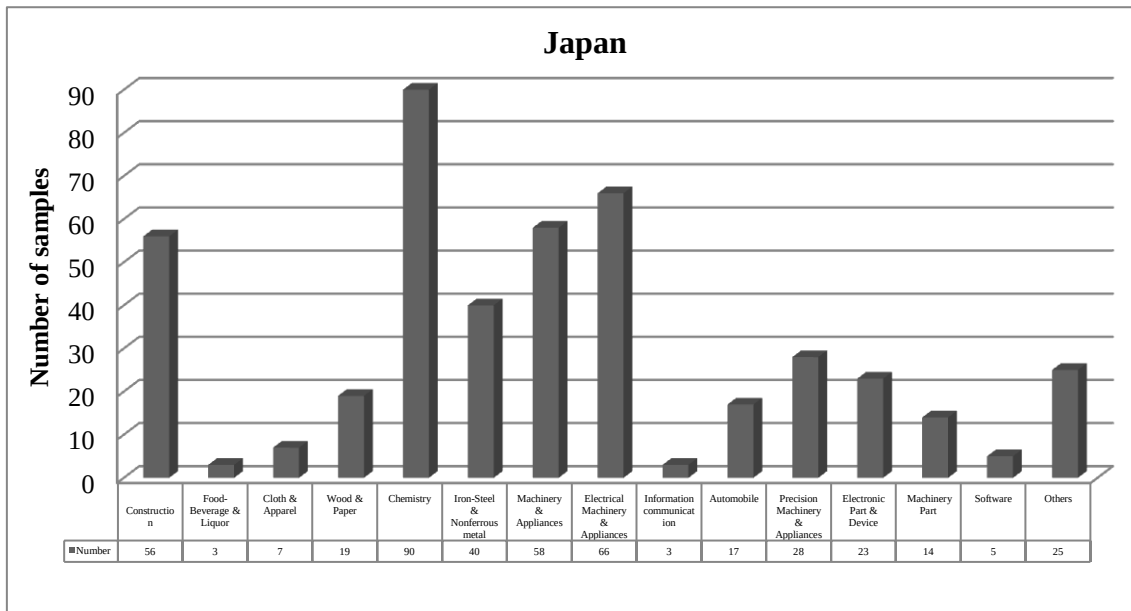
As a result, 454 valid answers were acquired with 7.6% response rate. This ratio is not high, but rather higher than our initial expectation. Because, for the respondents, it might be considered quite hesitant to expose how they conduct NPD. Also, it might arise from the non-anonymous response system. Because of promising confidentiality, the name of each respondent was supposed to be open to us, in order to assure high data reliability and channels for necessary communications with them after the survey. A feedback report was committed to sending back to each company, which could be an incentive for the companies to participate in the survey as well as gave us reliable data (Anantana et al., 2007).

As for the Chinese data, a new product development seminar was held in Japan cooperated with the Union of Japanese Scientists and Engineers (JUSE), in September, 2009. About 70 companies' managers took part in this seminar to learn Japanese advanced experiences on NPD performance, and 112 questionnaires were asked to be filled. Finally, 99 useful samples were collected. The overall response rate for the survey was 88.4%. This response rate is quite high which can be considered very well but no feedback report was committed to send to each company.

All of these collected samples covered a wide range of industries and firm size. As for the categories of participant companies, there are 14 different kinds of industries from Japan, but there is no construction industry data from China. The description of each category industry is presented in Table 2-1, Figure 2-2 and 2-3. (A represents different core assessment areas, e.g. A1 means area (1) Organizational Systems of Development and so on.)

Table 2-1: Statistical description of each category industry between Japan and China

	Japan					China				
	No.	A1	A2	A3	A4	N	A1	A2	A3	A4
1. Construction	56	2.28	2.42	2.27	2.15	0	0	0	0	0
2. Food-Beverage & Liquor	3	2.79	2.38	2.56	2.03	1	2.50	2.93	3.00	2.17
3. Cloth & Apparel	7	3.04	2.89	2.80	2.66	1	2.75	2.57	2.83	2.25
4. Wood & Paper	19	2.22	2.28	2.35	2.07	5	3.11	2.64	2.77	1.97
5. Chemistry	90	2.54	2.60	2.48	2.29	12	3.01	2.75	2.70	2.44
6. Iron-Steel & Nonferrous metal	40	2.43	2.49	2.31	2.08	1	2.54	2.50	2.08	2.08
7. Machinery & Appliances	58	2.64	2.79	2.56	2.60	9	2.31	2.45	2.30	2.23
8. Electrical Machinery & Appliances	66	2.72	2.85	2.71	2.70	22	2.45	2.69	2.44	2.21
9. Information communication	3	2.72	2.88	2.64	2.72	1	2.50	2.64	2.75	2.33
10. Automobile	17	3.32	3.26	3.18	3.18	14	2.48	2.37	2.04	2.25
11. Precision Machinery & Appliances	28	2.50	2.64	2.40	2.45	2	3.09	2.75	3.08	2.79
12. Electronic Part & Device	23	3.07	3.10	2.82	2.71	7	2.61	2.51	2.21	2.27
13. Machinery Part	14	2.96	3.04	2.89	2.79	15	2.67	2.88	2.53	2.51
14. Software	5	3.12	2.87	2.81	2.51	1	4.17	4.43	3.83	2.67
15. Others	25	2.77	2.72	2.56	2.42	8	2.49	2.51	2.82	2.04
Average score	454	2.62	2.70	2.54	2.44	99	2.63	2.65	2.48	2.28

**Figure 2.2:** The classification of samples based on 14 industries from Japanese data

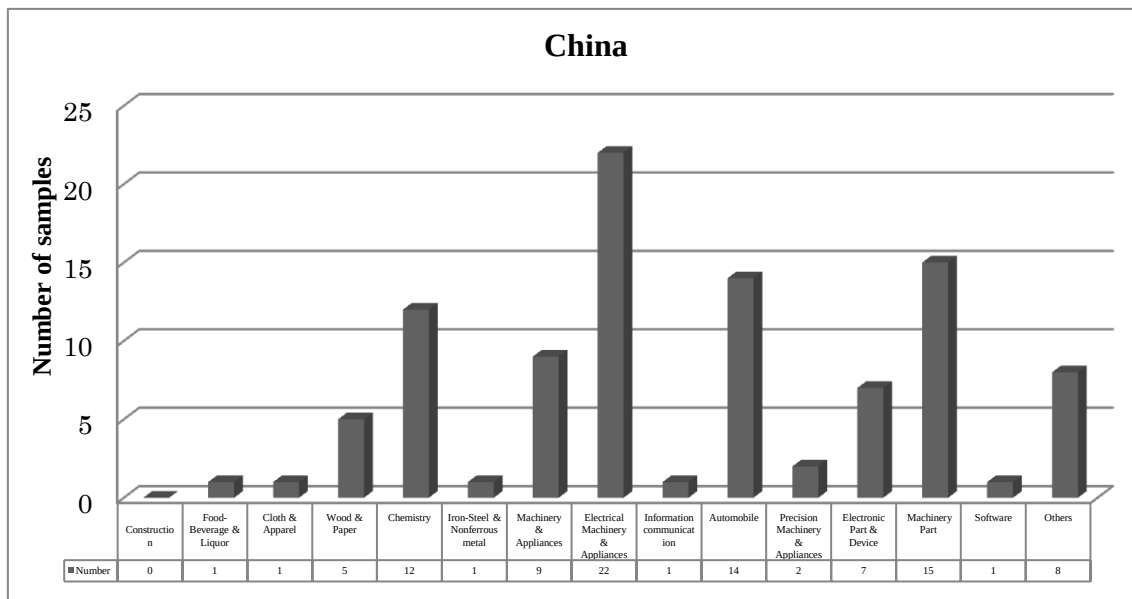


Figure 2.3: The classification of samples based on 14 industries from Chinese data

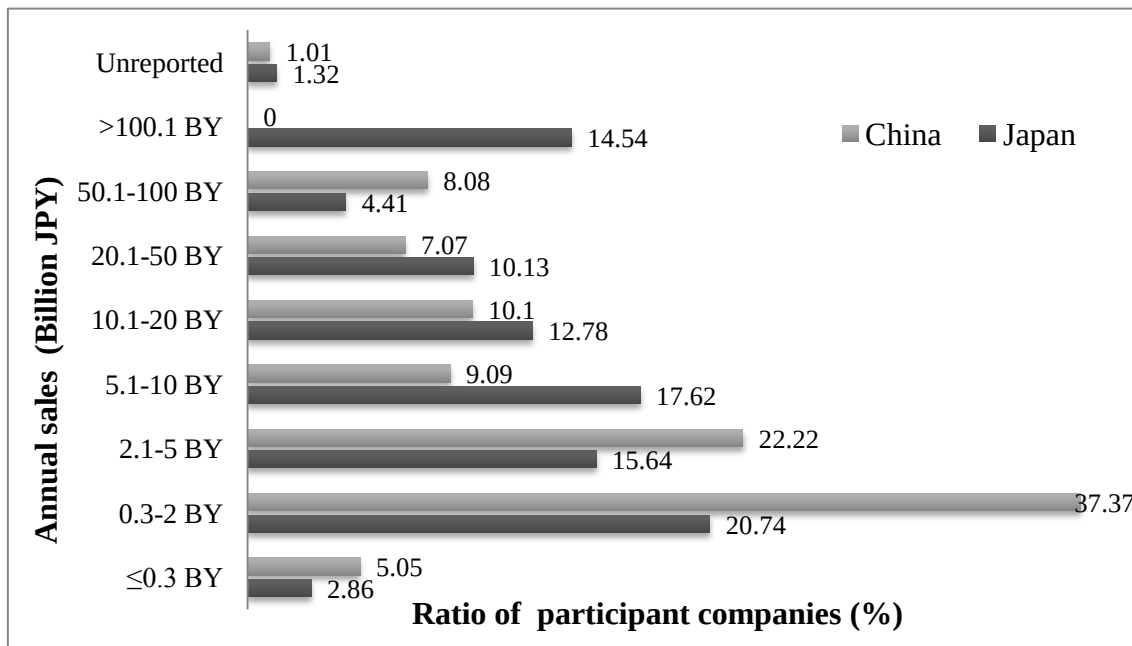
The profile of participant companies is shown in the Table 2-2, and Figure 2-4~2-6. As the results can be seen from these table and figures, with respect to the annual sales, more than 75% respondents worked for medium-size and large companies in Japan, but more than 70% respondents came from small and medium-size companies in China. According to the data of the new product development staff numbers, more than 30% Japanese companies where more than 50 staffs were occupied in the NPD work, but more than 55% Chinese companies that the NPD staffs were below 20 people. However, in accordance with the ratio of full-time NPD staff numbers, both in Japan and China, more than 60% of companies whose full-time NPD employee is more than 50%.

Table 2-2: Profile of participant companies

Characteristics of participant companies	Japan	China
1. Firm size (Sales of company, in million JPY)	%	%
≤30	2.86	5.05
31—200	20.74	37.37
201—500	15.64	22.22
501—1000	17.62	9.09
1001—2000	12.78	10.10
2001—5000	10.13	7.07
5001—10000	4.41	8.08
>10000	14.54	0
Unreported	1.32	1.01

Table 2-2 (Cont.): Profile of participant companies

Characteristics of participant companies	Japan	China
2. New product development staff numbers	%	%
≤3	10.79	0
3—5	12.11	18.18
6—10	14.10	22.22
11—20	13.88	15.15
21—50	16.96	19.19
51—100	8.81	15.15
>100	22.47	10.10
Unreported	0.88	0
3. The full-time new product development staff numbers	%	%
0	8.59	4.04
<10%	7.93	2.02
10%—20%	4.63	2.02
20%—30%	3.74	7.07
30%—50%	9.25	10.10
50%—90%	23.79	36.36
>90%	38.99	37.37
Unreported	3.08	1.01

**Figure 2.4:** The ration of firm size based on the annual sales between Japan and China

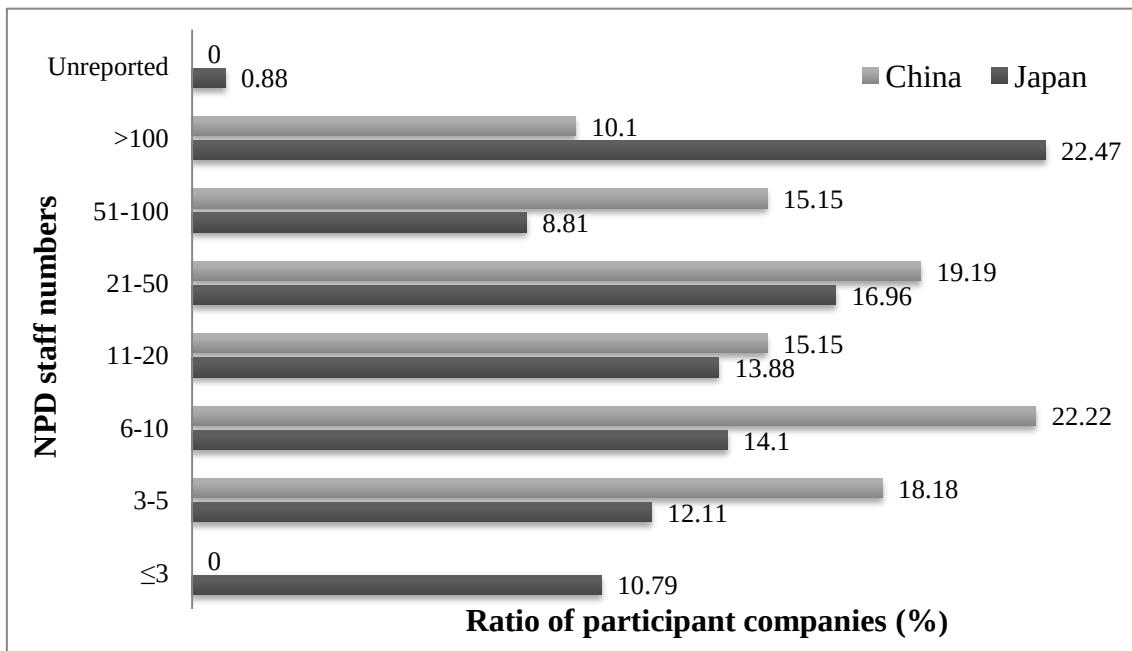


Figure 2.5: The ration of NPD staff numbers between Japan and China

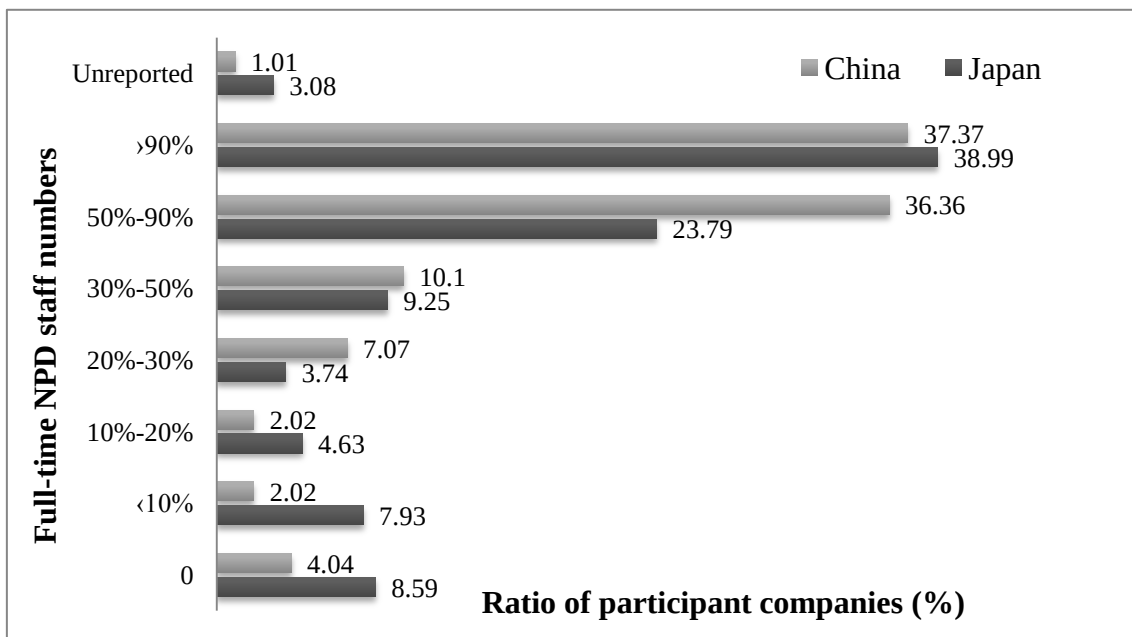


Figure 2.6: The ration of full-time NPD staff numbers between Japan and China

2.5.2 Reliability and data attribute

Composite reliability assesses the inter-item consistency, which is conducted by using the internal consistency method that is estimated by Cronbach's alpha. Typically,

reliability coefficients with 0.70 or higher are considered adequate. In order to ensure the reliability of NPDSC data which has been used in this research, the Cronbach's coefficient alpha has been calculated during the data collection process. The result is shown in terms of Cronbach's coefficient alpha at 0.973 for 25 assessment items from Japanese data and 0.877 from Chinese data. These results indicate that high reliability of NPDSC is ensured.

In this research, compared to Japanese data, there is no construction data from China. Therefore, a t-test has been respectively conducted on total score with each average area score to identify whether those scores are significantly different between Japanese all data and the data exclude construction industry. The result is that there is no significant difference between these two groups.

Then, a factor analysis has been done with the data from Japanese all data and the data exclude construction industry separately. The NPD structures between these two groups are nearly the same. Hence, Japanese all data has been used to be analyzed in this research, not the data exclude construction industry. As a result of the data collection process, the data attribute and the distribution of the total score (125) between Japanese and Chinese companies are shown in Table 2-3 and Figure 2-7.

Table 2-3: Data attribute of total score between Japan and China

	Japan	China
Number of Data	454	99
Mean	64.45	62.85
Std.Dev	15.33	12.56
Variance	235.06	157.69
Median	63.89	61.25
Mode	66.00	57.00
Maximum	117.00	103.00
Minimum	27.00	34.00

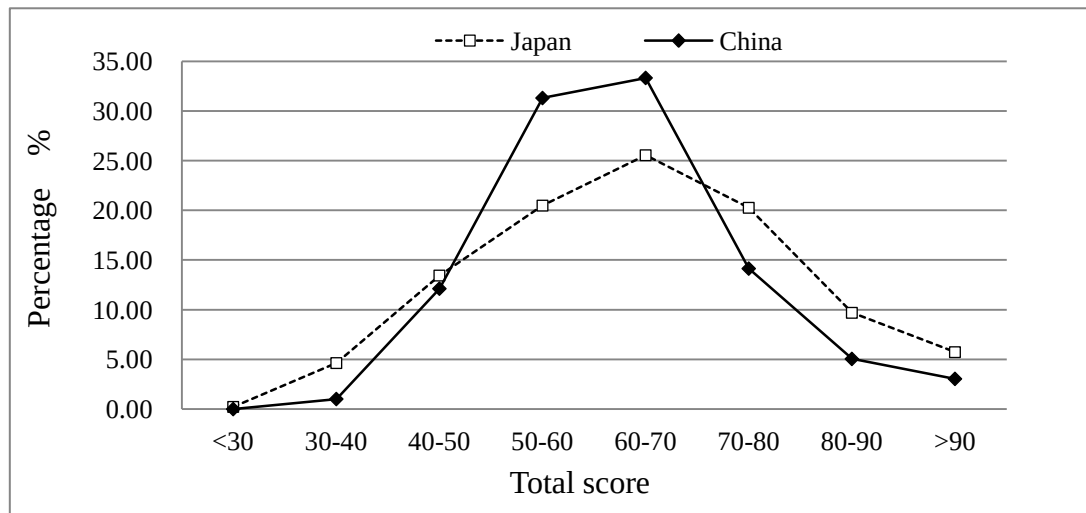


Figure 2.7: Distribution chart of NPDSC total score between Japan and China

As the data attribute revealed, the average total score between Japan and China is different. Also, the standard deviation and variance of Japanese data are larger than China's, which signifies that Japanese data shows higher degree of variation. From the total score distribute chart can be seen that most NPDSC scores from Japan are between 50 to 80, while most NPDSC scores from China are between 50 to 70.

2.6 Comparative Analysis

2.6.1 Primary comparison of NPD performance between Japan and China

The purpose of this section is to verify the **hypothesis 2.1a**. Attempt has been made to verify that NPD performance between Japan and China is different, and Japan's NPD operational performance level is higher than China's.

The average score and standard deviation of four fundamental areas are calculated and represented in Table 2-4. T-test is respectively conducted on average total score with each average area score to identify whether those scores are influenced by country difference. Findings from t-test demonstrate that except for area 4, t-values for the total score and all average area scores don't have significant differences between Japan and China. Chinese companies occupy lower scores than Japanese except area (1) Organizational System of Development, but not at a significant level. On the other hand, the area (4) Exploitation of Management Tools and IT are dominated by the Japanese companies, taking up the biggest difference in a highly significant level.

Table 2-4: Average scores of four areas between Japanese and Chinese companies

	Japan (454)		China(99)		t-test
	Ave.	SD	Ave.	SD	
1. Organizational Systems of Development	2.62	0.72	2.63	0.57	-0.07
2. Planning and Execution Ability	2.70	0.66	2.65	0.69	0.68
3. NPD Performance	2.54	0.62	2.48	0.64	0.87
4. Exploitation of Management Tools and Information Technology	2.44	0.68	2.28	0.52	2.15*
Average Total Score	2.58	0.86	2.52	0.82	0.98

* : 5% significant ; ** : 1% significant

The comparative result of each assessment item between Japan and China is also pointed out to recognize the strength and weakness including the variation of those 25 items. This result is displayed in Figure 2-8 in the form of radar chart so as to make the data more understandable.

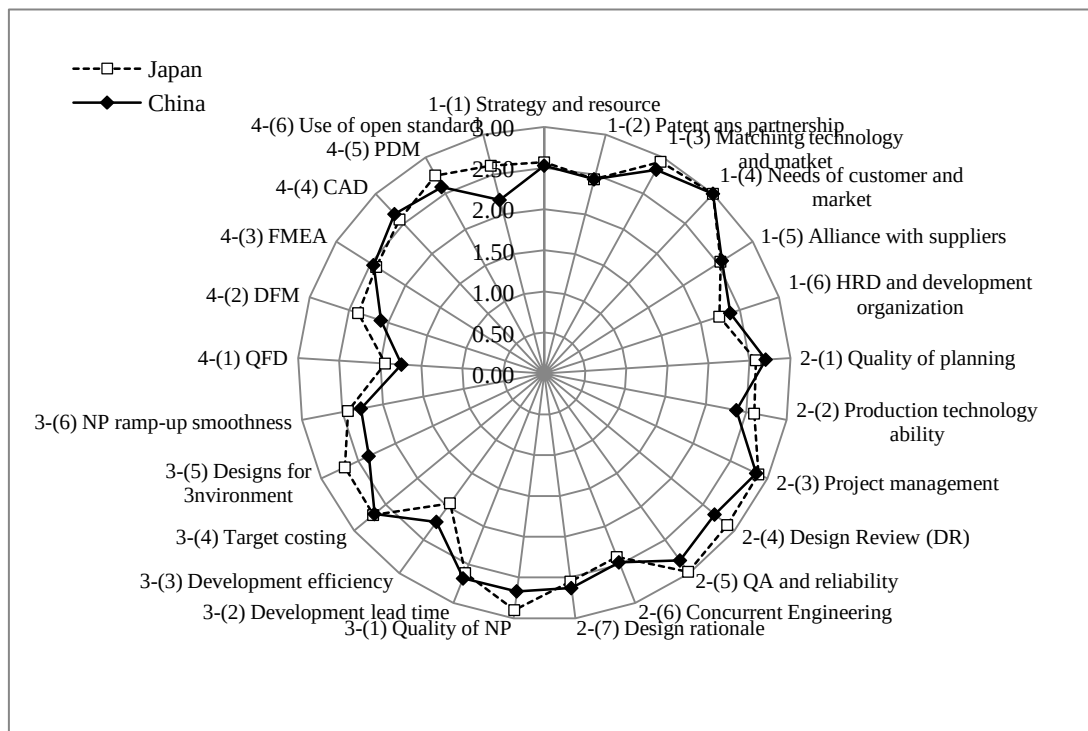


Figure 2.8: Radar chart of the NPDSC result between Japanese and Chinese companies

The highest competence items for Japanese companies are revealed in the planning and execution ability (item 2-2, 2-5), quality of new product (item 3-1), cost management (item 3-4), and pay attention to the environmental activities (item 3-5). Japanese companies also outperform in using IT evolution such as utilization of quality function deployment, design for manufacturing and maintenance prevention (item 4-1,4-2), take effective use of an arrangement by a technical database and production data management, digitization of technical data exchange and its standardization (item 4-5, 4-6).

On the other hand, Chinese companies take higher scores on the capability of cooperation with suppliers and human resource development and development organization (item 1-5, 1-6), emphasize the quality of new product planning (item 2-1), concurrent engineering and source stream management (item 2-6), especially, concern the design rationale and the practice of feedback to next development (item2-7). Chinese companies also get higher scores on the utilization of reliability analysis and the technology of CAD and CAE (item4-3, 4-4).

The preliminary comparison shows that Japanese companies are found to occupy higher scores with higher degree of variation. The **hypothesis 2.1a** that Japanese companies outperform Chinese in terms of their NPD operational performances is supported in a certain degree. But, findings after the t-test also reveal that the NPD operational performance level doesn't have a significant difference between Japan and China except the ability of exploitation of management tools and IT.

As the results shown, Japanese take higher scores on the ability of utilizing technology and assurance of the quality and reliability of NPD, whereas, Chinese get higher scores to the capability of rationality, NPD efficiency and human resources as well as organizational development. These kinds of differences on NPD ability are partly due to cultural diversity and environment between these two countries.

According to Hofstede's culture dimensions research (1994), Japanese cultural tendency toward high uncertainty avoidance which measures the extent to that individuals are able to tolerate ambiguity. Cultures that are high on uncertainty avoidance like Japan exhibits higher levels of anxiety and energy release have a greater need for formal rules and absolute truth, and show less tolerance for people and groups with deviant ideas or behaviors. They also tend to accept change less easily, take fewer

risks, avoid conflict and worry a lot about the future. These cultural characteristics lead Japanese companies to take the ability of quality and reliability for NPD very seriously.

In China, the culture is influenced by the thoughts of Confucius, which encourages people to pursue long-term benefits (perseverance) while suffer short-term loss (thrift). Since the special Chinese culture of Guanxi which is a relationship between people needs a lot of time and cost to be sustained. Thus, the ability of human resource development is valued by Chinese companies. Perks et al. (2009) confirmed it by an empirical study that reliance on informal social systems, through Guanxi, can act as a significant support for integration in certain activity areas and that Guanxi can influence integration in mid- to late- phase of NPD activities; who also indicated that where the basis for Guanxi exists, traditional and culturally derived interpersonal relationships still impact the way of people working together as well as successful NPD performance.

Moreover, after the reform and opening policy, with the rapid development of these 30 years, the production innovations in many Chinese firms have been driven by capital acquisition rather than technology exploitation (Yam et al., 2004). Especially, Chinese companies want to change the role of “Made in China” into “Created in China”, they must pay attention to improving the quality of product and accelerating the speed of launching new product into market. Therefore, Chinese maximize the quality of NPD planning, design rationale and development efficiency but downplay the exploitation of management tools and information technology, which is also a weakness for Chinese companies, who should utilize more reasonable and appropriate management tools and technologies to improve their NPD performance.

2.6.2 Factor analysis between Japan and China

In this section, the factor analysis is carried out in order to verify the **hypothesis 2.1b** that there are some common influential factors which constitute the NPD performance structure and could be considered as the approaches leading to the successful NPD performance, but different between Japan and China.

Factor analysis is a statistical data reduction technique used to explain variability among observed random variables in terms of fewer unobserved variables, known as factors. First, the exploratory factor analysis has been conducted separately with the data from each country. Then, the initial solution has been performed by the principal

axis factoring (PAF) with the constraint of Eigen-value more than one. The result indicated that three factors have been extracted from Japanese data according to the cumulative contributions rate at 55.25%, whereas, six factors have been obtained from Chinese data on the cumulative contributions rate of 53.40%.

In order to simplify the factor comparison between these two countries, the number of Chinese extracted factors has been limited to three during the principal axis factoring analysis. Therefore, three factors have been obtained from Chinese data with the cumulative contribution rate at 43.28%. Varimax rotation has been used during the process of factor analysis in order to remain independent relations among the extracted factors. The factor matrix is shown in Table 2-5, and the items with a factor loading more than 0.4 as well as the highest loading for each item are highlighted in dark.

Table 2-5: Rotated Factor Matrix of 454 Japanese and 99 Chinese samples

Assessment Item	Factor (Japan)			Factor (China)		
	1	2	3	1	2	3
1-(1) Clarification of development strategy and resource arrangement	.687	.319	.272	.548	.209	.132
1-(2) Patent strategy and partnership	.625	.398	.180	.492	.357	-.043
1-(3) Matching of own technology & market benchmarking	.709	.288	.257	.283	.264	.207
1-(4) Grasping needs of customers and markets and relationship with them	.692	.209	.288	.415	.207	.087
1-(5) Cooperation with suppliers	.575	.343	.311	.670	.060	.333
1-(6) Human resource development and development organization	.478	.318	.397	.554	.315	.169
2-(1) Quality of planning	.617	.251	.403	.541	.157	.189
2-(2) Production technology and engineering ability	.391	.136	.487	.397	.479	.169
2-(3) Project management of development and its control	.540	.437	.368	.440	.472	.189
2-(4) Practice of Design Review (DR) and its quality	.406	.506	.354	.207	.577	.039
2-(5) Systematization of quality assurance and establishment reliability	.418	.468	.397	.262	.667	.176
2-(6) Concurrent Engineering and source stream management	.480	.439	.438	.330	.621	.193
2-(7) Practice of design rationale and feedback to next development	.300	.499	.434	.207	.676	.163
3-(1) Quality of new products and their innovative attractiveness	.510	.171	.437	.523	.181	.283
3-(2) Lead time and deliver date of development	.316	.153	.595	.577	.227	.108
3-(3) Development efficiency (utilization of front loading method)	.409	.407	.437	.517	.315	.122
3-(4) Practice of target costing and its quality	.429	.416	.438	.517	.366	.136
3-(5) Quality of designs for environment (DFE)	.352	.388	.406	.379	.490	.227
3-(6) Period of early-stage production control (NP ramp-up smoothness)	.286	.315	.692	.633	.403	.114
4-(1) Utilization of QFD (Quality Function Development)	.209	.437	.520	.192	.344	.163
4-(2) Utilization of DFM (Design for Manufacturing) and MP	.293	.483	.506	.545	.315	.214
4-(3) Utilization of reliability analysis (eg.FMEA) and Taguchi methods	.258	.537	.394	.285	.537	.394
4-(4) Utilization of CAD (two and three dimensional) and CAE	.250	.676	.201	.325	.235	.503
4-(5) Arrangement of technical database and PDM (Product Data Management)	.214	.713	.192	.167	.148	.963
4-(6) Digitization of technical data exchange and its standardization	.256	.686	.132	.099	.373	.373

From the Japanese findings can be seen that, factor one shows a strong relationship with all items in the area (1) and some items represented management practices which support NPD strategy such as quality of planning, new product and their innovative attractiveness, project management of development and its control. Thus, this factor has been named as “*Development strategy and organization*”. Meanwhile, since factor two has a high correlation with most of the items from the area (4) and some items on behalf of practice of design review, rationale and their quality assurance and reliability, which are related to the ability of using technologies. Therefore, “*Development production technology*” has been named for this factor. As well, factor three is related to the majority of items in area (3) and some items referred to the technology, it more concerns about the efficiency of NPD performance. As a result, it has been named “*Utilization capability of tools and IT*”. The naming method of extracted factors is referred from Anantana et al. (2007).

Since the raw score of each item in NPD can be considered as a result of the capability of these factors, as a result, these three factors are identified as the measurement index for NPD operational performance of the Japanese sector. The names of the extracted factors from Japanese data are interpreted as follows:

- **Factor 1:** *Development strategy and organization;*
- **Factor 2:** *Development production technology;*
- **Factor 3:** *Utilization capability of tools and IT;*

In the same way, with respect to the results from Chinese companies, the first factor is found to have a high relationship with most items from the area (1) and area (3), which mainly refers to the organization and NPD performance. Thus, factor one has been given the name “*NPD performance and organization ability*”. The second factor is examined to identify the related items, which are primarily from the area (2) with some contents of designing for the environment and utilization of reliability analysis. Therefore, the name of “*Production execution ability*” has been given to the factor two. Since the last factor has a strong correlation with management tools and information technologies, thus it has been called “*IT utilization ability*”. Consequently, these three factors are extracted from Chinese data to point out the structure of generating efficient NPD for Chinese industry. The names of the extracted factors from Chinese data are interpreted as follows:

- **Factor 1:** *NPD performance and organization ability;*
- **Factor 2:** *Production execution ability;*
- **Factor 3:** *IT utilization ability;*

Subsequently, confirmatory factor analysis has been conducted in order to validate the structural differences of these factors. Based on the results of exploratory factor analysis of Japan is shown in Table 2-5, reference model has been constructed. Each of three factors has been composed of the items highlighted in dark in the Table 2-5, like 10 items for factor one, 7 items for factor two, and 8 items for factor three. When the Japanese data has been applied to this reference model, model fitness indices has been explained as 0.935 for the comparative fit index (CFI) and 0.060 for the root mean squared error of approximation (RMSEA). It implies how the Japanese data fit into this reference model.

On the other hand, when the Chinese data were applied, CFI and RMSEA become 0.857 and 0.070, respectively. While these results could be considered still within acceptable to some extent, model fitness becomes worse in comparison with the Japanese data. From the results of these exploratory and confirmatory factor analyses, it could be considered that **hypothesis 2.1b**, the factors which identify their NPD competencies are considered differently between Japan and China has been supported.

According to Anantana et al. (2009), three different perspectives of NPD are used to analyze the approaches for successful NPD, such as: (1) enhancing positive quality perspective, (2) efficiency perspective, and (3) preventing negative quality perspective. In accordance with these perspectives, assessment items of 3-(1) Quality of new product, 3-(3) Development efficiency and 2-(5) Quality assurances and reliability are selected to be represented at each performance perspective, respectively.

In accordance with this opinion, from the pattern matrix, factor loading between each factor and selected performance is different between Japan and China. As the Japanese results can be seen that, the highest loading of 3-(1) Quality of new product is shown in factor one, factor two contains the highest loading of 2-(5) Quality assurance and reliability, as well the highest loading on 3-(3) Development efficiency is in factor three. Consequently, the Figure 2-9 illustrates the summary of approached on each performance perspective by Japanese result. The main approaches are depicted by rigid arrows whereas the subsidiary approaches are drawn by the arrows with dash line.

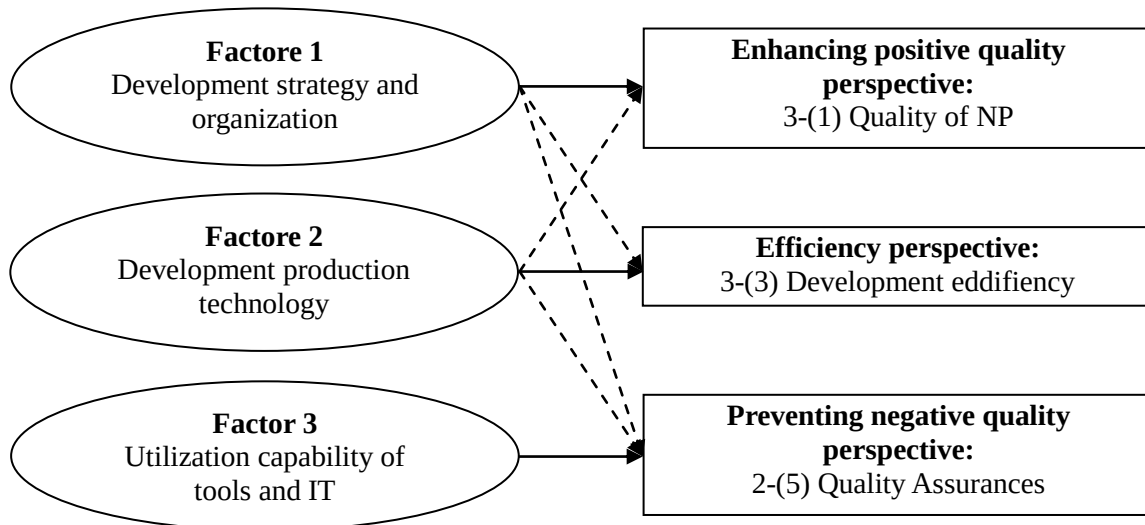


Figure 2.9: The different approaches for three performance perspectives which constitute successful NPD by Japanese result
(Source: Anantana et al., 2009)

While, according to the Chinese result, the highest loading of 3-(1) Quality of new product and 3-(3) Development efficiency are shown in the factor one, and the factor two includes the highest loading of 2-(5) Quality assurance and reliability, but no selected performance loading is in the factor three. The results confirm it again that the approaches for successful NPD are different between Japan and China.

2.7 Correlation Analysis

In this section, correlation analysis is conducted to test and verify the **hypothesis 2.2a, 2.2b and 2.3**. First, analyze the relationship between three common influential factors which are extracted from NPDSC and R&D investment and firm size, in order to verify that whether R&D investment and firm size will positively relate to the successful NPD performance. And then, correlation analysis is performed between these three extracted factors and the financial bottom line indices in order to verify that whether these factors represent as drivers in leading successful NPD operational performance to the financial outcome. Since the number of financial data from China is too few, thus, only the Japanese data are utilized to be analyzed in this section.

2.7.1 Correlation analysis between NPD operational performance, R&D investment and firm size

According to Mu et al. (2009), firm assets can be used as a standard to divide firm size, which has a significant positive relationship with technological and organizational management and then influence the success of NPD performance. Also, the manner that the personnel charged with the task of NPD are organized can influence the success of NPD. The presence of a champion on a project team has been identified as an asset and an important factor leading to project success (Cooper and Kleinschmidt, 1995).

Thus, in this part, the sales of the company represent the firm size, the number of employees whose work involved in NPD, the ratio of full-time NPD staff to all employees whose work involved in NPD, and the ratio of NPD cost to sales stand for the R&D investment. As well, in this part, the NPD performance is represented by the extracted factors, because the factor scores are more concentrated and representative than raw scores. Therefore, the results of correlation analysis between extracted influential factors and R&D investment and firm size are shown in Table 2-6.

Table 2-6: Correlation analysis between NPD operational performance and R&D investment and firm size (Japan)

		Factor 1	Factor 2	Factor 3
Staff number	Pearson Correlation	.419**	.396**	.202**
	Sig.(2-tailed)	.000	.000	.000
	N	450	450	450
Ratio of full-time staff	Pearson Correlation	.191**	.222**	.129**
	Sig.(2-tailed)	.000	.000	.000
	N	442	442	442
Ratio of NPD cost	Pearson Correlation	-.093	.002	-.084
	Sig.(2-tailed)	.202	.983	.247
	N	192	192	192
Firm size	Pearson Correlation	.435*	.350**	.271**
	Sig.(2-tailed)	.000	.000	.000
	N	448	448	448

* : 5% significant ; ** : 1% significant

As the results show, all of these three extracted factors which represent NPD efficiency have positive relations with the number of employees whose work involved in NPD, the ratio of full-time NPD staff and firm size in a significant level. The **hypothesis 2.2a** and **2.2b** are supported. But, NPD efficiency is not significant with the ratio of NPD cost to sales. This result is similar to Reilly et al. (2002) that the role of personality in team performance is significantly related to the success of new product

development. Kandemir et al. (2006) confirmed this conclusion in a further step that human resources are important for implementing and maintaining of the NPD operational performance, but financial investment doesn't have a significant relationship with the NPD project success.

2.7.2 Correlation analysis between NPD performance and financial outcome

According to Suzuki et al., (2009), five financial bottom line indexes such as the return on assets (ROA), return on investment (ROI), operating profit margin (OPM), operating profit (OP) and net sales (NS) were used to examine whether the factors represented as drivers in leading NPD competencies can improve the financial outcomes. In this part, the same financial indexes with Suzuki et al. are used to operate the correlation analysis between extracted influential factors and financial performance. The result is shown in Table 2-7. All of these financial data are obtained from Nikkei NEEDS in the same year of NPDSC data is employed. And in this research, the ROA means the operating profit divide the total assets. The Nikkei NEEDS is a Japanese publicly opened financial database, which can improve the reliability of the analysis results.

Table 2-7: Correlation analysis between NPD operational performance and financial indexes (Japan)

		ROA.	ROI	OPM	OP	NS
Factor 1	Pearson Correlation	.256**	.090	.206*	.188*	.140
	Sig. (2-tailed)	.004	.350	.022	.035	.117
	N	122	122	124	126	126
Factor 2	Pearson Correlation	.061	-.006	.128	.218*	.304**
	Sig. (2-tailed)	.506	.951	.158	.014	.001
	N	122	122	124	126	126
Factor 3	Pearson Correlation	-.060	-.162	-.034	.357**	.367**
	Sig. (2-tailed)	.509	.075	.704	.000	.000
	N	122	122	124	126	126

* : 5% significant ; ** : 1% significant

As the result can be seen that, all of three factors have a significant impact on operating profit, which indicates that improve the ability of NPD performance could increase company's profit. In addition, factor one has a significant positive correlation with ROA and operating profit margin, factor two and factor three are positive on net sales in a significant level, the result also confirmed that the NPD competencies have the positive correlation with firm size, because the net sales can represent the firm size

(Anantana et al, 2009). But, no factors are found to have significant relationship with ROI, may be it because the account of time lagging effect.

Consequently, from the result of correlation analysis between NPD operational performance and financial indices can be seen that the **hypothesis 2.3** is supported. Since an improvement in the ability of NPD strategy and organizational system seems to produce significant financial outcomes, such as ROA, operating profit margin in a long-term effect. While, enhancing the capability of development of production technology and tools could increase the operating profit and net sales in a short-term effect on financial performance.

2.8 Conclusions

In this research, the New Product Development Scorecard (NPDSC) has been utilized as an evaluating instrument to investigate the NPD operational performance and its potential factors which constitute an efficient NPD in Japan and China, respectively. And then, the relationship between NPD operational performance and R&D investment and firm size has been discussed. As well, the correlation analysis between NPD operational performance and financial outcome has been also conducted based on Japanese data. The findings and implications are concluded as follows:

First, the preliminary comparison between Japan and China indicates that the Japanese NPD level is higher than China but not significant. And these two countries take higher abilities on different areas on NPD performance that Chinese get higher scores on the organizational systems of development, while Japanes occupy the higher scores on the exploitation of management tools and IT. Except the reason that Japan and China in the different development stage, these results could be explained by the different environment and cultures between these two countries. According to Chinese culture, Confucian dynamism encourages people to pursue long-term benefits and harmonious relationship with their partners and competitors. With the further development of the economy, China should change this kind of operational philosophy, not only pay attention to the relationship with their partners but also take other functional areas seriously, such as planning executive ability and technology exploitation capability. It should be also noted that these production problems have important implications for foreign partners in joint ventures in China, that foreign partners should pay particular attention to the transfer of the necessary production skills

and know-how to their Chinese partners. In addition, Japanese data were collected in 2007 and Chinese data were obtained in 2009, the economic crisis which happened in 2008 maybe has some influences on the preliminary comparative result. Because due to the economic crisis, lots of small and middle Chinese private companies bankrupted in 2008, and Chinese companies become more modesty and objective to evaluate themselves than before economic crisis. However, what kinds of influences on NPD performance by economic crisis should be discussed in a further step in the future.

Second, the results of factor analysis indicate that there are some influential factors which impact Japanese NPD performance structure is different to the Chinese. From the perspective of approaches for successful NPD, the factor analysis results confirm it again that the approaches for successful NPD are different between Japan and China. NPD performance in Japanese firms is clearly associated with three perspectives of approaches for successful NPD, but Chinese NPD performance can't distinguish explicitly with these three approaches. Since the NPD performance in Japan is better than in China, thus, these findings suggest that in order to improve NPD performance, Chinese companies should ensure the clear and precise development strategy and resource arrangement, enhance the new products quality as well as utilize and implement more appropriate and reasonable production technologies, management tools and IT.

In order to explain these differences, the culture differences should be considered again. According to Hofstede (1994), Japanese scored very high on uncertainty avoidance and masculinity dimensions. A country in these dimensions is considered to have a greater need for formal rules and absolute truth, and shows less tolerance for people and groups with deviant ideas or behaviors. Thus, they are highly motivated to succeed (high masculinity), and prefer structured processes (high uncertainty avoidance). Brockner et al. (2001) also confirmed it that the high uncertainty avoidance corporate culture may lead to the enactment of procedures of the time or situation deviate from one to the next. While, China scored low on uncertainty avoidance and near the mean on masculinity. These cultural differences may explain why NPD performance in China is limited to approaches for successful NPD unclearly compared to Japanese NPD performance. These results remind that if companies want to cooperate with foreign partners on NPD performance should take the culture difference seriously. Since there are just two countries' NPDSC data, it is very difficult to discuss the relationship between culture and NPD performance in a further step, thus, the relationship between culture and operational performance will be discussed in the chapter 3.

Third, the correlation analysis between extracted potential factors which represent the successful NPD performance and R&D investment as well as firm size indicates that human resources and firm size have a significant positive relationship with the NPD success except the cost of NPD. Kandemir et al. (2006) confirmed this conclusion in a further step that human resources are important for implementing and maintaining of the NPD operational performance, but financial investment doesn't have a significant relationship with the NPD project success. Suzuki et al. (2009) also indicated that just increase the R&D expenses can't improve financial performance directly, but integrated with the development strategy and organization as well as the alliance among companies will improve the NPD efficiency and then contribute to the financial performance.

Finally, the correlation analysis is conducted between extracted potential factors and financial outcome from Japanese companies, in order to verify that whether these factors represent drivers in leading successful NPD operational performance can improve financial outcome. As a result, NPD performance has a positive effect on financial performance in a significant level except with the financial index of ROI. This result may be on account of time lagging effect and it should be noted in the future research.

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CHAPTER 3 SUPPLY CHAIN MANAGEMENT (SCM)

OPERATIONAL PERFORMANCE AND ITS

INFLUENTIAL FACTORS

Chapter Overview

This chapter, the SCM / Logistics Scorecard (LSC) has been utilized as a benchmarking instrument in this research, which is a very useful data collection tool and developed by Tokyo Institute of Technology (Tokyo Tech) in collaboration with Japan Institute of Logistics system (JILS) (Arashida et al., 2005). Based on the contribution of Huang (2006, 2008) and Yaibuathet et al. (2007, 2008) on SCM research by LSC data, this research also utilized the LSC data to investigate the SCM operational performance and its potential factors which constitute an efficient SCM in Japan and China not only in a national level perspective, but also in the different industries, firm sizes, ownership statuses and regions perspective, respectively. Chinese LSC scores are significantly different with Japanese but the SCM structure between Japan and China is very similar. As well, different industries, firm sizes, ownership status and regional disparity have significant impacts on SCM performance. And then, the relationship between SCM operational performance and financial performance has been discussed based on Japanese data, the results indicate SCM performance has a significant positive relationship with financial outcome, and IT utilization integrated with organizational strategy will yield better financial performance that implement them separately. Finally, the correlation analysis between SCM operational performance and Hofstede culture dimensions shows that SCM performance has a significant relationship with national culture, which suggests that in order to improve the international SCM performance, the culture differences should be taken seriously.

3.1 Research Background

As the result of information technology development and globalization of corporate activities, in order to respond quickly to the diversification of consumer demand and market change, the individual business in the 21st century, have no longer competed as a

solely independent entity, but rather as a supply chain. Companies associated in the same network require efficient supply chain integration to cooperate together in order to optimize their overall performance and achieve maximum benefits as a whole. Therefore, supply chain management (SCM) has been subsequently considered as a vital foundation for improving business competence. Moreover, numerous companies have started to appreciate that SCM could play a key role in building sustainable competitive advantage for their products in a highly competitive market (Jones, 1998).

3.1.1 A framework for supply chain and supply chain management

A supply chain is a system of organizations, people, activities, information and resources involved in moving a product or service from supplier to customer. Supply chain activities transform natural resources, raw materials, and components into a finished product that is delivered to the end customer. However, the definition of supply chain has not been unified yet, and researchers expound their views from different perspectives. There are several representative definitions as following:

Supply chain is a system whose constituent parts include material suppliers, production facilities, distribution services and customers linked together via the feed forward flow of materials and the feedback flow of information (Stevens, 1989).

A supply chain is a network of facilities that performs the functions of procurement of material, transformation of material to intermediate and finished product, and distribution of finished products to customers (Lee and Billington, 1993).

A supply chain is an integrated process wherein raw materials are manufactured into final products, then delivered to customers (via distribution, retail, or both), which contains four echelons (supply, manufacturing, distribution and consumers), where each level (or echelon) of the chain may comprise numerous facilities (Beamon, 1999).

In general, supply chain is a complicated system which contains intricate relationships among material flow, information flow and capital flow inside and outside of companies. In order to control and manage these relationships and improve the supply chain's competitive capability, supply chain management is necessary.

Supply chain management (SCM) often refers either to a process-oriented

management approach to sourcing, producing and delivering goods and services to end consumers or in a broader meaning that, to the co-ordination of the various actors belonging to the same supply chain (Harland, 1996), which is concerned with managing the upstream and downstream relationships with suppliers and customers to deliver superior customer value at the least cost to the chain as a whole (Christopher, 1998).

Simchi-Levi et al. (2000) defined SCM as a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system-wide costs while satisfying service level requirements.

Good supply chain management can help companies contribute to entering new markets, developing new products and new distribution channels, improving after-sales service level and customer satisfaction degree, reducing inventory cost, logistics costs, and unit production costs, and improving work efficiency and so on. Some famous international companies such as HP, IBM, Dell, etc, made great achievements in the supply chain management practice which was believed that supply chain management is an effective way to adapt to global competition in nowadays.

The difficulty of implementing SCM is that balance the relationship between individual company and the whole chain, because most of companies tend to have an “individual focus” or “inward-looking” or “self-focused” attitudes in the management approach (Holmberg, 2000), but fail to consider “inter-functional” or “partnership” or “chain-wide” areas for performance improvement (Lai et al., 2002). In order to solve these problems, an appropriate performance measurement is conducive to successful SCM implementation.

3.1.2 Measurement tool for supply chain operational performance

Supply chain performance evaluation is one the most important problems concerned by the managers and researchers, which has been defined as effectiveness and efficiency in accomplishing a given task in relation to how well a goal is met (Mentzer and Konrad, 1991). Therefore, supply chain performance measurement is noted as a significant tool to improve the efficiency of the whole supply chain, which also can help managers to diagnosis problems, monitor performance and enhance

motivation and communication and then to make the decision for driving continuous improvement of business and setting directions and guidelines for future strategies in the organization.

In recent years, with the development of information technology and other high technologies, SCM has become more and more difficult and complex. However, traditional performance measurements focus on supply chain within the enterprise performances or individual activities, which can promote the optimization of the function rather than the whole supply chain system. The key difficulty of SCM performance measurement system is hard to combine supply chain strategy and performance measurement synchronically. The difficulties are partly due to the complexity induced by the large number of related and interdependent activities in the supply chain. Understanding the interdependencies and the complex causal relationships in a supply chain is crucial to the successful management of these activities.

Systematic thinking offers a method for describing and analyzing problems in such contexts, therefore well suited to solving the complex and dynamic socioeconomic problems found in logistics systems today. However, the problems reported by many organizations show that the use of systems thinking is insufficiently developed, although it has been discussed for several decades (Stefan, 2000). Gunasekaran et al. (2001) has attempt to develop a framework for measuring the strategic, tactical and operational level performance in a supply chain, who also presented a list of key performance metrics such as dealing with suppliers, delivery performance, customer-service, and inventory and logistics costs in a SCM to make an effort to align and relate them to customer satisfaction.

In order to improve the effectiveness of supply chain models, Beamon (1999) thought performance measures must be selected that will allow for a more complete and accurate analysis, who also discussed the importance of a SCM system to achieve simultaneously a high level of efficiency, a high level of customer service and the ability to respond effectively to a changing environment. As well, in order to evaluate the supply chain management performance, a scientific and comprehensive analysis tool is valued very important, which was earlier noted as a significant element to improve efficiency of the entire supply chain. Meanwhile, suitable and accurate performance measures could be used to not only drive business improvement continuously but also set directions for future organizational strategies (Kuwaiti and Kay, 2000).

Roger (1999) considered that supply performance measuring should cover 10 aspects, such as: tangibles, reliability, responsiveness, competence, courtesy, credibility, security, access, communication, and understanding of the consumer. SCOR (supply chain operations reference model) developed by PRTM also proposed the following 11 evaluation indicators to measure supply chain performance, such as: order fulfillment cycle time, perfect order fulfillment, upside supply chain flexibility, upside supply chain adaptability, downside supply chain adaptability, supply chain management cost, cost of goods sold, cash-to-cash cycle time, return on supply chain fixed assets, return on working capital.

The existing SCM performance measurement tools did not consider balancing the short-term indices and long-term indices. Therefore, in order to overcome this gap, the SCM / Logistics Scorecard (LSC) has been encouraged to be developed by Tokyo Institute of Technology (Tokyo Tech) in collaboration with the Japan Institute of Logistics System (JILS) after conducting an extensive survey of existing scorecards (Arashida et al., 2004), which has been also utilized as a data collection tool for this research.

Research on supply chain performance evaluation measurements can help supply chain members to understand their extent of contribution to the overall performance of the whole supply chain and also can help them to distinguish and share the risk and distribute the interest from the supply chain. At the same time, it also can help supply chain managers understand the supply chain operation, the gap with competitors supply chain, establish performance benchmarking, improve the business process, and learn from the best supply chain to improve their competitive advantage.

3.1.3 International comparison of supply chain management

Under the current globalization environment with the emergence of global logistics management, in order to improve the SCM capability in one country or the whole world, the international comparison of SCM performance is necessary and important. In the context of analyzing linkage between SCM performance and other indicators, Harland (1997) carried out an empirical research by European automotive aftermarket data in non-vertically integrated supply chains in the UK and Spain. The results indicated that chains in different territories exhibited different operational requirements and position in the supply chain gave rise to different operational requirements.

Harrison and New (2002) conducted an international survey into the relationship between corporate strategy, supply chain strategy and supply chain performance management. The results show that the business units had a close link between their supply chain strategy and their supply chain technology, in comparison with those that reported a weaker link, displayed a consistent set of characteristics. Furthermore, Morash and Lynch (2002) investigated the relationship between supply chain capabilities and public policy in three global regions: North America, Europe and the Pacific Basin. The research finds that the public policy enabled customer service or more broadly, demand-oriented performance capabilities may confer greater competitive advantages than cost- and supply- oriented performance capabilities.

An alternative stream of interest emphasized on comparing supply chain environment cross-nationally. Yaibuathet et al. (2007) investigated operational performance and its potential factors which constitute an efficient supply chain operational performance in different countries, Japan, Thailand and China. The result indicates that the structure in generating successful SCM of Japanese, Thai and Chinese industry are not the same due to different operating environments. Similarly, Huang (2008) made a cross-national comparative analysis among Japan, China, Thailand, Korea and Finland, who indicated that the SCM performance and structure are different with each country, but there is a common SCM approach structure exists among five countries although consider culture difference.

The comparison researches on supply chain management components and their influences on organizational performance between US and Taiwan were conducted by Chow et al. (2008), who indicate that supply chain competence has positive influence on organizational performance, but the practice of supply chain management may be structurally or situation-dependent in different cultural environment. Further supported was provided by Closs and Mollenkopf (2004), who confirmed that supply chain competencies appear to be employed in different ways to create different performance advantage across the various business environment from comparison analysis among US, Australia and New Zealand.

There is hardly any previous research to have focused directly on comparing supply chain operational performance across different countries except the research from Yaibuathet et al. (2007) and Huang (2008). Therefore, this section attempts to conduct the international comparison on supply chain operational performance in various aspects, such as different industry, firm size and so on.

3.1.4 The relationship between SCM performances and financial performance

Supply chain management is based on the concept that integration across business operations is essential to business performance including customer satisfaction, value creation, exceptional returns and long-run competitive advantage (Tracey et al., 2005). Therefore, the relationship between supply chain operational performance and financial performance has been discussed by some researchers, and the existing researches suggest that supply chain practices have a significant impact on company's financial performance in two different aspects, directly and indirectly. Frohlich and Westbrook (2001) indicated that supply chain integration is directly related to superior business performance, and Rosenzweig et al. (2003) provided empirical evidence to confirm it again in the consumer products sector by the hierarchical regression analysis.

Tracey et al. (2005) indicated that strategically developing SCM capabilities enable a manufacturing firm to identify and take advantage of opportunities in the global marketplace and significant positive relationships exist among three types of SCM capabilities (outside-in, inside-out and spanning) and business performance (perceived customer value, customer loyalty, market performance and financial performance). This research also verified that the inside-out capability of supply chain showed significant positive direct effects on business performance, outside-in capability such as inbound transportation, material warehousing, inventory control and production support showed an indirect effect on the four performance measures, whereas, the spanning capability was found to have direct effects on the perceived customer value, customer loyalty, market performance, but indirect effect on financial performance.

Furthermore, Reiner and Hofmann (2006) presented an integrated benchmarking approach to confirm that efficient supply chains lead to high financial performance, especially lead to low cash to cash cycle time, high profitability and high revenue. Moreover, in order to improve the capability of SCM, the implementation of IT in SCM is very important and necessary, but the relationship between IT utilization and financial performance reveal mixed results, and there was no strong evidence for a direct relationship between them. Mukhopadhyay et al. (1995) conducted an empirical analysis by the performance data gathered from the assembly centers of Chrysler Corporation and indicated that IT can decrease substantial cost, improve product quality and get the tangible and intangible benefits from improving information exchanges between Chrysler and its assembly center suppliers as a result of using EDI technology.

However, an empirical study by Powell and Anne (1997) shows that IT alone has not produced sustainable performance advantage in the retail industry, but that some firms have gained advantages by using IT to leverage intangible, complementary human and business resource such as flexible culture, strategic planning, IT integration and supplier relationships. Furthermore, Melville et al. (2004) argued that IT is valuable to improve organizational performance, but the extent and dimensions are dependent upon firms' internal and external factors, such as complementary organizational resources of the firm and its trading partners, as well as the competitive and macro environment.

3.1.5 The Impact of national culture on the development of SCM performance

In addition to that, Institutional Environment (IE) is also one of the most significant factors for an achievement of SCM development, which is recognized to consist of various building blocks of a national setting and context, and forces within it may pressure local firms to retain traditional channel systems that are suboptimal from the perspective of supply chain innovations (Bello et al., 2004). According to Scott (2001), IE is composed by three elements, such as: regulative, normative and cultural-cognitive.

Regulative element refers to the demands of governments and regulatory bodies to comply with laws and other requirements, including the legal and regulatory mechanisms interpret societal standards in a country that effectively shape channel member actions.

Normative element mentions to a society's values and norms that direct behavior through social obligations and expectations, which prescribe how specified actors are to behave, imposing constraints as well as empowering social action and impact channels as local firms adopt certain modes of conduct and mimic the structures and processes of businesses that they consider legitimate.

Cultural-cognitive element refers to the socially mediated construction of a common framework of meaning that provides templates and scripts for action, which achieve compliance by providing actors with "prefabricated organizing models and scripts" making other types of behavior inconceivable for society, and sometimes may negatively impact the willingness and ability of the firm for institutional arrangement (Scott, 2001; Bello et al., 2004; Grewal and Dharwadkar, 2002; Yaibuathet et al., 2008).

In order to manage supply chains and improve the competitive capability, each chain player's role should be identified and recognized that different country's role may differ depending on the international environmental context and position in the supply chain. Fernie (1995) made a comparative analysis between US retailers and their counterparts in parts of Europe on the grocery industry sector. The research showed that the logistical environment differs markedly between and even within countries. The main reasons for these differences not only can be attributed to the intensity of price competition, conflict rather than collaboration between suppliers and retailers, commodity purchasing and holding of promotional stock and the varying rates of adoption of information technology, especially EDI usage, but also due to geography and distribution "culture", which will require the international marketer to assess all these factors in developing a logistics strategy for different country markets.

Wu (2004) indicated that the degree of trust, power, continuity and communication between supply chain partners would enhance commitment, and consequently promote the integration of the SCM business process. The level of affective commitment, continuance commitment, and normative commitment of supply chain partners would be helpful in the integration of the SCM business process. The ability of a strategy supply chain to engender cultural competitiveness, or joint entrepreneurship and learning aimed at filling market gaps, is a key path through which a strategic supply chain may become a competitive advantage (Ireland and Webb, 2007).

3.2 Purpose of This Chapter

The main purpose of this section is to analyze supply chain operational performance in a fast newly industrialized developing country -- China, including cross-national comparison with a developed country -- Japan. In order to achieve the main purpose, this research attempts are focusing on the following objectives.

The first research objective mainly focuses on analyzing and comparing supply chain operational performance between Japan and China not only in a national level, but also on the different industries and firm size perspective. Consequently, the influential factors which may impact on the success of SCM will be investigated and then attempt to verify that whether different countries produce different weights on approaches to SCM building. In order to derive these approaches, factor analysis has been conducted on the LSC data of each country.

The second research objective mainly focuses on measuring the supply chain operational performance among different ownership status and regional companies in China. As well as try to find the influential factors which impact the SCM operational performance for each kind of company.

The third research objective is trying to analysis the relationship between SCM operational performance and financial outcome, and to examine whether these influential factors represented as drivers in leading SCM operational performance can improve the financial outcomes of the focal companies.

The last research objective is to discuss the relationship between national culture and SCM operational performance, and to examine whether national culture has a significant impact on SCM performance.

3.3 Previous Research and Hypotheses

3.3.1 Comparative analysis of SCM performance between Japan and China

With China's accession to the world trade organization (WTO), as well as, the market economic system and modern enterprise system are established and become to perfection gradually, the competition which Chinese companies faced become internationalization and integration. Enterprises in China, especially in manufacturing industry, have to inevitably face more pressure in the global market competition. The comparison between Japan and China on SCM performance will help Chinese to understand more clearly about the development situation of Chinese SCM and then improve their SCM performance.

3.3.1.1 Comparative analysis on national level

Compared with developed countries, especially, the level of SCM in China has been lagging behind for many years (Chen and Yang, 2003). China's low labor cost has made China become the world's 'Manufacturing Factory', and won the competitive advantage for a while. Whereas, the low labor cost cannot substitute for efficient SCM and it also cannot establish successful SCM. Under the economic globalization context, the historical competitive advantage of low labor force and raw material costs fade away with the progress of economic development, Chinese enterprises must improve the level of their SCM to maintain their sustainable and stable development. However,

Japan, as a world leader in the manufacturing sector, is playing a very important role in the globalized economy. Especially, the method of production management in Japanese companies not only improves the production efficiency and competitive advantage for Japanese companies, but also has an essential influence on the development of the world's production and management.

There are some similarities between Japan and China, the successful experience of Japanese companies has a certain reference significance to the Chinese enterprises to improve their management capability in manufacturing. In addition, according to Closs and Mollrnpf (2004) that firms in different operating environments focus on different capabilities to their performance. In this research, the average scores of each item and area are viewed as the management ability both for Japan and China. Therefore, the following hypotheses have been derived:

Hypothesis 3.1a: Japanese SCM operational performance level is higher than Chinese in terms of their LSC assessment scores.

Hypothesis 3.1b: There are some common influential factors constitute the SCM structure, which could be considered as the approaches leading to success SCM, whereas the SCM structure between Japan and China is different.

3.3.1.2 Comparative analysis on different industry

SCM literature suggests that various companies have different levels of adoption of specific SCM strategies, which result in varying levels of organizational performance. According to Sengupta et al. (2006), there are several differences in the relative importance of the strategies across the industry sectors and have disparate impacts on perceived performance on specific SCM operational and financial performance, for example, operational performance in the service sector is more closely associated with the firm's approach to sharing information with supplier chain partners and the level of product customization relative to their competitors, while operational performance for manufacturing companies is predicted only by their strategy toward hedging risk.

Bruce et al. (2004) argued that the textiles and clothing industry does not neatly fit into either a lean or agile paradigm, but instead it is a combination of the two driven by low margins and volatility of demand, which would ensure fast product replenishment, the building and maintaining of supply chain partnerships and flexibility in response to

the volatility of demand from retailers. Lam and Postle (2006) also indicated that the differentiation of product demands into functional and innovative products helps the supply chain company to employ different supply chain strategies for different products, namely responsive supply chain strategy for innovative products and efficiency supply chain strategy for functional products, which are focused on the downstream supply chain aiming at shortening the time to reach the market and also to reduce the stock levels in the retailing industry.

Kotabe et al. (2003) conducted a comparative analysis on supplier performance improvement between U.S. and Japanese automotive industry, who found similar interaction patterns and highlighted that it is important to distinguish between simple techniques and higher-level technological capabilities when studying interfirm relationships, as well, who also emphasized that some differences should be taken into account, such as U.S. firms appear more willing to deal with new partners, while Japanese firms have been more reluctant to change partners. Yaibuathet et al. (2008) also confirmed that different industrial types focus on different areas of supply chain operational performances and the SCM operational performances are influenced by industry types, who also indicated that each industry has different characteristics and involved in different supply chain environments. Therefore, in this research, the LSC data from Japan and China covering several industries has been utilized and the following hypotheses have been proposed:

Hypothesis 3.2a: Supply chain operational performance is different among industries.

Hypothesis 3.2b: Japanese SCM operational performance level is higher than Chinese among different industries in terms of their LSC assessment scores.

3.3.1.3 Comparative analysis on different firm sizes

Some researches indicate that different firm size may have a significant influence on supply chain operational performance, and larger firms apply more formal management techniques on inventory management and modeling as well as more sophisticated information systems to deal with the increased complex environment that they face, who also suggested that entrepreneurs should not only make deliberate choices on what firm size suits them, but also what is the appropriate structure for it given the role they want to play in their supply chains (Haan et al. 2007).

It is well known that larger firms have advantages of greater financial resources and economies of scale in favor of outsourcing (Ono, 2003), and larger organizations are also expected to possess the financial resources and risk capacity necessary for new technology investments and will be associated with greater levels of supply chain technology (Patterson et al., 2003), while, lack of technical knowledge and resources inhibit technology adoption in small firms which also impede the development and implementation of supply chain operational performance in small firms (Cragg and King, 1993).

Ellinger (2003) conducted an empirical research which suggests that internet utilization in the supply chain is significantly influenced by firm size in the transportation industry. However, there is little research on the relationship analysis between firm size and supply chain operational performance, especially different supply chain operational performance among different firm size companies between Japan and China. Therefore, the hypotheses are derived as follows:

Hypothesis 3.3a: Supply chain operational performance is different among firm sizes, and large companies perform better than middle and small companies.

Hypothesis 3.3b: Japanese SCM operational performance level is higher than Chinese among different firm sizes in terms of their LSC assessment scores.

Hypothesis 3.3c: The supply chain structure is different among firm sizes in China.

3.3.2 Comparative analysis of SCM operational performance by Chinese data

It is commonly considered that numerous factors affect SCM operational performance. Cultural difference, ownership status, regional economic disparity and firm size could either improve or impede the ability of supply chain partners, which are resulted directly in the entire supply chain's operational performance (Hult et al., 2007; Yaibuathet et al., 2008; Su et al., 2008). In particular, the Chinese regional economy growth is lopsided that means the SCM operational performance in China is influenced by inter-provincial and inter-ministerial relationships (Luk, 1998; Huang, 2006). Meanwhile, the Chinese traditional cultures could affect the Chinese SCM significantly (Tian et al., 2008; Huang, 2008).

3.3.2.1 Comparative analysis on different ownership status

Ownership status is considered to be had a significant impact on logistics outsourcing, and foreign owned firms are more likely to use logistics outsourcing (Hong et al. 2004). Moreover, it is also considered to have some influences on SCM structure, and the influencing factors which establish SCM operational performance between multinational and local companies are different in Thailand, as well as an empirical research to indicated that multinational companies perform better supply chain operational performance that local companies in Thai industry (Yaibuathet et al., 2007).

Willmore (1986), Chibber and Majundar (1997), Okamoto and Sjihome (2000) also confirmed this result based on the developing countries' data, such as Brazil, India, Indonesia and so on. Huang (2006) also conducted an empirical research in China, the results indicated that the international companies or cooperated companies performance better than local companies, especially much better than state companies on SCM operational performance. However, Driffield and Girma (2003), Barbosa and Louri (2004) got the opposite result that multinational firms are less profitable than domestic firms based on the data from developed countries, including USA, UK, Greece and Portugal.

Despite the increased attention paid to SCM performance measurement, there haven't much literatures to compare supply chain operational performance among different ownership companies in China. The earlier research focused on comparing state ownership enterprises (SOEs), foreign ownership enterprises (FOEs), and private and individual enterprises (POEs) in other performance areas such as management model (Dai and Wang, 2010), innovation performance (Huang and Xu, 2009), human resources management performance (Zhao et al., 2008), capital productivity (Wu and Liu, 2007), and enterprise technology management (Zhu and Wu, 2005).

The purpose of this article is to provide empirical, comparative data and analysis of SOEs, FOEs and POEs in China whether they perform significantly different in the area of supply chain operational performance. Thus, the hypotheses in this section are:

Hypothesis 3.4a: Supply chain operational performance is different among ownership status and fFOEs outperform than SOEs and POEs.

Hypothesis 3.4b: The supply chain structure is different among ownership statuses.

3.3.2.2 *Comparative analysis on different regions*

It is widely observed that the economic development gap between regions in China is significant. After the reform and opening-up policies were launched and implemented in 1978, and during the country's ongoing process of transformation from a centrally planned economy to market economy, there have been major differences in the economic growth patterns experienced by different provinces. Indeed, there are considerable variations between the different provinces in terms of natural resources, geographical locations, cultures and habits, religions and beliefs, languages and the potential for economic development. Especially, the economic development policy for different regions is also different in China. As a result, economic development is unbalanced among China's eastern, central and western regions (Chen and Wu, 2005).

Numerous empirical studies have been devoted to regional disparities. Tsui (1993) indicated that regional development strategy plays an important role in determining whether regional development is balanced or unbalanced, and that placing restrictions on inter-regional migration causes increased disparities between urban and rural areas by using data on 434 Chinese cities over the period 1988-1990. Chen and Fleisher (1996) pointed out that convergence in the economic growth rates of different provinces is affected by various factors including the physical investment ratio, growth in the employed population, investment in human capital, FDI and whether or not a province is located in the coastal region.

Wei (1993) showed that the overflow effect created by the technology and management skills brought in by foreign companies tended to boost the economic growth rate in China. Fujita and Hu (2001) also indicated that globalization and economic liberalization had significant influence on increasing regional disparity, whilst Brun et al. (2002) found that the spillover effects had not been sufficient to reduce the disparities across Chinese provinces.

However, Demurger et al. (2002) pointed out that geography and policy had almost equal influence on coastal regional growth, although geography affected growth with a much longer lag than policy. The recent findings of Jones et al. (2003) also showed that China's preferential treatment for certain cities, by promoting their openness, can account for a large proportion of the differences in growth rates across cities. Huang (2006) made a simple comparative analysis on SCM performance between coastal and inland region, but there was no significant difference between these two regions.

There are lots of regional disparity studies conducted by researchers, and the regional economic disparity can impact China's overall economic growth which also influences the building of SCM in China. However, there is little comparative research on the supply chain operational performance among different regions in China. Therefore, this topic will be discussed in this research and the hypotheses have been proposed as follows:

Hypothesis 3.5a: Supply chain operational performance is influenced by regional disparity, and companies in the developed place outperform than other place in China.

Hypothesis 3.5b: The supply chain structure is different among regional companies.

Since, the ownership status and regional disparity make a difference to logistics and technology development, thus, the hypothesis is developed:

Hypothesis 3.5c: The interaction between ownership status and regional disparity has a significant influence on SCM operational performance.

3.3.3 Correlation analysis between SCM performance and financial outcomes

The relationship between SCM operational performance and financial performance has been discussed by many researchers, and more and more literatures suggest that SCM performance has a significant influence on financial performance in two different ways, directly and indirectly. Li et al. (2004) indicate that enhanced competitive advantage and increased organizational performance could improve the level of SCM practice which has a significant positive relationship with financial performance directly. Sengupta et al. (2006) point out that organizational strategy in SCM such as facility location, distribution network and transportation modes would directly improve financial performance in service companies. Yaibuathet et al. (2008) and Suzuki et al. (2006) also confirmed that improve SCM organizational performance can directly positively influence on financial performance, not only on the short term financial performance, but also on the long term financial performance. However, Vickery et al. (2003) argued that the relationship of supply chain integration and financial performance is indirect through customer service for first tier suppliers in the automotive industry.

Mover, in a time of shortening product life cycles, complex corporate joint ventures and stiffening requirements for customer service, information technology (IT) is necessary to consider the complete scope of SCM, from supplier of raw materials, through factors and warehouses, to demand in a store for a finished product (Davis, 1993). In order to improve the capability of SCM, the implementation of information technology (IT) in SCM is very important and necessary. Wu et al. (2006) also emphasized that organization strategy may serve as a catalyst in transforming IT related resource into higher added value for the firm performance. However, some studies empirically confirmed that IT utilization or investment fails to improve financial performance directly (Shin, 2001; Vickery et al., 2003; Yaibuathet et al, 2006, 2007; Suzuki, 2009). Consequently, the following hypotheses are proposed:

Hypothesis 3.6a: The common influential factors which represent as drivers in leading SCM performance have a positive influence on firm's financial performance.

Hypothesis 3.6b: The interaction between IT utilization and SCM organization strategy can yield more financial outcomes than implement them separately.

3.3.4 Correlation analysis between SCM performance and national culture

With the increasing globalization of business development, the importance of understanding national culture having influence on operational performance has been heightened. National culture is a valid way to explain differences in international operational decision-making (Pagell, et al., 2005), as well, it also influence on the firms perceiving the linkages of relationship and knowledge in their intra-cultural and intercultural exchanges, especially the magnitude of the associations between trust and commitment and between commitment and information sharing in intra-cultural relationship was significantly different between different cultures (Griffith, et al., 2006)

In order to manage supply chains and improve the competitive capability, each chain player's role should be identified in contributing to satisfying end customer requirements, recognizing that different country's role may differ depending on the international environmental context and position in the supply chain. The influence of national culture on the functioning of cross-national buyer-seller interactions has received considerable attention in the international business literature, which also can improve or impede the development of SCM performance (Freeman and Browne, 2004).

For example, one unique Chinese culture was characterized by the “Guanxi” or personal relationship (Jiang and Prater, 2002), which was recognized that the strong reliance on personal connection among the Chinese business people can greatly influence the development of SCM and logistics innovation in China. As while, Japanese culture was uniquely recognized as the “Keiretsu”, a highly coordinated family of independent firms linked by long-lasting, nearly unbreakable bonds, and which supported the development of SCM in Japan.

As mentioned cultural studies, the Hofstede culture dimensions is the most famous and which emphasized that the spread of business onto the global stage brings the issue of national and regional differences to the fore (Hofstede, 1993). According to his research, culturally-based values systems comprise five dimensions, such as: (1) Power distance, (2) Individualism / Collectivism, (3) Masculinity / Femininity, (4) Uncertainty avoidance, and (5) Long-term / Short-term orientation (Confucianism). In this research, the Hofstede culture dimension has been used to do the correlation analysis between culture and SCM performance. As a result, the hypothesis is derived:

Hypothesis 3.7: National culture has a significant relationship with SCM performance.

3.4 SCM / Logistics Scorecard (LSC)

Supply chain performance measurement is earlier noted as a significant foundation for improving the efficiency of the entire supply chain. Performance measures could be used not only for driving continuous improvement of business, but also setting directions for future strategies in the organization. Meanwhile, suitable and accurate performance measurement is considered beneficial to the improvement of SCM. A scorecard is a simplified benchmarking methodology to diagnose and evaluate various advantages and disadvantages of their business operations from the point of total optimization of SCM.

SCM / Logistics scorecard (LSC) has been developed since 2001 by Tokyo Institute of Technology (Tokyo Tech) in collaboration with Japan Institute of Logistics system (JILS). The scorecard was built after conducting surveys on various renowned SCM scorecards, such as Efficient Consumer Response (ECR), Standard ECR, Quick Response (QR), SCOR model and so on. The Hayashi's Quantification Method (Type III) classification was subsequently conducted to configure the position of each

scorecard between two dimensions: the performance-performance driver orientation and the managerial-technical orientation. As a result, none of the existing scorecards was considered to balance between these two dimensions. For this reason, the ultimate goal of LSC is to have a balance of these two dimensions together within a simple and versatile concept in order to get an easy database building process for benchmarking purposes (Arashida, et al., 2004).

Consequently, the LSC encompasses 22 assessment items based on four fundamental areas, which are (1) Corporate Strategy and Inter-Organization Alignment, (2) Planning and Execution Capability, (3) Logistics Performance, and (4) IT Methods and Implementation. Each assessment item is allocated into five-point scale from one to five. The detailed description of each level is also given indicating the 5th level as the best practice for each item. This method is different from the normal Likert-scale questionnaire, which, for example, gives statements and asks participants to judge themselves as strongly disagree (Level 1) to strongly agree (Level 5). With clearly provided information on each level, not only the respondents could identify themselves more precisely but also the bias among them could be reduced. The score of one integer and a half (for example 2.5) is also acceptable for managers who placed their companies between two levels.

Despite the generality of this scorecard, individual companies could perform their self-assessment, and then compare their performance with competitors in the same industry cluster as well as across sectors. The result of this assessment could indicate the strengths and weaknesses of the existing working method from an SCM perspective (Suzuki et al., 2007, 2009). The detail of LSC is presented in the Appendix B in Japanese, English and Chinese version.

Surveys on SCM of Chinese firms have been conducting for many years. However, along with progress in academics and practices, the questionnaires used in the former surveys cannot fulfill the requirements for the systematical SCM evaluation of the contemporary Chinese firms (Su et al., 2008). Furthermore, the LSC was found to be efficient to analyze the relationship between supply chain performance and its managerial performance (Arashida et al., 2004), investigate the correlation between institutional environment and supply chain operations (Yaibuathet et al., 2008), identify influential factors which determine the SCM performance and their impacts on financial bottom line indices (Suzuki et al., 2009). Therefore, SCM / Logistics Scorecard (LSC) could be considered practical for utilizing it as a data collection tool for this research.

3.5 Data Collection Process and Attributes

3.5.1 Data collection process

The LSC data collection has been carried out initially in Japan and then extended to China, Thailand, Finland and South Korea in order to expand LSC research scope to international comparisons. Accordingly, the LSC has been translated into other languages including English, Chinese, Thai, Finnish and Korean from its original version in Japanese.

The data collection process in Japan was launched in 2001 in cooperation with Tokyo Tech and JILS, which is a continuous process from 2001 to 2010. Putting the most priority on data reliability, most data were obtained by interviewing high-level managers. The company evaluation through LSC was executed after the interview, which were conducted to ensure the identical understanding to the respondents, for example, the instructions of using LSC. A feedback report was then sent back to each respective company. This report contained the results of the company compared with others in the same group of industrial type including the rank among competitors. Thus, the provided incentive could maintain the reliability level of the achieved data (Suzuki et al., 2009).

Then, the data collection has been extended to China from 2006 in cooperation with Tsinghua University, Xi'an Jiaotong University and Shanghai Jiaotong University. Most of the collection processes in China were followed those in Japan as well as targeted respondents, and all of these data were from the mainland China. However, Chinese data collection has been carried out without providing company feedback report (Huang, 2008).

Although at the time of writing, 1037 data have been collected from Japanese companies since 2001, because the LSC data collection has been launched in China since 2006, and in order to make the comparison analysis more objectively, only 554 Japanese data were used in this research, which have been obtained since 2006 and were consistent with Chinese data collection process. As for the Chinese companies, 236 valid data were successfully obtained. The category of LSC data both from Japan and China are shown in Table 3-1.

Table 3-1: Category of participating companies between Japan and China

	Japan	China
Food	70	9
Electronics	71	85
Automotive	99	16
Chemistry	93	39
Fiber	8	5
Pharmaceutical	17	1
Others	196	81
Total	554	236

According to the different ownership structure, the Chinese data can be classified into three ownership status types: state owned enterprises (SOEs), foreign owned enterprises (FOEs) and private and individual owned enterprises (POEs). Referring to the different annual turnovers, those obtained data can be divided into four firm sizes: small, middle, large and mega firms. Meanwhile, in accordance with the different per capita GDP in those provinces and cities, these collected data can be separated into two different regions: top 3 of GDP per capita regions and the others. The category of LSC data from China is shown in Table 3-2.

Table 3-2: Category of participant companies in China

Category	Number of company				Total
	Ownership Status				
	SOEs	FOEs	POEs	Unknown	
Small Firms	6	9	21	2	38
Middle Firms	23	41	45	4	113
Large Firms	10	21	6	0	37
Mega Firms	9	24	5	0	38
Unknown	2	3	1	4	10
Total	50	98	78	40	236

3.5.2 Reliability and data attributes

In order to ensure the reliability of LSC data which was used in this paper, the Cronbach's coefficient alpha was calculated during the data collection process. The results were shown in terms of Cronbach's coefficient alpha at 0.965 for 22 assessment

items from Japanese data and 0.957 from Chinese data. These results indicated that high reliability of LSC was ensured. As a result of the data collection process, the data attribute and the distribution of the total score (110) between Japan and China are shown in Table 3-3 and Figure 3-1. As the data attribute revealed, the average total scores between Japan and China were different. Also, the standard deviation, variance and range of Chinese data were larger than Japanese, which means that Chinese data showed higher degree of variation.

Table 3-3: Data attribute of total score between Japanese and Chinese companies

	Japan	China
Number of Data	554	236
Mean	62.53	65.94
Std.Dev	15.01	18.94
Variance	225.29	358.86
Median	61	67
Mode	54	83
Range	91	86
Maximum	105	110
Minimum	14	24

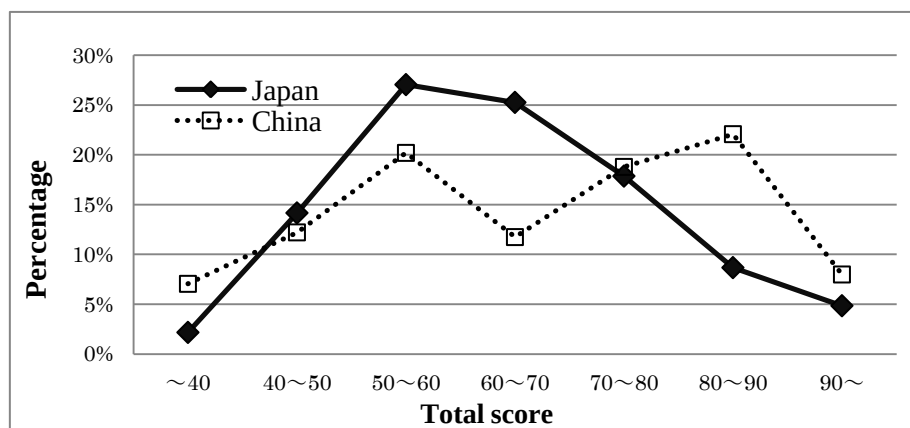


Figure 3.1: Distribution chart of LSC total score between Japan and China

From the distribution chart of total score between Japan and China, it could be observed that the Japanese data presents a normal distribution, while the Chinese data is shown as a bimodal distribution. This polarization of Chinese data distribution may be caused by regional and cultural disparity, which will be discussed in a further step in the followings. The average total scores of these two countries were found different and the Chinese companies produced high scores than those from Japanese companies.

3.6 Comparative Analysis on SCM performance between Japan and China

This section is to discuss the comparison between Japan and China in a national level as well as the approaches leading to success SCM between these two countries. Moreover, the comparative analysis among different industries and firm size between Japan and China on SCM performance has been also discussed.

3.6.1 Comparative analysis between Japan and China on a national level

First, the primary comparison between Japan and China has been analyzed by the raw scores. The average score and standard deviation of four fundamental areas have been calculated and represented in Table 3-4 and Figure 3-2. Since T-test is respectively conducted on total average score with each average area score to identify whether those scores are influenced by country difference, which is also presented in Table 3-4.

Table 3-4: Average scores of four areas between Japanese and Chinese companies

Assessment Item	Japan (554)		China(236) (128)		t-test
	Average	SD	Average	SD	
1. Corporate Strategy and Inter-Organization Alignment	3.06	0.71	3.35	0.90	-4.95**
2. Planning and Execution Capability	2.88	0.72	3.00	0.94	-1.88*
3. Logistics Performance	2.83	0.69	2.93	0.92	-1.78*
4. IT Methods and Implementation	2.91	0.75	2.88	1.02	0.51
Average Total LSC Score	2.91	0.64	3.04	0.86	-2.32*

*: 5% significant; **: 1% significant

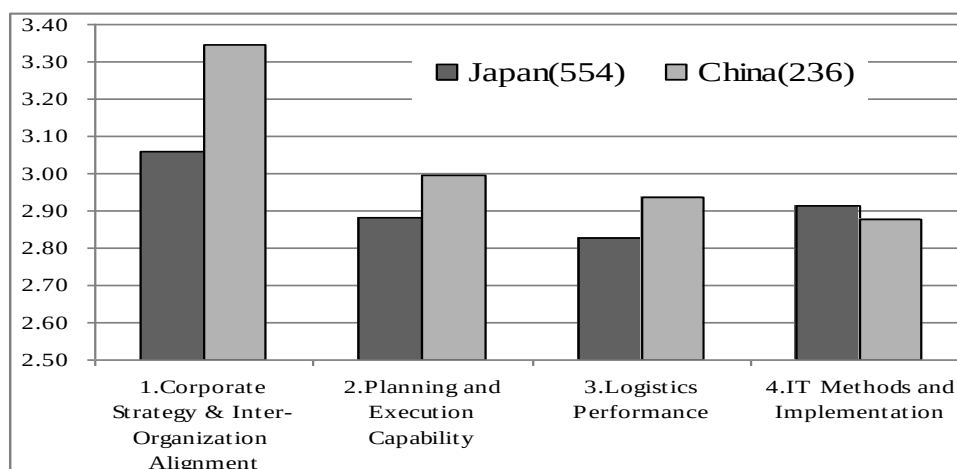


Figure 3.2: Average scores of four areas between Japanese and Chinese companies

Findings from t-test demonstrate that t-values of all average area scores except for area 4, are less than 0.05, confirming that those scores are statistically different. Chinese companies occupied higher scores than Japanese, especially in area (1) Corporate strategy and inter-organization alignment, taking up the biggest difference which was noticeable at a fairly high significant level. On the other hand, the area (4) IT methods and implementation was dominated by the Japanese companies but not significant.

The comparative result of each assessment item between Japanese and Chinese companies was also pointed out to recognize the strengths and weaknesses including the variation of those 22 items. This result is displayed in Figure 3-3 as a radar chart so as to make the data more understandable.

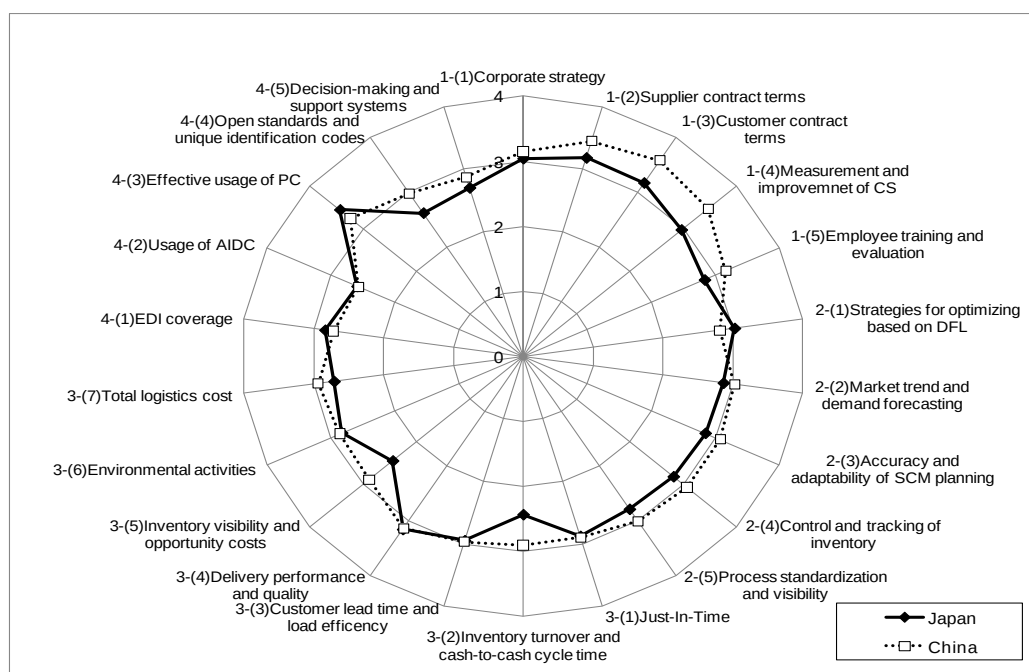


Figure 3.3: Radar chart of the LSC result between Japan and China

From the radar chart can be seen that the highest competence items for Japanese industry were revealed in the strategies for optimizing logistics system resources based on design for logistics (item 2-1), delivery performance and quality (item 3-4) and give great attention to environmental activities (item 3-6). Japanese companies also outperformed in using IT evolution such as introducing bar coding systems to synchronize the material and information flow, use electronic data interchange systems in the supply chains (item 4-1,4-2) and take effective usage of computers in operations and decision-making issues (item 4-3). On the other hand, Chinese companies took higher scores on the capability of SCM organization, especially on clarifying contracts

and sharing information with customers and suppliers, as well as improving employees' abilities to response to customer satisfaction. This conclusion was derived from the superior score in areas (1), (2) and (3).

Because of the Chinese data, around 42% of Chinese participants were FOEs, which maybe influence the overall China's SCM performance level, thus, the average score and standard deviation of four fundamental areas between FOEs and Chinese local companies have been calculated and represented in Table 3-5.

Table 3-5: Average scores of four areas between FOEs and Chinese Local companies

Assessment Item	FOEs (98)		Local (128)		t-test
	Average	SD	Average	SD	
1. Corporate Strategy and Inter-Organization Alignment	3.50	0.88	3.22	0.90	2.36*
2. Planning and Execution Capability	3.18	0.98	2.83	0.88	2.81**
3. Logistics Performance	2.99	0.96	2.86	0.88	1.04
4. IT Methods and Implementation	3.06	1.00	2.71	1.01	2.63**
Average Total LSC Score	3.18	0.90	3.04	0.86	2.38*

*: 5% significant; **: 1% significant

The results from t-test demonstrate that FOEs take significantly higher scores than local companies in China, except the area (3), and FOEs have a significant influence on Chinese overall SCM performance level. And then, the average score and standard deviation of four fundamental areas between Japanese and Chinese local companies have been calculated and represented in Table 3-6.

Table 3-6: Average scores of four areas between Japanese and Chinese local companies

Assessment Item	Japan (554)		China local (128)		t-test
	Average	SD	Average	SD	
1. Corporate Strategy and Inter-Organization Alignment	3.06	0.71	3.22	0.90	-2.25*
2. Planning and Execution Capability	2.88	0.72	2.83	0.88	0.63
3. Logistics Performance	2.83	0.69	2.86	0.88	-0.48
4. IT Methods and Implementation	2.91	0.75	2.71	1.01	2.57*
Average Total LSC Score	2.91	0.64	2.91	0.81	0.05

*: 5% significant; **: 1% significant

The result in Table 3-6 is different in Table 3-4, which confirmed again that FOEs have a significant influence on Chinese overall SCM performance level.

The preliminary comparison shows that the Chinese industry was found to occupy the higher scores with the higher degree of variation. Findings after the t-test confirmed that the SCM performance was statistically different between Japan and China. The **hypothesis 3.1a** that Japanese manufacturing has a higher score than Chinese in terms of their SCM performance assessments is not supported. The result of raw scores comparison between Japan and China could be explained by the following two reasons:

On one hand, around 42% of Chinese participants were FOEs, which could have obtained advanced knowledge, manufacturing standards and technologies, marketing and management systems from their mother companies in the US, Japan, Germany and so on. Those subsidiary companies must improve their competitive advantages by increasing the product quality, reducing inventory cost as well as leveling up the customer responsiveness instead of decreasing labor cost. Otherwise, the mother companies may relocate their manufacturing base to other countries which may influence the whole country's economy. Moreover, the domestic firms which confronted a high competition with foreign companies at home and abroad, who must improve their competitiveness, otherwise they would be eliminated in the competition environment.

On the other hand, the comparative results also can be explained by the different cultures in these two countries. According to Takada (2003), Japanese people tend to be self-critical or evaluate themselves negatively when they are under a competition-free situation and feel affective bonds to others. Since the Japanese respondents were told that the LSC evaluations were a contribution for academic research and their results would be kept secret, the modestly rating may be tracked down among Japanese participants. In addition, some studies indicate that, with the economic development, Chinese people become more and more individualistic, and they have a tendency to evaluate themselves rather leniency (Xie et al., 2006), therefore, it could be speculated that Chinese people may evaluate themselves higher than their actual performance.

Because the unexpected result between Japan and China by the raw scores, there is some weakness by the raw score comparison, thus, the factor analysis was carried out to verify the **hypothesis 3.1b** that there are some common influential factors constitute the SCM structure, whereas different between Japan and China.

Factor analysis is a statistical data reduction technique used to explain variability among observed random variables in terms of fewer unobserved variables, known as factors. In addition, this analysis could extract the influential factors, which determine

the operational performance of SCM, and determine whether Japan and China have distinctive managerial approach to SCM. The factor analysis was conducted separately with the data from each country, 554 samples from Japan and 236 from China.

The initial solution was performed by the principal axis factoring with the constraint of Eigen-value more than one. The result indicated that three factors were extracted from Japanese data with the cumulative contributions rate at 47.93%, whereas, two factors were obtained from Chinese data at the cumulative contributions rate of 54.47%. In order to simplify the factor comparison between these two countries, the number of Chinese extracted factors was limited to three during the principal axis factoring analysis. Therefore, three factors were obtained from Chinese data with the cumulative contribution rate at 57.34%. Varimax rotation was used during the process of factor analysis in order to remain the independent relations among the extracted factors. The factor matrix is shown in Table 3-7, and the items with factor loading more than 0.4 as well as the highest loading for each item are highlighted in dark.

Table 3-7: Rotated Factor Matrix of 554 Japanese and 236 Chinese samples

Assessment Item	Factor (Japan)			Factor (China)		
	1	2	3	1	2	3
1-(1)Corporate strategy regarding logistics and its importance	.354	.593	.235	.379	.270	.582
1-(2)Definition of supplier contract terms & degree of info sharing	.435	.555	.249	.249	.227	.700
1-(3)Definition of customer contract terms & degree of info sharing	.305	.591	.211	.159	.212	.660
1-(4)System for measurement and improvement of CS	.268	.530	.170	.415	.210	.602
1-(5)System for employee training and evaluation	.305	.615	.218	.395	.304	.481
2-(1)Strategies for optimizing logistics system resources based on DFL	.501	.388	.358	.399	.505	.374
2-(2)Understanding of market trends & accuracy of demand forecasting	.370	.272	.222	.484	.350	.423
2-(3)Accuracy and adaptability of SCM planning	.607	.303	.208	.516	.321	.430
2-(4)Control and tracking of inventory: accuracy and visibility	.669	.211	.242	.468	.344	.515
2-(5)Process standardization and visibility	.572	.436	.304	.546	.401	.457
3-(1)Just-In-Time	.586	.336	.398	.588	.427	.297
3-(2)Inventory turnover & cash-to-cash cycle time	.515	.318	.273	.672	.379	.240
3-(3)Customer lead time and load efficiency	.579	.217	.293	.590	.280	.252
3-(4)Delivery performance and quality	.484	.277	.315	.720	.227	.305
3-(5)Supply chain inventory visibility & opportunity costs	.546	.374	.275	.554	.431	.302
3-(6)Environmental activities	.117	.487	.307	.520	.295	.280
3-(7)Total logistics cost	.440	.366	.276	.594	.446	.323
4-(1)Electronic Data Interchange (EDI) coverage	.360	.150	.627	.283	.667	.199
4-(2)Usage of Bar Coding / AIDC	.291	.278	.579	.327	.647	.137
4-(3)Effective usage of computers in operations and decision-making	.227	.246	.433	.238	.600	.388
4-(4)Open standards and unique identification codes	.270	.411	.520	.331	.626	.395
4-(5)Decision-making systems and support to supply chain partners	.423	.380	.488	.339	.565	.336

According to the naming method from Yaibuathet et al. (2007), the extracted factors have been named as follows. From the Japanese findings, factor one shows

strong relationship with all items in area (2) and area (3) except the item 3-(6). Since these items may account for the agility and flexibility to market changes including the ability to respond to customer requirements, this factor is named as “*Responsiveness*”. Meanwhile, since factor two has high correlation with all the items from area (1) and environmental activities, which are related to the organizational issues in order to build up the efficient supply chain, it is entitled as “*SCM organization ability*”. Factor three is related to all items in area (4), therefore, it is named as “*IT utilization ability*”.

Since the raw score of each item in LSC can be considered as a result of the capability of these factors, these three factors are identified as the measurement indices for SCM operational performance of Japanese sector. The names of the extracted factors from Japanese data are interpreted as follows:

- **Factor 1:** *Responsiveness*;
- **Factor 2:** *SCM organization ability*;
- **Factor 3:** *IT utilization ability*;

In the same way, with respect to the results from Chinese companies, three factors have been defined as followed. The first factor is found to have high relationship with most items from area (2) and all items from area (3), thus, it is also called “*Responsiveness*”. Subsequently, the second factor is examined to identify the related items, which are all from the area (4) with some contents of 2-(1) that concerned with the strategies for optimizing logistics system resources based on design for logistics. Therefore, the specified name is “*IT utilization ability*” too. The uncovered final factor has strong correlation with corporate strategy and inter-organization alignment, in this case, “*SCM organization ability*” is designated for this factor.

Consequently, three factors are extracted from Chinese data to point out the structure of generating efficient supply chain for Chinese industry. The names of the extracted factors from Chinese data are named as followed:

- **Factor 1:** *Responsiveness*;
- **Factor 2:** *IT utilization ability*;
- **Factor 3:** *SCM organization ability*;

The result of the factor analysis reveals that the factors which identify their SCM competencies are considered to be similar between Japan and China. From the pattern

matrix, it is worthwhile to note that both Japanese and Chinese considered the SCM organization issues and technical issues independently. From the perspective of the way of thinking IT and organizational strategy, the **hypothesis 3.1b** is considered to be partially supported. However, the results indicated a slight contradiction to previous research that supply chain organization strategy and IT utilization were considered together as one factor extracted from factor analysis by Thailand and Finland data (Yaibuathet et al., 2007). The decisive difference could be explained by the fact that Japanese and Chinese people are all identified to the oriental Confucian culture and both of them have a high long-term orientation (Hofstede, 1994). They believe that the building of long-term collaboration with suppliers is very important, and the IT usage just plays a separated role as an enabler to achieve higher SCM performance. While, both Thailand and Finland seems to believe that effective IT utilization do assist in delivering right strategy about SCM throughout the organization as well as achieving a high degree of information sharing among business partners.

3.6.2 Comparative analysis between Japan and China on different industries

The purpose of this section is to demonstrate whether the SCM performance is significantly different among industry types between Japan and China. The method of One-way Analysis of Variance (One-way ANOVA) is used in this section. The total average score and average area scores from different industry are summarized and revealed in Table 3-8 ~ 3-9 and Figure 3-4 ~ 3-5 in terms of column chart.

Table 3-8: Summary of ANOVA test of variables among different industries (Japanese)

Industry Areas	Food (70)	Electronics (71)	Automotive (99)	Chemistry (93)	Fiber (8)	F-value
1. Corporate Strategy and Inter-Organization Alignment	2.65	3.02	3.25	3.02	2.88	7.651**
2. Planning and Execution Capability	2.82	3.10	2.94	2.78	2.75	2.594*
3. Logistics Performance	2.58	2.78	2.93	2.71	2.54	3.025*
4. IT Methods and Implementation	2.71	2.97	2.97	2.70	2.84	2.610*
Average Total Score	2.68	2.95	3.00	2.80	2.73	3.458**

*: 5% significant; **: 1% significant

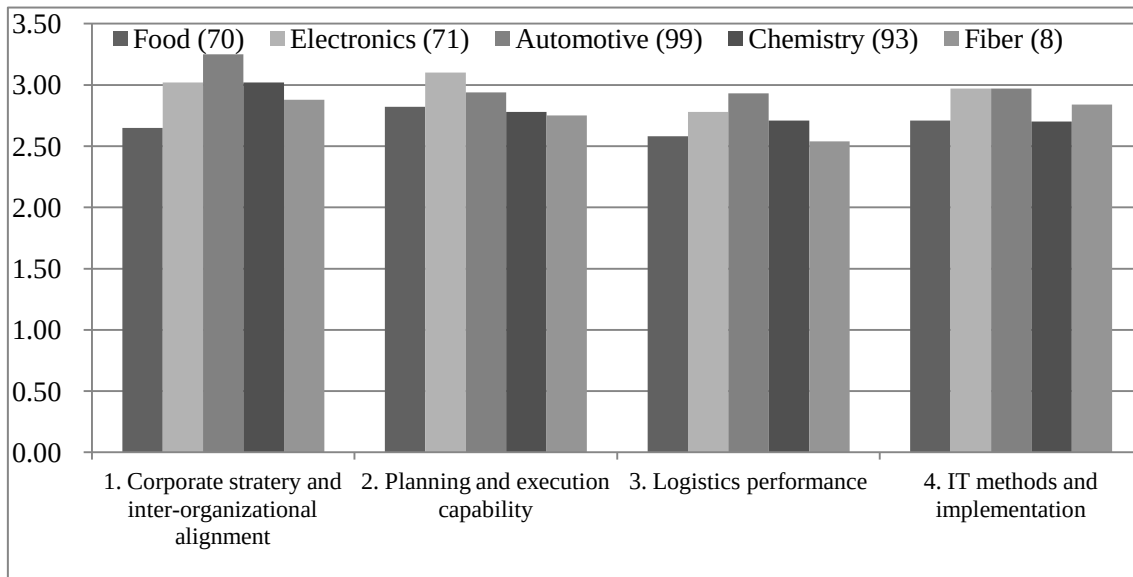


Figure 3.4: Summary of ANOVA test of variables among different industries (Japanese)

From the Japanese result can be seen that, the automotive industry take the higher average total score and areas scores than other industries, and the food industry take the lowest LSC scores among all kinds of industries. Results from one-way ANOVA indicate that, SCM operational performance in terms of LSC scores has been significantly different among industry types, especially, in the area (1) Corporate strategy and inter-organization alignment has a big difference among each industry than other areas, and the automotive industry take the highest score in this area and then the electronics industry. These industries are positioned in a highly competitive group, the close relationship and information sharing with supply chain partners are considered very important.

Table 3-9: Summary of ANOVA test of variables among different industries (Chinese)

Industry	Food	Electronics	Automotive	Chemistry	Fiber	F-value
Areas	(9)	(85)	(16)	(39)	(5)	
1. Corporate Strategy and Inter-Organization Alignment	2.74	3.62	3.56	3.01	3.50	4.389**
2. Planning and Execution Capability	2.63	3.26	3.23	2.66	2.82	3.343*
3. Logistics Performance	2.58	3.19	3.20	2.64	3.03	3.004*
4. IT Methods and Implementation	2.31	3.20	3.19	2.41	3.24	5.280**
Average Total Score	2.57	3.32	3.29	2.68	3.14	4.880**

*: 5% significant; **: 1% significant

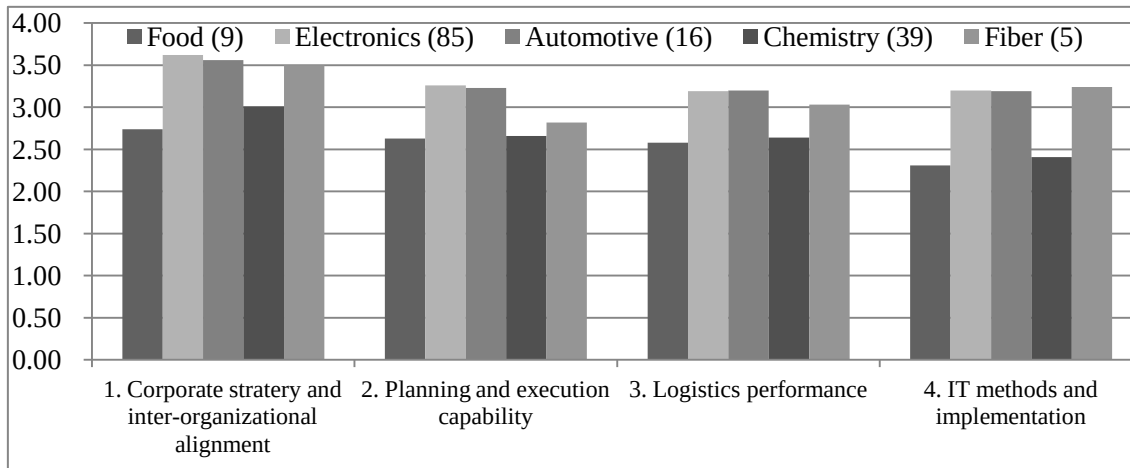


Figure 3.5: Summary of ANOVA test of variables among different industries (Chinese)

According to the Chinese result, the electronics industry take the higher average total score and areas scores than other industries, and the food industry take the lowest LSC scores among all kinds of industries too. From the result can be seen that, supply chain operational performance in terms of LSC scores has been significant different, especially, in the area (4) IT methods and implementation has a big difference among each industry than other areas, and the electronic, automotive and fiber industry take higher score in this area. All of these industries belong to the highly changeable and complicated group, the IT utilization and implementation can help them to accurate the data exchange and quickly respond to the market changes. Therefore, the **hypothesis 3.2a** is supported that SCM performance is significantly different among industries

Then, the comparative analysis between Japan and China on SCM performance among different industries has been conducted by the t-test. The results are shown in the Table 3-10.

Table 3-10: Average scores among different industries between Japan and China

Industry Areas	Food Average			Electronic Average		
	Japan	China	t-value	Japan	China	t-value
1. Corporate Strategy and Inter-Organization Alignment	2.65	2.74	-0.225	3.02	3.62	-4.497**
2. Planning and Execution Capability	2.82	2.63	0.525	3.10	3.26	-1.119
3. Logistics Performance	2.58	2.58	-0.010	2.78	3.19	-2.977**
4. IT Methods and Implementation	2.71	2.31	1.067	2.97	3.20	-1.568
Average Total Score	2.68	2.57	0.344	2.95	3.32	-2.893**

*: 5% significant; **: 1% significant

Table 3-10 (Cont.): Average scores among different industries between Japan and China

Industry Areas	Automotive Average			Chemical Average			Fiber Average		
	Japan	China	t-value	Japan	China	t-value	Japan	China	t-value
1. Corporate Strategy and Inter-Organization Alignment	3.25	3.56	-1.345	3.02	3.01	0.045	2.88	3.50	-1.452
2. Planning and Execution Capability	2.94	3.23	-1.116	2.78	2.66	0.719	2.75	2.82	-0.222
3. Logistics Performance	2.93	3.20	-1.067	2.71	2.64	0.400	2.54	3.03	-1.220
4. IT Methods and Implementation	2.97	3.19	-1.053	2.70	2.41	1.765	2.84	3.24	-0.845
Average Total Score	3.01	3.29	-1.217	2.80	2.68	0.829	2.73	3.14	-1.129

*: 5% significant; **: 1% significant

From the results shown in Table 3-10 can be seen that, Japanese perform better than Chinese in the chemical industry but not significant, whereas, Chinese take higher scores than Japanese in electronic, automotive and fiber industry, especially in the electronic industry has a significant difference. Therefore, the **Hypothesis 3.2b** is not supported. This unexpected result may be influenced by the foreign companies that more advanced technologies, know-how, management knowledge and methods learnt from developed countries by joint ventures or foreign companies, which prompt Chinese SCM operational performance to improve into a higher level. Because according to the “2013 report on foreign investment in China”, by the end of 2012, most foreign capital has been invested in the manufacturing industry, which have a great influence on the development of China’s manufacturing and also make China become the world’s factory. However, this result is still unbelievable, which may be explained by the culture differences that Japanese people are more modest whereas Chinese people are more lenient when they evaluate themselves.

In addition, focus on each assessment area the biggest difference between Japan and China is in the area (1) Corporate strategy and inter-organization. Because of China’s traditional culture that building of long-term collaboration with supply chain partners is very important. In order to build trust, loyalty and long-term stable relationship in China, one special Chinese culture called Guanxi must be taken seriously, which will influence business development in China and also may influence the SCM operational performance. Therefore, Guanxi will be discussed in this research in the Chapter 4.

3.6.3 Comparative analysis between Japan and China on different firm size

The purpose of this section is to demonstrate whether the SCM operational performance is significantly different among firm size between Japan and China. The method of One-way Analysis of Variance (One-way ANOVA) and factor analysis are used in this section.

From the viewpoint of turnover, the 236 Chinese respondents can be divided into four groups, as small firms, middle firms, large firms, and the mega firms. According to the “The division standard of Large, Middle and Small Enterprises” of China, the annual turnovers (in million RMB) for the small, middle, large and mega firms are [0, 50), [50, 500), [500, 5000), [5000, ∞), respectively. Because the division standard of firm size between Japan and China is different, in order to do the comparative analysis between Japan and China is more visualized and understandable, in this research according to the Chinese division standard, Japanese companies also divided into four groups. Figure 3-6 shows the proportion of participant companies with different firm size between Japan and China.

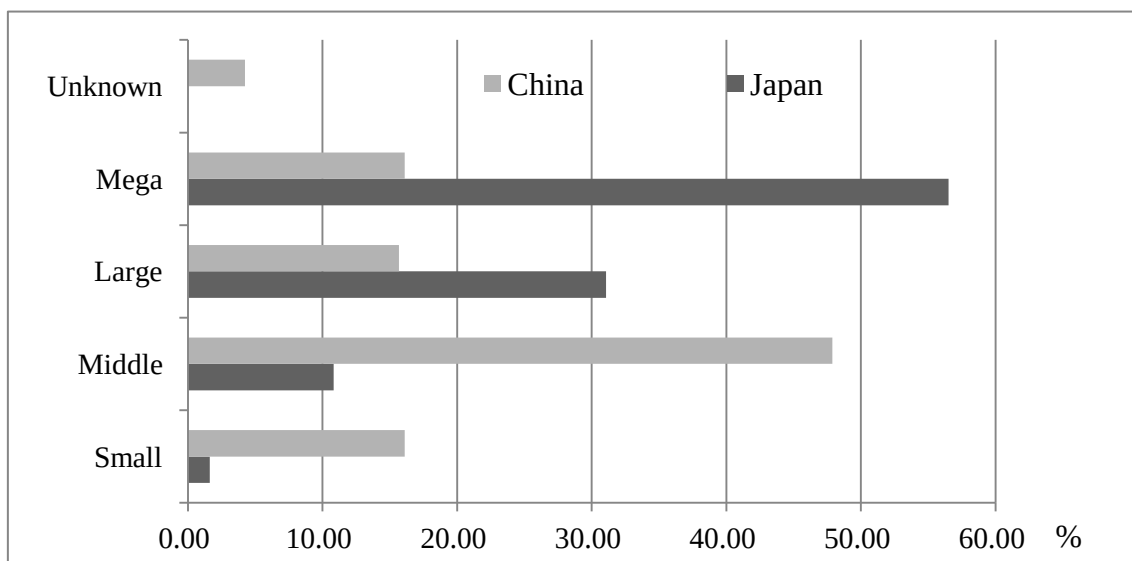


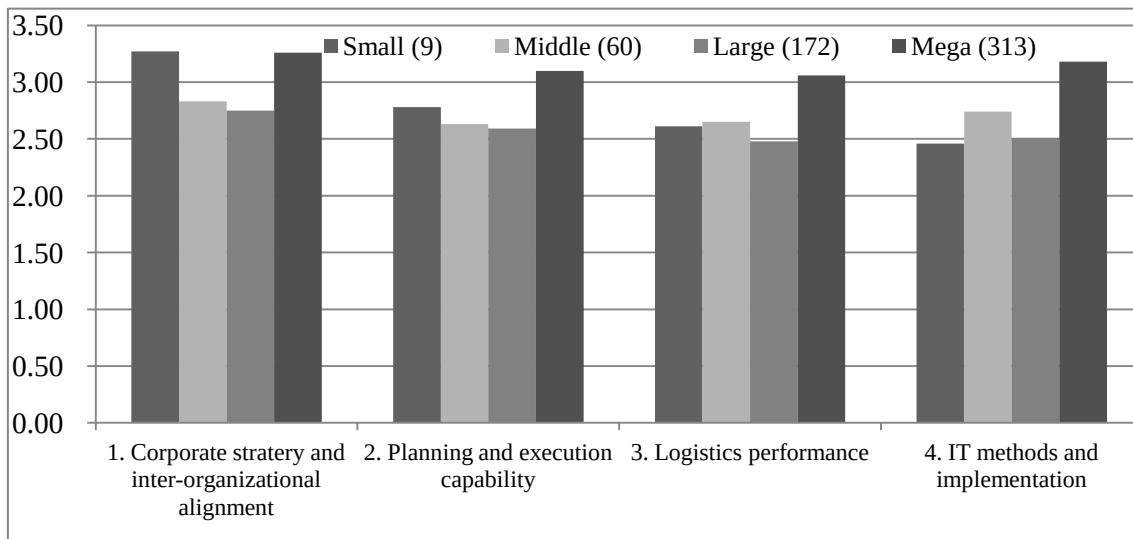
Figure 3.6: Proportion of Participant companies with different firm size between Japan and China

The average total score and average area scores from different firm size companies are summarized and revealed in Table 3-11 ~ 3-12 and Figure 3-7 ~ 3.8 in terms of column chart respectively.

Table 3-11: Summary of ANOVA test of variables among different firm size (Japanese)

Areas	Firm Size				F-value
	Small (38)	Middle (113)	Large (37)	Mega (38)	
1. Corporate Strategy and Inter-Organization Alignment	3.27	2.83	2.75	3.26	24.979**
2. Planning and Execution Capability	2.78	2.63	2.59	3.10	24.731**
3. Logistics Performance	2.61	2.65	2.48	3.06	31.600**
4. IT Methods and Implementation	2.46	2.74	2.51	3.18	37.921**
Average Total Score	2.76	2.71	2.58	3.14	37.674**

*: 5% significant; **: 1% significant

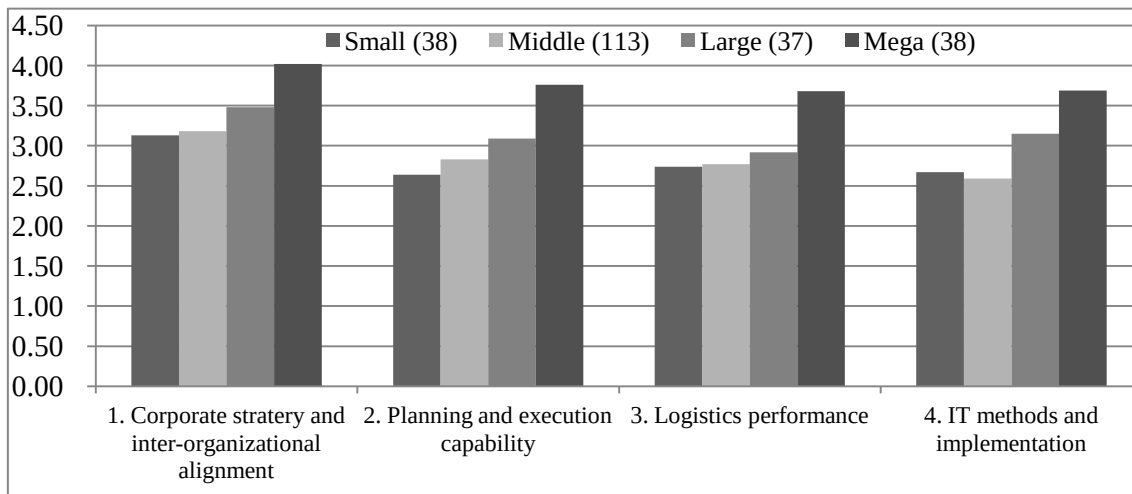
**Figure 3.7:** Average scores of four areas among different firm size companies

As the Japanese result shows, mega companies take the higher average total score and area scores than other companies, but the large companies take the lowest LSC scores among all kinds of firm size companies. However, the small companies seem to perform very good in Japan on SCM performance. Especially, in the area (4) IT methods and implementation has a big difference among each firm size companies than other areas. Results from ANOVA indicate that, supply chain operational performance in terms of LSC scores has been different, and the mega companies perform better than the other companies, but the large companies in Japan seem not to do better than small and middle companies, which is a very interesting result.

Table 3-12: Summary of ANOVA test of variables among different firm size (Chinese)

Areas	Firm Size				F-value
	Small (38)	Middle (113)	Large (37)	Mega (38)	
1. Corporate Strategy and Inter-Organization Alignment	3.13	3.18	3.50	4.02	10.852**
2. Planning and Execution Capability	2.64	2.83	3.17	3.76	13.580**
3. Logistics Performance	2.74	2.77	3.01	3.68	11.474**
4. IT Methods and Implementation	2.66	2.56	3.25	3.69	14.753**
Average Total Score	2.79	2.84	3.21	3.80	15.965**

*: 5% significant; **: 1% significant

**Figure 3.8:** Average scores of four areas among different firm size companies

According to the Chinese results, large and mega companies take the higher average total score and area scores than small and middle companies. Especially, in the area (4) IT methods and implementation also has a big difference among each firm size companies than other areas. This result is consistent with the conclusion of Rogers (2004), Patterson (2003) and Ellinger et al. (2003) that net works, website and other supply chain technologies are influenced by the firm size. Large companies may have more information to manage, and thus would be more likely to adopt IT systems to improve operational efficiency. In addition, more than 40% small and middle companies belong to the POEs, whereas more than 85% large and mega companies are from SOEs and FOEs. The SOEs and FOEs manage more resources, knowledge, technologies, know-how, experiences and so on than POEs in China, thus, the SCM performance has been significantly different among firm size, large and mega companies perform better than the middle and small companies. Therefore, the **Hypothesis 3.3a** is supported.

Then, the comparative analysis between Japan and China on SCM operational performance by LSC data among different firm size has been conducted by the t-test. The results are revealed in the Table 3-13.

Table 3-13: Average scores among different firm size between Japan and China

Firm size Areas	Small Average			Middle Average		
	Japan	China	t-value	Japan	China	t-value
1. Corporate Strategy and Inter-Organization Alignment	3.27	3.13	0.673	2.83	3.18	-2.622*
2. Planning and Execution Capability	2.78	2.64	0.784	2.63	2.83	-1.454
3. Logistics Performance	2.61	2.74	-0.570	2.65	2.77	-0.923
4. IT Methods and Implementation	2.46	2.67	-0.598	2.74	2.59	1.026
Average Total Score	2.76	2.79	-0.154	2.71	2.84	-1.113

*: 5% significant; **: 1% significant

Table 3-13 (Cont.): Average scores among different firm size between Japan and China

Firm size Areas	Large Average			Mega Average		
	Japan	China	t-value	Japan	China	t-value
1. Corporate Strategy and Inter-Organization Alignment	2.75	3.48	-4.763**	3.26	4.02	-6.464**
2. Planning and Execution Capability	2.59	3.09	-3.375**	3.10	3.76	-5.292**
3. Logistics Performance	2.48	2.92	-3.151**	3.06	3.68	-5.314**
4. IT Methods and Implementation	2.51	3.15	-4.289**	3.18	3.69	-4.015**
Average Total Score	2.58	3.14	-4.211**	3.14	3.80	-6.153**

*: 5% significant; **: 1% significant

From the result can be seen that, nearly all kinds of Chinese companies take higher LSC scores than Japanese companies in terms of their SCM performance items, therefore, the **Hypothesis 3.3b** is not supported. Meanwhile, the result also indicates that the larger the companies, the more significant difference between Japan and China. Focus on each area, there is more significant difference in the area (1) Corporate strategy and inter-organization alignment, which indicates that all of Chinese companies pay more attention on the relationship with supply chain partners to seek long-term cooperation. This unexpected result may be due to more than 85% large and mega companies belonging to SOEs and FOEs in China, who take abundant experiences on SCM performance, however, the result is still considered affected by the culture difference.

In order to verify the **Hypothesis 3.3c** that different firm size companies have different structure to constitute an efficient SCM performance, the factor analysis was carried out among the Chinese companies which were divided by the firm size criterion. In order to do the factor analysis more conveniently, these four kinds of firm size companies are divided into two groups: small-middle companies group and large-mega companies group.

As a result, three factors were extracted from small-middle companies with the cumulative contribution rate at 54.42%, whereas, two factors were obtained from large-mega companies at the cumulative contributions rate of 43.01%. In order to simplify the factor comparison between these two groups, the number of large-mega companies' extracted factors was limited to three during the principal axis factoring analysis. Therefore, three factors were obtained from large-mega companies with the cumulative contribution rate at 59.10%. Varimax rotation was used during the process of factor analysis in order to remain the independent relations among the extracted factors. The factor matrix is shown in Table 3-12 and the items with factor loading more than 0.4 as well as the highest loading for each item are highlighted in dark.

Table 3-14: Pattern Matrix of small-middle and large-mega firms from Chinese data

Assessment Item	Factor (small-middle 151)			Factor (large-mega firm 75)		
	1	2	3	1	2	3
1-(1)Corporate strategy regarding logistics and its importance	.368	.259	.567	.712	.226	.252
1-(2)Definition of supplier contract terms & degree of info sharing	.197	.178	.687	.730	.287	.147
1-(3)Definition of customer contract terms & degree of info sharing	.129	.117	.703	.533	.248	.150
1-(4)System for measurement and improvement of CS	.403	.179	.612	.669	.257	.248
1-(5)System for employee training and evaluation	.302	.258	.453	.559	.384	.438
2-(1)Strategies for optimizing logistics system resources based on DFL	.327	.534	.254	.583	.551	.233
2-(2)Understanding of market trends & accuracy of demand forecasting	.483	.351	.395	.394	.298	.663
2-(3)Accuracy and adaptability of SCM planning	.467	.306	.460	.325	.483	.543
2-(4)Control and tracking of inventory: accuracy and visibility	.467	.324	.499	.572	.361	.448
2-(5)Process standardization and visibility	.530	.430	.448	.441	.540	.420
3-(1)Just-In-Time	.580	.461	.253	.347	.645	.319
3-(2)Inventory turnover & cash-to-cash cycle time	.671	.360	.260	.231	.727	.317
3-(3)Customer lead time and load efficiency	.650	.253	.210	.347	.495	.233
3-(4)Delivery performance and quality	.724	.190	.274	.392	.543	.320
3-(5)Supply chain inventory visibility & opportunity costs	.499	.439	.272	.357	.609	.301
3-(6)Environmental activities	.544	.269	.283	.389	.349	.347
3-(7)Total logistics cost	.599	.453	.307	.384	.688	.262
4-(1)Electronic Data Interchange (EDI) coverage	.188	.680	.153	.171	.419	.554
4-(2)Usage of Bar Coding / AIDC	.242	.673	.056	.195	.303	.686
4-(3)Effective usage of computers in operations and decision-making	.221	.639	.208	.619	.255	.441
4-(4)Open standards and unique identification codes	.318	.631	.356	.403	.319	.532
4-(5)Decision-making systems and support to supply chain partners	.291	.553	.342	.205	.623	.341

From the small-middle companies' findings, three factors were determined. Compared the factor loading between entire Chinese and the small-middle companies from Chinese, it can be seen that, the factor structure is the same. Thus, the names of the extracted factors from small-middle companies are named as followed:

- **Factor 1:** *Responsiveness*;
- **Factor 2:** *IT utilization ability*;
- **Factor 3:** *SCM organization ability*;

According to the large-mega companies' result, factor one shows strong relationship with all items of area (1), item 2-(1) and 2-(4) which concerned about the logistics strategy and inventory management, and 4-(3) Effective usage of computers in operations and decision-making. Hence, this factor is also named as “*SCM organization ability*”. Meanwhile, factor two has high concern with area (2) Planning and execution capability, thus it is called “*Responsiveness*”. Factor three relates to market forecasting, planning and IT utilization, therefore, it is named as “*SCM planning and IT utilization*”. The names of the extracted factors from large-mega companies are named as followed:

- **Factor 1:** *SCM organization ability*;
- **Factor 2:** *Responsiveness*;
- **Factor 3:** *SCM planning and IT utilization*;

Similarly, according to the perspective of the way of thinking IT and organizational strategy, the factor analysis result appeared to support **Hypothesis 3.3c** that SCM performance structures of different firm size are different. The items that constitute each extracted factor are found to be different in each condition of firm size. It is also worthwhile to note that the observation from the small-middle companies' pattern matrix was same to the matrix from overall Chinese industry.

This result indicated that small-middle companies have influenced on the overall China's SCM structure. Meanwhile, a very interesting result was come out, that, in the previous research, the result showed that Chinese companies appeared to consider the technical issues are independently from other factors. But, in this section, the result shows that large-mega companies seemed believe that the appropriate implementation of IT and decision support system brings about the improvement in inventory control and visibility right through the SCM. This finding suffered greatest discrepancy from overall Chinese findings.

3.7 Comparative Analysis on SCM performance by Chinese LSC data

With the development of economic and increasing foreign investment in China, the enterprise ownership status presents diversified form, and the economic regional gap is also becoming bigger and bigger. Therefore, the comparative analysis on SCM operational performance among different ownership status and regions are worth to be discussed. This section focuses on the investigation of the inner comparison by Chinese LSC data on SCM performance as well as the approaches leading to success SCM.

3.7.1 Comparative analysis on different ownership status

The purpose of this section is to verify that SCM performance is different among ownership status. The method of One-way Analysis of Variance (One-way ANOVA) and factor analysis are used in this section among different ownership companies.

The Chinese companies could be mainly divided into three groups, namely: state owned enterprises (SOEs), foreign owned enterprises (FOEs) and private and individual owned enterprises (POEs). Pyke et al. (2000) conducted a comparative analysis on manufacturing and SCM in China among state-, collective- and privately-owned enterprises; Huang (2006) also did the similar research in China among state-, collective-, private-, foreign-owned and joint venture enterprises. Although the category of Chinese data could be classified into more than three categories, only three groups those SOEs, FOEs and POEs are divided and utilized in this study. It has been regarded that these three ownership companies have contributed to form the economic growth of China over the last 20 years (Clarke and Du, 1998). Average total LSC score including four area scores of surveyed enterprises are compared and revealed in Table 3-15 and Figure 3-9 in terms of distribution chart.

Table 3-15: Summary of ANOVA test of variables among different ownership status

Areas	Ownership			F-value
	SOEs (50)	FOEs (98)	POEs (78)	
1. Corporate Strategy and Inter-Organization Alignment	3.33	3.50	3.15	3.419*
2. Planning and Execution Capability	2.92	3.18	2.77	4.321*
3. Logistics Performance	2.89	2.99	2.85	0.572
4. IT Methods and Implementation	2.77	3.06	2.67	3.619*
Average Total Score	2.97	3.18	2.86	3.079*

*: 5% significant; **: 1% significant

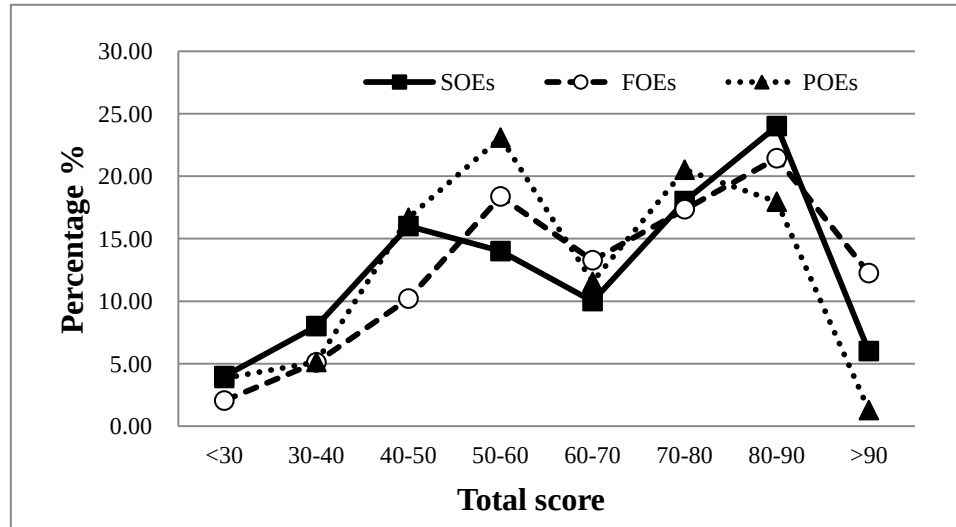


Figure 3.9: Distribution chart of total score among different ownership status

As initial results in the Figure 3-9 reveal that, FOEs occupies the higher average total score and area scores than SOEs and POEs. This comparison within China shows that, the FOEs group performs better than the SOEs and POEs in all areas, also the SOEs outperforms the POEs in all areas. This result is consistent with the conclusion of Sun et al. (2008), whereas different with the result for Huang (2006) that private companies perform better than other ownership enterprises, especially much better than state and collective companies. Compared to Huang's research, much more data are utilized in this study, thus, maybe the result in this research is more general in current days.

However, from the Table 3-15 can be seen that, the ownership status don't have a significant difference on area (3) Logistics Performance, that may because the China's logistics infrastructure is imperfect, and the logistics market is still under developing, therefore, the overall logistics performance efficiency is not very high compared to developed countries. Results from ANOVA reveal that, supply chain operational performance is different among ownership status and the foreign ownership enterprises (FOEs) outperform than the state ownership enterprises (SOEs) and private and individual enterprises (POEs). Therefore, the **Hypothesis 3.4a** is supported.

In order to authenticate the **Hypothesis 3.4b** that different ownership companies have different factor structure to constitute an efficient SCM operational performance, the factor analysis was conducted separately with the data from overall Chinese companies, which are divided into 50 SOEs, 98 FOEs and 78 POEs. The initial solution was performed by the principal axis factoring with the constraint of Eigen-value more

than one. The results suggested that three factors were extracted from SOEs, FOEs and POEs with the cumulative contribution rate at 64.63%, 63.71% and 50.51%, respectively. As a result, the rotated factor pattern matrixes of 50 SOEs, 98 FOEs and 78 POEs are given in Table 3-16. The larger factor loading of more than 0.4 indicated the strong relationship between each item and factor; therefore, the items with factor loading more than 0.4 as well as the highest loading for each item are highlighted in dark.

Table 3-16: Pattern Matrix of 50 SOEs, 98 FOEs and 78 POEs from Chinese data

Assessment Item	Factor (SOEs 50)			Factor (FOEs 98)			Factor (POEs 78)		
	1	2	3	1	2	3	1	2	3
1-(1)Corporate strategy regarding logistics and its importance	.452	.577	.348	.523	.423	.313	.130	.702	.123
1-(2)Definition of supplier contract terms & degree of info sharing	.169	.383	.722	.605	.321	.348	.118	.612	.139
1-(3)Definition of customer contract terms & degree of info sharing	.088	.239	.709	.538	.226	.306	.253	.576	.040
1-(4)System for measurement and improvement of CS	.463	.437	.510	.749	.227	.172	.128	.598	.360
1-(5)System for employee training and evaluation	.645	.261	.493	.589	.361	.280	.019	.441	.286
2-(1)Strategies for optimizing logistics system resources based on DFL	.534	.345	.467	.411	.627	.274	.536	.232	.153
2-(2)Understanding of market trends & accuracy of demand forecasting	.746	.336	.146	.665	.299	.347	.356	.519	.377
2-(3)Accuracy and adaptability of SCM planning	.362	.455	.286	.668	.318	.345	.459	.564	.289
2-(4)Control and tracking of inventory: accuracy and visibility	.356	.516	.437	.638	.421	.374	.310	.661	.158
2-(5)Process standardization and visibility	.633	.416	.342	.522	.611	.277	.353	.544	.447
3-(1)Just-In-Time	.619	.547	.264	.483	.592	.293	.455	.235	.509
3-(2)Inventory turnover & cash-to-cash cycle time	.606	.518	.139	.504	.633	.235	.428	.347	.506
3-(3)Customer lead time and load efficiency	.302	.701	.201	.513	.543	.096	.429	.217	.341
3-(4)Delivery performance and quality	.287	.722	.372	.510	.521	.189	.296	.273	.716
3-(5)Supply chain inventory visibility & opportunity costs	.350	.705	.266	.361	.718	.318	.510	.261	.310
3-(6)Environmental activities	.217	.598	.343	.423	.379	.464	.074	.180	.698
3-(7)Total logistics cost	.393	.686	.345	.311	.776	.356	.509	.416	.343
4-(1)Electronic Data Interchange (EDI) coverage	.683	.196	.166	.349	.345	.657	.684	.028	.178
4-(2)Usage of Bar Coding / AIDC	.785	.311	.000	.291	.270	.736	.565	-.002	.317
4-(3)Effective usage of computers in operations and decision-making	.577	.307	.486	.535	.368	.324	.778	.213	-.097
4-(4)Open standards and unique identification codes	.610	.255	.400	.436	.448	.522	.669	.353	.234
4-(5)Decision-making systems and support to supply chain partners	.567	.314	.188	.139	.711	.359	.581	.387	.107

From the SOEs findings, three factors are determined. The factor one shows strong relationship with all items of area (4) IT Methods and Implementation, most items of area (3) Logistics performance and 1-(5) Systems for employee training and evaluation. Since these items may use IT method to account for the agility and flexibility to market changes including the ability to respond customer requirements. Hence, this factor is named as “*IT utilization and responsiveness*”. Meanwhile, factor two had high concern with the inventory and cost, so it was entitled “*Inventory and cost control*”. The third factor related to information sharing with supplier and customer, therefore it was defined as “*Information sharing*”.

These three factors are identified as the measurement indices for SCM operational performance of SOEs sector. The names of the extracted factors are interpreted as follows:

- **Factor 1:** *IT utilization and responsiveness;*
- **Factor 2:** *Inventory and cost control;*
- **Factor 3:** *Information sharing;*

With respect to the results from FOEs, the three factors are defined as follows that the first factor is found to have the high relationship with area (1) and most items from area (2), so it is called “*SCM organization ability*”. Subsequently, the second factor was examined to identify the related items, which are the items of area (3) and implementation with some contents of 2-(1) and 2-(5) that concerned with the SCM process. Therefore, the specified name is “*SCM performance*”. The last factor has strong correlation with the IT method and implementation, in this case, “*IT utilization*” is designated for this factor.

Consequently, three factors are extracted from FOEs data to point out the structure of generating efficient supply chain for FOEs companies, which are named as followed:

- **Factor 1:** *SCM organization ability;*
- **Factor 2:** *SCM performance;*
- **Factor 3:** *IT utilization ability;*

In terms to the results from POEs, the three factors represented as that, the factor one appeared to take high correlation with the area (4), concerned the customer lead time and cost. Hence, it is entitled as “*IT utilization and cost control*”. The second extracted factor focuses on area (1) and most items of area (2), therefore, it is defined as “*SCM organization ability*”. While the third factor concerns the ability of supply chain execution, so, it represented as “*Responsiveness*”. The names of these three factors are interpreted as followed:

- **Factor 1:** *IT utilization and cost control;*
- **Factor 2:** *SCM organization ability;*
- **Factor 3:** *Responsiveness;*

Similarly, according to the perspective of thinking IT and organazional strategy, the

factor analysis result appeared to support the **Hypothesis 3.4b** that SCM performance structures of different ownership are not similar. The items that constitute each extracted factor are found to be different in each condition of ownership status. It is also worthwhile to note that the factors of SOEs are somewhat similar with the POEs', but both of them are different with the FOEs'. This result also indicates that culture has an influence on the structure of the supply chain management.

Meanwhile, in this section, the result shows that FOEs seemed believe that the appropriate implementation of IT should integrate with the SCM organization ability. Moreover, the IT support could assist in delivering organization strategy regarding SCM all over supply chain member, which may possibly ensure that every business partners are directed at the same target. However, this finding suffers greatest discrepancy from overall Chinese findings.

3.7.2 Comparative analysis on different regions

The purpose of this section is to make a statistic test for that whether regional disparity influences SCM operational performance in a significant level. The methods of t-test and factor analysis are used in this section between different regions.

The economical difference between regions is very significant in China, not only between coastal and inland region as well as the east and west region, but also within the coastal or east regions (Chen and Zheng, 2008). Per capital GDP is often used as a very important indicator to evaluate the economic development situation of one country or region. Because in recent 10 years, the top 3 of per capital GDP regions among all provinces, municipalities and autonomous regions in China have been always Shanghai, Beijing and Tianjin, which are significant higher than other places. Therefore, in this research, the 236 respondents from 17 different provinces and municipalities can be divided into two groups, as the top 3 of per capital GDP regions which named the developed regions group, and the other regions which named the developing regions group. Thus, the comparative analysis is conducted between these two groups, and the regional disparity in China by per capital GDP is shown in the Figure 3-10.



Figure 3.10: The regional disparity in China by per capital GDP

The average total score and average area scores from these two different regional groups in terms of SCM operational performance items are summarized and revealed in Table 3-17 and Figure 3-11 by the distribution chart.

Table 3-17: Average scores of four areas between different regions

Region Areas	Developed (67)		Developing (158)		t-value
	Ave.	SD	Ave.	SD	
1. Corporate Strategy and Inter-Organization Alignment	3.56	0.88	3.30	0.87	2.05*
2. Planning and Execution Capability	3.19	0.97	2.94	0.89	1.91
3. Logistics Performance	3.20	0.88	2.85	0.90	2.64*
4. IT Methods and Implementation	3.30	0.89	2.71	1.00	4.16**
Average Total Score	3.32	0.83	2.95	0.83	3.10**

*: 5% significant; **: 1% significant

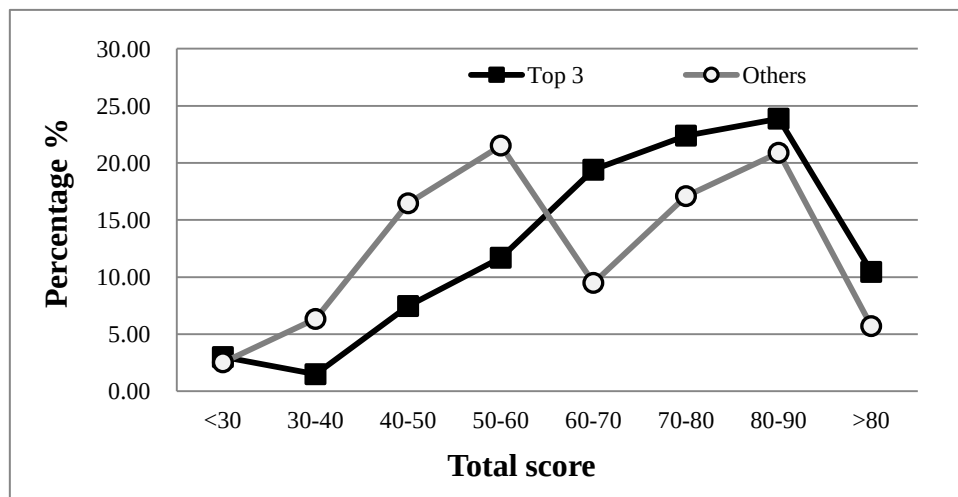


Figure 3.11: Distribution chart of total score between each region

From the distribution chart could be observed that two populations have different format of data distributed. The developed regions group shows a form of skewness distribution to the left while the developing regions group is shown as a bimodal distribution. The average total score of these groups are found at different level where the developed regions produced higher scores than the developing regions. Further investigation has been carried out in detail for each area of assessment as shown in Table 3-15. As a result, it is clearly noticed that the companies which in the developed regions performed better than the developing regions with a fairly high significant level almost in each area, especially in the area (4) IT methods and implementation.

This result could be explained that the economic reform and development are unbalanced in China. The coastal regions, especially Shanghai, Beijing and Tianjin, these kinds of international metropolises have a good industrial infrastructure and sound internal and external communications links, which provide these regions with a distinct location advantage during the period of institutional transformation (Chen and Wu, 2005). Especially, the IT and telecommunication infrastructure construction, high-tech personnel education and training in these metropolis are much better than other places in China, which is the reason why there is a big difference between the developed and developing regions on the area (4) IT methods and implementation in a significant level. In addition, since the distinct location advantages, human resources, good infrastructure facilities, institutional environment, not only foreign direct investment (FDI) but also domestic investment are mainly concentrating on the eastern coastal regions in China, thus, which will promote these regions' economic development and improve their operational performance. Consequently, the **Hypothesis 3.5a** is supported.

According to the “2013 report on foreign investment in China”, the eastern region has always been the major areas of absorbing FDI in China, and by the end of 2012, the proportions of foreign investment projects and the actual use of foreign investment in eastern region are accounting for 83.5% and 85.9% of the country’s cumulative total, as well as, the central region are 10.6%, 8.0% and the western region are 5.9%, 6.1%, respectively. The data is represented in the Table 3-18.

Table 3-18: China's regional distribution of foreign investment by the end of 2012

	Foreign investment projects		Actual use of foreign investment	
	Number	Proportion (%)	Amount (billion USD)	Proportion (%)
Eastern region	637368	83.5	1098.45	85.9
Central region	80963	10.6	102.48	8.0
Western region	44947	5.9	77.98	6.1
Total	763278	100	1278.90	100

(Source: The ministry of commerce foreign statistics)

Because the gap of GDP and per capital GDP among all provinces in China is so big that economic development from the richest provinces to the poorest provinces is like the economic development from the developed country to the underdeveloped country. As well, in the developed region, due to the influence of foreign investment, especially the influence from the developed countries such as the US, Japan, Germany, and so on, the way of operational performance may difference between developed region and developing region. Therefore, the comparative analysis on the SCM structure between different regions is worth to be discussed. In order to verify the **Hypothesis 3.5b** that regional disparity have an influence on the SCM structure to constitute efficient SCM performance, the factor analysis was carried out among different regions.

As a result, four factors were obtained from developed region with the cumulative contribution rate at 62.86%, whereas, three factors were obtained from developing region at the cumulative contributions rate of 56.73%. In order to simplify the factor comparison between these two groups, the number of developed region’s extracted factors was limited to three during the principal axis factoring analysis. Therefore, three factors were obtained from developed region with the cumulative contribution rate at 58.50%. Varimax rotation was used during the process of factor analysis in order to remain the independent relations among the extracted factors. The factor matrix is shown in Table 3-19, and the items with factor loading more than 0.4 as well as the highest loading for each item are highlighted in dark.

Table 3-19: Pattern Matrix of developed and developing regions by Chinese data

Assessment Item	Factor (developed 67)			Factor (developing 158)		
	1	2	3	1	2	3
1-(1)Corporate strategy regarding logistics and its importance	.295	.195	.689	.337	.640	.302
1-(2)Definition of supplier contract terms & degree of info sharing	.166	.162	.586	.273	.702	.166
1-(3)Definition of customer contract terms & degree of info sharing	.189	.171	.788	.138	.618	.178
1-(4)System for measurement and improvement of CS	.273	.238	.706	.408	.558	.251
1-(5)System for employee training and evaluation	.250	.520	.433	.395	.472	.275
2-(1)Strategies for optimizing logistics system resources based on DFL	.632	.422	.297	.287	.430	.465
2-(2)Understanding of market trends & accuracy of demand forecasting	.509	.603	.227	.388	.464	.344
2-(3)Accuracy and adaptability of SCM planning	.333	.705	.237	.490	.484	.291
2-(4)Control and tracking of inventory: accuracy and visibility	.375	.629	.317	.441	.605	.311
2-(5)Process standardization and visibility	.603	.541	.285	.524	.507	.374
3-(1)Just-In-Time	.684	.317	.200	.566	.319	.446
3-(2)Inventory turnover & cash-to-cash cycle time	.508	.617	.204	.664	.270	.324
3-(3)Customer lead time and load efficiency	.438	.382	.327	.665	.219	.236
3-(4)Delivery performance and quality	.584	.258	.256	.740	.324	.220
3-(5)Supply chain inventory visibility & opportunity costs	.445	.465	.255	.463	.364	.438
3-(6)Environmental activities	.597	.242	.330	.576	.265	.237
3-(7)Total logistics cost	.818	.243	.306	.582	.361	.419
4-(1)Electronic Data Interchange (EDI) coverage	.462	.431	.110	.224	.175	.719
4-(2)Usage of Bar Coding / AIDC	.189	.757	.088	.312	.119	.659
4-(3)Effective usage of computers in operations and decision-making	.284	.464	.415	.220	.367	.602
4-(4)Open standards and unique identification codes	.213	.659	.296	.330	.433	.594
4-(5)Decision-making systems and support to supply chain partners	.696	.208	.198	.279	.416	.522

From the developed regions' findings, three factors were determined. The factor one showed a strong relationship with most items from area (3) and some items about strategies optimizing, process standardizing and decision making for supply chain management, and thus, it was named "*SCM performance*". The second factor was examined to identify the related items, which were the items of area (2) and (4), and implementation with some contents of 3-(2) and 3-(5) that concerned with the inventory. Therefore, the specified name was called "*IT utilization and inventory control*". The last factor had strong correlation with the area (1), which mainly about the information sharing and organizational strategy; in this case, "*Information sharing and organization strategy*" was designated for this factor.

Consequently, three factors were extracted from developed regional companies to point out the structure of generating efficient supply chain for developed regional companies, which are named as followed:

- **Factor 1:** *SCM performance*;
- **Factor 2:** *IT utilization and inventory control*;
- **Factor 3:** *Information sharing and organization strategy*;

With respect to the results from developing regions, the three factors were defined as follows that the first factor was found to have the high relationship with area (3) and item about SCM planning, so it was called “*Responsiveness*”. Subsequently, the second factor was examined to have high concern with area (1) and some items about market forecasting and inventory controlling, therefore, this factor was named as “*SCM organization ability*”. Since, the last factor had related to area (4) and item about strategies optimizing based on DFL, hence, “*IT utilization ability*” was designated for this factor. These three factors were identified as the measurement indices for SCM performance of developing regions, which are named as follows:

- **Factor 1:** *Responsiveness*;
- **Factor 2:** *SCM organization ability*;
- **Factor 3:** *IT utilization ability*;

Similarly, according to the way of thinking IT and organization strategy, the **Hypothesis 3.5b** was supported that SCM performance structures between different regions are different. Similarly, from the factor analysis result can be seen that, the SCM structure between developing regions and overall Chinese is similar which also indicated that developing regions may have more influences on the way of SCM operational performance in overall China.

Then, the extracted influential factors which represent China’s SCM competency and the method of Two-way Analysis of Variance (Two-way ANOVA) were conducted in order to demonstrate whether the interaction between ownership status and regional disparity has a significant impact on supply chain operational performance. The result of the Two-way ANOVA is revealed in Table 3-20.

Table 3-20: Result of two-way ANOVA (Ownership status × Regional disparity)

	Responsiveness	IT Utilization Ability	SCM Organization Ability
Ownership status	0.109	1.588	5.236*
Regional disparity	0.374	14.229**	0.201
Ownership * Region	0.132	0.019	2.601*

*: 5% significant; **: 1% significant

Result from the Two-way ANOVA indicates that the ownership status has a significant on SCM organization strategy, regional disparity make a difference to IT

utilization in a strong significant level, while, the interaction between ownership status and regional disparity influences the SCM organization ability. The result also confirms that the way of thinking IT utilization is significantly different between developed and developing region, and the SCM structure between these two regions is different.

Since the culture differences have significant impact on the different ownership companies' organizational culture and operational performance. As for the Chinese people, make a long-term relationship with customers and suppliers is one of good representative capabilities for the SCM organization ability. Because policies, infrastructures, physical capital, labor market and human capital are different among eastern, central and western regions, result in the significant difference on IT utilization ability among different regions' companies. Ownership status synergy regional disparity has significant meaning on the SCM organization ability, which once again confirms that Chinese people believe the building of long-term collaboration with supply chain partners is very important, and the IT usage just plays a separated role as an enabler to achieve higher SCM performance. Thus, **Hypothesis 3.5c** is considered to be supported.

3.8 Correlation Analysis

3.8.1 Correlation Analysis between SCM Performance and Financial Outcome

In this section, correlation analysis was conducted to analyze the relationship between three factors which were extracted from LSC data and the financial bottom line indices in order to verify that whether these factors represent as drivers in leading successful SCM operational performance to the financial outcome.

During this process of correlation analysis, the independent variables were companies' scores for the extracted three factors and the dependent variables were companies' indices of financial outcome. According to previous research (Yaibuathet et al., 2007) some time-lag considerations which reflect SCM operational performance to the managerial effectiveness have to be taken into account. Theoretically, it could be considered that efficient SCM operational performance could lead to better inventory management, and then, inventory reduction could lead to enhance better cash flow and ROA in a time-lag process. Thus, the following time-lagged data of the financial bottom line indices were used, that is, the inventory turnover period in the same year when the LSC data were collected, one year later for cash flow and two years later for ROA (in this research, ROA means the operating profit divide the total assets).

Since the financial data from China is very difficult to be collected, and the numbers of financial data from China were only 24, it was too limited to be analyzed in this section. Moreover, the reliability of Chinese financial data is not so good, therefore, only the Japanese data were utilized to explore the correlation analysis between each factor and the corresponding company's financial bottom line indices such as ROA, cash flow (CF) and the inventory turnover period (ITP) which were obtained from Nikkei Economic Electronic Databank System CD-ROM (NEEDS). The result of correlation analysis is shown in Table 3-21.

Table 3-21: Correlation between SCM operational performance and financial indexes (Japan)

N=229	ROA	CF	ITP
Responsiveness	-0.004 (0.473)	0.014 (0.416)	-0.144* (0.015)
SCM Organization Ability	0.114* (0.042)	0.125* (0.029)	0.089 (0.091)
IT Utilization Ability	0.108 (0.051)	0.060 (0.183)	-0.075 (0.130)
Org. × IT	0.140* (0.017)	0.128* (0.026)	0.003 (0.484)

. *: 5% significant

Focusing on independent effect of each factor, it can be seen that, Responsiveness had a significant impact on inventory turnover period, which indicated that improvement in the ability to respond to market could reduce the inventory turnover period. SCM organization ability took a significant positive correlation with ROA and CF, while IT utilization ability was found to have little relation with these three selected financial indices. The **Hypothesis 3.6a** is considered to be supported.

Since an improvement in the ability of responsiveness could reduce inventory turnover period, thus this operational performance factor has a short-term effect on financial performance. Meanwhile, enhancing the SCM organizational ability could produce significant financial outcomes in a long-term effect. The implementation of IT is also a vital factor which can influence the operational performance in supply chain. However, improving IT capability alone can't be a distinctive factor directly related to financial performance without a proper organization management (Shin, 2001, Yaibuathet et al., 2007). As well, since the suggestion of the well-known "IT Paradox", it is difficult to obtain a directly positive effect from IT investment to operational outcomes. Therefore, as shown in Table 3-21, the IT utilization in cooperation with

SCM organization strategy was analyzed, the result illustrated that synergetic effect of organization ability and IT utilization could yield better financial outcomes than the merely extension of IT usage or organization ability separately in supply chain. The **Hypothesis 3.6b** is supported.

3.8.2 Correlation Analysis between SCM Performance and National Culture

In this section, correlation analysis was conducted to analyze the relationship between SCM operational performance and the Hofstede culture dimensions in order to verify that whether national culture has influence on SCM operational performance. According to previous research, in order to manage supply chains and improve the competitive capability, each chain player's role should be identified in contributing to satisfying end customer requirements, recognizing that different country's role may differ depending on the international environmental context and position in the SCM performance.

The influence of national culture on the functioning of cross-national buyer-seller interactions has received considerable attention in the international business literature, which also can improve or impede the development of supply chain management performance (Freeman and Browne, 2004). However, there is merely empirical research to verify the relationship between SCM operational performance and the culture influence. Huang (2008) did the similar analysis in 2008 by five countries' data, and the result indicated that national culture has a significant influence on SCM operational performance except the IT methods and implementation ability. However, nowadays, under the globalization environment, especially with the more and more increasing international cooperation business in most countries, whether the national culture still has a significant relationship with SCM operational performance or not should be discussed by some new data. Thus, this relationship will be discussed in this research by a large data set.

As mentioned national cultural studies, the Hofstede culture dimension is the most famous research and which emphasized that the spread of business onto the global stage brings the issue of national and regional differences to the fore (Hofstede, 1993). According to Hofstede's web site, there are some new changes that culturally-based values systems comprise six dimensions, such as: (1) Power distance (PDI), (2) Individualism / Collectivism (IDV), (3) Masculinity / Femininity (MAS), (4)

Uncertainty avoidance (UAI), (5) Pragmatism and (6) Indulgence / Restraint. In this research, the Hofstede culture dimension of PDI, IDV, MAS and UAI was used to do the correlation analysis between national culture and SCM performance.

In this section, five countries' LSC data and cultural dimension data were used to do the correlation analysis, such as Japan, China, Korea, Finland and Thailand. At the time of writing, 1037 LSC data were collected from Japan, 236 data from China, 202 data from Korea, 53 data from Finland and 181 from Thailand. The data of each country's cultural dimension can be gotten from Hofstede's web site, which is revealed in Table 3-22.

Table 3-22: The data of Hofstede cultural dimensions

	PDI	IDV	MAS	UAI
Japan	54	46	95	92
China	80	20	66	30
Korea	60	18	39	85
Finland	33	63	26	59
Thailand	64	20	34	64

The result of correlation analysis between national culture and SCM operational performance is shown in the Table 3-23.

Table 3-23: Correlation analysis between SCM performance and cultural dimension

		PDI	IDV	MAS	UAI
1. Corporate Strategy and Inter-Organization Alignment	Pearson Correlation	.133**	-.098**	-.047	-.133**
	Sig. (2-tailed)	.000	.000	.054	.000
	N	1709	1709	1709	1709
2. Planning and Execution Capability	Pearson Correlation	.075**	-.075**	-.042	-.059*
	Sig. (2-tailed)	.002	.002	.080	.015
	N	1709	1709	1709	1709
3. Logistics Performance	Pearson Correlation	.093**	-.078**	-.018	-.061*
	Sig. (2-tailed)	.000	.001	.451	.011
	N	1709	1709	1709	1709
4. IT Methods and Implementation	Pearson Correlation	.000	-.028	-.029	-.006
	Sig. (2-tailed)	1.000	.242	.224	.805
	N	1709	1709	1709	1709
Average score	Pearson Correlation	.082**	-.076**	-.039	-.069**
	Sig. (2-tailed)	.001	.002	.107	.0024
	N	1709	1709	1709	1709
Total score	Pearson Correlation	.113**	-.100*	-.016	-.058*
	Sig. (2-tailed)	.000	.000	.518	.016
	N	1709	1709	1709	1709

*: 5% significant; **: 1% significant

As the result shown, national culture has a significant relationship with SCM operational performance, **Hypothesis 3.7** is supported. Focusing on each area, it can be seen that, area (1) Corporate strategy and inter-organization alignment, area (2) Planning and execution capability and (3) Logistics performance had a significant relationship with all the cultural dimensions except the Masculinity dimension, however, area (4) IT methods and implementation was found to have no significant correlation with culture dimensions. As for the overall SCM operational performance, it also had significant relationship with all the culture dimensions except the Masculinity dimension. From the result can be seen that no matter how development of the globalization environment and how closed the international cooperation in nowadays, in order to improve SCM performance, especially the cross-national SCM operational performance, the culture difference must be taken seriously.

3.9 Conclusions

In this research, the SCM Logistics Scorecard (LSC) was utilized as an evaluating instrument to investigate the SCM operational performance and its potential factors which constitute an efficient SCM in Japan and China, respectively. In the cross-national comparison, the SCM operational performance between Japan and China is not only in the national level, but also from the different industry and firm size perspective. In the comparison within China, the main studies are on comparing performance in different ownership status and regions, and the potential factors which constitute an efficient SCM in China on different perspectives. As well, the synergy effect between ownership status, region disparity and SCM operational performance is analyzed by the Chinese LSC data. In addition, the correlation between SCM operational performance and financial outcome, Hofstede culture dimensions were analyzed in this research. The conclusions can be divided into three sections, one is for the cross-national comparison analysis; the other one is for the Chinese data analysis; and the last one is for the correlation analysis.

3.9.1 Conclusions for cross-national comparison between Japan and China

First, the preliminary comparison between Japan and China indicated Chinese LSC scores are significantly higher than Japanese. Moreover, the comparative analysis between Japan and China among different industries and firm size confirmed it again, which also indicate that industry type and firm size have a significant impact on SCM

operational performance, and different type of companies focus on different areas in term of SCM performance. In addition to the reason that foreign owned enterprises seemed to influence the overall performance of Chinese SCM, these unexpected results could be explained by the different cultures between Japan and China. Japanese people tend to be self-critical when they are under a competition-free situation (Takata, 2003), whereas, Chinese people have a tendency to evaluate themselves rather leniency (Yu and Murphy, 1993; Xie et al., 2006), therefore, it could be speculated that Chinese people may evaluate themselves higher than their actual performance.

Second, by the way of thinking IT utilization and organizational strategy, the results of factor analysis indicated that the potential factors which impact Japanese SCM structures are considered to be similar with Chinese. However, this result is different from previous research, that the IT usage was not identified as a unique factor from Thai and Finnish data (Yaibuathet et al., 2006; Huang, 2008), but as an independent factor in Japan and China. The result may be explained by that, both Japanese and Chinese think that long-term collaboration with business partners is very important, and the IT usage is just an enabler to achieve better SCM performance. Moreover, after China's reform and open policy, China have been absorbing lots of knowledge from Japan, especially, the business management thinking, method and economic development model, whose SCM operational performance are deeply influenced by Japan's management thought. Thus, the way of building SCM is similar between Japan and China.

3.9.2 Conclusions for inner comparison by Chinese data

First, the comparison in ownership status indicates that SCM performance is significantly different among ownership status, SOEs and FOEs take up higher scores POEs. Compared with SOEs and FOEs, most POEs belong to the small and middle size companies, who don't have the ability and advantage in geographically dispersed operations, volumes of transactions, more supply chain partners, to share more information, there, they couldn't have more capabilities to improve their SCM operational performance quickly. Especially in China, there are fewer preferential policies for POEs, and they are difficult to develop their operational performance in a higher level. Whereas, POEs are one the main forces which contribute to China's economic, thus the Chinese government should establish some relevant policies to protect POEs to develop better in the future.

Second, the comparison between the developed regions and developing regions indicates that SCM operational performance is significantly influenced by the regional disparity. The developed regions perform better than developing regions with a fairly high significant level almost in every area. After the reform and opening policy, China's regional development strategy plays an important role in determining whether regional development is balanced or unbalanced. Because of the preferential policies and geography advantages, the eastern coastal regions have developed much better than central and western regions. Globalization and economic liberalization have significant influence on increasing regional disparity (Fujita and Hu, 2001). In order to decrease the regional disparity, the Chinese government has established some policies, such as The West China Development Strategy, Revitalize the Old Northeast Industrial Bases, Promotion to The Rise of Central China to promote the development of the western, northeastern and central regions and encourage foreign investment to there. In addition, human capital is a determinant factor which influences regional economic disparity. Therefore, investment in education is an important way to reduce regional disparity in China. The Chinese government should pay much attention to enhance human resource education and cultivation as well as upgrade the overall quality of the labor force in China. As well, the government also should establish some policies to encourage human resource to go to west.

Third, by the way of thinking IT utilization and organizational strategy, the result of factor analysis can be seen that, SCM performance structures among different firm size, ownership status and regional companies are different respectively. Whereas, the SCM structure of small-middle companies and developing regional companies is similar with the SCM structure of overall Chinese. Although, the SCM structure of SOEs is somewhat similar with the POEs', both of them are different with the FOEs'. This result indicated that cultural impact has an influence on the SCM operational performance. Similarly, in this section, the result showed that large-mega companies and FOEs seemed believe that the appropriate implementation of IT should integrate with the organization ability to improve the SCM operational performance. Moreover, the IT support could assist in delivering organization strategy regarding SCM all over supply chain member, which may possibly ensure that every business partners are directed at the same target. However, this finding is different with overall Chinese findings.

3.9.3 Conclusions for correlation analysis

First, the result of correlation analysis between extracted factors which represent China's SCM competencies and the ownership status, regional disparity and the interaction of ownership status and regional disparity indicates that, ownership status has a significant relationship with the SCM organization ability, and regional disparity influences on IT utilization ability in a significant level. Moreover, ownership status synergy regional disparity has significant meaning on the SCM organization ability. Especially, regional disparity has a fairly highly significant influence on IT utilization ability, which confirms it again that the way of thinking IT utilization and implementation is different between regions. Thus, the SCM structure could be considered different between developed and developing region.

Second, the correlation analysis between extracted potential factors and financial bottom line indices from Japanese companies indicate that successful SCM operational performance can improve the financial performance in a direct and indirect way. The findings show that Responsiveness has a direct significant influence on inventory turnover period, and SCM organization ability takes a direct significant positive impact on ROA and CF, but IT utilization ability has weak relation with financial indices. However, when considering IT utilization in cooperation with SCM organization strategy, a stronger relationship with financial outcomes could be appeared than conducted them separately. It is implied that enhance IT utilization has an indirect way to improve financial performance, which should be cooperated with organization strategy. Thus, it is a weakness both for Japan and China, that the way of thinking SCM organization strategy and IT utilization are independent when they implement their SCM operational performance.

Third, the result of relationship analysis between SCM operational performance and national culture dimension indicates that national culture has a significant relationship with SCM operational performance. Focusing on each area, especially area (1) Corporate strategy and inter-organization alignment had a significant correlation with all the cultural dimensions except the Masculinity dimension, which indicated that in order to deal with the relationship among inter-organization alignment, the culture influence must be always kept in focus. However, culture doesn't have a significant influence on the area (4) IT methods and implementation, the result is similar with Huang (2008). This result may be indicated that technologies are enable tools for companies to improve SCM performance, and how to use technologies doesn't have

significant difference between each culture environment, whereas, the way of how to use IT with organizational strategy is significantly influenced by the culture difference. As for the overall SCM operational performance, it also had a significant relationship with all the culture dimensions except the Masculinity dimension, which indicates that in order to improve cross-national SCM operational performance, the culture difference must be taken seriously.

Moreover, turn back to the comparison between Japan and China, the unexpected result that Chinese perform much better than Japanese in term of SCM performance assessment items could be explained by culture differences. According to the Hofstede's culture dimensions, the Chinese culture is identified in the low uncertainty avoidance (UAI) dimension, while, the Japanese culture is attributed to have high uncertainty avoidance (UAI) position (Hofstede, 1994). The people who are in the high UAI country tend to show more rigor, anxiety and stress, and they are very strict to themselves, consequently, they evaluate themselves rather modestly or strictly. Also, according to Enkawa's research (2010), the SCM performance is lower as UAI is higher. Therefore, it could be speculated that Chinese people may evaluate themselves higher than their actual performance, and the SCM performance in Japan should perform better than in China.

In addition, based on the same culture effect, the primary comparative result between Japan and China on NPD and SCM performance is inconsistent. Although the NPDSC and LSC were filled by Chinese, the participants attribute is different, the culture effect is different and then the result is different. All the Chinese NPD data were collected in Japan, and the participants are mainly managers who came to Japan to learn Japan's advanced experiences on NPD, and they know this gap between Japan and China, so when they were asked to fill the NPD scorecard, they will be more objective and modest to give the scores. Whereas, all the Chinese SCM data were obtained in China, and the participants' background and attitude can't be ensured. Thus, maybe there is some bias between NPD and SCM's scores, and the culture effect is reduced for NPD data. The conclusion also confirms that the genuine gap between Japan and China on NPD performance should be larger than the gap on SCM performance, and Japan should outperform China on NPD performance in a significant level. In order to make it more understandable, the explanation is displayed in the Figure 3-12.

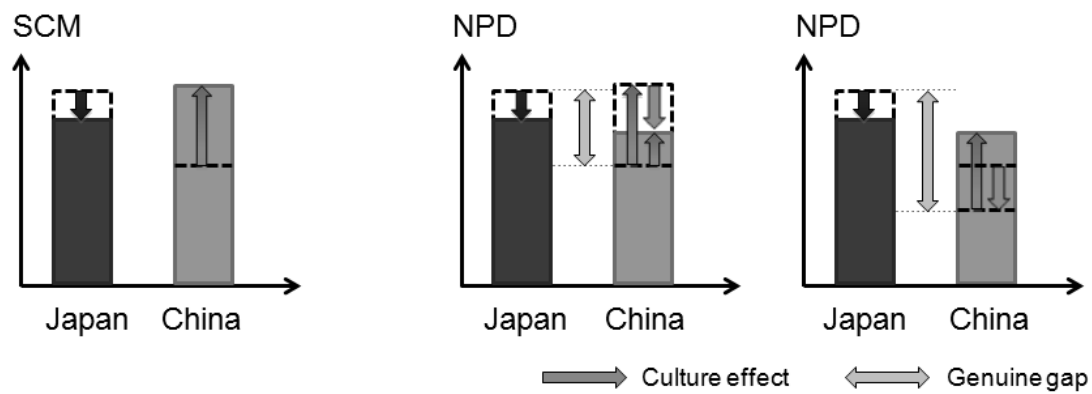


Figure 3.12: Culture effect and genuine gap between NPD and SCM performance

Finally, the Chinese average LSC scores in area (1) Corporate strategy and inter-organization alignment was unexpectedly higher than those from Japan, which could be explained by China's special culture--Guanxi. Guanxi as a system of personal connections which carries long-term social obligations is held to play a significant role in business relationship in China (Fock and Wook, 1998; Park and Luo, 2001). Guanxi orientation is dependent on ownership status (Su et al., 2003), and the POEs companies appear to have a stronger association with Guanxi related characteristics than those with SOEs (Millington et al., 2005). Guanxi also operated as a governance mechanism which brings direct effects on market performance and indirect effects through channel capability and responsive capability in the transitional economy of China (Flora et al., 2008). In order to do business in China, the Guanxi should be taken seriously, which will be discussed in the Chapter 4.

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CHAPTER 4 COMPARISON ANALYSIS ON CULTURE AND GUANXI BETWEEN JAPAN AND CHINA

Chapter Overview

In this chapter, based on the Hofstede culture dimensions and Guanxi's characteristics, a questionnaire has been developed and utilized as an evaluate instrument to investigate the cultural differences including the Guanxi between Japan and China, as well as analyzed the relationship between Guanxi and collectivism orientation. Guanxi is a special Chinese culture, which is a live, special, dynamic and working relationship or connection between two persons as well as a kind of social resource, can be exchanged and used to pass barriers and deal with problems. The results indicate that compared the special culture Guanxi, national culture is more robust and difficult to be changed by a different culture environment. However, even the business environment is becoming more and more formal, Guanxi is still very important in the collectivism society of Japan and China.

4.1 Research Background

Under the globalization environment, the international cooperation has become more and more closed and frequently. Because national culture has a significant relationship with SCM operational performance, and Guanxi also may influence SCM performance in China. Thus the national culture difference and Guanxi will be discussed in a future step in this section, which will help international companies to do better in different business environment, especially in China.

4.1.1 A framework of national culture

Globalization has offered opportunities for companies to expand their business across borders and extend their reach into new market, as well as multinational cooperation in business becomes more and more prominent. Therefore, it is very important for managers and researchers to understand the different national cultures and

its implications among different countries in order to improve the competitive capability for multinational business success. Especially, pay attention to the East Asia, where is a vital and expanding area for the fast growing economics in the world.

The cultural influences on people are expressed at least four levels: the first level is embodied in the impact on the performance that the external items can be observed (the observable artifacts), such as the construction of different cultures, costumes, food, languages and so on. The second level is performed at the impact on people's behavior that different people have different behaviors in different cultural environment. The third level is expressed by cultural influence on the institutions and customs that different cultures construct different institutions and customs. The last level is manifested in cultural influence on people's philosophy, worldview, values, the way of thinking, underlying assumptions and so on. Although this effect is often unconscious, but it is the highest level of cultural influence, which determines people's perception, thought process, emotions, values and even behaviors (Wang and Zheng, 2008). Therefore, cultural factors as important variables which affect individuals or groups' psychological and behaviors are used for academic research, especially in business domain.

Under the global development of economy, numerous cross-cultural researches have been studied, which demonstrated how people's communication styles in multinational business are influenced by their cultural expectations (Hui and Graen, 1997). Hofstede (1993) believes that the spread of business into the global stage brings the issue of national and regional differences to the fore. According to his cultural dimensions research, culturally-based values systems comprise five dimensions, such as: (1) Power distance, (2) Individualism / Collectivism, (3) Masculinity / Femininity, (4) Uncertainty avoidance and (5) Long-term / Short-term orientation (Confucianism). Recently, from Hofstede's website can be seen that, the five cultural dimensions have changed into six dimensions, the Long-term / Short-term orientation (Confucianism) has been replaced by Pragmatic / Normative and added a new cultural dimension that is Indulgence / Restraint. Among these culture dimensions, Individualism / Collectivism have served as a powerful theoretical construct for cross-cultural comparison of communication behavior.

Especially, this research has selected Japan and China to be studied, because Japan as a developed country, whose economy strength has taken over the past several decades in the world, even the Japanese culture has been recognized to represent the

East Asian culture as a whole by many business leaders. However in recent years, notable industrial progress in China has also made Chinese business culture attract a wide business interest. Moreover, the relationship between Japan and China is very closed, not only on the culture, but also on the business cooperation. Japan and China is the main and closed business cooperative partner for both parties. The culture research is very important for these two countries to understand more deeply with each other and conduct better cooperation to get more benefit.

Whilst a cross-cultural comparison based on Hofstede's (2001) five dimensions suggests that both Japan and China share certain similar values and they also differ in other cultural aspects. For instance, both Japan and China have been considered the collectivistic societies compared to other countries and the world average, and both of their culture have been influenced by the Confucianism, which emphasizes the long-term orientation is different from the western behavioral tendency for short-term performances. A significant feature is that the long-term orientation score for China is extremely higher than other countries. This reflects the unique business philosophy that is rooted in traditional Chinese culture which emphasizes the long term nature, and is often rooted in exclusive business networks or Guanxi ties (Yen et al, 2011). It is very important to do a close examination of country-specific culture and core values for understanding business practice, especially for international companies to do business in different countries. In this research, the special Chinese culture called Guanxi will be discussed.

4.1.2 A framework of Guanxi culture

After the reform and opening policy in 1978, and the accession to the World Trade Organization (WTO) in 2001, the fast development make China's economy have jumped into the second position in the world after the year of 2010. China has become one of the most open markets in the world during these ten years; however, this new land of opportunity is only open to those who fully appreciate the complexities of business culture of this country (Zhang and Pimpa, 2010). In order to understand the culture differences between Chinese and other countries' managerial approaches, this research will introduce and discuss a special Chinese culture called Guanxi, and try to analyze the Chinese societal system and its implications on business practices.

Guanxi is the personal relations or social connections in the Confucian society, which refers to a network of informal interpersonal relationships and exchange of favor established for the purpose of conducting business activities throughout China and East Asia (Lovett, et.al, 1999). Guanxi has been recognized as one of the major dynamics in the Chinese society where business behavior revolves around Guanxi, including not only the local firms, but also the foreign businesses (Luo, 1997). Because personal relationship have been found to shape economic outcomes in inter-organizational exchange in a variety of contexts (Weitz and Jap, 1995). Therefore, Guanxi is foremost a cultural concept that implies inter personal connections, but its underlying philosophy has dominated people's social and economic lives for a long time (Zhang and Zhang, 2006).

Guanxi has been also compared with other cultures for the development of business relationships. According to Alston's research (1989), although the business principles in Japan, China and Korea is unique for each country, there are still have some similarities among Japanese Wa (group harmony and social cohesion), Chinese Guanxi (personal relations) and Korean Inhwa (harmony based on respect of hierarchal relationships) in some degree. Moreover, Hitt et al. (2002) made a comparative study about the relational capital, based on Chinese guanxi (individual connections for providing or implying the exchange of favors), Japanese kankei (subconscious notion of granting access through relationship controlled by the "barrier gate" and proved their loyalty and obligations to the larger social arrangement) and Korean inmak (people connection including whom and how many one knows and relates to family, educational and / or regional ties), which provides the framework for business dealings in many Asian countries. As a result, the social capital of many Asian firms gives them a potential competitive advantage in global markets. In addition, Michailova and Worm (2003), Hsu (2005), Jansson et al (2007) discussed the similarities and differences about personal networks in China (guanxi) and Russia (blat) and found that these specific cultural heritages have their own particular configurations and characteristics, but they also share some similarities during the command economy period and will continue to have influence on marketization in their countries.

4.2 Research Purpose of This Section

Since Japan and China is neighbor on the geographic location, they also have some similarities in culture as well as lots of cooperation in the business. Therefore, in this

research, the first objective mainly focuses on if there are some significant cultural differences between Japan and China, although both of whom represent collectivism societies. Since Guanxi is one of the most important cultures in China which is influenced by the Confucian culture, therefore, the second objective of this study attempts to verify if Guanxi actions have significant differences between these two countries. Finally the last objective of this study is trying to analyze the relationship between Guanxi and collectivism orientation, in order to find that if the collectivism orientation has a significant influence on the Guanxi actions.

4.3 Previous Research and Hypotheses

4.3.1 Culture section

National culture is defined as the beliefs, values and assumptions perceived by people in their early childhood that later distinguish one group of people from another (Hofstede, 1993). Many definition of national culture have been proposed, but Hofstede culture dimensions are arguably the most widely used in national comparison research, such as national culture and the preference for management controls (Chow et al., 1994) or multi-national operations (Chow et al., 1999); national culture influence NPD operational performance (Nakata and Sivakumar, 1996), consumer's evaluation (Crotts and Erdmann, 2000), corporate adoption of IT infrastructure (Png et al., 2001), financial systems (Kwork and Tadesse, 2006), exporter-distributor relations (Nes et al., 2007), earnings management (Han et al., 2010), customer satisfaction and SCM operational performance (Enkawa, 2010), or organizational culture, work value and NPD collaboration (Pan and Chen, 2010) and so on. Therefore, the fully understanding and healthy communication between different national cultures or business environments are crucial for the business operation of multinational corporations. And the Hofstede culture dimensions are considered to be a very common and useful data collection tool to do these kinds of researches.

Focus on the Hofstede culture dimensions, based on quantities of questionnaires collection and data analysis, four culture dimensions are proposed at first by Hofstede (1994), those are:

1. Power distance (PDI): expressing the degree to which the less powerful members of a society accept and expect that power is distributed unequally. The fundamental issue of this dimension is how a society handles inequalities

among people. Small PDI society manifests an equality of roles within the group and the ideal situation is resourceful democrat; whereas large PDI society represents existential inequality with orders and autocrat. Moreover, Lee et al. (2000) indicate that in low PDI society, the relationship between procedural justice and trust in supervisor is higher just the same as the relationship between distributive justice and contract fulfillment. In addition, people in the low PDI society are more initiative and likely to participate in decision-making which also contributes the high performance to their group; whereas people in the high PDI society are more passive and likely to qualify their opinions or participate in decision-making with fear (Newmen and Nollen, 1996).

2. Individualism / Collectivism (IDV): representing the degree to which individuals are integrated in to groups. A society's position on this dimension is reflected in whether people's self-image is defined in terms of "I" or "we." Individualist society is universalism which views other people as potential resources as well as task prevails over relationship and with calculative model of employer-employee relationship. Whereas, collectivist society is particularism which views other people as members of their group as well as relationship prevails over task and with a moral model of employer-employee relationship. Moreover, individualists are more attuned toward a promotion focus while collectivists are more prevention focus (Lee et al., 2000), and collectivists emphasize having more contact with workers or partners as well they are more likely to work on a team than alone compared with individualists (Bochner and Hesketh, 1994).

3. Masculinity / Femininity (MAS): referring to the distribution of roles between the sexes which is another fundamental issue for any society to which a range of solutions are found. Masculinity society means people have a preference for achievement, heroism, assertiveness and material rewards for success; whereas, femininity society represents people have a preference for cooperation, modesty, caring for the weak and quality of life.

4. Uncertainty avoidance (UAI): indicating the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. The fundamental issue of this dimension is how a society deals with the fact that the future can never be known: should try to control the future or just let it happen? Low UAI

society appears to dislike rules, regulations or standards and the people in this society prefer to change jobs, take on more risk about the uncertain, unknown or unstructured situation. Whereas, high UAI society seems to have an emotional need for more clear rules, regulations and standards, or enact more detailed procedures to help the people in this society to reduce uncertainty and deal with their discomfort with unsure or unknown situation (Newmen and Nollen, 1996; Schwartz, 1999; Brockner, et al., 2001).

And then, the fifth dimension was found in a study among students in 23 countries around the world, using a questionnaire designed by Chinese scholars (The Chinese Culture Connection, 1987), and which was named as:

5. Long-term orientation / Short-term orientation (LTO): is also called Confucian Dynamism in Hofstede's study (2001), which expresses to deal with virtue and regardless of truth. Values associated with long-term orientation are thrift and perseverance; whereas, values associated with short-term orientation is respect for tradition, fulfilling social obligations and protecting one's "face". Confucian Dynamism encourage people to pursue long-term benefit (perseverance) while suffer short-term loss (thrift), which also has been indicated that short-term contracts sequences can implement strictly less than long-term contracts under asymmetric information context (Rey and Salanie, 1990)

However, the viability of Hofstede's fifth culture dimension has been questioned, because the Confucian values underlying the concept look so China that they are not registered in the western mind (Fang, 2003). Therefore, after that, according to Michael Minkov's research, two dimensions were generated by using recent World Values Survey data from representative samples of national populations. One was a new dimension called Indulgence / Restraint (IND), and the other one was more or less a replication of the fifth -- LTO dimension, thus, the fifth dimension was changed into Pragmatic / Normative (PRA) ((Minkov and Hofstede, 2011). The explanations of these two dimensions are as follows:

5. Pragmatic / Normative (PRA): describing how people in the past and today, relate to the fact that so many things happened around us can't be explained. In the pragmatic orientation society, most people don't have a need to explain everything, as they believe that it is impossible to understand fully the

complexity of life. The challenge is not to know the truth but to live a virtuous life, because they show an ability to adapt traditions easily to changed conditions, a strong propensity to save and invest thriftiness and perseverance in achieving results. However, in the normative orientation society, most people have a strong desire to explain as much as possible the absolute truth and normative in their thinking. They also exhibit great respect for traditions, a relatively small propensity to save for the future and a focus on achieving quick results.

6. Indulgence / Restraint (IND): indulgence stands for a society that allows relatively free gratification of basic and natural human drives related to enjoying life and having fun, while restraint stands for a society that suppresses gratification of needs and regulates it by means of strict social norms.

In this research, the Hofstede culture dimensions of Power distance (PDI), Individualism / Collectivism (IDV), Masculinity / Femininity (MAS) and Uncertainty avoidance (UAI) have been utilized to do the comparative analysis on culture differences between Japan and China. Because of the historical relationship between Japan and China, most western researchers usually conclude the Eastern culture as one with minor difference in degree, however, as time goes, Confucianism thoughts have been gradually developing out their own behavioral modes and becoming part of social constraint for each region (Wong, 2010). Although the features of Chinese and Japanese culture have been considered as Collectivism and Long-term orientation, which have been different from western behavioral tendency for Individualism and Short-term performance, each society has its separate, distinctive culture and philosophy which guide business performance in their society (Hofstede, 2001).

According to Hofstede culture dimensions, the Chinese society, whose culture sits in the higher rankings of Power distance representing people who live in this society believe inequality amongst people is acceptable and their respect of the rights of power and authority of those high social hierarchical standing. Although people have been in the pursuit of equal power and right, but the thousands of years' Confucian hierarchy culture is not easy to be changed at all. Whereas, Japan is constantly threatened by natural disasters from earthquakes, tsunamis, typhoon and so on, its culture presents high uncertainty avoidance. People in this circumstance can't bear ambiguity, so they have a greater need for formal rules and absolute truth, and show less tolerance for people and groups with deviant ideas or behaviors. They also tend to accept less change,

take fewer risks, avoid conflict and worry a lot about future. As well, Japan is one of the most masculine societies in the world, however, in combination with their collectivism character, the assertive and competitive individual behaviors which were often associated with masculine culture are not obviously found on Japanese but the severe competition between groups and Japanese workaholic are the expression of their masculinity. It is still hard for women to climb up the corporate ladders in Japan with their masculine norm of hard and long working hours.

Environmental factors such as institutional, economic, and social systems in different countries have influence on culture (Farth et.al, 1997). Some researchers pointed out culture are relatively stable even in the face of substantial change and turbulence (Lin and Fu, 1990; Lay and Verkuyten, 1999; Hofstede, 2001; Ward et.al, 2002), while, other researchers indicated culture may transcend national borders, compared with the cultural effects, the national effect is more influential (Tan, 2002; Leung and Rice, 2002; Costigan and Su, 2004). Since culture is influenced and may be changed in a different culture environment, as well as there is little empirical work to investigate the culture difference between Chinese people at home and abroad, thus, this research is not only to demonstrate the cultural diversity between Chinese and Japanese, but also discuss the relationship between Chinese in China and Chinese in Japan. Therefore, the hypothesis has been proposed:

Hypothesis 4.1: There is significant difference among three groups on culture dimension, but the Chinese in China and Chinese in Japan would share more similarities than Japanese.

4.3.2 Guanxi section

The Chinese phrase “Guanxi” is made up by two Chinese characters. The first character 关 (guan) as noun means “a pass, a gate” or “a barrier, a hurdle”, as verb means “to close”. The second character 系(xi) as noun means “a system, a tie, a relationship or a connection”, as verb means to “tie up” or “link” (Huang, 1987; Fan, 2002a). However, when they make up a phrase, the term Guanxi (关系) in the Chinese language has multiple and complex meanings. To be briefly, Guanxi is a live, special, dynamic and working relationship or connection between two persons, which is a kind of social resources, can be exchanged and used to pass barriers and deal with troubles or problems.

Guanxi is one of the major dynamics in Chinese society where business behavior revolves around Guanxi. It is widely recognized that the China market cannot be tackled effectively without paying due attention to the construction and maintenance of good Guanxi (Davies et al, 1995), and Guanxi is a key business determinant of firm performance because the life blood of the macro economy and the micro business conduct in the society is Guanxi network (Luo, 1997). It is believed that right Guanxi is a vital factor in business negotiation, and could bring a wide range of benefits: securing rare resources, bypassing or short-cutting the bureaucratic maze, obtaining information and privilege, selling otherwise unsellable goods, providing insurance against uncertainty and assistance when problems arose (Fan, 2002a). Guanxi is also found to have positive effects on market performance as well as financial performance such as ROA and ROI (Luo et al., 2012), positive effect of Guanxi on performance is stronger for small than for large firms (Peng and Luo, 2000), and supply relationship with POEs has a stronger association with Guanxi than with SOEs (Millington et al., 2005). From a Chinese perspective social chaos is avoided, not by institutional law, but by an individual's acceptance of their proper place and role in society (Lee and Paul, 2000). In such environment business can't be conducted without the facilitating role of Guanxi.

Guanxi is a very intricate and complicated conception to be defined. Generally speaking, the Chinese word Guanxi refers to the concept of drawing on connections to secure favors in personal relations, which contains implicit mutual obligation, assurance and understanding, and governs Chinese attitudes toward long-term social and business relationships (Millington et.al, 2005). Guanxi has been illustrated and discussed in many fields such as anthropology, psychology, business administration which is used to expand other supports beyond family and must follow some specific rules in order to maintain the social harmony. Referred to the perspectives on Guanxi from those different research fields, Guanxi including the following key factors (Fei, 1947; Huang, 1987; Fan, 2002a; Wang, 2007; Huang et al, 2008; Zhang and Pimpa, 2010; Shou et al., 2011; Yen et al., 2011):

1. Ren-qing (favors): indicating individual emotional responses of daily life, means a resource allocated to another person as a gift and also connotes a set of social norms to guide an individual to get along well with other people. Sometimes, it also means human debt and has to be repaid in someday but not immediately, and not just as money, but mainly as for other kinds of things, such as a favor, help and so on.
2. Xin-ren or Xin-yong (trust): expressing that there is trust, reliance, credence,

belief and dependence existing in this relationship, which mainly relies on one's oral commitment and ability to fulfill his/her promise and obligation. Trust in China is in regulating different levels of Guanxi and setting them in hierarchical order with priorities in Chinese societies. As well, Trust, in Chinese business relationships, is more based on one's credit of ability to return favors than relied on one's integrity and competency.

3. Gan-qing (feelings): reflecting the tenor of a social relationship between two people or two organizations, as well as an emotional attachment that exists among parties of a network. Generally, Gan-qing comprise of salient beliefs including "a perceived possibility and judgment of consequences resulting from the behavior" whereas subjective norms are "an individual's perception about how people important to them judge the behavior." If the attitudes and subjective norms do not match up within the reasoned action theory, this would result in damaging one's own social functions and interactions within the whole network.

4. Bao (reciprocity): referring to the social connection which is base on mutual benefits to for maintain the beneficial equality with each other, but the reciprocity might be detained and unequal. In the Confucian society, if somebody feels he/she owes someone favors, then, he/she will respond the favors for a bigger one; if not follow the rule of Bao, the guanxi will become harder to maintain. Moreover, people of a guanxi web are held together by an invisible and unwritten code of reciprocity and members are accountable by the 'threat' of losing face - which embodies an individual's integrity, honor and personal equity.

5. Man-zi (face): indicating an individual's self-image that social position or status, prestige, gained by successfully performing one or more specific social roles that are well identification recognized by others. The image mainly depends on one's self-concept, one's role, one's reference group, and one's conjecture about what is highly valued, admired, and respected by the significant others sharing the social network. Within a social network, having mianzi enhances not only relative position but also many kinds of privileges that further improve the quality of life. Thus, saving mianzi is rather important in Chinese society. Therefore, if someone is subjectively felt of losing mianzi, his/her self-esteem is injured, who will utilize all the resources or methods to

"earn face" in order to maintain mianzi.

6. Cha-xu-ge-ju (differentiated mode of association): standing for each individual is claimed to be surrounded by a series of concentric circles, produced by one's own social influence. Each web of social relations has a self as its center. Each circle spreading out from the center becomes more distant and at the same time more insignificant. Everyone's circles are interrelated, and one touches different circles at different times and places. Chinese is more likely to sort others with the types of relationships between them and treat them differently from close to distant, inside to outside. The thought of Cha-xu-ge-ju made China as a hierarchical society, and the human relationship is also versatile and hierarchical.

7. He (harmony): emphasizing that everyone in the Chinese society will keep to the prescribed roles, and follow the hierarchy (which comes from the Confucian "Wu-lun" structure) and status to decide their acts in order to keep social harmony which also implies that Chinese are inclined to prevent conflict and directed to the system of group-oriented social relationship. In addition, harmony also indicates that Chinese show a great tendency to adopt an avoiding, obliging and integrating style, and less likely to adopt dominating styles in the process of conflict. Thus, the ability to achieve a harmonious state becomes the criterion for evaluating the communication competence of individuals (Pan and Chen, 2010).

According to the above characters, it can be seen that Guanxi interaction has been viewed as idiosyncratic cultural phenomenon where Confucianism is the major life philosophy. In this Confucian society, in order to establish and maintain the hierarchical power structure, emphasize on collectivism and group harmony, the basic social norms of Guanxi is the Wulun relationship, those are, the monarch-subject, father-son, husband-wife, elder-younger brothers and senior-junior friends, which defines Chinese relationships and sets the rules for each role playing. From the perspective of Chinese social progress, the "family–nation–world" is the structure from inside to outside where the family ethic is the basis of Confucius' human relations (Wong, 2010, Lin, 2011).

In addition, Japanese culture has been regarded to be influenced by the Chinese, maintaining face (Mianzi), the "shame culture," and the five basic Chinese relationships discussed above are the three major features of the Japanese culture (Nakayama and

Stucky, 2004). Since Japanese and Chinese are considered to be diligent, and value group harmony in general, as well as the historical relationship between Japan and China, western researchers usually conclude the Eastern culture as one with minor difference in degree. However, as time goes on, Confucianism thoughts have been gradually developing out with their own behavioral modes and becoming part of social constraint for each region (Wong, 2010). Moreover, Guanxi in the Confucian society, has been established for the purpose of conducting business activities throughout China and East Asia (Lovett, et.al, 1999), which also confirms Asian countries such as China, Japan, Korea, Taiwan and Singapore as relatively high power distance countries (Zhang and Pimpa, 2010). Since institutional environments have influences on Guanxi, thus, the following hypothesis has been extracted:

Hypothesis 4.2: There is significant difference among three groups on Guanxi, but the Chinese in China and Chinese in Japan would share more similarities than Japanese.

4.3.3 Relationship between culture and Guanxi

Guanxi in China, which is based on long-term orientation and mutual trust, is heterogeneous and more complicated than any kind of western interpersonal relationships (Zhang and Zhang, 2006). As a collectivism society, the Chinese structure is organized by concentric Guanxi circles, extending from family (the core) to relatives, friends, and so on, which is called “differentiated mode of association” (Fei, 1992). This inequality may be traced back to the Confucian codification of interpersonal ties that define one’s place in the hierarchy of social relationships (Lee and Paul, 2000). Guanxi ties are one of very common ways to measuring Guanxi. Guanxi ties indicate that if there are some kinds of relationship ties between two people or more individuals, and then they have Guanxi, which are also considered to be the major determinants of the strength or closeness of interpersonal relationships in China (Tsui and Farh, 1997).

According to the previous research, Guanxi ties based on blood or common experiences are not necessary for further interpersonal relationship developments (Kiong and Kee, 1998), which are not sufficient for people to build strong Guanxi, and they must work together for a while, frequently interacting and exchanging favors, and then they could build and maintain Guanxi. Guanxi is characterized into categories in accordance with its bases (Hui and Graen, 1997). However, no matter, how Guanxi is classified and implemented theoretically, in practice there are certain rules for each role

played among parties in accordance with Wu-lun relationship (Zhang and Pimpa, 2010), from family to relatives, friends and acquaintances, from inside to outside. Thus, according to the different tie of Guanxi base, Guanxi can be divided into the following categories (revealed in Table 4-1).

Table 4-1: A Summary of Guanxi's Classification

Guanxi's categories	Guanxi base
Hwang (1987)	
(1) Expressive tie	(1) Family members and relatives
(2) Instrumental tie	(2) Purely strangers
(3) Mixed tie	(3) Between the above both
Yang (1995)	
(1) Jia-ren Guanxi	(1) Family members
(2) Qinqi Guanxi	(2) Relatives
(3) Pengyou Guanxi	(3) Friends, colleagues, classmates
(4) Sheng-ren Guanxi	(4) Mere acquaintances or strangers
Tsang (1998)	
(1) Blood Guanxi	(1) Family members, relatives, members of the same clan
(2) Social Guanxi	(2) Members in a same organization
Su and Littlefield (2001)	
(1) Qinyou Guanxi	(1) Kith and kin relationships emphasizing favor-seeking
(2) Quanli Guanxi	(2) Power-dependence relationships emphasizing rent-seeking
Fan (2002a, 2002b)	
(1) Family Guanxi	(1) Mostly blood base, some social base
(2) Helper Guanxi	(2) Social base,
(3) Business Guanxi	(3) Social base, mainly through intermediary
Chen and Chen (2004)	
(1) Family Guanxi	(1) Family members and relatives
(2) Familiar Guanxi	(2) Former classmates, colleagues
(3) Stranger Guanxi	(3) With or without common demographic attributes
Zhang and Zhang (2006)	
(1) Qinqing Guanxi	(1) Family members and relatives
(2) Renqing Guanxi	(2) Fellow countrymen, classmates or alumni, colleagues, etc
(3) Jiaoyi Guanxi	(3) Mere acquaintances
Luo et al. (2011)	
(1) Business Guanxi	(1) Guanxi with businesspartners
(2) Government Guanxi	(2) Guanxi with government
Jiang et al. (2012)	
(1) Ascribed base Guanxi	(1) Inherited at birth, locality, kinship, surname, and dialect, etc
(2) Social base Guanxi	(2) Colleagues, classmates/alumni, student/teacher, etc
(3) Third party base Guanxi	(3) Want to establish Guanxi, but don't have any shared identity.

Guanxi is also a dynamic process and can be exchanged in some certain conditions (Fan, 2002a, 2002b). Simultaneously, in the collectivism society, the mutual trust between in-group and out-group is totally different. Therefore, in this research, according to the relationship from the inside to outside of group, Guanxi can be divided into the following three types, such as: (1) Guanxi based on strong tie (family members, relatives and intimate friends); (2) Guanxi based on middle tie (normal friends, neighbors, colleagues, classmates, etc); and (3) Guanxi based on weak tie (mere acquaintances or strangers). With respect to social context, Guanxi provides a tightly knitted social framework in which individuals are protective of one another and organizations safeguard their members' interests which presents a preference for cooperation, group decision-making, and so on. Thus, the importance of networks lies in their emphasis on collectivism and group harmony. Thus, the hypothesis is put forward:

Hypothesis 4.3: Collectivism has a significant relationship with all different kinds of Guanxi.

4.4 Questionnaire for Culture and Guanxi

In order to test these hypotheses, a questionnaire survey research method was used to obtain the responses from China and Japan. As a data collection tool, a questionnaire was developed, which includes two parts, one is about the culture dimensions, and the other one is about the Guanxi cultures.

The culture dimensions encompass 14 assessment items based on four core assessment areas, which are chosen from Hofstede's cultural dimensions, that are Power distance (PDI) (3 items), Masculinity / Femininity (MAS) (3 items), Individualism / Collectivism (IDV) (3 items), Uncertainty avoidance (UAI) (5 items) in 2012, and add Long-term orientation / Short-term orientation (LTO) (4 items) in 2013. Because the LTO data just collected from Chinese group and no data from Japanese, thus, in this research, this dimension will not be discussed.

As well the Guanxi sections include 24 items based on three different kinds of Guanxi, and 8 items for each kind of Guanxi. Respondents are asked to choose their opinions about each sentence from "strongly disagree" to "strongly agree" in five point scales for culture section, or seven point scales for Guanxi section, respectively. (The questionnaire will be shown in the appendix C).

4.5 Data Collection Process and Attributes

The data collection has been started in July, 2012, both in Japan and China in the same time by the way of online survey. The data was collected from three groups: Chinese in China, Chinese in Japan, and Japanese. Most of the respondents are university students without working experience but all of the respondents are chosen randomly, with different ages, hometown, occupations, and so on.

At the time of August, 2012, a total of 134 valid samples have been obtained from Chinese in China, 101 samples from Chinese in Japan and 104 samples from Japanese. The statistical profile of each group is presented in Table 4-2 and Finger 4-1~4-6.

Table 4-2: Profile of participant for each group

	Chinese in China	Chinese in Japan	Japanese	Total
1. Gender	%	%	%	%
Male	47.01	47.52	74.04	55.46
Female	52.99	52.48	25.96	44.54
2. Age	%	%	%	%
<=20	13.43	0.99	2.88	6.49
21~30	85.60	87.13	74.85	82.01
31~40	2.99	7.92	2.88	4.42
41~50	1.49	3.96	5.77	3.54
51~60	1.49	0	2.88	1.47
>=61	0	0	6.73	2.06
3. Identity	%	%	%	%
Student	73.13	66.36	66.35	70.21
Employee	26.87	33.64	33.65	29.79
4. Working Experience	%	%	%	%
<=1	73.13	70.30	-	71.91
1~2	5.97	3.96	-	5.11
2~3	5.97	3.96	-	5.11
3~5	5.22	4.95	-	5.11
5~10	4.48	8.91	-	6.38
10~20	2.24	3.96	-	2.98
>=20	2.99	3.96	-	3.40
5. Salary (CNY/month)	%	%	%	%
0	65.67	-	-	65.67
<2000	5.97	-	-	5.97
2001~3000	6.72	-	-	6.72
3001~5000	15.67	-	-	15.67
5001~8000	4.48	-	-	4.48
8001~15000	1.49	-	-	1.49
15001~50000	0	-	-	0
>=50000	0	-	-	0
6. Family background	%	%	%	%
Worker	25.37	18.81	-	22.55
Farmer	27.61	8.91	-	19.57
Cadre	20.90	27.77	-	21.70
Solider	2.24	5.94	-	3.83
Other	23.89	43.56	-	32.34

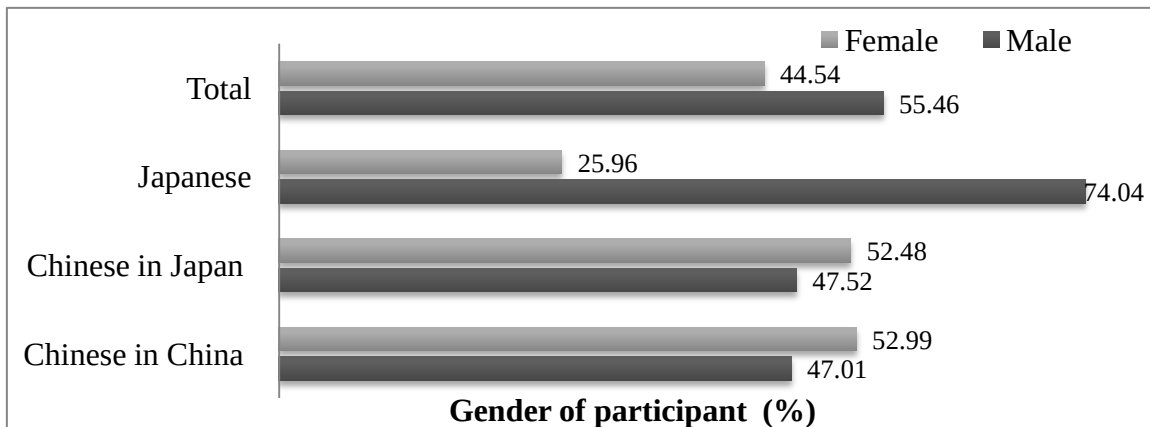


Figure 4.1: Gender of participant

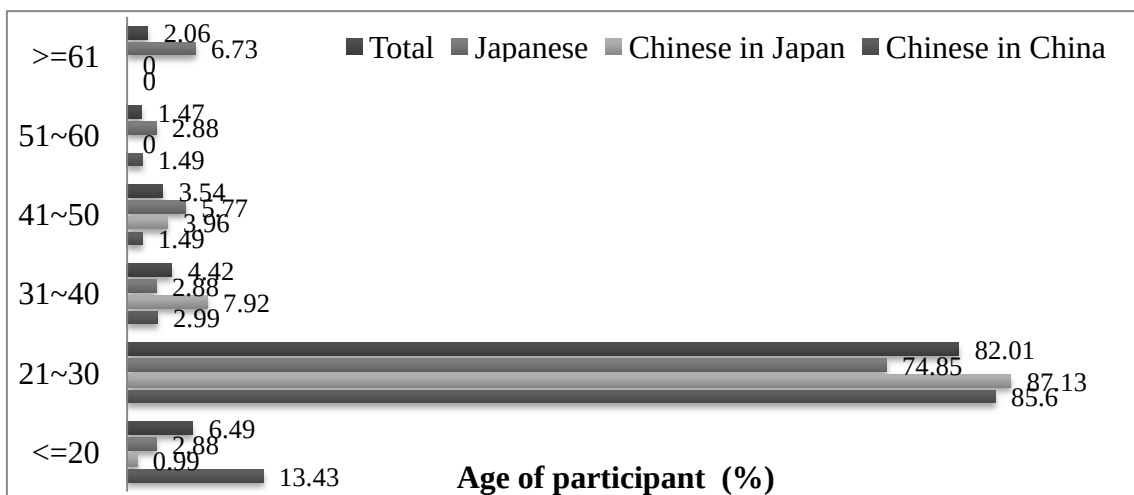


Figure 4.2: Age of participant

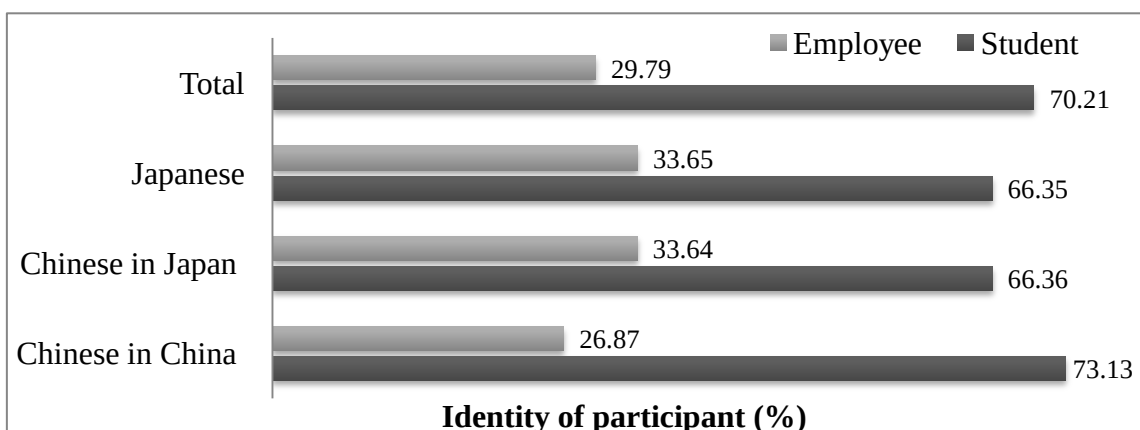


Figure 4.3: Identity of participant

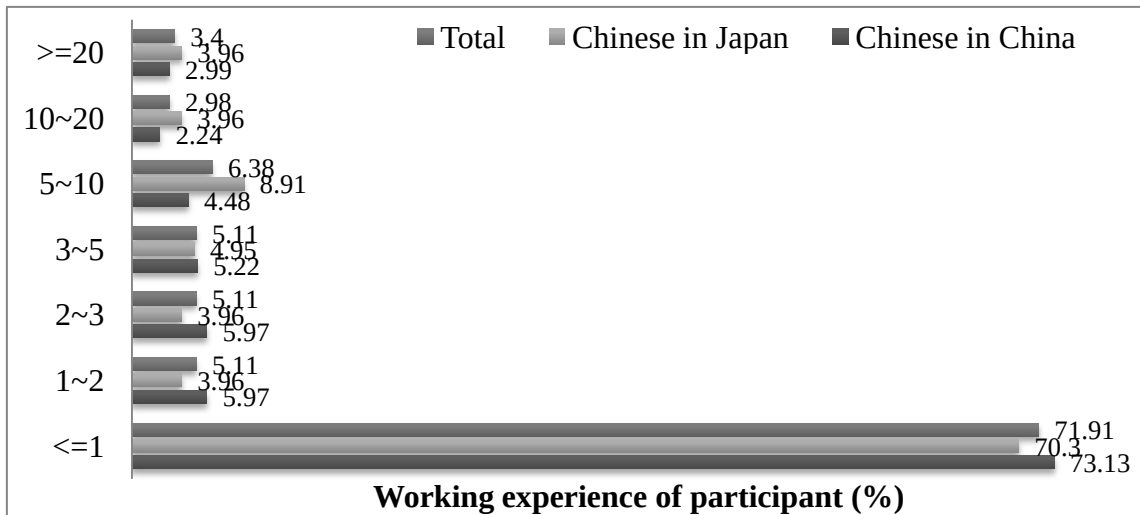


Figure 4.4: Working experience of participant

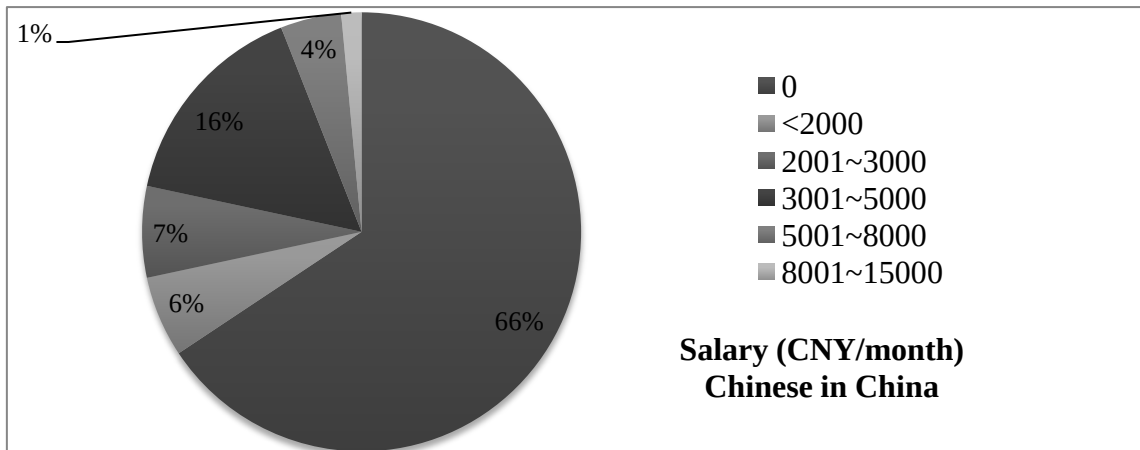


Figure 4.5: Salary of participant

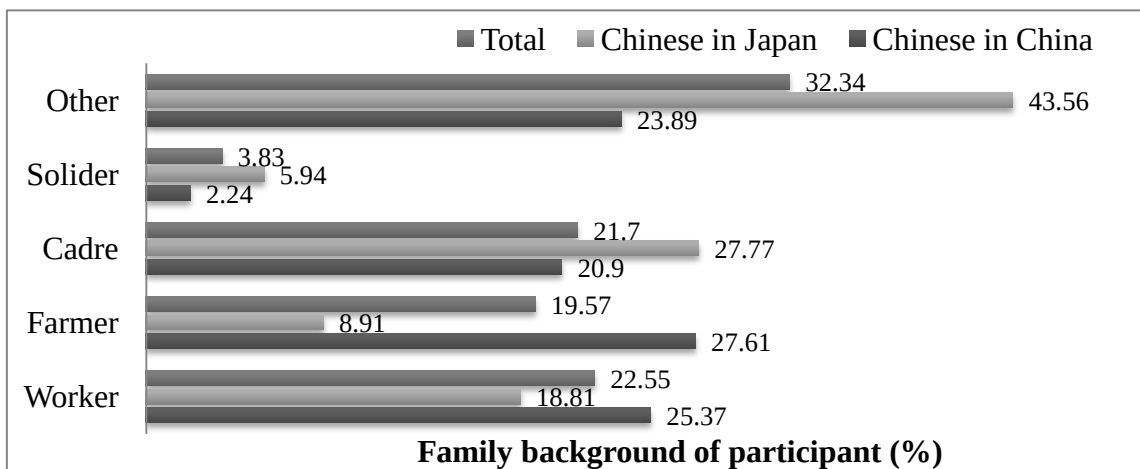


Figure 4.6: Family background of participant

As the results represented from the table 4-2 and figure 4-1~4-6 can be seen that, with respect to the respondents' gender, the male and female in two group Chinese are nearly the same, but in Japanese group, the male are much more than female. According to the age, most respondents are between 21 and 30, but as for the identity, most respondents are university students without working experience.

Because questions about the salary and family background are too private to be asked to Japanese, but which maybe have an influence on people's thought and behaviors, thus, these two questions just asked to Chinese people. From the results can be seen that, the employee's salary from Chinese in China are mainly between 3001 to 5000 CNY per month, which are match with their working experience. As for the family background, most respondents from the workers or other careers' families.

In order to ensure the reliability of questionnaire data which are used in this research, the Cronbach's coefficient alpha has been calculated during the data collection process. Generally a value above 0.7 is considered adequate for internal consistency. The results are shown in terms of Cronbach's coefficient alpha at 0.6 for culture section and 0.884 for Guanxi section. These results indicate that high reliability of questionnaire in Guanxi section is ensured, but in culture section is not so good.

4.6 Culture Comparative Analysis among Chinese in China, Chinese in Japan and Japanese

The purpose of this section is trying to verify the **hypothesis 4.1** that there is significant difference among three groups on culture dimension, but Chinese in China and Chinese in Japan would share more similarities than Japanese.

In order to testify it, the method of one-way analysis of variance (One-way ANOVA) is used among different groups and then the results shows in the Table 4-3. As the results shown, all of groups have significant differences on these four culture dimensions, especially in the PDI and IDV dimension.

Table 4-3: Summary of ANOVA test of variables among different groups on culture dimensions

Culture Dimensions	Chinese in China	Chinese in Japan	Japanese	F-value
PDI	2.59	2.85	3.38	22.35**
MAS	1.61	1.77	1.94	7.89**
IDV	2.53	2.69	3.09	22.20**
UAI	2.68	2.50	2.69	4.55*

* : 5% significant ; ** : 1% significant

Then, the multiple comparisons among three groups are conducted and the results are shown in the Table 4-4. From the results can be seen that, Chinese in China have a significant difference from Japanese for all of the culture dimensions except the UAI, as well Chinese in Japan also have a significant difference from Japanese for all of the culture dimensions except the MAS. However, both of these two Chinese groups do not have significant difference between each other except the UAI dimension. Therefore, the **hypothesis 4.1** is supported.

Table 4-4: Multiple comparisons among different groups on culture dimensions

Culture Dimensions	Chinese in China	Chinese in Japan	Mean difference	Chinese in China	Japanese	Mean difference	Chinese in Japan	Japanese	Mean difference
PDI	2.59	2.85	-0.26	2.59	3.38	-0.78**	2.85	3.38	-0.52**
MAS	1.61	1.77	-0.16	1.61	1.94	-0.33**	1.77	1.94	-0.17
IDV	2.53	2.69	-0.16	2.53	3.09	-0.56**	2.69	3.09	-0.40**
UAI	2.68	2.50	0.19*	2.68	2.69	-0.01	2.50	2.69	-0.20*

* : 5% significant ; ** : 1% significant

As the results shown, most of scores for Chinese in Japan on Hofstede culture dimensions are between the scores for Chinese in China and Japanese. According to some researches, traditional values and practices can be influenced by different culture environment but appear to be embedded in a country's social and economic institutions (Fey et.al, 2009), and various social, economic, and political institutional forces derive at least partly from national culture. A convergence approach represents that people in an international environment will embrace the attitudes and behavior common to people in other nations despite culture difference (Ralston et al., 1993), however, the transition needs a long term change. Furthermore, national culture may shape the nature and impact of management practices in that country (Wu et.al, 2008), but difficult to be changed by a different culture and business environment totally. That is the reason why

the scores of Chinese in Japan are between Chinese in China and Japanese on culture dimensions.

According to Hofstede national culture scores (refer to the Table 3-20, pp.101), Japan take 54 on PDI and 92 on UAI, whereas, China take 80 on PDI and 30 on UAI. However, from the results shown in Table 4-3 and 4-4 can be seen that, Japanese take a significant higher score than Chinese on the PDI dimension, whereas Chinese in China get the similar score with Japanese on UAI dimension. These results are different with Hofstede's results. In addition, Chinese in Japan take a significant lower score on UAI than Chinese in China and Japanese, this result is totally different with other dimensions.

These differences may be due to the participants attribute in this research. The participants for culture research in this dissertation are mainly university students without working experience, according to Ralston et al. (1999), the Confucian spirit has possibly been diluted to such an extent that the younger generation knows little about or it is not influenced by Confucian dynamism in China. And after the reform and opening-up policy in China, more and more freedom and equality thoughts have been accepted by Chinese people. In addition, because of the one-child policy, before entering into the society, the Chinese young generation are so free that they wouldn't like to accept the traditional culture about the differentiated mode of association or hierarchical social status, especially for the university students who are pursuing the democracy, freedom and equality, thus, the score of PDI should become smaller compared than before.

In addition, along with the growth of China's economy and competition intensifies, the sense of crisis, stress, pressure and insecurity is becoming stronger and stronger in China, especially young people become more and more anxious for their life and future than before. Thus it may lead Chinese to take higher score on UAI. On the other hand, all of Hofstede's data were collected from IBM company, and the participants were at different ages with working experiences. Therefore, the result in this research may be lack of universality and can't spread to all the people as well as we hope to get more data in the future to do our research in a further step, especially the data from the people who are at different ages with working experiences.

4.7 Guanxi Comparative Analysis among Chinese in China, Chinese in Japan and Japanese

In this section, in order to verify the **hypothesis 4.2** that there is significant difference among three groups on Guanxi, but Chinese in China and Chinese in Japan would share more similarities than Japanese, the method of one-way analysis of variance has been used to do data analysis. The results are shown in the Table 4-5.

Table 4-5: Summary of ANOVA test of variables among different groups on Guanxi

	Chinese in China	Chinese in Japan	Japanese	F-value
Guanxi based on strong tie	4.44	4.01	3.65	19.80**
Guanxi based on middle tie	5.01	4.76	4.56	6.12**
Guanxi based on weak tie	4.55	4.26	4.30	2.265
Average Guanxi	4.67	4.34	4.16	10.30**

* : 5% significant ; ** : 1% significant

As the results represented in Table 4-5, Chinese in China take higher scores than Chinese in Japan and Japanese in all three kinds of Guanxi and average Guanxi. According to the result of F-value, three groups have significant differences on the Guanxi based on the strong and middle tie as well as average Guanxi, but no significant difference on the Guanxi based on weak tie.

Then, the multiple comparisons among three groups are also conducted, and the results are shown in the Table 4-6. From the results can be seen that, the opinion to the Guanxi, Chinese in China have significant difference with Chinese in Japan on the Guanxi based on strong tie and the total Guanxi, but have significant difference with Japanese on all of the Guanxi except the Guanxi based on the weak tie, however, Chinese in Japan just have significant difference with Japanese on Guanxi based on strong tie. Thus, three groups have significant differences on Guanxi except the Guanxi based on the weak tie, but two Chinese groups don't share more similarity that Japanese. Therefore, the **hypothesis 4.2** is just supported in a certain degree.

Table 4-6: Multiple comparisons among different groups on Guanxi

	Chinese in China	Chinese in Japan	Mean difference	Chinese in China	Japanese	Mean difference	Chinese in Japan	Japanese	Mean difference
Strong tie	4.44	4.01	0.43**	4.44	3.65	0.79**	4.01	3.65	0.36*
Middle tie	5.01	4.76	0.25	5.01	4.56	0.45**	4.76	4.56	0.21
Weak tie	4.55	4.26	0.30	4.55	4.30	0.26	4.26	4.30	-0.04
Average Guanxi	4.67	4.34	0.32*	4.67	4.16	0.50**	4.34	4.16	0.18

* : 5% significant ; ** : 1% significant

From these results shown in Table 4-5 and 4-6 can be seen that, there is much significant differences among three groups on Guanxi based on the strong tie. Although compared to western countries, both China and Japan have a collectivistic rather than an individualistic cultural value orientation, the opinion to the core relationship between Japan and China may be different. As for China, the core relationship mainly refers to the bloody relationship, family members or closed relatives around the core person, whereas, as for Japan, the core relationship not only mainly indicates the personal relationships, but also relates to the Wa or Keiretsu groups with common interests (Alston, 1989; Lincoln et al., 1996; McGuire and Dow, 2002).

In addition, Chinese in Japan share more similarity than Chinese in China on Guanxi, may be because compared to China, Japan's legal system is more perfect. Even though China's legal system has been made great progress during these years, but, China is still typified as "a country ruled by men" whereas, Japan is typified as "a country ruled by law". In China, people in the social network are strongly bonded to have strong and clear role obligations, and hold high levels of trust, loyalty and altruism to people not to law. Therefore, Chinese people in Japan will obey Japanese law and they needn't use too much relationship to deal with problems, because some researchers indicate that Guanxi is more useful when the circumstance uncertainty was higher (Keister, 2002). As well, people can transcend their own cultures and provided insights into another culture, but cannot replicate it directly and totally into another culture (Hui and Graen, 1997).

On the other hand, from the result can be seen that, the Guanxi actions between China and Japan are significant different except Guanxi based on the weak tie. That maybe because both China and Japan is the collectivism society and influenced by the

Confucianism, both of them think the relationship between in-group and out-group is totally different. As well, both of them don't trust the out-group too much and don't like to deal with strangers, thus, the attitude to the Guanxi based on the weak tie is similar between Japan and China. The relationship between collectivism and Guanxi will be discussed in the next section.

4.8 Correlation Analysis between Guanxi and Collectivism Orientation

According to some research, Guanxi may lead to a strong in-group bias (Earley, 1993; 1994); especially Chinese and Japanese are collectivistic with respect to their own group. In other words, Guanxi defines who are in group and who are out group. Thus, in order to verify the **hypothesis 4.3** that Collectivism has significant relationship with all different kinds of Guanxi, the method of correlation analysis has been utilized in this section. The results of correlation analysis between collectivism and Guanxi are shown in the Table 4-7.

Table 4-7: Correlation analysis between Collectivism Dimension and Guanxi

		Strong tie	Middle tie	Weak tie	Average Guanxi
IDV	Pearson Correlation	-0.173**	-0.109*	-0.112*	-0.170**
	Sig. (2-tailed)	0.001	0.046	0.039	0.002
	N	339	339	339	339

* : 5% significant ; ** : 1% significant

As the result represented, the Individualism has a significant negative relationship with Guanxi actions, especially with the Guanxi based on the strong tie, thus the **hypothesis 4.3** has been supported, which also means Guanxi is still very important in the collectivism society of China and Japan. The result confirms it again, in the collectivism society people use Guanxi only with trustworthy partners, and relationship orientation is only applied to insiders of Guanxi network but not to outsiders of networks (Zhang and Pimpa, 2010). To establish and develop Guanxi is to form the basis for a gradual transition from outsider to an insider so that a long-term relationship can be built (Haley et.al, 1998).

4.9 Conclusions

In this research, based on the Hofstede culture dimensions and Guanxi's characteristics, a questionnaire has been developed and utilized as an evaluate instrument to investigate the cultural differences including the Guanxi between Japan and China, as well as analyzed the relationship between Guanxi and collectivism orientation. The findings and implications are concluded as follows:

First, the culture comparison among Chinese in China, Chinese in Japan and Japanese indicated that there is significant difference among three groups on culture dimensions, as well as, the culture dimensions between two Chinese groups share more similarities than Japanese. The result confirms that although the environment will influence culture and globalization has been radically taking place all over the world, each national culture still owns its uniqueness for its particular core value (Wong, 2010), and the core value of culture would be relatively stable even in the face of substantial change and turbulence (Ward et.al, 2002). As for the management, this research also indicates that people in different culture environment, the behaviors and thoughts are also different according to the different fundamental cultures, thus, the management practice should be adapted to the local culture in order to be most efficiency in the international business.

Second, the Guanxi comparison among Chinese in China, Chinese in Japan and Japanese indicated that there is significant difference among three groups on Guanxi actions, but the Guanxi actions between Chinese in China, Chinese in Japan do not have more similarities than Japanese. People's behaviors will change if environment and business ethical changes. During the transition period of China, the policies and environment filled with uncertainty, Guanxi plays a bigger role in the business and social context, practically when the business environment is uncertain and adequate legal system is not available (Lee and Hunphreys, 2007). From the comparison results may conclude that compared to special culture Guanxi, national culture is more ingrained and robust, which is very difficult to be changed by a different culture and business environment.

Third, the correlation analysis between Guanxi and collectivism orientation indicated that collectivism has a significant relationship with Guanxi, which also emphasize that, even now, under the more and more open and standard business environment, Guanxi still plays a very important role in the collectivism society in

China, even in Japan. In the collectivism society, people's attitude to the relationship between in-group and out-group is totally different. According to Shin et al. (2007), Guanxi has a stronger impact on in-group than on external information sharing, and compared collectivism and Confucian dynamism, Guanxi also the only significant meaningful factor that operated across group boundaries, having moderate influence on external information sharing. They also indicate that enormous opportunities for improved efficiency, increased flexibility, and timeliness can be realized by the free sharing of information in a supply chain according to the Guanxi. Therefore, people share long-term orientation, mutual trust, loyalty and reciprocal with each other in-group much more than out-group. Guanxi plays a moderating role between in-group and out-group in the collectivism society.

Since insufficient understand of culture can become a barrier to do the international business and lead to business failure, thus, the findings in this research suggest managers or executives involved in the business with Chinese companies should understand their own culture and Chinese culture deeply and then consider how implement their own values and thoughts into their business partners in order to perform better cooperation and obtain more benefit. The most basic thing for the foreign companies is to understand and establish Guanxi with Chinese partners and know how to use Guanxi to develop business relationship for business activities in China as Guanxi is a key in Chinese business culture.

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CHAPTER 5 CONCLUSIONS AND FUTURE RESEARCHES

Chapter Overview

This dissertation constitutes a contribution to the area of operational performance and its influential factors, as well as comparison of national culture difference between Japan and China. Under different culture environment, the operational performance is also different, and the culture influence should be taken seriously by companies. The general summaries and implications of this dissertation, as well as the limitations and directions for future research are summarized in this chapter.

5.1 General Summary

The main objective of this dissertation is to do the comparison of operational performance and investigate its influential factors between Japan and China. In order to fulfill this objective, NPDSC and LSC have been utilized as an essential data collection tool to investigate NPD, SCM operational performance and its potential factors which constitute an efficient NPD and SCM performance between Japan and China respectively. As well, culture has been recognized to have significant impact on SCM performance, thus, the Culture and Guanxi Questionnaire has been developed and utilized to do the comparative analysis on culture differences. The general summaries are concluded as follows:

5.1.1 General summary for NPD section

First, from the preliminary comparison between Japan and China indicates that the Japanese NPD performance level is higher than Chinese but not significant. As for each assessment area and items, these two countries focus on different things which match to their development stage respectively. As for Japanese, who represents a significant higher ability of exploiting management tools and IT to standardize the data exchange and make sure the quality of new product, while, Chinese pay attention on the capability of cooperation with suppliers and human resource as well as organization development. Compared with Japan, China as a developing country who haven't controlled and

managed so many technologies, they have to cultivate human resource and improve organization first. In addition, Chinese traditional culture, Confucian dynamism encourages people to pursue long-term benefits, thus, regard to present stage, compared technologies, human resource is more important for China.

Second, the results of factor analysis indicate that there are some influential factors which impact Chinese NPD performance structure, but different between Japan and China. NPD performance in Japanese firms is clearly associated with three perspectives of approaches for successful NPD, but Chinese NPD performance can't distinguish explicitly with these three approaches. This difference may be influenced by the culture differences. Because Japan is a very high uncertainty avoidance society, who have a greater need for formal rules and absolute truth; while, China is a low uncertainty avoidance society, who shows more tolerance for people and groups with deviant ideas or behaviors, thus, these cultural differences may explain why NPD performance in China in term of approaches for successful NPD is unclear.

Third, the correlation analysis between extracted potential factors and R&D investment as well as firm size by Japanese data indicates that human resources and firm size have a significant positive relationship with the NPD success except the cost of NPD. In the same time, the correlation analysis between extracted potential factors and financial outcome by Japanese data indicates that NPD performance has a positive effect on financial performance in a significant level except with the financial index of ROI, which maybe account for the time lagging effect and it should be noted in the future research.

5.1.2 General summary for SCM section

First, the preliminary comparison indicates that Chinese SCM performance level is significant higher than Japanese except the IT methods and implementation. Chinese pay attention on the ability of corporate strategy and inter-organization alignment in accordance with the contract and information sharing with suppliers and customers as well as employee training and evaluation. However, Japanese occupy a higher ability to deal with IT methods and implementation to ensure the high efficiency of their SCM performance. In addition, the unexpected result that Chinese perform much better than Japanese on SCM performance may be explained culture differences. Japanese people tend to be self-critical when they are under a competition-free situation, whereas,

Chinese people have a tendency to evaluate themselves rather leniently, therefore, it could be speculated that Chinese people may evaluate themselves higher than their actual performance. Moreover, the comparative analysis between Japan and China among different industries and firm size indicate that industry type and firm size have a significant impact on SCM performance, and different type of companies focus on different areas in term of SCM performance.

Second, by the way of thinking IT utilization and organizational strategy, the results of factor analysis indicates that there are some influential factors which impact SCM performance structure and considered to be similar between Japan and China. However, this result is different from previous research, that the IT usage was not identified as a unique factor from Thai and Finnish data sets, but as an independent factor in Japan and China. Both Japanese and Chinese think it is very important to perform a long-term collaboration with business partners, and the IT usage is just an enabler to achieve better SCM performance. In addition, after the reform and open policy, China have been absorbing lots of management knowledge, methods, experiences and economic development models from Japan and America, especially, the culture between Japan and China is similar in some degree, the Chinese SCM operational performance is deeply influenced by Japanese management thought, thus, the way of building SCM is similar between these two countries.

Third, the comparison by Chinese data indicates that SCM performance is significantly different among ownership status, SOEs and FOEs take up higher scores than POEs. Compared with SOEs and FOEs, most POEs in China belong to the small and middle companies, and who don't have more abilities to improve their SCM performance quickly. In addition, SCM performance is significantly influenced by the regional disparity. The developed regions perform better than developing regions in a fairly highly significant level. After the reform and opening policy, China's regional development strategy plays an important role in determining of China's regional economic development. Because of the preferential policies and geography advantages, the eastern coastal regions have developed much better than central and western regions. In order to decrease the regional disparity, the Chinese government has established some policies to promote the development of the western, northeastern and central regions and encourage foreign investment to go to the developing regions.

Fourth, the correlation analysis between extracted factors which represent China's SCM competencies and the ownership status, regional disparity and the interaction

effect indicates that, ownership status and regional disparity have a significant impact on SCM performance. Especially, regional disparity has a fairly highly significant influence on IT utilization ability, which confirms it again that the way of thinking IT utilization and implementation is different between different regions. Then, the correlation analysis between extracted potential factors and financial performance by Japanese data indicates that successful SCM performance can improve corporate financial performance in a direct and indirect way. Organization strategies have a direct significant influence on financial performance; however, IT utilization ability has an indirect impact on financial performance, which in cooperation with organization strategy will yield a stronger relationship with financial outcomes than implement them separately.

Finally, correlation analysis between SCM operational performance and national culture dimensions indicates that national culture has a significant relationship with SCM performance. Focusing on each area, especially area (1) Corporate strategy and inter-organization alignment had a significant correlation with cultural dimensions, which indicated that in order to deal with the relationship among inter-organization alignment, the culture influence must be taken seriously. In this area, China takes a much higher score, which may be explained by the special Chinese culture called Guanxi. Guanxi is a system of personal connections which carries long-term social obligations to maintain business relationship in China. However, culture doesn't have a significant influence on the area (4) IT methods and implementation. The result reveals that how to use technologies doesn't have significant difference between each culture environment; whereas, the way of how to use IT with organizational strategy is significantly influenced by the culture difference.

5.1.3 General summary for culture section

First, the culture comparison indicates that there is significant difference among three groups on culture dimensions, and Chinese in China share more similarities with Chinese in Japan than Japanese. The result confirms that although the environment will influence culture and globalization has been radically taking place all over the world, each national culture still owns its core value which would be relatively stable even in the face of substantial change and turbulence. Then, the Guanxi comparison shows that there is significant difference among three groups on Guanxi, but Chinese in China and Chinese in Japan don't share more similarities than Japanese. Compared to special

culture Guanxi, national culture is more ingrained and robust, which is very difficult to be changed by a different culture and business environment.

Second, the correlation analysis between Guanxi and collectivism indicates that even under current business environment, Guanxi, especially Guanxi based on the strong tie still plays a very important role in the collectivism society in China, even in Japan. In the collectivism society, people's attitude to the relationship between in-group and out-group is totally different. And people would like to share long-term orientation, mutual trust, loyalty and reciprocal with each other in-group much more than out-group. Guanxi plays a moderating role between in-group and out-group in the collectivism society. The result also indicates that, even in the contemporary society, family ethic is still the base and the core of Confucius' human relations, and the "family – nation – world" is still the structure from inside to outside for Chinese, where each one ought to be committed, responsible and content to his given role to ensure the whole society stays in stable and harmony.

5.2 Managerial Implications

Based on the main findings of this dissertation, the following managerial implications have been concluded:

First, comparison of NPD performance between Japan and China indicates that, China's NPD performance maybe lags far behind Japan, which is in their initial stage of NPD performance. The deficiency on the planning executive ability and technology exploitation capability reveals that these production problems have to be taken seriously by foreign companies before they want to build joint ventures in China, which also suggests that foreign companies should pay attention to the transfer of the necessary production skills, methods, technologies and know-how to their Chinese partners. In addition, the NPD structure is different between Japan and China, which may be influenced by national culture. Especially China should clearly their NPD approaches in order to achieve success NPD performance. Moreover, compared financial investment, human resources are more important for implementing and maintaining NPD performance, which also suggests managers, that the staff recruitment and training in R&D department should be taken more seriously.

Second, comparison of SCM performance between Japan and China indicates that these two countries focus on different capabilities on SCM performance which are similar with the NPD performance, thus, foreign companies should pay more attention to human relationship, information sharing and organization strategy with Chinese partners, and transfer their necessary technologies to their Chinese partners. Because IT can't influence financial performance directly, thus both Japan and China should consider how to integrate IT utilization with organization strategy in order to improve SCM efficiency and yield more financial outcomes. Moreover, regional economic development in China is fairly unbalanced and the regional policies are also different between each region, when foreign companies want to do business in China, they have to pay attention this seriously. In addition, insufficient understanding of culture can become a barrier to do the international business and lead to business failure, thus, the management practice should be adapted to the local culture in order to be most efficiency in the international business. Especially, China is a multi-ethnic, multi-lingual, multi-religious and multi-cultural country, and different regions also have their own cultures, which remind the foreign companies should not only take the national culture difference seriously, but also pay much attention to the regional culture.

Third, the culture research suggests that the most basic thing for the foreign companies to do business in China is to understand and establish Guanxi with Chinese partners. Because Guanxi is an unwritten rule that binds social and business relationship in Chinese society, and the foundation and guideline of Guanxi is trust which is totally different with western trust which embodies a written contract or agreement. Guanxi is a key in Chinese business culture. However, everything has two sides like the coins. The ethics of Guanxi has been argued by many researchers. Guanxi may bring benefits to individuals as well as organizations they represent but these benefits are obtained at the expenses of other individuals or firms and thus detrimental to the society (Fan, 2002b), business Guanxi is inevitably associated with favoritism, unfair competition, bribery and fraud (Fan, 2002a), Guanxi practice embodies such rules and codes of conduct that should be seen as an informal institutional mechanism facilitating the contacting process of corrupt exchanges (Li, 2011). Although Guanxi has lot of above black sides and risks, Chinese people still emphasize the value of commitment, trust and mutual cooperation based on Guanxi, who also are apt to be more responsive to investments of time rather than money to maintain the Guanxi issues of trust and commitment (Lee and Ellis, 2000). These remind foreign managers or executives that it is necessary to understand and establish Guanxi with Chinese partners, but how to use Guanxi to do business activities legally and ethically is much more important.

5.3 Limitations and Direction for Future Researches

Because of the limited time and obtained data, there are some limitations in this dissertation which should be discussed in a future step in future research.

First, this dissertation has only examined the performance structure of NPD between Japan and China in a national level. Since industry type, firm size, ownership status and regional disparity could influence the management structure and its operational performance, which also may impact on the approaches to the successful NPD, thus, the future research will draw attention to investigate NPD performance from those perspectives in a further step. Meanwhile, the mechanism of how human resource and financial investment influence NPD efficiency should be investigated in a further step. In addition, a strong planning and rational perspective on NPD performance is highly consistent with the culture and environment (Nakata and Sivakumar, 1996; Pan and Chen., 2010). Especially in China, the Guanxi affects people's relationship and behavior in Chinese society, and it also influences the integration of R&D and marketing department (Gao et al, 2008; Chen et al., 2010), which also play a significant role on the successful NPD performance. Thus, how culture, especially how Guanxi influence NPD performance should be discussed in a further step. A research focuses on Chinese culture and the NPD can help foreign companies better understand the NPD strategy in Chinese firms, and then prepare better strategies to compete and collaborate with Chinese partners.

Second, the correlation analysis between operational performance and financial indices has just been conducted by Japanese data in this research. In order to investigate the mechanism of how IT integrated with organizational ability will improve SCM efficiency and then yield more financial outcomes more clearly, much more financial data are expected to be obtained from developed and developing countries in the future.

Third, long-term orientation is another characteristic for China and Japan, and there is also some relationship between collectivism and long-term orientation. Since Guanxi is a system of personal connections that carry long-term social obligations, thus, establish and maintain Guanxi will take lot of time and effort, especially for the people who are not the member of in-group. Therefore, the relationship between Guanxi and long-term orientation will be discussed in future research. In addition, compared Hofstede culture dimensions, the significant difference in this research is that Japanese take the highest score on the PDI dimension, and Chinese in China get the similar score

with Japanese on UAI dimension. Although some researchers indicate that some of data used in Hofstede's study are outdated which makes the framework unable to keep pace with changes in the real world, and culture practice is not always the reflection of cultural values (Pan and Chen., 2010), nobody can deny the contribution of Hofstede's work. The participants for culture research in this dissertation are mainly university students without working experience; thus, the result in this research may be lack of universality and can't spread to all the people. Therefore, we hope to get more data in the future to do our research in a further step, especially the data from the people who are at different ages with working experiences.

Finally, the scope of this research is expected to be extended to collaborate with international organizations for systematic data collection in a larger scale in different countries in order to create a reliable database in future. It is also further expected that the directions provided in this research would be utilized as a prototype for investigating and enhancing NPD and SCM operational performance in different business environments, especially in some other newly industrialized developing countries.

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Appendix A

New Product Development Scorecard (NPDSC)

- **Chinese (survey conducted in China)**
- **English**
- **Japanese (survey conducted in Japan)**

新产品开发打分卡调查问卷

■ 填写打分卡的注意事项

- (1) 请根据贵公司的实际水平, 选择适合的分數 (1 到 5 分别代表从低到高五级)。
- (2) 如果贵公司实际情况达到某一水平但是无法完全符合该水平的所有条件时, 请选择比该水平低一级的分數, 或者取两水平之间的分數 (例如您认为贵公司的水平应该是 3 级, 但是公司又不能完全满足 3 级水平的条件, 就请选择比 3 级低一级的分數, 即 2; 或者您认为贵公司最适合的水平在 2 和 3 之间, 您可填写 2.5)
- (3) 对贵公司/贵事业部的产品开发有全面了解与认知的人, 请回答该问卷。另外, 如果贵公司拥有多种事业类型的话, 我们建议您分事业类型进行回答。
- (4) 如果此份打分卡由贵公司/贵事业部的不同人进行独立评价及回答的话, 有助于大家看到不同人对于新产品开发认知上的差别。这种情况的话, 请每人填写一份问卷。

■ 填写打分卡之前请在□内✓上贵公司/贵事业部门的基本信息, 并填写详细内容

1. ☐ 贵公司/ ☐ 贵事业部的名称及所在地 ()
所在省份 () ☐ 省 ☐ 市 ☐ 自治区
2. ☐ 贵公司/ ☐ 贵事业部的产品开发类别 (请填写主要产品即可, 可多选)
☐ ① 土木·建筑 ☐ ②-1 加工食品 ☐ ②-2 饮料·酒类 ☐ ③ 衣料·纤维 ☐ ④-1 木材·家具 ☐ ④-2 造纸·纸浆
☐ ④-3 印刷 ☐ ⑤-1 医药 ☐ ⑤-2 化工产品 (面向消费者) ☐ ⑤-3 化工原料·工业用化学产品 ☐ ⑥ 钢铁·非铁金属
☐ ⑦-1 一般器械器具 (面向消费者) ☐ ⑦-2 同 (面向企业) ☐ ⑧-1 电器器械器具 (面向消费者) ☐ ⑧-2 同 (面向企业)
☐ ⑨ 情报通信机械 ☐ ⑩-1 汽车·摩托车 ☐ ⑩-2 造船·其他运输器械 ☐ ⑪-1 精密机械器具 (面向消费者)
☐ ⑪-2 同 (面向企业) ☐ ⑫-1 电子零部件·电子设备 (汽车用) ☐ ⑫-2 同 (汽车以外用) ☐ ⑬-1 机械零部件 (汽车用)
☐ ⑬-2 同 (汽车以外用) ☐ ⑬ 软件·系统 ☐ ⑭ 其他 ()
3. ☐ 贵公司/ ☐ 贵事业部的年销售额 (单位: 人民币)
☐ ① 低于 2 千万 ☐ ② 2 千万~1.3 亿 ☐ ③ 1.3 亿~3.3 亿 ☐ ④ 3.3 亿~6.6 亿
☐ ⑤ 6.6 亿~13.2 亿 ☐ ⑥ 13.2 亿~33 亿 ☐ ⑦ 33 亿~66 亿 ☐ ⑧ 高于 66 亿
4. ☐ 贵公司/ ☐ 贵事业部从事新产品开发的员工人数
☐ ① 低于 3 人 ☐ ② 3~5 人 ☐ ③ 6~10 人 ☐ ④ 11~20 人
☐ ⑤ 21~50 人 ☐ ⑥ 51~100 人 ☐ ⑦ 101 人以上
· 委托给外部的产品开发比例:
☐ ① 0 ☐ ② 不满 10% ☐ ③ 不满 10%~20% ☐ ④ 不满 20%~30%
☐ ⑤ 不满 30%~50% ☐ ⑥ 不满 50%~90% ☐ ⑦ 几乎全部
· 专职属于贵公司/贵事业部的产品开发的员工比例
☐ ① 0 ☐ ② 不满 10% ☐ ③ 不满 10%~20% ☐ ④ 不满 20%~30%
☐ ⑤ 不满 30%~50% ☐ ⑥ 不满 50%~90% ☐ ⑦ 几乎是全员
5. 包含研究开发的新产品开发成本占销售额的百分比: 大约占销售额的 () %

■ 填写人或者填写团队的信息

- 1) 个人姓名或者团队名称 () 2) 填写时间 () 年 () 月 () 日
- 3) 填写人的职务或者所属部门: _____
- 4) 联络方式: 电话/传真: _____ 电子邮件: _____

■ 请在下面的空格里填写各评价指标的分數。

评价项目	1. 研发体制						2. 计划及运作能力							3. 研发绩效						4. 工具/信息技术的应用					
	①	②	③	④	⑤	⑥	①	②	③	④	⑤	⑥	⑦	①	②	③	④	⑤	⑥	①	②	③	④	⑤	⑥
回答																									

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新产品开发打分卡调查问卷

1.研发体制

评价项目	回答	水平 1	水平 2	水平 3	水平 4	水平 5	备注
①研发战略的明确程度及资源的确保程度		没有特别地制定中长期的研发战略及目标，只是进行敷衍了事的开发	虽然大致拥有中长期的目标与计划，但还没有与资源确保计划相关联。	正在制定中长期的研发战略及资源获得计划	在水平 3 的基础上，已经提前开始了必要的技术研发	在拥有中长期研发战略的基础上，对企业技术水平的强弱及市场动向进行分析，提前进行的技术开发与个别的新产品开发紧密相连	
②专利战略及合作		对于申请专利没有经验	对于申请专利有一定的经验，但是针对专利申请的奖励暂时没有开展	不但具有明确的专利战略，还配置有完整的专利取得体制	除了本企业的专利外，还确立了与合作企业等最佳开发组合相连接的战略	在水平 4 的基础上，专利管理以支持新产品开发及提高技术研发品质的形式，为企业经营做出贡献	・ 最佳开发组合： 除了进行本企业的新产品开发以外，通过与其他企业进行共同开发及合作开发的混合形式，来实现开发风险的分散以及实现使开发最合适化的战略
③技术与市场的匹配程度及测量基准		在新产品开发的时候，只考虑本企业的供给，有自命不凡的倾向	考虑到本企业的供给与目标市场的匹配程度	在水平 2 的基础上，在目标市场与竞争企业做基准化分析	在熟知本企业的强弱基础上，除了已存在的目标市场之外，拥有开拓新市场的视野。	基于全球性竞争的视野进行基准测量及市场调查。在此基础上，有系统得进行技术研发及市场开发	・ 测量基准： 通过调查那些被认为具有竞争性的其他企业及最好的实践者（企业）的产品的品质，成本以及开发方式，来认识本企业的市场位置及其强弱。
④顾客・市场需求的把握及其关系		没有考虑和把握顾客・市场的需求	虽然了解顾客・老顾客的需求，但是没有形成体系	把顾客・老顾客的需求与营业相结合	在系统化的进行水平 3 的基础上，时常反馈研发后的情报，并在下个阶段的产品开发中得到有效利用	在水平 4 的体制基础上，以向顾客提出方案及合作的方式进行双向开发。	
⑤与供应商的合作关系		与供应商有短期的合约关系，但是几乎没有掌握技术以及品质上的信息	在选定供应商时，虽然已经充分评价技术及 QCD ，但是开发时的信息基本上没有共享	开发时，拥有紧密的信息共享机制，根据场合可以进行适时地技术支持	在水平 3 的基础上，开发过程的重叠与同时运作紧密相连	在水平 4 的基础之上，形成与相互学习相连接的永恒的双赢体制	・ 双赢： 通过使供应商与顾客相连接的方式，产生利益并实现利益共享
⑥人才培养与研发组织		没有特别意识到进行研发人才的培养项目	虽然拥有人才培养及教育项目，但是总体上都是应付的状态	以将来的计划为基础，正在整顿必要的技术调查及培养项目	在水平 3 的基础之上，把握必要技术的脉络及现状水平，并且多个专业化的项目正在同时进行中。	在水平 4 的基础之上，能够培养把握全局的项目经理，并且根据实际状况，研发小组与组织结构的机能能够有效的发挥。	

2.计划及运作能力

评价项目	回答	水平 1	水平 2	水平 3	水平 4	水平 5	备注
①企划的品质		总体上都是突发奇想（临时）的新产品企划	能够大致上做到把握市场分析及交易商的需求，但是以本企业供给为基础的企划都是应付的东西。	正在对水平 2 的手续进行标准化，但是存在一些形式化的问题阻碍有效的企划	为了达到克服水平 3 的问题，同时为了活用独创性的想法为目标而制定的方针政策	不断改进企划案的标准化，同时形成以创造出独创的想法为目标的人才培养项目及环境	
②生产技术能力		由于生产技术能力的不足，降低了企划的品质	→ （介于水平 1 与水平 3 之间）	拥有实现企划案的生产技术能力	→ （介于水平 3 与水平 5 之间）	由于拥有较高的生产技术能力，提高了比企划中目标更高的品质	
③设计开发的项目管理及进程管理		没有项目管理的意识，进程管理也模糊不清	制定大致的交货期目标，但为此而进行的路标设定等管理模糊不清	设定了交货期目标与品质目标以及设定了达成两者过程中的路标，但是没有对此而制定明确的对策	拥有以克服水平 3 的问题为目标的进程计划（例如 PDPC 法的有效利用）与管理的企划	在水平 4 的基础上具有设计变更与进程情报的信息共享体制。形成在遇到不可预测的状况时，由领导进行调整的环境	・ PDPD (Process Decision Program Chart)： 事先预测能想到的各种结果及风险，制成图表，有意地将进程按所想的方向引导的 N7 方法
④DR（设计评审）的实施及其质量		完全没有 DR 这种概念	知道 DR 的概念，但没有固定实行	通过各横向部门人员的参与，DR 固定执行，但是没有定期进行检查	为了使 DR 具体化，每逢新产品开发时都要对参加人员、实施时期以及实施次数进行检查	在水平 4 的基础上，将必要的信息整理成数据库并完善支持系统，以此来有效实施 DR	・ DR(Design Review)： 设计评审。针对设计审查，设计过程的阶段，跨部门成员对性能，机能，可靠性等进行审查，指出问题并加以改善。
⑤品质保证的系统化及可靠性的确保		没有品质保证的系统，可靠性确保的体制也不充分	有大致的品质保证系统图，但该系统是否能够有效发挥作用不得而知	品质保证的系统得到完善，已经建立应对之前出现的问题及防治问题流出的方法	水平 3 的基础上，在与重要品质和产品可靠性相关的事物方面，FMEA 及其可靠性解析得到应用	水平 4 的基础上，在将初始管理彻底化的并行工程之上，形成从开发，生产到营业一体化的品质保证体系。	・ FMEA(Failure Mode and Effect Analysis)： 以找出设计与工程的不完善及潜在的问题为目标，来解析对构成成分的故障模式与其上流系统的影响的手法。
⑥并行工程体制与源流管理的彻底化		与开发相关联的部门/组织间的信息共享还没有形成，但是按序存取的过程正在形成	为了缩短开发周期而意识到开发过程重叠性的必要性	为了实现水平 2，企业内部之间的信息共享结构已经形成	水平 4 不仅仅在企业内，而且在包含供应商及老客户的协作活动中发挥作用，总是形成边际效应	水平 4 的并行工程体制是考虑到读取顾客的需求及减轻环境负重的内容，实现交货期短，成本低，成为业界 NO.1	・ 并行工程： 新产品开发的过程不是按照顺序进行，而是通过将整个过程同时、并列进行来实现缩短开发周期的方法论。因此，过程中的信息共享及提早指出问题点的活动是必不可少的。
⑦设计原理的实施与对下阶段开发的反馈		设计开发过程几乎没有记录	虽然留有设计会议的会议记录，但是几乎没有从中发现问题，不能在下阶段开发中加以有效利用。	从设计会议等会议记录中找出对下次会议与下阶段开发有用的信息，写成书面的形式，并且相当一部分已付诸实践	在水平 3 的基础之上，除了正式的设计会议外，在做决策时，扩大非正式的设计变更等以增强效果。	在水平 4 的基础之上，除了过去的历史记录反映外，作为信息共享的机制正在被进行中的设计开发有效利用	・ 设计原理： 设计开发的过程中，整顿设计会议等的记录（议题，样式与方法等的替代方案，讨论的内容，决定的理由/合理性），并在下阶段开发中有效利用的想法。特别在有效利用失败的经验时非常有效。

新产品开发打分卡调查问卷

3.开发绩效

评价项目	回答	水平 1	水平 2	水平 3	水平 4	水平 5	备注
①新产品的品质、满意度		对于新产品的顾客满意度低、申诉多及对此进行处理的情况频繁发生。	从市场及顾客得到的评价不怎么高，但是不满未必很多。	以现有业务、现有市场为对象，虽然市场及老顾客对新产品的评价很高，但仍然一直致力于具有革新价值的新产品的开发	针对水平 3，市场与老客户都期待对现有产品的开发带来革新的价值，并超越已存在的产品的范畴，企业也正在很好得响应这一期待	能够经常开发出现有市场没有的，市场与老顾客意想不到的，且能带来满足感的革新的新产品	
②研发的提前期与交货期		由于在研发过程中频繁返工等原因，导致不能遵守开发的交货期。	→ (介于水平 1 与水平 3 之间)	虽然顾客的要求与预定的交货期基本达成，但是开发周期是否合理无法判断。	→ (介于水平 3 与水平 5 之间)	通过必要的关键技术提前开发等战略及并行工程的整顿，拥有能应对交货期时间短、在业界属于 No.1 的爆发力。	
③研发效率(前期准备工作的运用程度)		没有研发效率的评价，也没有研发工作的测定	对研发工作进行了测量	为了使研发工作效率化，努力做出前期准备工作的安排计划	在水平 3 的基础之上，对前面出现的问题及其影响进行评价（对下游研发的成本有影响）	通过水平 4 的实践，时常检验研发工作，提高研发效率	・ 前期负荷 ：为了提前发现问题和问题发生时的信息共享，新产品开发时应尽量在前面的环节多花费功夫。 ・ 源流管理 ：为了防止问题发生，追溯至源头寻找对策的思考方法。
④成本计划的实施及其质量		没有目标成本的想法，也没有达成此目标的活动	以采购为中心的 VE 活动正在进行，但是初始阶段的成本修正还没有做出	有目标成本的想法，初始阶段的成本修正活动也在进行	水平 3 的基础上组合的方法论，从产品设计、制作方法、采购等侧面出发，形成系统化。	水平 4 基础上的组合，基本上完全达成目标，并且此状态一直持续下去。	・ 成本企划 ：在新产品的企划、开发的阶段，战略性得设定成本目标，并且为了达成此目标，从设计、制作方法、采购的观点出发做出成本修正的活动 ・ VE(V 价值工程) ：广义的 VA （价值分析）。是指以产品或作业的功能分析为核心，以提高产品或作业的价值为目的，力求以最低寿命周期成本实现产品或作业使用所要求的必要功能的一项有组织的创造性活动。
⑤面向环境的设计及其质量		在产品开发/设计时，没有特别考虑到环境问题	暂时考虑到环境，但是针对 DFE（面向环境的设计）的基准及规则还没有完善	拥有并正在实行与 DFE 有关的方针及规则	在水平 3 的基础之上，定量地评价对环境负荷的影响并制定削减此影响的对策	水平 4 的内容是涉及包含了产品被使用者的生活周期为视野被进行评价的、并且在产品设计、购买、生产及市场活动中被有效利用。	・ DFE(Design For Environment) ：指在产品的整个生命周期的各个阶段，包括设计、选材、生产、包装、运输、使用、报废处理及回收利用，都必须综合考虑其对资源和环境的影响的设计。
⑥初期流动管理的长度		生产技术能力不足，并且在启用新产品之后频繁发生事故，再到稳定下来总是需要很长的期间	→ (介于水平 1 与水平 3 之间)	关于初期流动，拥有包含生产技术作用的明确指标，并且新产品开发的每次改善措施都有实施	→ (介于水平 3 与水平 5 之间)	在强大的生产技术与源流管理的彻底支持下，初期流动期间无限接近零（垂直向上）	・ 源流管理 ：为了防止问题的发生而追溯到问题的源头而采取对策的想法

4. 工具 / 信息技术的应用

评价项目	回答	水平 1	水平 2	水平 3	水平 4	水平 5	备注
①QFD 的利用情况		不知道 QFD，即使知道也不用	品质表等有一部分正在导入，但是几乎没有被系统性的使用	做成从把握品质要求出发，到设计、特性、零件、工程的展开等一系列的机能展开表。	在水平 3 的基础上，作为部门间的信息共享及提早发现问题的工具，在全企业中很好的发挥作用。	作为水平 4 的进一步发展形式，努力形成本企业独自努力的使用方法及其系统化。	・ QFD ：质量功能展开。把顾客对产品的需求进行多层次的演绎分析，转化为产品的设计要求、零部件特性、工艺要求、生产要求的质量工程工具，用来指导产品的健壮设计和质量保证。
②DFM（可制造性设计）信息、MP（维修预防）信息的利用情况		在商品设计及设备设计方面，没有形成将过去的事故及问题的信息有效利用的结构	拥有制造/组合的简单性设计及容易维护的工程设计的想法，但是这些想法依赖于个人的知识和经验	检查列表的知识经验集合正在被配备与实践	作为 DFM 信息与 MP 信息的数据收集及有效使用正在系统化得进行	在水平 4 的基础上作为知识管理的系统，大大增强了效果	・ DFM(Design For Manufacturability) ：可制造性设计。通过将设计本体在制造及组合中变得容易设计，来提高品质及制造效率的设计。 ・ MP(Maintenance Prevention)维修预防 ：已存在的设备、工程的故障、不佳状况及其改善的信息与其数据库。能够加进新设备与工程的设计有效利用为目的。
③FMEA(故障类型与影响分析)等可靠性检测方法及稳健设计（质量工程）的利用情况		由于新产品可靠性的想法非常单薄，在投入市场后频繁发生由于可靠性问题而引发的纷争	尽管在新产品开发时拥有确保可靠性的想法，但是以在事前指出问题为目的的具体方法还没有被运用	关于重要零部件，FMEA 与 FTA 等可靠性分析的方法正在被使用	在水平 3 的基础上，明确制定重要零部件的定义，为了保证稳健的设计，质量工程也被有效利用。	在水平 4 的基础之上，形成将 SQC 与质量工程组合起来的最适合的可靠性设计，关于工程设计也形成 FMEA 等的有效利用的方法	・ FTA(Failure Tree Analysis)故障树分析 ：在可靠性及安全性上，对不希望发生的事态，在发生路径、原因以树形图的形式，从上而下进行描绘解析的手法。 ・ 质量工程 ：也称作田口方法。是一种低成本、高效益的质量工程方法，它强调产品质量的提高不是通过检验，而是通过设计。其基本思想是把产品的稳健性设计到产品和制造过程中，通过控制源头质量来抵御大量的下游生产或顾客使用中的噪声或不可控因素的干扰，这些因素包括环境湿度、材料老化、制造误差、零件间的波动等等。
④CAD（2 维，3 维）CAE 的有效率用程度		虽然认为有必要导入 CAD 与 CAE，但实际上要么未导入，要么尽管导入但是没有发挥效果	尽管在需要处导入 CAD 与 CAE，但是黑箱化现象的存在导致只有一部分效果能够发挥	CAD 与 CAE 的导入，通过开发设计的加速与模拟技术与提前发现问题的效果大体相连接。	在水平 3 的基础上，很好的发挥了作为削减试制次数和作为并行工程工具的作用	在水平 4 的基础上，特别是 3 维 CAD 与加入独特经验的 CAE 相结合发挥了巨大的效果	・ CAD(Computer Aided Design) ：计算机辅助设计。在设计的效率化与 3 维 CAD 方面，初始产品的形象共享与构造，解析与干涉检查等是有可能的。 ・ CAE(Computer Aided Engineering) ：计算机辅助工程。依据 3 维 CAD 数据进行仿真的技术来优化各种各样设计参数的最适值的解析或模型自动成型技术的总称。
⑤技术数据库的配置及 PDM（产品数据管理）		设计图的书写方法或编码也是根据职位与人的不同而不同，技术数据完全没有被再次有效利用	存在被称为技术与产品模型的数据库，但是完全没有被有效利用	拥有设计图编号的单个号码化的构成管理的大体结构，遗留数据也被有效利用	在水平 3 的基础上，情报、数据已被信息化，同时以有效利用为目的的一元化管理也正在形成	水平 4 的 PDM，能够应对技术的剧烈变化，并且因为充分有效利用的构成管理系统使得 PDM 的有效利用得到提升	・ PDM(Product Data Management) ：产品数据管理。将与产品开发相关的技术信息进行管理与有效利用，在相关的部门间，在必要的时候必要的场合，提供与共享必要的信息，以此为目的的信息技术
⑥技术数据交换的信息化程度及标准化程度		在合作开发的合作伙伴间，没有能力应对设计图的标准化与信息化	为了促进双方的信息共享，形成几个标准化与共同化	虽然电子信息数据的交换正在形成并部分被利用，但只是个别且不能被通用的专用标准，且效果被局限	在水平 3 的基础上，通过互联网或公开标准的有效利用及其视野提高效果	考虑机密性的同时，通过最大限度的采用公开标准使得超越体系形成双赢局面的有效数据交换变为可能。	

New Product Development Scorecard (NPDSC)

Entry date (yy/mm/dd): _____ / _____ / _____

Important notes previous to filling the Scorecard:

Please answer the questionnaire of company brief information below together with the score of NPDSC in the provided table, and please return us only this page.

- Fill in the score (1 to 5) according to the level that fits your company.
- If all the conditions of the level you think is best fitting are not satisfied, fill in the score of one level below. If you think the best fitting level is between two levels (let's say 2 and 3), then you can fill in an intermediate score (in this case 2.5).
- For the items that you think are clearly not applicable to your company, fill in "N/A" in the corresponding square.
- According to the item, while referring to the section in charge and suppliers/customers, we recommend group evaluation if possible.
- **In case, there are obvious differences between each section in the company, we recommend to answer the NPDSC separately.**
- The filled in Scorecard we receive from you is strictly confidential, and will not be transmitted to any party. Thank you for your cooperation.

Before filling in the Scorecard, please provide brief information about your company by answering the following questionnaire.

1. Company / Company Section name & location (_____) Main Location (_____)
2. Type of Industry (Please fill out the main products, multiple answers can be chosen)
 - (1) ☐ Construction; (2)-1 ☐ Processed Foods; (2)-2 ☐ Beer / Beverage; (3) ☐ Apparel fabric / Fiber;
 - (4)-1 ☐ Timber / furniture; (4)-2 ☐ Paper / Pulp; (4)-3 ☐ Printing; (5)-1 ☐ Pharmaceutical;
 - (5)-2 ☐ Chemistry (Consumer-oriented); (5)-3 ☐ Chemical raw materials / industrial chemical products;
 - (6) ☐ Steel / Nonferrous metals; (7)-1 ☐ General instrument (Consumer-oriented); (7)-2 ☐ General instrument (Business-oriented); (8)-1 ☐ Electric machinery (Consumer-oriented); (8)-2 ☐ Electric machinery (Business-oriented);
 - (9) ☐ Intelligence communication machinery; (10)-1 ☐ Automobile / motorcycle; (10)-2 ☐ Shipbuilding / Other transport equipment;
 - (11)-1 ☐ Precision machinery equipment (Consumer-oriented); (11)-2 ☐ Precision machinery equipment (Business-oriented);
 - (12)-1 ☐ Electronic components / Electronic equipment (For automobile use); (12)-2 ☐ Electronic components / Electronic equipment (Not for automobile use);
 - (13)-1 ☐ Mechanical parts (For automobile use); (13)-2 ☐ Mechanical parts (Not for automobile use);
 - (14) ☐ Software / System; (15) ☐ Others
3. Company / Business unit's yearly sales:
 - ☐ (1) less than 0.3 Billion Yens ☐ (2) 0.3~2 BY ☐ (3) 2.1~5 BY ☐ (4) 5.1~10 BY
 - ☐ (5) 10.1~20 BY ☐ (6) 20.1~50 BY ☐ (7) 50.1~100 BY ☐ (8) More than 100.1 BY
4. Company / Business unit number of NPD employees
 - ☐ (1) Less than 3 ☐ (2) 3~5 ☐ (3) 6~10 ☐ (4) 11~20 ☐ (5) 21~50 ☐ (6) 51~100 ☐ (7) More than 101
 - *Including Full-time NPD staff belongs to your company / business unit
 - ☐ (1) Null ☐ (2) less than 10% ☐ (3) 10~20% ☐ (4) 20~30% ☐ (5) 30~50% ☐ (6) More than 50%
 - *Proportion of Delegated to external new product development
 - ☐ (1) 0 ☐ (2) less than 10% ☐ (3) 10~20% ☐ (4) 20~30% ☐ (5) 30~50% ☐ (6) 50%~90%
 - ☐ (7) More than 90%
5. Percentage of NPD cost to sales (NPD cost including R&D cost): _____ %
6. Person/Group name (_____)
 - Contact: Tel. _____ Fax _____
 - E-mail: _____

Please fill the score of each item on Scorecard (NPDSC).

1. Organizational System of Development						2. Planning and Execution Ability							3. New Product development Performance						4. Exploitation of management tools and information technology					
①	②	③	④	⑤	⑥	①	②	③	④	⑤	⑥	⑦	①	②	③	④	⑤	⑥	①	②	③	④	⑤	⑥

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New Product Development Scorecard (NPDS)

1. Organizational System of Development

Items		Level 1	Level 2	Level 3	level 4	level 5
1. Clarification of strategy and resource arrangement		Bustling about stopgap development without any explicit middle and long term development planning	Although having middle and long term development planning to some extent, it is not linked with concrete resource planning.	Middle and long term development strategy and its resource planning are explicitly arranged.	Necessary proactive technology activities are running under scenario of level 3.	Under explicit middle-long term strategy, SWOT of own technologies considering market trends is well analyzed, and proactive technology development and reactive new product developments are linked and well arranged.
2. Patent strategy and partnership		Having not any know-how about patent application	Having experience and vision about patent application	Having system encouraging patent application under explicit patent strategy	Strategy of partnership as well as own patent, linked with development portfolio, is arranged and carried out.	In addition to level 4, patent management contributes to company management so as to support improved quality of new product and technology development activities.
3. Matching of own technologies & markets and benchmarking		New product development tends to fall into complacence only relying on own seeds	Matching between own seeds and their targeted is considered to some extent.	In addition to matching with target market, benchmarking of other companies compete in the same market is conducted.	While analyzing strength and weakness of own seeds, New market development are researched in addition to present market.	Technology development and market development are systematically conducted under benchmarking and market research with a world-wide competitive outlook.
4. Grasping needs of customers and markets and relationship with them		Customer and market needs are not grasped nor incorporated into new product development.	Customer needs are understood, but their knowledge is rather implicit and remains in personal level.	Customer needs are systematically grasped cooperated with sales department.	In addition to systematic customer needs incorporation, there is system customer information after development is fed back and effectively used in next development.	In addition to level 4, two-way development is also conducted under systematic alliance with customers.
5. Alliance with suppliers		Short term contract relationship with suppliers and little information sharing on quality.	Little information sharing of product development with suppliers although selecting them under enough consideration on their technology and QCD ability.	Close information sharing with suppliers in product development and technology support is occasionally provided to them.	By implementing level 3 activity, overlapped and concurrent development process is realized with suppliers.	Level 4 activity creates mutual learning and produces sustainable win-win relationship with suppliers.
6. Human resource development and development organization		No human development program focusing new product and technology development.	There are human developments and education program, but not systematic ones.	Explicit human development is arranged based on future planning concerning necessary technologies.	In addition to level 3, necessary technology map in the future and present level are elaborated and program like multi-experts is also linked.	In addition to level 4, project managers who can comprehend the whole can be promoted and development team and organization in accordance with situations are formed and work well.

2. Planning and Execution Ability

items		level 1	level 2	level 3	level 4	level 5
1. Quality of Planning		Haphazard new product planning.	New product planning is supposed under market analysis or customer needs survey, but it is not systematic one.	Level 2 procedure is standardized, but on the other hand there is problem remaining only the name that hiders effective planning.	Overcoming the problem of level 3, there is a countermeasure to use creative planning ideas to advantage.	Periodical review of planning standards is conducted, and systematic human resource development and organizational culture are cultivated to produce creative ideas.
2. Production technology ability		Shortage of production technology ability degrades quality of idea and planning.	— (Between Level 1 and 3)	Production technology to what extent can almost satisfy target of planning and idea.	— (Between Level 3 and 5)	High production technology enhances quality of planning and idea.
3. Project management of development and its control		No project management concept	Ambiguous due date control so that milestones may not be set to keep the due date.	Project management so that major milestone control is implemented under explicit QCD targets, but shortage of countermeasures to realize definite achievement.	To cope with the problem of level 3, various countermeasures like usage of PDPC method are arranged.	In addition to level 4, design change and progress information are shared among related members, and risk management to cope with contingent situations works well.
4. Practice of DR and its quality		No concept of DR (Design Review) itself.	There is knowledge of DR, but its practice is not well-established.	DR that cross-functional members participate in is well-established, but periodical review of DR system is not conducted.	To prevent from falling into only the name of DR, periodical review is conducted for each product development concerning to participating members, timing and frequency.	In addition to level 4, database and support system are built and always bushed up to make DR more effective.
5. Quality assurance and reliability		No systematic quality assurance is built, nor is product reliability established.	There is quality assurance system chart, but it is unclear whether it works well.	Quality assurance system is well arranged, and concept of <i>maedasi</i> (discovery of potential problems at up-stream process) and activity of prevention from problem flow-out work fairly.	In addition to level 3, methods like FMEA and reliability analysis are definitely utilized and work effectively to critical quality influencing product reliability.	In addition to level 4, quality assurance system is achieved so as to link with concurrent engineering under through upstream management (do it right at the source).
6. Concurrent engineering		Sequential product development without any information sharing of related departments or organizations.	Necessity of overlapping of development processes is identified to shorten development lead time.	To realize level 2 identification, inter-departmental information sharing system is well arranged within own organization.	Besides level 4, concurrent activities including suppliers and customers are promoted and improved.	Concurrent system of level 4 is enhanced considering customer needs and reduced environmental loads to the maximum, and the shortest development lead time and minimum cost are realized within own industry.
7. Practice of design rationale and feedback to next development		No record of past product development process.	Records of design meeting have been accumulated, but there is not any system to feed back next development effective information by finding any problem from them.	Records of design meeting are formatted so as to find problems of development process, and feed back to next product development.	Not only records of formal design meeting, but also information of informal decision makings likes design changes is also effectively used to improve development process and it works well.	In addition to level 4, design rationale system is extended and utilized for information sharing of ongoing project and product development.

New Product Development Scorecard (NPDSC)

3. New Product development Performance

items		level 1	level 2	level 3	level 4	level 5
1. Quality of new products and their innovative attractiveness		Customer satisfaction on new product is low, and many complaints cause frequently additional works.	Market and customers" evaluation does not seem high, but there are not many direct complaints from them.	Evaluation of products intended for existing market and customers are supposed to be high, but new product development so as to provide them with innovative new value is an uphill struggle.	Stepping up from level 3, new product development producing innovative customer value beyond existing products is expected and more or less realized.	Innovative product providing customers with unexpected attractiveness is rather constantly developed.
2. Development lead time and compliance to due date		Frequent recurrence on the way of development process causes always to delay development due date.	— (Between Level 1 and 3)	Customer's request and planned due date are almost satisfied, but validity of their development lead time is not well justified.	— (Between Level 3 and 5)	Strategy like proactive element technology development and concurrent engineering system realizes the most agile lead time in own industry so as to respond to even short due date.
3. Development efficiency (practice of front loading)		Development efficiency is not evaluated, nor is development manpower measured.	Development manpower is grasped.	To improve development man-hour, planning on how and when to throw manpower, like front loading, are devised.	In addition to level 3, it is grasped what potential problems and where they are detected at development process, and their influences are evaluated.	Through level 4 activity and system, continuous review on how to throw manpower including usage of IT is conducted, and that brings continuous efficiency increase.
4. Practice of target costing and its quality		No concept of target cost and no activity to achieve it.	Cost down activity by VE (Value Engineering) is practiced mainly in purchasing, but building cost at the source of development process is not yet conducted.	Cost building activity at the source development process is practiced under concept of target costing.	Methodology of level 3 practice is systemized from the three aspects of product design, purchasing and production engineering.	Cost target is always achieved completely through the practice of level 4.
5. Design for Environment		No concern about environment in product development and design.	Although there is concern about environment, any standard or rule for DFE (Design For Environment) is not arranged.	There is explicit guideline or rule for DFE, and activity based on them is practiced.	In addition to level 3, impact on environmental load is quantitatively evaluated and its reduction is successfully implemented.	Activity of level 4 is extended to the scope of product life cycle including how to be used, and its evaluation is reflected to product design, purchasing, production and marketing.
6. New product ramp-up smoothness and period		Frequent troubles occur after start-up of new product production, and it takes a lot of time until stable production.	— (Between Level 1 and 3)	There is an explicit guideline of start-up production including the role of production engineering, and its guideline is reviewed and improved in each new product development.	— (Between Level 3 and 5)	Start-up production period is made close to zero (vertical ramp-up) supported by strong production engineering and thorough practice of "do it right at the source" management.

4. Exploitation of management tools and information technology

C items		level 1	level 2	level 3	level 4	level 5
1. Coverage of development management tools like QFD		QFD is not known, nor used.	Part of QFD like quality table is used, but it is not systematically used.	Starting from grasp of customer requirement, series of tables to deploy to design characteristics, parts and process are made and used.	Usage of level 3 is extended company-wide and it works well as a tool of inter-departmental information sharing and "do it right at the source" management.	Evolving level 4, usage and systemization of QFD are developed building in own company's original idea and devices.
2. DFM (Design for Manufacturability) and MP (Maintenance Prevention) design database and their exploitation		No system to make use of past information of problems available in product design & process design.	There is a concept of necessity on product design easy to make & assembly and process design easy to maintain, but its practice relies on personal knowledge and know-how.	Explicit know-how guideline like checklist is arranged and used.	Systematic data collection and utilization are practiced as named something like DFM and MP information.	Level 4 practice is bushed up to knowledge management system, and brings excellent effect.
3. Exploitation of reliability analysis tools like FMEA		Having little sense of reliability, frequent troubles of reliability problems occurs after shipment to market.	While having sense of importance on reliability built-in at development process, it is not enough to utilize any concrete methodology to find out potential problems.	Methodology such as FMEA, FTA and reliability analysis is used in critical parts.	In level 3, it is well defined and arranged what critical parts are, and efficient application of quality engineering for robust design is implemented.	In addition to level 4, optimal reliability design by utilizing SQC and quality engineering is supposed to be realized, and methodology like FMEA is applied to process design as well.
4. CAD (two and three dimensional) and CAE		Irrespective of necessity of ICT like CAD and CAE, they are not yet introduced, nor are any effect produced even though ICT is partly introduced.	Although CAD or/and CAE are introduced at necessary processes, only partial effect is gained, for example, by the reason that they make processes invisible (black box).	Utilization of CAD and CAE brings about some effect like reduced lead time of development and maedasi (discovery of potential problems at up-stream process) by simulation technology.	Evolving level 3, it brings about increased quality and reliability as well as the reduced number of trial manufacture, and it works well as tool of concurrent engineering.	In level 4, 3D-CAD and CAE incorporating own company's original know-how are developed and always blushed up, and drastic effect like trial-less development is obtained.
5. Arrangement of technology information and PDM		No reuse of technical data like drawing plans by the reason that it differs how to draw a plan and put its number depending on departments and engineers.	There are technical and product databases including paper based ones, their reuse is not well conducted.	Configuration management like unique numbering of drawing plan works partly well to promote reuse legacy data.	Legacy data is digitized and unified management for reuse is enabled.	Product data management of level 4 is enhanced up to configuration management system so as to enable effective reuse responding to fierce technological change.
6. Use of open standard for exchange of technical data		Poor standardization and no digitization of technical data between development collaborative partners.	Standardization to promote efficient information sharing between partners is partly practiced.	Digital data exchange is also partly practiced, but its standard is the dedicated one only compatible in narrow stakeholders and then its effect is limited.	From level 3, utilization of the Internet and data exchange by open standard like STEP is practiced or ready to implement, and it brings increased efficiency.	Maintaining security, open standard is adapted to the maximum, and it enables efficient data exchange and win-win relationships beyond group companies.

新商品開発スコアカード (Ver.3.3) 回答用紙

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①	②	③	④	⑤	⑥	①	②	③	④	⑤	⑥	⑦	①	②	③	④	⑤	⑥	①	②	③	④	⑤	⑥

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新商品開発スコアカード

1.開発体制

中項目	回答	レベル 1	レベル 2	レベル 3	レベル 4	レベル 5	備考（言葉）
①開発戦略の明確さと資源の確保		特に中長期の開発戦略・目標をもってなく、その場しのぎの開発に迫られている	一応の中長期のビジョン・シナリオがあるが、資源確保の計画とリンクしていない。	中長期の開発戦略と、資源獲得の計画が策定されている。	レベル 3 のシナリオのもとに、必要な先行技術開発もなされている。	中長期戦略のもとで、自社技術の強みや弱みと市場動向の分析が行われ、先行技術開発と個別の新商品開発がリンクされている	
②特許戦略とパートナーシップ		特許申請についてノウハウをもっていない。	特許申請についての経験があり、特許申請の奨励は一応行われている	明確な特許戦略のもとで、特許取得の体制が整備されている。	自社特許だけでなく、パートナーシップ等、開発ポートフォリオとリンクした戦略が確立されている。	レベル 4 に加えて、特許マネジメントが新商品開発や技術開発等の質向上を支援する形で企業経営に寄与するものになっている。	・開発ポートフォリオ：自社の新商品開発で行うだけでなく、他社との共同開発や提携等の開発をミックスさせることによる開発リスクの分散や最適化を図る戦略。
③技術と市場のマッチングとベンチマーキング		新商品開発にあたって自社シーズだけにに基づくひとりよがりの傾向がある。	自社シーズとそのターゲット市場のマッチングは考慮されている。	レベル 2 において、ターゲット市場で競合する他社のベンチマーキングが行われている。	自社シーズの強み、弱みを知った上で、既存のターゲット市場に加えて新たな市場を開拓する視点がある。	世界的な競争を視野に入れたベンチマーキングと市場調査を行い、それに基づく技術開発と市場開発が体系的に行われている。	・ベンチマーキング：競合他社やベストプラクティスと思われる企業の商品の品質、コストあるいは開発のやり方を調査し、自社の位置付けや強み、弱みを知ること。
④顧客・市場のニーズ把握と関係		顧客・市場のニーズを把握していない、取り入れている	顧客・得意先のニーズは理解しているが属人的な暗黙知化している。	顧客・得意先のニーズについて営業とも連携して把握されている	レベル 3 が系統的行われ、開発後の情報も常にフィードバックされ、次期商品開発に活用出来る仕組みがある	レベル 4 の体制のもとで、顧客への提案型や連携のもとでの双方向の開発が行われている。	
⑤サプライヤーとの連携関係		サプライヤーとは短期的な契約関係で技術や品質上の情報もあり把握していない	サプライヤーの選定に際しては、技術および QCD を十分評価した上であるが、開発時の情報共有は気薄である。	開発時に緊密な情報共有があり、場合によっては技術支援も行っている。	レベル 3 のことで、開発プロセスのオーバーラップや同時進行に結びついている。	レベル 4 に加えて、それが相互学習につながり恒常的な win-win 体制になっている	・win-win：サプライヤーや顧客と連携することにより、メリットを引き出しそれを共有すること。ゲインシェアリング。
⑥人材育成と開発組織		特に開発を意識した人材育成プログラムは存在しない。	人材育成や教育プログラムはあるが、どちらかと言えば場当たり的である。	将来計画に基づく必要な技術の洗い出しとその育成プログラムが整備されている。	レベル 3 に加えて、必要技術のマップと現状レベルが把握され、かつ多専門化プログラムが連動している。	レベル 4 に加えて、全体を見渡せるプロジェクトマネジャーも育成でき、状況に応じた開発チームや組織形態がうまく組機能してる。	

2.計画・実行力

中項目	回答	レベル 1	レベル 2	レベル 3	レベル 4	レベル 5	備考（言葉）
①企画の質		どちらかと言えば思いつきの新商品企画になっている。	一応の市場分析や取引先のニーズ把握がなされ、自社のシーズに基づく企画がなされているが、それ場当たり的である。	レベル 2 の手順が標準化されている。その一方で形骸化した問題もあり、それが有効な企画を阻んでいることもある。	レベル 3 の問題を克服するために同時に独創的アイディアをいかすためのしくみをもっている。	企画立案のための標準の見直しが行われ、同時に独創的アイディア創出のための人材育成と風土が出来ている。	
②生産技術力		生産技術力不足で企画の質を下げってしまう	→ (レベル 1 と 3 の中間)	企画の狙いを満足出来る生産技術力を持っている	→ (レベル 3 と 5 の中間)	高い生産技術力で企画のねらい以上の質を高めている	
③設計開発のプロジェクトマネジメントと進捗管理		プロジェクトマネジメントの考え方がなく、進捗管理もあいまいである。	一応の納期目標は策定されているが、そのためのマイルストーン設定等の管理があいまいである。	納期目標や品質目標とそれを達成過程のマイルストーンも設定出来ているが、それを確実にするための方策がとられない。	レベル 3 の問題点を克服するために進捗計画(例えば PDPC 法の活用)と管理のしくみある。	レベル 4 + 設計変更や進捗情報の情報共有の体制があり、不測の事態にもリーダーによる調整とれる環境が出来ている。	・PDPC(Process Decision Program Chart)：事前に考えられる様々な結果やリスクを予測し、チャート化して進行を望ましい方向に導くことを意図した N 7 の手法。
④DR（デザインレビュー）の実施とその質		そもそも DR という考え方そのものがない。	DR の考え方は知っているが、その実行は定着化していない	部門横断的なメンバーの参加による DR が定着化しているが、定期的な見直しは行っていない	DR が形骸化しないように新商品開発ごとに参加メンバーや実施時期・回数見直している。	レベル 4 に加えて、有効な DR にするために必要な情報をデータベース化し、支援システムも整備されている。	・DR(Design Review)：デザインレビュー。設計審査。設計過程の節目で部門横断のメンバーにより、性能、機能、信頼性等について審査し問題点の摘出や改善を行うこと。
⑤品質保証の体系化と信頼性の確保		品質保証の体系がなく、信頼性確保の体制も十分ではない。	一応の品質保証の体系図はあるが、それが有効に機能しているかわからない。	品質保証の体系は整備され、問題点の前出しと流出防止の考え方もかなり出来ている。	レベル 3 に加えて、重要品質や製品信頼性に関わるものに、FMEA や信頼性解析が用いられている。	レベル 4 に加えて、源流管理を徹底したコンカレントエンジニアリングのもとで、開発から製造、営業まで一貫通貫の品質保証体制になっている。	・FMEA(Failure Mode and Effect Analysis)：設計や工程の不完全や潜在的な問題点を見出すために構成要素の故障モードとその上位システムへの影響を解析する手法。 源流管理:問題の発生を防ぐためにその原因の源流に遡って対策をとる考え方。
⑥コンカレントエンジニアリング体制と源流管理の徹底		開発に関連した部門・組織間の情報共有ができていなく、プロセスがシークエンシャルになっている。	開発期間短縮のために、開発プロセスのオーバーラップの必要性は意識されている。	レベル 2 の実現のために社内の部門間の情報共有のしくみがなされている。	レベル 4 が社内だけでなく、サプライヤーや得意先を含めたコンカレントな活動になっており、常にブラッシュアップされている。	レベル 4 のコンカレント体制が、顧客ニーズの取り込みや、環境負荷軽減も考慮に入れものとなっており、業界 NO.1 の短納期、コストを実現している	・コンカレントエンジニアリング：新商品開発のプロセスを順次行うのではなく、プロセスをオーバーラップ、並行化することによって開発リードタイム短縮を図る方法論。そのためにはプロセス間の情報共有や問題点の前出し活動が不可欠となる。
⑦デザインラショナルーレの実施と次期開発へのフィードバック		設計開発プロセスの記録はほとんど残していない。	設計会議の議事録等は残しているものの、そこから問題点を見出し次の開発に活かされることはほとんどない。	設計会議等の議事録が次へ次期開発へのフィードバックをねらった書式になっており、かなり実践されている。	レベル 3 に加えて公式な設計会議だけでなく、インフォーマルな設計変更等の意思決定時にも拡大され効果を上げてる。	レベル 4 に加えて、過去の履歴の反映だけでなく、進行中の設計開発にも情報共有のしくみとして活用されている。	・デザインラショナルーレ：設計開発プロセスの過程における設計会議等の記録（議題、仕様や方法等の代替案、議論の内容、決定の理由・合理性）を整備・し、次の開発に有効利用する考え方。特に失敗経験の活用に有効。

新商品開発スコアカード

3.開発パフォーマンス

中項目	回答	レベル1	レベル2	レベル3	レベル4	レベル5	備考（言葉）
①新商品の質、ワクワク度		新商品に対する顧客満足度は低くクレームが多く、その対応に追われていることが頻発している	市場、顧客からの評価はあまり高くないが、不満は必ずしも多くない	既存事業、既存市場を対象とした新商品についての市場、得意先からの評価は高いが、革新的な価値をあたえるような新商品開発には苦戦している。	レベル3について、既存商品の枠を越えた革新的な価値をもたらす開発を、市場・得意先から期待され、かなり対応できている。	既存市場にない市場や得意先に想定外の“ワクワク感”を与えるような革新的な新商品が、コンスタントに開発出来ている。	
②開発リードタイムと納期		開発途中で手戻りが頻発する等で、いつも開発納期が守れない。	→ (レベル1と3の間)	顧客の要求や予定納期はほぼ達成出来ているが、それが合理的開発期間であるかどうかは判断できない。	→ (レベル3と5の間)	必要な要素技術の先行開発等の戦略とコンアカレントエンジニアリングのしくみ整備により、短納期にも対応出来る業界 No.1の瞬発力を有している。	
③開発効率(フロントローディングの活用度)		開発効率は評価していないし、開発工数も測定していない。	開発工数は測定している。	開発工数を効率化するために、フロントローディング等の工数のかけ方の計画も工夫している。	レベル3に加えて、問題点の前出し活動の影響(下流で発見する程級数的にコストがかかる)も評価している。	レベル4の実践を通して常に開発工数の見直しや、効率アップが実現されている。	・フロントローディング：源流管理や問題点の前出しやそのための情報共有を進めるために新商品開発プロセスの前工程になるべく工数を多くかけること。 源流管理:問題の発生を防ぐためにその原因の源流に遡って対策をとる考え方。
④原価企画の実施と質		目標原価という考え方やその達成のための活動はされていない。	調達を中心にVE活動はおこなわれているが、源流段階でのコストの作り込みは出来ない。	目標原価の考え方があり、源流でコストの作り込み活動が行われている。	レベル3の取り組みの方法論が、商品設計、つくり方、買い方(調達)のそれぞれの側面から体系化出来ている。	レベル4の取り組みにより、ほぼ完全に目標必達の状況が続いている。	・原価企画：新商品の企画、開発の段階で、原価目標を戦略的に設定し、これを達成するための設計、つくり方、買い方の観点からのコスト作りこみ活動。 ・VE(Value Engineering)：最低のライフサイクルコストで、必要な機能を達成するための商品の機能分析とそのための組織的活動。
⑤環境対応設計の質		商品開発・設計において特に環境問題について配慮していない。	一応の環境への配慮はあるが、DFE(環境対応設計)のための基準やルールは整備されていない。	DFEに関する指針やルールがあり、実行されている。	レベル3に加えて、環境負荷に与える影響を定量的に評価しその削減の取り組みがなされている。	レベル4のことが、商品の使われた方を含めたライフサイクルにわたるスコープで評価され、製品設計、購買、生産、マーケティングに活かされている。	・DFE(Design For Environment)：環境対応設計。解体性、分離性、識別性、再利用性、安全性、処理安全性等の環境負荷や再利用性、リサイクル率を高めるための設計。
⑥初期流動管理の長さ		生産技術力の不足もあり、新商品を立ち上げ後トラブルが頻発し安定するまでにいつも長期間を要している。	→ (レベル1と3の間)	初期流動について生産技術の役割を含めた明確な指標をもっており、新商品開発の都度改善施策がとられている。	→ (レベル3と5の間)	強い生産技術と源流管理の徹底に支えられ、初期流動期間を限りなくゼロに近づけている(垂直立ち上げ)。	・源流管理：問題の発生を防ぐためにその原因の源流に遡って対策をとる考え方。

4.ツール／情報技術の活用の仕方

中項目	回答	レベル1	レベル2	レベル3	レベル4	レベル5	備考（言葉）
①QFDの活用度		QFDを知らない、知っていても使用していない	品質表等を一部導入しているがあまり組織的に使われていない。	要求品質の把握から出発し、設計特性、部品、工程への展開などの一連の機能展開表を作成している	レベル3において、部門間の情報共有や問題点の前出しの道具として全社的にうまく機能している。	レベル4の進化形として、自社独自の工夫を盛り込んだ使い方やシステム化がなされている。	
②DFM情報、MP情報活用度		商品設計や設備設計において過去のトラブルや問題点の情報が活用出来るしくみが出来ていない。	製造・組立容易性設計やメンテナンスのしやすい工程設計の考え方はあるが、属人的ノウハウに頼っている。	チェックリスト程度のノウハウ集は整備され、実践されている。	DFM情報やMP情報としてデータの収集と活用が体系的に行われている。	レベル4がナレッジマネジメントのシステムとして、大きな効果を上げている。	・DFM(Design For Manufacturability)：製造容易性設計。設計自体を製造や組立しやすい設計にすることで品質や製造効率を高める設計。 ・MP(Maintenance Prevention)情報：既存設備や工程の故障や不具合とその改善の情報およびそのデータベース。新設備や工程の設計に盛り込むことを目的とする。
③FMEA 等信頼性手法ややロバスト設計(品質工学)の活用		新商品の信頼性という考え方そのものが気薄で、市場投入後の信頼性問題のトラブルが頻発している。	開発時に信頼性を確保する考え方はあるものの事前の問題摘出のための具体的な手法は用いられていない。	重要部品についてはFMEAやFTA、信頼性解析の手法が用いられている。	レベル3において、重要部品の定義が明確に出来ていて、ロバスト設計のための品質工学の活用も出来ている。	レベル4に加えて、SQCと品質工学を組み合わせた最適な信頼性設計がなされ、工程設計についてもFMEA等の効率的活用がなされている。	・FTA(Failure Tree Analysis)：信頼性又は安全性上その発生が望ましくない事象についてその発生経路・原因を樹形図の形でトップダウン的に描き解析する手法。 ・品質工学：タグチメソッドとも呼ばれる。その中のロバスト設計では、コントロールできない誤差因子を設計時に想定し、その変化に対して特性値が安定な制御因子を実験計画やシミュレーションにより見出し、設計パラメータの最適化が図られる。
④CAD(2次元、3次元)、CAEの有効活用度		CADやCAEの導入の必要性がありながら未導入であったり、導入しているものの効果を出せないでいる。	必要などころにはCADやCAEを導入しているが、ブラックボックス化現象もあり部分的な効果しか発揮できていない	CADやCAEの導入が、開発設計のスピードアップやシミュレーション技術による問題点の前出し一応の効果に結びついている。	レベル3により、試作回数の削減やコンカレントエンジニアリングのツールとしてうまく機能している。	レベル4において特に3次元CADと独自のノウハウも入れ込んだCAEにより試作レス等の劇的な効果を出している。	・CAD(Computer Aided Design)：コンピュータ援用設計。設計の効率化や3次元CADでは源流での製品イメージの共有や構造・熱解析や干渉チェック等が可能。 ・CAE(Computer Aided Engineering)：3次元CADデータからシミュレーション技術による様々な設計パラメータの最適化の解析や金型等の自動造形等の技術の総称。
⑤技術データベースの整備とPDM		図面の書き方や番号も部署や人によって異なる等、技術データの再活用が全く出来ていない。	技術や製品モデルのデータベース(含む紙ベース)と呼ばれているものはあるが、その活用はうまく出来ていない。	図面番号のワンナンバー化等の構成管理の一応のしくみがあり、レガシーデータの活用がある。	レベル3において、情報・データがデジタル化され、活用のための一元管理が出来ている。	レベル4のPDMが、激しい技術の変化にも対応でき、十分有効活用が出来る構成管理システムまでに高められている。	・PDM(Product Data Management)：製品開発に関する技術情報を管理・活用し、関係部署間で必要な情報を必要な時に必要な場所に提供・共有するための情報技術。
⑥技術データ交換のデジタル化の程度と標準化		開発を連携するパートナー間において図面の標準化やデジタル化に対応できていない。	双方の情報共有を促進するためのいくつかの標準化や共通化は出来ている。	デジタル情報でのデータ交換も一部なされているが、個別でしか通用しない専用標準であり効果は限定的である。	レベル3から、インターネットの活用やオープン標準による交換も視野にあり、効果を上げている。	機密性も考慮しながら最大限にオープン標準を採用し系列を超えたwin-win関係の効率的データ交換も可能にしている。	

Appendix B

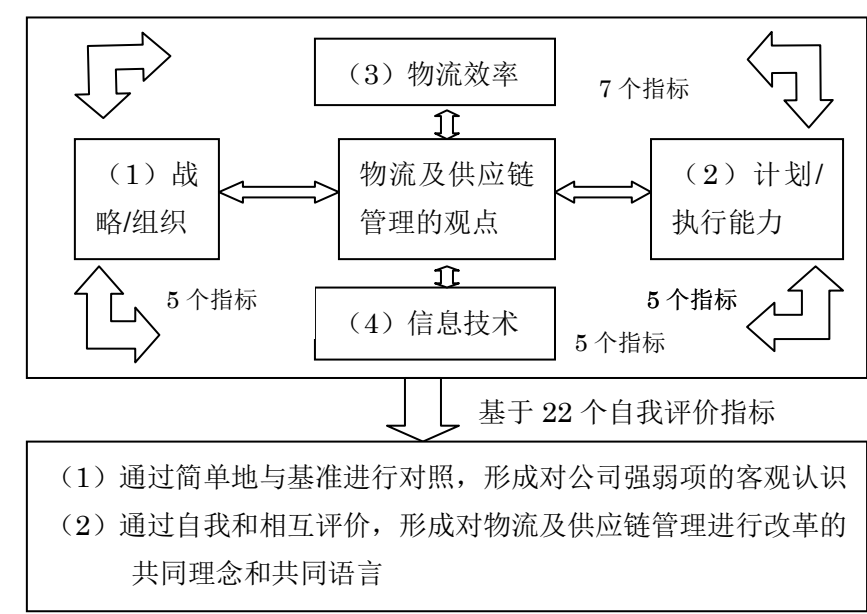
SCM Logistics Scorecard (LSC)

- **Chinese (survey conducted in China)**
- **English**
- **Japanese (survey conducted in Japan)**

物流及供应链管理打分卡调查问卷

物流及供应链管理打分卡的概念

该打分卡依据公司在 22 个指标上的得分，从物流和供应链管理的角度来评价公司的工作方法及效率。22 个指标涉及到 4 个领域，它们分别是：战略/组织，计划/执行能力，物流效率，以及信息技术的使用。通过这个自我评价，公司可以从供应链管理的角度认识到公司的强项和弱项，从而可以利用供应链管理的思想和双赢的逻辑与商业伙伴一起推动公司的改革，使公司获得更大的成功。该打分卡的结构及目的如图 1 所示。



填写打分卡的注意事项

- (1) 依据公司的水平，选择适当的分数（1 到 5 分别代表从低到高五级）。
- (2) 如果你认为公司还没有完全达到某一级水平，请填写比该水平低一级的分数（比如你认为公司的水平应该是 3 级，但是公司又不能完全满足 3 级水平的条件，就请选择比 3 级低一级的分数，即 2）。如果你认为公司最适合的水平在打分卡上的两个水平之间（比如在 2 和 3 之间），那末你可以填写中间数字，即 2.5。
- (3) 对于你认为明显不适用于贵公司的评价指标，就请在相应的空格里填写“NA”。
- (4) 这些指标的评价需要同时参考主管部门，供应商或者顾客的意见，因此，如果可能，我们建议相关人员或者部门共同评价。
- (5) 从贵公司得到填写好的打分卡，我们将为其严格保密，绝对不会对外公布。感谢您的合作。

打分卡中所用术语的解释

ABC(Activity Based Costing) (基于作业的成本计算)：成本会计的一种方法，它精确地计算了现实中特别难控制的企业的一般管理费用，其方法是通过将它们分摊到预先定义的活动上，而不是将它们分摊到产品上。

ADC(Automatic Data Capture) (自动数据捕捉)：连接信息和产品的自动识别技术的总称，例如条形码（1 维或者 2 维），RFID(智能卡)。

EDI(Electronic Data Interchange) (电子信息交换)：一种通过电子网络交换商业信息的技术。EDI 有两种标准：专用标准和通用标准，专用标准只对企业内部，不公开；通用标准对全社会公开。例如，日本的通用标准有基于 CII 的 JTRN 标准，国际标准 UN/EDIFACT，最近国际互联网上使用的比较简单的 Web 标准和 XML EDI 标准。

DFL(Design For Logistics) (面向物流的设计)：为了维持物流管理的效率，同时响应多样化和持续改革的竞争，而对产品和运输包装进行再设计，对物流的过程进行再造，及其它对策和方法的总称。

ERP (Enterprise Resource Planning) (企业资源规划)：将基本信息的处理，如销售信息，生产信息和会计信息，集成为一体的企业管理平台。

SCM(Supply Chain Management) (供应链管理)：指通过共享顾客或者消费者信息，使其可以在整个供应链中及时获取，从而快速响应市场变化的所有方法。依据行业或者组织之间的合作形式，出现了不同的形态，例如 ECR, QR, CRP, VMI, 3PL, CPFR, BTO, CTO.

SCM 软件：例如 ERP， 此类软件的目的是为企业管理提供计划和决策支持。它通过需求预测，销售计划 and 生产/物流计划的同步化使总体优化成为可能。

界面费用(Interface Cost)：例如物流成本的一部分，它产生于组织间连接处，包括信息互换和命令处理的成本。当组织的连接处没有信息共享时，各种各样的重复操作将会产生附加成本。这些附加成本是不能完全控制的物流成本的主要组成部分。

通用标准(Open Standard)：指国际和国内的标准相同，并且获得广泛接受的标准。对于 EDI，有 UN/EDIFACT 或者 JTRN. 对于条形码，有 JAN 码（日本标准），SCM 编码等。

类别管理(Category Management)：为了提高生产和运作系统的效率而进行合作的商业伙伴（例如生产者/销售者）形成的战略联盟，它将基于顾客的需求和偏好（而不是品牌或者产品）对产品进行分类，并将其作为一个战略单元来使用。

现金周转期(Cash-to-cash Cycle Time)：从接收到支出整个过程中现金的循环时间。资金回收的速度定义为：应收帐款周转时间+在库周转时间-应收帐款回收时间。

知识管理(Knowledge Management)：出于商业活动的需要，在组织内将员工或部门的知识 and 专利的进行积累和有效地共享。

统一编码 (One Number)：在部门，组织和整个地区间，对货物和商品采用同一编码的系统。它可以防止重复输入和重复操作。它在有效利用 EDI 或者 ADC 技术中扮演着重要的角色。

填写打分卡之前需要说明的重要事项 (请在□标明贵公司或者贵独立核算部门所处的范围，并填写详细内容)

- (1) ☐ 公司名称/☐独立核算部门名称及所在地（_____）所在省份（_____）☐省☐市☐自治区
- (2) 贵公司/独立核算部门所在行业的类别
 - ☐1) 制造业（请列举主要产品：_____）
 - ☐2) 零售业/批发业（主要项目：_____）
 - ☐3) 物流业
 - ☐4) 物流分公司
 - ☐5) 信息/通讯业（主要产品：_____）
 - ☐6) 服务业（主要项目：_____）
 - ☐7) 其他（_____）
- (3) 公司/独立核算部门的年销售额（单位：人民币元）
 - ☐1) 小于 2 千万
 - ☐2) 2 千万-1.3 亿
 - ☐3) 1.3 亿-3.3 亿
 - ☐4) 3.3 亿-6.6 亿
 - ☐5) 6.6 亿-13.2 亿
 - ☐6) 13.2 亿-33 亿
 - ☐7) 33 亿-66 亿
 - ☐8) 高于 66 亿
- (4) 公司/独立核算部门的员工人数
 - ☐1) 少于 20 人
 - ☐2) 21-50
 - ☐3) 51-100
 - ☐4) 101-200
 - ☐5) 201-500
 - ☐6) 501-1000
 - ☐7) 多于 1001临时员工的比例
 - ☐1) 没有
 - ☐2) 少于 10%
 - ☐3) 10-20%
 - ☐4) 20-30%
 - ☐5) 30-50%
 - ☐6) 高于 50%
- (5) 委托给外部的业务内容（包括部分委托）
 - ☐1) 没有
 - ☐2) 内部物流业务
 - ☐3) 制造业务
 - ☐4) 产品物流业务
 - ☐5) 信息处理业务
 - ☐6) 其他（_____）
- (6) 填写人或者填写团队的信息
 - 1) 个人姓名或者团队名称：_____
 - 2) 填写时间：_____年____月____日
 - 3) 联络方式 电话：_____ 传真：_____ 电子邮件：_____

评价项目	1. 企业战略和组织间的协 调					2. 计划及运作能 力					3 物流效率							4 信息技术的应 用				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)
回答																						

咨询及问卷返回地址

東京工業大学 大学院社会理工学研究科 経営工学専攻 圓川・鈴木研究室 邮编 152-8552 日本国东京都目黒区大岡山 2-12-61, W9-61
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物流及供应链管理打分卡调查问卷

1. 企业战略和组织间的协调

评 价 项 目	回答	水平 1	水平 2	水平 3	水平 4	水平 5
(1) 企业战略的明确程度及物流在企业中的地位		最高层的执行者没有意识到物流及供应链管理在战略或政策上的重要性; 没有专门负责物流及 SCM 革新的部门	有负责物流革新的部门, 但活动范围限于各部门内部; 高层领导没有积极地参与, 企业也没有明确的物流战略	在领导的监督下(有专门负责的事业部经理), 形成了物流和供应链管理的革新系统, 但没有覆盖全公司	在明确的物流战略的指导下, 在高层领导者(副总经理以上的领导)的主管下, 不断推进物流管理的革新	存在清晰的物流战略, 在总经理的领导下, 存在覆盖整个企业的体制, 以增强物流对环境变化的适应性
(2) 供应商交易条件#的明确程度及信息*共享程度 #支付时间、折扣、库存归属、运输条件等 *计划内部非正式传达、库存信息等		与主要的供应商在交易内容上没有达成协议, 或者没有信息共享, 单独进行决策	与主要的供应商达成部分协议, 或正在处于商量阶段	与主要供应商之间达成明确的协议, 但是无法向双赢的局面发展	达成明确的协议, 基于信息共享进行合作, 开始向双赢方向发展	达成明确的协议, 正在建立基于战略和信息共享的双赢系统
(3) 顾客交易条件#的明确程度及信息共享*的程度 #支付时间、配送条件, 库存归属、退货条件 *需求及库存信息、预测信息内部公开		与主要顾客在交易内容上没有达成协议, 或者没有信息共享, 单独进行决策	与主要的顾客达成部分协议, 或正在处于商量阶段	与主要顾客之间达成明确的协议, 但是无法向双赢的局面发展	达成明确的协议, 部分双赢及信息共享等是在顾客主导下进行	达成明确的协议, 确立了基于战略和信息共享的合作机制
4 客户满意度的测量, 提高客户满意度的公司内部体制		对核心客户没有明确的定义。以暂时和方便的方式处理顾客的意见	明确了客户的定义, 但没有定期调查顾客满意度, 没有记录顾客的意见	仅在销售类部门定期调查顾客满意度, 公司内部相应的合作和共享程度低	对顾客满意度进行定期量化调查, 公司内部的相关部门正在相互合作	达到水平 4, 并且与顾客共享满意度评估信息, 并且合作进行产品策划
5 员工培训及评估系统		没有专门准备从客户和整体优化的角度进行工作的培训项目	这方面培训的意识存在, 但没有具体的培训项目	有为了提高领导能力和提高提出创造性建议的能力的培训计划, 并正在实施	达到水平 3, 并且将基于能力和成绩的评价系统与权利下放相联系	达到水平 4, 并且知识管理系统(为了在组织中共享知识和专利)全面地发挥作用

2. 计划及运作能力

评 价 项 目	回答	水平 1	水平 2	水平 3	水平 4	水平 5
1 基于 DFL 的资源(运输手段), 库存及定位的最优化战略		对于现有的资源和库存位置的选择没有进行战略分析甚至没有优化意识	意识到这个问题, 但是没有找到新的战略和战术	重新检查公司的位置(包括工厂, 配送中心, 中转中心)确定, 并且正在推进最优化改革战略	达到水平 3, 并且供应商和客户也参与其中	重组供应链, 推进战略伙伴关系和类别管理战略, 以快速跟踪市场变化
2 市场动向的把握和需求预测的精度		仅仅依靠销售部门的经验	只对特定产品参考以往的销售数量, 加上销售部门的经验, 进行需求预测	根据市场趋势分析和过去的数据, 由销售及相关部门共同对主要产品进行预测	产品的各种类别都达到水平 3 的要求, 系统化地进行需求预测	与交易伙伴一起达到水平 4 的要求, 并且对于市场的动向可以灵活地检查和跟踪
3 供应链计划(从订单到派车)的精度和调整能力		有库存的情况下, 销售、物资补充、配送等计划都是相互独立进行, 彼此没有互动	以月为单位, 水平 1 中的各种计划的制定大体上是互动的	以周为单位, 前面所列的各项计划是互动的, 但周内的计划调整是各自独立的	每项计划都在以周为单位滚动进行, 针对顾客的计划以天为单位调整, 并且互动	以天为单位的各种计划及调整是互动的, 可以与顾客及供应商一起进行以小时为单位的计划调整
4 在库/WIP 信息管理精度和及信息共享		没有专门跟踪补充库存的进度及库存信息, 只对结果进行管理	大体上, 以天为单位进行进度管理, 以月为单位进行库存跟踪管理	已经建立跟踪企业内所有活动的进度(包括库存信息的控制)的体制	存在以天和小时为单位的跟踪系统, 而且该系统包含了供应商的补充及库存信息	跟踪包括供应商和顾客的整个供应链的补充及库存活动, 同时战略层面上信息共享
5 过程的标准化和可视化的程度及体制		没有对工作方法进行标准化, 也没有实施单元货载的工作方法, 存在黑箱操作	大体上工作方法实现了标准化, 但是全部的工作流程没有实现完全可视化	灵活的应用标准化及单元货载, 但是与供应商接口处的部分行为不能可视化	包括接口部分在内的工作流程, 已标准化并可视化, 正在改善和改革内部工作	达到水平 4, 并且与客户合作时, 整个的供应链过程是可视的, 同时不断地改善

物流及供应链管理打分卡调查问卷

3 物流效率

评 价 项 目	回答	水平 1	水平 2	水平 3	水平 4	水平 5
1 JIT 生产准备（基于信息共享，实现产品与信息的同步化，同时减少等待和运输时间）的实践		组织内部没有准时化生产的思想或者意识	有准时化生产的方法，但是没有运用在生产，补充，装卸或配送等方面	采取各种方法来减少生产准备（数分钟准备，离线准备等）的时间，但是方法之间是相互独立的	正在实施依据配送计划决定检货顺序并配车等同步化运作	在水平 4 的同步化运作中包括供应商和顾客
2 库存周转率，现金周转期		二者均不可测量，不仅现金周转率低，库存周转率也低	对每一个仓库，掌握了总的库存周转率，但是其管理没有与现金流相联系	掌握每个供应商和产品种类的库存周转率，精度以周为单位，并且结果小于 12 回/年	水平 3 的精度以日计算，并且结果为每年 12 回以上，其管理与现金流相联系	精度以小时计算，结果为每年 24 回以上，现金周转期小于 10 天。
3 顾客提前期（从订货到配送）和装载效率（非订单生产的条件下，顾客提前期指从制定计划到配送）		从订货到配送的提前期很长，频繁收到顾客提出缩短配送时间的要求	掌握不同类别顾客的提前期，通过库存来实现快速配送，没有采取明确的措施以缩短提前期	掌握和管理不同顾客种类和项目种类的提前期，并且与以提高装载效率为目的的货车配置计划相关联	达到水平 3,平均提前期在 2 天以内，并且持续改进以不断缩短提前期	达到水平 4，并且平均装载效率高于 80%，灵活地进行直接送货
4 满足交货期和和数量要求的比率（物流质量）		准时配送比率（按时配送的订单/所有的订单）和准确配送率（正确数量配送的订单/所有订单）都没有掌握，而且顾客意见很多	能够掌握准时配送比率和准确配送比率，但是它们都低于 95%	两个比率均在 95-99%之间，搜集了引起迟送，数量不足，误送，破损等情况的原因数据	两个比率均在 99%以上，基于发生事故的原因数据，不断采取各种防止操作失误的措施	达到水平 4，并且与供应商和顾客合作，推行为了维持指标和提高效率的各种检查，反馈及控制的措施
5 全部库存的掌握及销售的机会损失		只能把握组织内部的现有的库存，对于销售损失伴随的机会损失没有估计	至少可以把握企业内部的库存，可以估计机会损失	可以掌握包括供应商在内的库存情况，能够估计自己公司的机会损失	掌握供应链中从供应商到顾客的所有库存情况，但是只能估计自己企业的机会损失	掌握包括自己企业在内的整个供应链的库存情况，可以估计全部的机会损失
6 环境问题		对于环境问题没有兴趣，公司及事业部等组织都没有采用特别的措施	理解环境问题的重要性，但是还没有采取相应的措施	取得 ISO14000 认证，公司都关心环境问题，企业内有与环境相关的部门，负责与外部联系和教育员工	达到水平 3，实施绿色采购，基于环境保护进行物流合理化改革（减少包装材料，改革往返率，考虑环保的运输）	以低成本达到水平 4，以环保物流系统作为本公司的竞争战略，并提供丰富的服务项目
7 供应链总成本/全部物流成本的掌握(订单管理成本（含运费），库存保管成本，计划管理成本，信息系统管理成本等与物流相关的全部成本)		掌握销售管理费及制造成本，但是没有正确掌握本公司的成本结构	掌握本公司的成本结构及需要解决的课题	达到水平 2，并且在个别供应商和顾客中展开，将成本数据应用于利润管理中	基于 ABC 等方法，企业可以控制包括管理成本在内的供应链总成本，该信息应用在利润管理及各种改革改善活动中	达到水平 4，自己公司，以及供应商和顾客都可以从供应链的角度掌握供应链总成本。为了降低成本，实行收益共享

4 信息技术的应 用

评 价 项 目	回答	水平 1	水平 2	水平 3	水平 4	水平 5
1) EDI 的覆盖率		与顾客和供应商没有网络连接	在部分顾客和主要供应商的要求下导入 EDI, 但完全被动	EDI 的使用率超过 50%，但是大多数是自己，顾客或者供应商的专用标准	在水平 3 实施过程中，EDI 和公司内部信息系统连接在一起，实现了自动化	EDI 与企业内部几乎所有系统相联接，并且积极推行和采用通用标准。
2) 条形码的应用情况		没有通过条形码来管理事务	在部分活动中导入条形码系统, 例如检查, 但这些数据没有应用于其它目的	达到水平 2，应用一次输入的数据在其它领域的管理中，如跟踪物料以减少库存	达到水平 3，条形码不仅应用于物料跟踪，而且用于流程再造	达到水平 4，正在实施或者计划实施 EDI 的连接，二维条形码，或者智能卡
3) 个人计算机, DSS (ERP, SCM 软件) 的有效利用情况		商务系统中没有采用个人计算机	部分商务活动中采用个人计算机和因特网	大多数日常管理活动及业务系统都实现计算机化	达到水平 3，采用了决策支持系统和配车计划等信息技术	达到水平 4，战略上采用外包，具体实践中采用各种信息软件，如 ERP, SCM 软件，数据挖掘技术
4) 通用标准，统一编码的采用情况		企业没有考虑在信息技术中采用通用标准和统一编码等可以提高效率的技术	理解水平 1 中采用的必要性	在组织内部，采用统一编码，并且简化业务流程以发挥信息技术的效力	与货主一起达到水平 3，已经采用或者考虑采用通用的 EDI 标准	与顾客一起达到水平 4，在通用标准的制定上有主动权
5) 对交易对象的决策支持程度		对于顾客和供应商的决策依据没有认识，或者没有兴趣	大体上知道顾客和供应商的决策过程，但是没有掌握它们采用的系统	掌握了供应商和顾客的决策过程，但是没有动力和意愿实现利益共享	为了实现利益共享，开始修改共同系统的操作方法和决策过程	为了实现利益共享，不断主动进行各种改革和改善，并为供应商和顾客提供各种支持

SCM/Logistics Scordcard (LSC)

Entry date (yy/mm/dd): _____ / _____ / _____

Important notes previous to filling the Scorecard:

Please answer the questionnaire of company brief information below together with the score of LSC in the provided table, and please return us only this page.

- Fill in the score (1 to 5) according to the level that fits your company.
- If all the conditions of the level you think is best fitting are not satisfied, fill in the score of one level below. If you think the best fitting level is between two levels (let's say 2 and 3), then you can fill in an intermediate score (in this case 2.5).
- For the items that you think are clearly not applicable to your company, fill in "N/A" in the corresponding square.
- According to the item, while referring to the section in charge and suppliers/customers, we recommend group evaluation if possible.
- **In case, there are obvious differences between each section in the company, we recommend to answer the LSC separately.**
- The filled in Scorecard we receive from you is strictly confidential, and will not be transmitted to any party. Thank you for your cooperation.

Before filling in the Scorecard, please provide brief information about your company by answering the following questionnaire.

- Company / Company Section name & location (_____)
Main Location (_____)
- Type of Industry
☐ Manufacturing (Main product : _____)
Foods ☐ Beer & Beverage (Daily delivery service products) ☐ Materials & Processed Foods
Chemistry ☐ Materials ☐ Consumer Goods
Fiber/Paper ☐ Fiber/Paper
Pharmaceutical ☐ Pharmaceutical
Electric Machinery ☐ For General Use ☐ For Business Use
Automobile ☐ Automobile/Transports ☐ Automobile/Electric Parts
☐ Physical Distribution
☐ Subsidiary ☐ 3PL ☐ Independent
☐ Others (_____)
- Company / Establishment's yearly sales
☐ (1) less than 0.3 Billion Yens ☐ (2) 0.3~2 BY ☐ (3) 2.1~5 BY ☐ (4) 5.1~10 BY
☐ (5) 10.1~20 BY ☐ (6) 20.1~50 BY ☐ (7) 50.1~100 BY ☐ (8) More than 100.1 BY
- Company / Establishment number of employees
☐ (1) Less than 20 ☐ (2) 21~50 ☐ (3) 51~100 ☐ (4) 101~200
☐ (5) 201~500 ☐ (6) 501~1000 ☐ (7) More than 1001
*Including part-time staff
☐ (1) Null ☐ (2) less than 10% ☐ (3) 10~20% ☐ (4) 20~30%
☐ (5) 30~50% ☐ (6) More than 50%
- Business contents with exterior (please check for all items applicable - even partly)
☐ (1) N/A ☐ (2) Basic distribution business ☐ (3) Manufacturing business
☐ (4) Product distribution business ☐ (5) Information processing
☐ (6) Others (_____)
- Person/Group name (_____)
Contact: Tel. _____ Fax _____
E-mail: _____

Please fill the score of each items on Scorecard (LSC).

1. Corporate strategy & inter-organizational alignment					2. Planning and execution capability					3. Logistics Performance							4. IT methods and implementation				
(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)

For inquiries please contact :

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O-okayama 2-12-1, Meguro-ku, Tokyo 152-8552 Japan Tel/Fax : 03-5734-3941 E-mail : lsc@ie.me.titech.ac.jp

SCM/Logistics Scorecard (LSC)

1. Corporate strategy & inter-organizational alignment

Item	Score	Level 1	Level 2	Level 3	Level 4	Level 5	Terminology
(1) Corporate strategy regarding logistics and its importance		Top executives have not formulated a strategy or policy regarding logistics/SCM. No department has responsibility for logistics/SCM improvement or innovation.	A department with responsibility for logistics system innovation exists, but action is limited to that department. Logistics/SCM strategy is not clearly defined. Top mgmt not actively involved.	Under leadership of a top executive, there is a program for logistics/SCM innovation, but the program does not extend company-wide.	Supported by a clear corporate-level strategy, a top executive (managing executive director or above) leads efforts for logistics/SCM innovation. The innovation program is making progress.	Under the CEO's leadership and a clear corporate strategy, there is an company-wide system that supports rapid adaptation of the supply chain to environmental change.	<u>Supply Chain Management (SCM)</u> : All measures that cope quickly with market change by sharing customer/ customer information and making it timely available all along the supply chain. According to the industry, or the form of alignment, various terms have appeared; ECR, QR, CRP, VMI, 3PL, CPFR, BTO, CTO
(2) Definition of supplier contract terms & degree of information sharing		No formal, written agreement or info sharing with main suppliers. Decision making is done independently.	Formal, written agreements exist with some suppliers. Agreements with other suppliers are under consideration	Formal, written agreements exist with some suppliers, but the agreements are not necessarily based on win-win solutions for both parties.	Formal, written agreements exist with nearly all suppliers. Some of these are aimed at win-win solutions based on info sharing.	Formal, written agreements exist with nearly all suppliers. Company has a well-established approach for seeking win-win solutions based on strategy and info sharing.	
(3) Definition of customer contract terms & degree of information sharing		No formal, written agreement or info sharing with main customers. Decision making is always done by customers.	Formal, written agreements with customers are under consideration	Formal, written agreements exist with some customers, but the agreements are not necessarily based on win-win solutions for both parties.	Formal, written agreements exist with nearly all customers. Company has a partly-established approach for seeking win-win solutions based on info sharing under a leadership of customers.	Formal, written agreements exist with nearly all customres. Company has a well-established approach for seeking win-win solutions based on strategy and info sharing.	
(4) System for measurement and improvement of customer satisfaction		No clear definition of customers. Customer complaints are resolved in a temporary and expedient way.	There is a clear definition of customers. However, there are no periodic surveys of customer satisfaction levels; no record of customer complaints is kept.	Periodic surveys of customer satisfaction levels are carried out. However, the survey results are acted upon only by the sales dept, with low cross-functional involvement.	Periodic, quantitative surveys of customer satisfaction levels are carried out. There is cross-functional involvement to improve customer satisfaction.	In addition to Level 4, the results of customer satisfaction surveys are shared with relevant customers and are used in the joint development of products/services.	
(5) System for employee training and evaluation		No particular training program exists to develop employee abilities to achieve customer satisfaction and system optimization.	Company slogans dealing with customer satisfaction or system optimization exist, but there are no corresponding training programs.	A training program for increasing employee abilities to achieve customer satisfaction and system optimization exists and is put into practice.	Meets Level 3, and in addition, the employee evaluation system directly considers employee abilities to achieve customer satisfaction and system optimization. Training leads to increased employee empowerment.	In addition to Level 4, there is a knowledge management system for sharing knowledge and know-how at the team and organization level.	<u>Knowledge management</u> : Accumulation and efficient sharing of employees' / sections' knowledge and know-how at the organizational level for business activity.

2. Planning and execution capability

Item	Score	Level 1	Level 2	Level 3	Level 4	Level 5	Terminology
(1) Strategies for optimizing logistics system resources based on design for logistics		Efficienct utilization of logistics facilities and resources is not seen as a problem. No improvement strategy exists.	Importance of optimizing logistics system resources is recognized, but there is no strategic plan or review.	Strategic plan exists for review of transportation modes and inventory allocation among plant, distribution center, transfer center. Optimization efforts are making progress.	In addition to Level 3, suppliers and customers are involved in efforts to optimize logistics systems resources.	Clear strategy exists for collaboration and optimization across the supply chain, including product re-design based on design for logistics, and use of other approaches such as joint distribution and category management.	<u>Design For Logistics (DFL)</u> : General term of a measure / approach for product and load redesign that goes up to replenishment and distribution processes restructuring, in order to enhance efficient logistics while coping with diversification and constant changes. <u>Category Management</u> : Continual monitoring of expenditures and supplier performance in specific buying categories with the intent of driving ongoing cost or supplier performance improvements. Also sometimes referred to as supplier relationship management or commodity management.
(2) Understanding of market trends & accuracy of demand forecasting		Rely on the experience and judgment of the sales department to predict market trends and forecast demand.	Demand forecasting for certain products is based on a quantitative sales history combined with the judgment and experience of the sales department.	Demand forecasting for key products is based on an analysis of market trends and quantitative sales history, and includes the input of sales and related departments.	Level 3 approach is extended to all products, and forecasts for key products are broken down into items or categories. Demand forecasting system is in place.	Level 4 approach is carried out jointly with supply chain partners. Demand forecasts can be revised dynamically for changing market conditions.	
(3) Accuracy and adaptability of SCM planning		Planning for sales, replenishment and delivery is carried out separately, without consideration of inventory availability.	Plans for sales, replenishment, and delivery are intended to be coordinated with each other on a monthly basis, but in practice this is only partially achieved.	Plans for sales, replenishment and delivery are supposed to be coordinated with each other on a weekly basis, but individual departments may make their own adjustments during the week.	Linkage of weekly plans between departments is done on a rolling basis. Plan adjustments for customers can be done on a daily basis.	Linkage of daily plans between departments is done on a rolling basis. Plan adjustments for suppliers or customers can be done on an hourly basis.	
(4) Control and tracking of inventory (product/parts/WIP): accuracy and visibility		No tracking or visibility of inventory/WIP status. Management action is taken after-the-fact.	For most items, inventory status is tracked on a daily basis, and supply is adjusted to meet demand on a monthly basis.	A system is in place which enables the company to manage and track its own inventory and replenishment activities on a daily basis.	A system is in place which enables the company to manage and track inventory and replenishment activities for itself and its suppliers on a daily/hourly basis.	Inventory and replenishment activities are managed and tracked throughout the entire supply chain, including suppliers and customers. Information is strategically shared.	
(5) Process standardization and visibility		Little standardization of work methods or use of unit loads. Some process activities are treated as a "black-box".	Work methods are mostly standardized, but the overall work flow is not completely visible.	Work methods are standardized and unit loads are used, but interface activities with suppliers and customers are not made sufficiently visible.	Work flow, including interface activities with suppliers and customers, is standardized and made visible. There is continous improvement of work activities within the company.	In addition to Level 4, partnerships are established for each business unit and the entire supply chain is made visible. Process innovation is continually pursued.	<u>Interface cost</u> : As logistics cost, it is generated on the interface between organizations. This includes the cost of information exchanges and order processings. When there is no information sharing, the various re-handlings will generateadditional costs, which are mainly the parts in the logistics cost that are not fully understood.

SCM/Logistics Scorecard (LSC)

3. Logistics Performance

Item	Score	Level 1	Level 2	Level 3	Level 4	Level 5	Terminology
(1) Just-In-Time (elimination of idle time and setup time through information sharing and synchronization of material and information flow)		Just-in-time philosophy is not part of the company's approach or practices	Company recognizes the importance of JIT philosophy, but has not implemented JIT practices in production, replenishment, material handling, or delivery.	JIT practices such as setup time reduction, lot-size reduction, load consolidation or merchandise are implemented, but they are not synchronized with other activities.	Some JIT activities are synchronized (e.g. picking sequence is determined from delivery plan, delivery trucks allocated based on picking sequence, etc).	JIT activities are synchronized throughout the material flow and involve suppliers and customers.	
(2) Inventory turnover & cash-to-cash cycle time		Neither inventory turns nor cash-to-cash cycle time are measured. Inventory turnover is low, and cash flow is poor.	Inventory turnover is known at the aggregate level for each facility, but inventory management is not linked to cash flow.	Inventory turnover for each supplier and individual product is measured with accuracy at the week-level and actual performance level of less than 12 turns/year.	Inventory turnover for each supplier and SKU is measured with accuracy at the day-level and actual performance level of 12+ turns/year. Inventory management is linked with cash flow.	Exceeds Level 4, with inventory measured with accuracy at the hours-level and actual performance of 24+ turns/year. Cash-to-cash cycle time is less than 10 days.	<u>Cash-to-cash cycle time</u> : Cycle time of cash flow through income and expenditure. Speed of fund collection, defined as "receivables turnover period + inventory turnover period - receivables collection period."
(3) Customer lead time (from order placement to receipt) and load efficiency		Lead time from order placement to receipt is long. Company receives frequent requests from customer to shorten lead time.	Lead times for different customer categories are known, but orders with short lead time are covered by on-hand inventory. Little effort made to reduce lead times.	Lead time is known and managed for each customer or item category, and is linked to truck allocation planning to increase load efficiency.	In addition to Level 3, average lead time is less than 2 days. Continuous efforts made to further reduce lead times.	In addition to Level 4, achieves load efficiency of 80% or higher.	
(4) Delivery performance and quality		On-time delivery rate (on-time deliveries / total orders) and order fulfillment accuracy (accurate deliveries / total orders) are not known. Company faces many customer complaints.	On-time delivery rate and order fulfillment accuracy are measured, but actual performance level is less than 95%.	Performance is between 95 and 99% for both rates. To improve performance, efforts are made to collect data on the root causes of late deliveries, stock outs, miss deliveries, damage, etc.	Performance exceeds 99% for both rates. Based on data about root causes, error prevention measures such as mistake-proofing are implemented on an ongoing basis.	In addition to Level 4, suppliers and customers are involved in improvement efforts. But maintaining high performance, efforts to improve efficiency, such as elimination of incoming inspections, are promoted.	
(5) Supply chain inventory visibility & opportunity costs		Only on-hand inventories within one's own facility or company are known. Opportunity cost of lost sales is not known or estimated.	Inventory levels within the company are known. Some estimation is made of the opportunity cost of lost sales.	Inventory levels are known for the company and its immediate suppliers or customers. Some estimation is made of opportunity cost of lost sales for the company only.	Inventory levels are known for the company and its immediate suppliers and customers. Some estimation is made of opportunity cost of lost sales for the company only.	Inventory levels are known throughout the entire supply chain. Estimation is made of opportunity cost of lost sales at the end demand level.	
(6) Environmental activities		Low level of concern for environmental issues. No systematic efforts at the company or business-unit level to reduce environmental impacts.	Environmental issues are addressed at the company-level, such as through implementation of an environmental mgmt system. Within the company, a department has responsibility for coordination of environmental efforts.	Company is making progress in reducing its environmental impacts, as measured in its environmental management system, such as through recycling, source reduction, green purchasing, etc.	In addition to Level 3, innovations in logistics system have been implemented to reduce environmental impacts (transport. mode selection, route efficiency, reduction of packing materials, supplier selection, etc.)	In addition to Level 4, efforts also involve product design and development to consider design for logistics, design for environment, and other life cycle issues.	
(7) Total logistics cost (transportation costs, inventory holding costs, order management costs, administrative costs, etc)		Order management costs and product manufacturing costs are known, but logistics-related costs are not well-defined or separated out.	Most logistics-related costs for the company are known at an aggregate level (e.g. own transportation costs, freight payments to outside carriers, inventory holding costs).	In addition to Level 2, logistics-related costs are broken down to individual supplier and customer level well enough that they can be utilized in revenue management.	Total logistics costs (transport., inventory holding, order mgmt, admin. costs, etc) are broken down for each supplier and customer. Using activity-based costing approach, this information is used in revenue management and system improvement and innovation.	In addition to Level 4, total logistics costs throughout the supply chain are known and shared among supply chain members. Win-win scenarios for cost reduction are developed from the viewpoint of supply chain optimization.	<u>Activity Based Costing (ABC)</u> : Methods for cost accounting, that accounts precisely the overhead costs - particularly difficult to grasp in reality - not by assigning them automatically to products, but instead by allocating them to pre-defined activities.

4. IT methods and implementation

Item	Score	Level 1	Level 2	Level 3	Level 4	Level 5	Terminology
(1) Electronic Data Interchange (EDI) coverage		Company is not electronically linked to any customer or supplier.	EDI links are set up with some customers or suppliers at their request.	EDI is used with over 50% of customers or suppliers. Proprietary EDI standards are used in most cases.	In addition to Level 3, EDI is integrated with the company's internal systems so that manual re-entry of data is not necessary in most cases.	EDI is used for nearly all transactions and is integrated with internal systems. Open standards for EDI are adopted or in-process of adoption.	<u>Electronic Data Interchange (EDI)</u> : The computer-to-computer exchange of structured information, by agreed message standards, from one computer application to another by electronic means and with a minimum of human intervention. There are two types of EDI standard. Proprietary standard and open standard. UN/EDIFACT is used as the international open standard. Recently, Web EDI and XML EDI are also used as a simple standard.
(2) Usage of Bar Coding / Automatic Identification and Data Capture (AIDC)		Bar codes or other forms of automatic identification and data capture (AIDC) are not utilized.	Bar codes are utilized in some activities such as inspection, but the data is not used for other purposes.	Bar codes are utilized in some activities, such as inspection, and the data is shared with internal systems to synchronize the material and information flow.	Extending the scope of Level 3, bar codes are used as a means to accelerate innovation of the logistics system, in addition to synchronizing the material and information flow.	The best mix of bar codes, 2-dimensional symbols, IC tags and other AIDC methods is linked with EDI, and used to support innovation of the logistics system at the SCMlevel.	<u>Automatic Identification and Data Capture (AIDC)</u> : The methods of identifying objects, collecting data about them, and entering that data directly into computer systems for the synchronization of material and information flow. Technologies typically considered as part of AIDC include bar codes, QR codes, biometrics, OCR, RFID (IC tags).
(3) Effective usage of computers in operations and decision-making (ERP, supply chain planning software, etc.)		PCs are not utilized anywhere in the business.	PCs are used to support some business operations and activities.	Most routine business operations and activities are computerized (e.g. accounting, production, etc.) but are not integrated with each other.	In addition to Level 3, decision support systems and other IT tools are utilized for logistics planning and optimization.	ERP, SCP, CRM and other IT tools are utilized for planning and optimization of the entire supply chain. Outsourcing and other means are considered for increasing the effective use of IT and related resources.	<u>Enterprise Resource Planning (ERP)</u> : Management information systems that integrate and automate many of the business practices and informations associated with the operations and accounting of a company. <u>Supply Chain Planning (SCP)</u> : Management Information system for planning and optimization of the entire supply chain. It integrate and support many of the business planning and decision making by synchronizing material and information flow of the supply chain.
(4) Open standards and unique identification codes		Company has no awareness of open standards and unique identification codes.	Company understands the importance of open standards and unique identification codes for improving the efficiency of logistics processes.	To exploit the potential of IT, unique identification codes are used within the company and process simplification is also carried out.	In addition to Level 3, usage of unique identifiers is extended to suppliers and/or customers. Open standards for EDI and other IT applications are adopted or under consideration.	In addition to Level 4, unique identification codes are extended to both suppliers and customers. Company is actively working towards adoption of open standards for EDI and other IT applications.	<u>Unique identification codes</u> : Unique code for cargos and products through departments, organizations, and the whole country, which prevents re-entering and re-handling. IT plays an important role for utilizing EDI or AIDC technologies.
(5) Decision-making systems and support to supply chain partners		No knowledge or interest in the decision-making processes and systems used by suppliers or customers.	Has a general understanding of how a supplier or customer makes its decisions, but does not know the details of the systems used.	Understands the systems used by a supplier or customer, but has made no proposals or efforts to bring about a win-win solution.	Exploring ways to modify or integrate the systems of the company and its suppliers or customers in order to realize win-win solutions.	Have succeeded in implementing a win-win solution with supply chain partners, actively provide proposals and support to partners to improve their systems and innovate the SCM	

SCM ロジスティクススコアカード(LSC)<メーカー版>回答用紙

平成()年()月()日

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1. □貴社名/□貴事業部の名前と所在地()

同主な所在地()□都□道□府□県

2. 貴社/貴事業部の業種

□製造業(ご回答いただく主な取り扱い製品:)

食品 □①日配品・飲料 □②素材・加工食品 化学 □③素材系 □④消費財系

繊維・製紙 □⑤繊維・製紙 医薬品 □⑥医薬品

電機・機器 □⑦一般用機器 □⑧業務用機器 自動車 □⑨自動車・輸送機 □⑩自動車・電気部品

□物流業 □⑪物流子会社 □⑫3PL □⑬独立系

□その他()

3. 貴社/貴事業所の年間売上高

□①3億円未満 □②3～20億円 □③21～50億円 □④51～100億円

□⑤101～200億円 □⑥201～500億円 □⑦501～1000億円 □⑧1001億円以上

4. 貴社/貴事業所の従業員数

□①20人未満 □②21～50人 □③51～100人 □④101～200人

□⑤201～500人 □⑥501～1000人 □⑦1001人以上

・うちパートの人数

□①0 □②1割未満 □③1～2割未満 □④2～3割未満

□⑤3～5割未満 □⑥5割以上

5. 外部委託している業務内容(一部でも該当しているものをすべて✓して下さい)

□①なし □②構内物流業務 □③製造業務 □④製品物流業務

□⑤情報処理業務 □⑥その他()

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記入者名() 記入者の役職または部署()

連絡先(返送先) Tel/Fax: E-mail:

■スコアカード各項目のレベルを以下の回答欄にご記入下さい

1. 企業戦略と組織間連携					2. 計画・実行力					3. ロジスティクスパフォーマンス							4. 情報技術の活用の仕方				
①	②	③	④	⑤	①	②	③	④	⑤	①	②	③	④	⑤	⑥	⑦	①	②	③	④	⑤

問合せ・返送先: 東京工業大学 大学院社会理工学研究科 経営工学専攻 圓川・鈴木研究室 LSC 調査担当
〒152-8552 東京都目黒区大岡山 2-12-1, W9-61

Tel: 03-5734-3941 FAX: 03-5734-2947 E-mail: lsc@ie.me.titech.ac.jp

SCM ロジスティクススコアカード

1.企業戦略と組織間連携

中項目	回答欄	レベル1	レベル2	レベル3	レベル4	レベル5	備考(言葉)
① 企業戦略の明確さとロジスティクスの位置付け		企業トップの SCM やロジスティクスについての戦略・方針がなく、改革を担当する部署もない	ロジスティクス改革の担当部署はあるが、活動は部どまりで、トップの積極関与や明確な戦略はない	トップ(担当役員)のもとに、ロジスティクスや SCM 改革組織はあるが、全社的な浸透までには至っていない	明確な戦略のもとでトップ(専務・常務クラス以上)が主導し、改革が進みつつある	社長のリーダーシップと明確な戦略のもとに、環境変化に即応可能な全社的体制が出来ている	サプライチェーン・マネジメント(Supply Chain Management, SCM):顧客や消費者を起点とする情報を共有化し、供給連鎖を連携しながら同期化させることによって市場の変化に迅速対応する取り組み。業種や組織間の連携の形態によって、ECR、QR、CPR、VMI、3PL、CPFR、BTO、CTO 等の様々な用語が出現している。
② 取引先(サプライヤー)との取引条件＊の明確さと情報共有＃の程度 ＊納期・値引・在庫負担・運送条件 ＃計画内示、在庫情報等		主要取引先と取引内容の合意形成や情報共有がなく、単独で意思決定がされている	主要取引先と、取引内容の合意形成が一部あるが、検討段階のものもある	主要取引先とは、明文化された合意はあるが、互いにメリットを享受する win-win の取り組みまでは至っていない	明文化された取引の合意があり、一部は情報共有に基づく win-win を目指した連携の取り組みを開始している	明文化された取引の合意とともに、戦略と情報共有に基づく win-win の連携体制が確立されている	
③ 納入先(顧客)との取引条件＊の明確さと情報共有＃の程度 ＊納期・納品条件、在庫負担、返品条件等 ＃需要・在庫情報、内示予測等		主要納入先と取引内容の合意形成や情報共有がなく、常に受身の立場での意思決定がなされている	主要納入先と、取引内容の合意形成が検討段階にある	主要納入先とは、明文化された合意はあるが、互いにメリットを享受する win-win の取り組みまでは至っていない	明文化された取引の合意があり、win-win の連携のための情報共有は、顧客の主導のもとで一部行っている	明文化された取引の合意とともに、戦略と情報の共有に基づく連携体制が確立されている	
④ 顧客満足の測定とその向上のための社内体制		自社のコアとなる顧客について、明確な定義がなく、クレームがあってもその場しのぎの対応になっている	顧客の定義は明確にしているが、定期的な満足度調査はなく、クレーム等の顧客の声の蓄積もしていない	定期的に顧客満足度調査を行っているが、その対応については営業任せになっていて社内連携は低い	定期的・定量的な顧客満足度調査が行われ、その向上のための社内関連部門の連携が出来ている	レベル4＋顧客とその顧客の満足度評価を共有し、商品企画に活かすパートナーシッププログラムがある	
⑤ 人材育成とその評価システム		顧客や全体最適の視点での仕事の仕方に必要な人材育成プログラムは特に用意されていない	啓発や意識付けのスローガンはあるが、具体的な人材育成プログラムは存在しない	リーダーシップや創造的提案能力を育成するプログラムがあり、実践されている	レベル3＋その能力や成果に基づく評価システムが連動し、組織のエンパワーメント向上につながっている	レベル4＋知識やノウハウをチームや組織で共有するためのナレッジマネジメントの仕組みがありうまく機能している	ナレッジマネジメント:社員や部門が保有している知識やノウハウを組織として蓄積し、それを共有化することによって企業活動に生かすための取り組みやシステム。

2.計画・実行力

中項目	回答欄	レベル 1	レベル 2	レベル 3	レベル 4	レベル 5	備考 (言葉)
①資源（輸送手段）や在庫・拠点の DFL に基づく最適化戦略		手持ちの資源や拠点について問題意識や戦略は特にっていない	問題は感じているが具体的見直しの戦略・戦術は出来ない	自社の拠点（工場・DC・TC）や輸配送手段の見直しに基づき最適化を図る戦略を持ち進めている	レベル3のシナリオが顧客や取引先を巻き込んだものになっている	サプライチェーンを見渡し商品設計・構成の変更まで含めた変化対応のための共同化やカテゴリーマネジメント戦略がある	DFL（Design For Logistics）：多様化や変化に対応しながらロジスティクスの効率化を維持するために、製品・荷姿の再設計や、補充や物流プロセスの再構築まで遡った対策・考え方の総称。カテゴリーマネジメント:ブランドやアイテムといった単位ではなく、消費者の購買ニーズに基づく商品カテゴリーを戦略的なユニットとして、取引関係にある、メーカーと小売業が協力して売場効率の向上を推進する戦略的連携。
② 市場動向の把握と需要予測の精度		営業の経験だけに任せている	特定商品についてのみ過去の売上数量を参考にし、営業の経験を加味して需要予測を行っている	主要商品については、営業と関連部門を巻き込んだ過去の数値と市場動向を分析した上で予測している	レベル3を商品全体に、または、主要製品についてはアイテム別に展開し、また需要予測のシステム化が出来ている	レベル4を、パートナーと協働で行い、市場動向の変化にフレキシブルに見直し出来る	
③ SCM の計画（受注から配車まで）精度と調整能力		在庫をもつことを前提にして、販売、補充、配送の計画が個別になされ、連動していない	各計画が月レベルで大体連動している	各計画が週レベルで連動し、週内の調整は個別になされている	各計画が週レベルでローリングさせながら連動し、川下の計画では日レベル連動した調整出来る	日レベルで連動しながら計画・調整が出来、取引先や顧客との時間レベルでの調整が可能である	
④ 在庫・進捗情報管理（トラッキング情報）精度とその情報の共有		補充活動の進捗や在庫情報のトラッキングは特にやってなく、結果の管理のみ	大体日レベルの進捗管理や月レベルでの在庫管理を行っている	自社内であれば在庫情報を含めてすべての活動の進捗の日レベルで追跡できる体制にある	取引先の補充・在庫情報を含めて、日・時間レベルの追跡が出来る体制にある	顧客・取引先を含めてサプライチェーン全体での補充・在庫情報が追跡でき、戦略的にその情報共有している	
⑤ プロセスの標準化・可視化の程度と体制		仕事の仕方の標準化やユニットロードの活用もまだあまり出来ていなく、ブラックボックス化している活動がある	大体の仕事の仕方は標準化されているが、全体の仕事の流れは必ずしも可視化されていない	標準化やユニットロードの活用は十分なされているが、取引先とのインターフェイス部分の活動が可視化出来ない	インターフェイス部分を含めた仕事の流れが標準化、可視化され、自社内の仕事の改善・改革が行われている	レベル4に加えて、事業ごとにパートナーと連携した供給連鎖のプロセスが見え、同時に改革が行われている	インターフェイスコスト:物流に代表される組織間のインターフェイスで発生するコストであり、受発注等の情報授受や処理のためのコストを含む。情報共有されていない状況では様々なハンドリングに伴うコストが発生している状況である、いわゆる物流コストで把握できていない部分が多く占める。

SCM ロジスティクススコアカード

3.ロジスティクスパフォーマンス

中項目	回答欄	レベル1	レベル2	レベル3	レベル4	レベル5	備考（言葉）
① ジャストインタイム（フロア・レディ*）の実践 *情報共有に基づく情物の同期化による待ち時間レス、段取レス		ジャストインタイムという考え方や意識は、組織内にない	ジャストインタイムという考え方はあるものの生産・補充・荷役・配送に活かされていない	シングル段取、外段取、フロアレディというような対策が個々の活動についてある	配送計画からピッキング順序を決め配車という様な情報の流れと同期化したジャストタイムの取り組みがある	レベル4の取り組みが取引先、顧客を巻き込んだものになっている	
② 在庫回転率と キャッシュツーキャッシュ		双方の指標を、ともに測定してなく、回転率は低く、資金の回転にも苦しんでいる	拠点別にトータルの在庫回転率は把握しているが、キャッシュの流れとリンクしたマネジメントにはなっていない	取引先別、カテゴリー・アイテム別に在庫回転率を把握している（把握の精度は週単位で、実績は年12回転以下）	レベル3を日単位の管理精度で行い（実績は12回転以上）、キャッシュフローにリンクしたマネジメントになっている	時間単位の管理精度で年24回転以上の実績で、キャッシュツーキャッシュも10日以内のレベルにある	キャッシュツーキャッシュ：現金収支であるキャッシュフローのサイクルタイム。売掛金回転日数＋在庫回転日数－売掛金回収日数で定義される資金回収のスピード
③ 顧客（受注*から納品まで）リードタイムと積載効率 *見込産業の場合は、計画立案から納品まで		受注から納品までのリードタイムが長く、顧客からの短縮の要請を頻繁に受けている	顧客別のリードタイムは把握しているが、短納期のものは在庫で対応し、リードタイム削減の取り組みはしていない	顧客別・アイテム別にリードタイムを把握・管理し、積載効率を高める配車計画とリンクさせている	レベル3＋平均リードタイムが2日以内で、常にリードタイム短縮努力がなされている	レベル4＋積載効率が平均80%以上を実現し、直送を積極的に活用している	
④ 納期・納品遵守率／物流品質		納期遵守率（納期遵守件数／オーダー件数）納品率（正確納品件数／オーダー件数）を把握してなくクレームも多い	納期遵守率、納品率を把握しているが、共に95%以下	いずれも95～99%にあり、納期遅れ、欠品・誤配、破損の発生源のデータの収集が行われている	いずれも99%以上であり、発生源データに基づき、ポカヨケ等の未然防止対策が継続的にとられている	レベル4＋取引先・顧客と連携し、指標を維持し効率化を図るための検品レス等の取り組みを推進している	
⑤ トータル在庫の把握と機会損失		事業所または自社内の手持ち在庫しか把握してなく、売り損じに伴う機会損失も推計していない	自社内の在庫把握にプラスして、機会損失も推計している	取引先を含めた在庫は把握し、自社の機会損失を推計している	取引先から自社そして顧客までの在庫量を把握しているが、機会損失は自社のみ分だけ推計している	自社を含めたサプライチェーン全体の在庫が把握でき、最終需要の機会損失まで推計できる	
⑥環境対応について		環境問題に関心は薄く、会社・事業部など組織として特に対策もしていない	ISO14000取得などを含めた、全社的な環境問題の取組をしている。また、社内に環境に関連した組織が存在し、社外への対応と社員への啓発を実施している	レベル2に加え、事業所における排出物をゼロにすることに向けての取り組み（ゼロエミッション活動）が行われている	レベル3に加えて、環境負荷を考慮したロジスティクス改革（輸送手段の選択、経路の最適化、グリーン購入など）を実施している	レベル4に加えて、商品設計や商品開発まで遡り、DFE（環境対応設計）などライフサイクルを考慮したDFLレベルでの環境負荷削減への評価、設計がなされている	
⑦トータルロジスティクスコスト*の把握について *受注管理コスト（含む運賃）、在庫維持コスト、計画管理コスト、情報システム管理コスト等のロジスティクス関するトータルコスト		販売管理費や製造原価は把握している。しかし、自社のロジスティクスに関係したコストは正確には把握していない	自社内のロジスティクスに関係したコストに関して、自家物流費、支払物流費、保管費等は把握している	レベル2のことを、取引先別、顧客別に大まかに把握し、収益管理に活用している	ABC等の分析により管理費を含めた自社のトータルロジスティクスコストに相当するものを、取引先別に把握し、収益管理だけでなく改善や改革に活かしている	レベル4に加えて、自社だけでなくサプライヤー、得意先を横串にしたトータルロジスティクスコストが把握できており、その削減によるゲインシェアリングシナリオが出来ている	ABC(Activity Based Costing)：活動基準原価計算と呼ばれる管理会計の方法。特に実態の把握しにくい間接費を、機械的に配賦するのではなく、コスト格差をうむ単位でアクティビティを定義することによって正確に算出する方法

4.情報技術の活用の仕方

中項目	回答欄	レベル1	レベル2	レベル3	レベル4	レベル5	備考（言葉）
①EDIのカバー率		どの顧客・取引先ともネットワークで結ばれていない	一部顧客・主要取引先の要求に応じてEDIを導入しているが、あくまで受身の立場である	EDIの使用率は50%以上であるが、大半が自社または顧客・取引先の専用標準である	レベル3において、EDIのやり取りのほとんどが社内システムとリンクし、手作業を伴わない	一部例外を除いてほとんどが社内システムとリンクしたEDI化がなされており、オープン標準の採用や移行にも積極的である	EDI(Electronic Data Interchange 電子データ交換)：帳票等の商取引で必要なデータをデジタル化してネットワークを介して交換。交換メッセージには取引先グループ内でしか通用しない専用標準とオープン標準がある。オープン標準には国内標準としてCII標準に基づくJTRAN、国際標準としてUN/EDIFACTがある。最近はインターネットを用いた簡易的なEDIとして、WebEDIやXMLEDIがある。
② バーコード（AIDC）の活用度		バーコードを用いた管理は行っていない	バーコードを用いた検品等を行っているが、そのデータを他目的に活用するような使い方になっていない	読み込みデータを他のシステムで活用する等情物一致の効果も出している例がある	レベル3の効果拡大させるために、バーコードや他のAIDCを業務改革とセットで情物一致の手段としてとらえている	レベル4に加えて、2次元シンボルやICタグの最適な組合せの下で、EDIとのリンクによるサプライチェーンレベルでのロジスティクス改革が実行あるいは視野に入っている	AIDC（Automatic Identification and Data Capture）：バーコード（1次元、2次元）、RFID（またはICカード）等の情物一致のための自動認識技術の総称。
③ PC、業務・意思決定支援ソフト（ERP、SCMソフト等）の有効活用		業務にパソコンも活用していない	業務システムの一部にパソコンを活用している	日常管理的な業務システムの大半はパソコン等コンピュータ化されている	レベル3に加え、サプライチェーンの計画や最適化に関して意思決定支援のツールとして情報技術を活用	ERPやSCMソフト、CRM等の情報技術を活用しており、その有用性を更に高めるため、アウトソーシングすることなども視野に入れている	ERP（Enterprise Resource Planning）：販売、生産、会計といった企業の基幹的な情報処理業務を統合化した新しい形態のパッケージソフト。 SCMソフト：ERPに対して、経営上の計画や意思決定支援を目的としたソフト。需要予測から、販売計画、生産・物流計画等を同期化させながら最適化を目指したロジックよりなる。
④オープン標準・ワンナンバー化への対応度		情報技術の活用オープン標準の採用や、有効活用のためのワンナンバー化は視野にない	レベル1について、その必要性は理解している	自社内についてはコード類のワンナンバー化や情報技術の能力を引き出す業務のシンプル化を行っている	レベル3を取引先を含めて実現し、EDI等のオープン標準の採用または検討している	レベル4を、顧客を含めて実現し、オープン標準採用にもイニシャティブをとっている	ワンナンバー化：貨物や商品のコード類の部門や組織、そして国を超えた1つのナンバーを与えることで、再入力やリハンドリングを防ぐことを目的としたもの。EDIやADC技術を組織間で有効活用するための大きな要件でもある。
⑤ 取引先への意思決定支援の程度		取引先や顧客のシステムや意思決定の仕方の根拠は知らないし、関心もない	取引先や顧客の意思決定の仕方は大体は分かっているが、使用システムについては把握していない	取引先や顧客の使用システムも把握しているが、win-winを実現するための提案や動きはしていない	win-winを実現するための相互のシステムの運用方法や意思決定の変更等の提案をはじめている	win-winを実現し、常にその改善・改革のためのイニシャティブを取り、取引先や顧客に提案・支援を行っている	

Appendix C

Culture and Guanxi Questionnaire

- **Chinese (survey conducted in China)**
- **English**
- **Japanese (survey conducted in Japan)**

文化维度调查研究

您好！我是东京工业大学的学生，此次研究旨在讨论“关系”对商业的不同影响及中日文化间的比较研究，此份调查问卷主要针对中国人群体。感谢您百忙之中帮助我完成这份调查问卷。调查结果仅用于我的毕业论文研究，不做任何商业用途，您的信息也将完全保密。非常感谢您的合作与支持。

东京工业大学 经营工学专攻 铃木研究室

一、基本信息

1. 性别：☐ 男性（ ）； ☐ 女性（ ）
2. 年龄：☐ 20 以下 ☐ 21~30 ☐ 31~40 ☐ 41~50 ☐ 51~60 ☐ 60 以上
3. 您现在所在的国家：☐ 中国（ ）； ☐ 日本（ ）；
4. 您的家乡所在的省/市/自治区：_____； 市/县_____；
5. 您的家庭出身（即父母的工作类型）：☐ 工人 ☐ 农民 ☐ 干部 ☐ 军人 ☐ 其他
6. 您目前从事的职业：
☐ 学生 ☐ 生产人员 ☐ 销售人员 ☐ 市场/公关人员 ☐ 客服人员 ☐ 行政/后勤人员
☐ 人力资源 ☐ 财务/审计人员 ☐ 文职/办事人员 ☐ 技术/研发人员 ☐ 管理人员 ☐ 教师
☐ 顾问/咨询人员 ☐ 专业人士（如会计师、律师、建筑师、医护人员、记者等） ☐ 其他
7. 您到目前为止的工作年限：
☐ 1 年以下 ☐ 1~2 年 ☐ 2~3 年 ☐ 3~5 年 ☐ 5~10 年 ☐ 10~20 年 ☐ 20 年以上
8. 您目前的月收入：（人民币）
☐ 无 ☐ 2000 以下 ☐ 2000~3000 ☐ 3001~5000
☐ 5001~8000 ☐ 8001~15000 ☐ 15001~50000 ☐ 50000 以上

二、对于您来说，以下问题您认为答案应该选择 1~5 中的那一个？（1 代表强烈赞同左边；2 代表比较赞同左边；3 代表无所谓；4 代表比较赞同右边；5 代表强烈赞同右边）

1-1. 人与人之间的不平等应该减小到最小限度	1	2	3	4	5	人与人之间存在不平等是理所当然的
1-2. 孩子和父母应该是平等关系	1	2	3	4	5	孩子应该服从父母。
1-3. 老师和学生应该是平等关系	1	2	3	4	5	学生应该尊敬老师
2-1. 重视人的因素，亲密的人际关系更重要	1	2	3	4	5	重视金钱和物质
2-2. 不论男女，都应该谦恭，都应该重视人际关系	1	2	3	4	5	男性应该特强、自信、雄心勃勃；只有女人才应该谦恭和注重人际关系
2-3. 用和解与谈判方式解决冲突	1	2	3	4	5	用一决雌雄的方式解决冲突
3-1. 自己很容易受到周围环境的影响	1	2	3	4	5	不论何时都生活在自己的空间里
3-2. 从“我们”的角度考虑问题	1	2	3	4	5	从“我”的角度考虑问题
3-3. 人与人之间的关系重于工作任务	1	2	3	4	5	工作任务重于人与人之间的关系
4-1. 充满不确定性的事物是正常的，人们接受这些事物并且习以为常	1	2	3	4	5	不确定性事物的存在是不应该的，人们必须消除他们
4-2. 了解我们不熟悉的事物是十分有趣的	1	2	3	4	5	与我熟悉的事有所不同的事物让我感到危险和不安
4-3. 如果不是特别需要的话，就不必制定法律、法令和规章制度	1	2	3	4	5	整个社会从情绪上需要制定法律、法令和规章制度，而不管他们是否会起作用
4-4. 人们不感到紧张，主观感觉处于康宁状态	1	2	3	4	5	人们感到紧张，主观感觉表现为焦虑
4-5. 同行之间的竞争利大于弊	1	2	3	4	5	同行之间的竞争弊大于利
5-1. 我经常做短期计划						我经常做长期计划
5-2. 我活在当下并享受每一天						我为将来努力工作
5-3. 我花费大量金钱寻求欢乐						我为将来存大量金钱
5-4. 为了现在的快乐我可以放弃将来的成功						为了将来的成功我可以放弃现在的快乐

三、对于您来说，以下问题您认为答案应该选择 1~7 中的那一个？（1 代表强烈不赞同；4 代表中性；7 代表强烈赞同）

注意：本问卷中的“家庭”包含家人、亲戚和亲属等；“熟人关系”包括朋友、同学、师生、同事、邻居等有较紧密关系的人；“认识的人”包括仅仅认识或只有利益联系等关系不亲密的人。

1-1. 我希望通过我的家庭获得商业机会（如求职、工作晋升等）	1	2	3	4	5	6	7
1-2. 我希望通过我的家庭获得商业信息（如政府政策、市场趋势等）	1	2	3	4	5	6	7
1-3. 我希望通过我的家庭来解决商业问题（如罚款、违反规则的处罚等）	1	2	3	4	5	6	7
1-4. 我认为以上现象在我的国家很普遍	1	2	3	4	5	6	7
1-5. 我认为以上现象是正确的	1	2	3	4	5	6	7
1-6. 保持联系或情感交流对维持家庭关系很重要	1	2	3	4	5	6	7
1-7. 赠送礼物或互相帮忙对维持家庭关系很重要	1	2	3	4	5	6	7
1-8. 给对方利益和好处对维持家庭关系很重要	1	2	3	4	5	6	7
2-1. 我希望通过我的熟人获得商业机会（如求职、工作晋升等）	1	2	3	4	5	6	7
2-2. 我希望通过我的熟人获得商业信息（如政府政策、市场趋势等）	1	2	3	4	5	6	7
2-3. 我希望通过我的熟人来解决商业问题（如罚款、违反规则的处罚等）	1	2	3	4	5	6	7
2-4. 我认为以上现象在我的国家很普遍	1	2	3	4	5	6	7
2-5. 我认为以上现象是正确的	1	2	3	4	5	6	7
2-6. 保持联系或情感交流对维持熟人关系很重要	1	2	3	4	5	6	7
2-7. 赠送礼物或互相帮忙对维持熟人关系很重要	1	2	3	4	5	6	7
2-8. 给对方利益和好处对维持熟人关系很重要	1	2	3	4	5	6	7
3-1. 我希望通过我认识的人获得商业机会（如求职、工作晋升等）	1	2	3	4	5	6	7
3-2. 我希望通过我认识的人获得商业信息（如政府政策、市场趋势等）	1	2	3	4	5	6	7
3-3. 我希望通过我认识的人来解决商业问题（如罚款、违反规则的处罚等）	1	2	3	4	5	6	7
3-4. 我认为以上现象在我的国家很普遍	1	2	3	4	5	6	7
3-5. 我认为以上现象是正确的	1	2	3	4	5	6	7
3-6. 保持联系或情感交流对维持认识的人的关系很重要	1	2	3	4	5	6	7
3-7. 赠送礼物或互相帮忙对维持认识的人的关系很重要	1	2	3	4	5	6	7
3-8. 给对方利益和好处对维持认识的人的关系很重要	1	2	3	4	5	6	7

Survey on Culture Dimension and Guanxi

This survey is part of an academic research project at Tokyo Institute of Technology, one of Japan's most prestigious public universities. It takes about 5 minutes to fill out this questionnaire. Your answers are highly valuable and will help advance the frontiers of consumer research. All answers will be treated anonymously, will not serve any commercial objectives, and will not be passed on to third parties under any circumstances. Thank you very much for your kind cooperation.

Tokyo Institute of Technology Suzuki Laboratory

I . Personal Information

- 1-1. Sex: 1. ☐ Male (); 2. ☐ Female ();
 1-2. Age: 1. ☐ 10-19; 2. ☐ 20-29; 3. ☐ 30-39;
 4. ☐ 40-19; 5. ☐ 50-59; 6. ☐ 60 or higher
 1-3. Profession: 1. ☐ Student; 2. ☐ Housewife (full-time); 3. ☐ Housewife (part-time);
 4. ☐ Employee (commercial); 5. ☐ Employee (technical); 6. ☐ Public servant;
 7. ☐ Teaching profession; 8. ☐ Entrepreneur/self-employed; 9. ☐ Other: _____
 1-4. Birthplace _____ Country name _____
 1-5. Household size: 1. ☐ 1 person; 2. ☐ 2 persons; 3. ☐ 3 persons;
 4. ☐ Four persons; 5. ☐ 5 persons; 6. ☐ 6 or more persons

II . This section evaluates your way of thinking regarding your workplace (alternatively, your university or another organization). Please answer the following questions by marking your relative position between A and B.

A	1	2	3	4	5	B
1.1 Inequalities between people should be reduced to a minimum						Inequalities between people is taken for granted
1.2 Children and their parents should be equal relationship						Children should obey their parents
1.3 Teachers and students should be equal relationship						Students should respect teachers
2.1 Emphasis on the human factor, intimate relationships are more important						Emphasis on money and favor
2.2 Men and women must be as responsible, ambitious, resolute, caring and tender, receptively						Men must be responsible, ambitious, resolute; women must be caring and tender
2.3 Reconciliation and negotiations to solve the conflict						Duel and debate to resolve conflicts
3.1 Easily influenced by others						Always go my way
3.2 Tend to think in terms of “we”						Tend to think in terms of “I”
3.3 Relationship prevails over task						Task prevails over relationship
4.1 Uncertainty is a normal feature of life, and is accepted as it comes						The uncertainty inherent in life is a continuous threat that must be fought
4.2 What is different is curious						What is different is dangerous
4.3 There should be no more roles than strictly necessary						There is an emotional need for rules, even if there were implicit
4.4 Low stress and low anxiety						High stress and high anxiety
4.5 Competition among colleagues is beneficial rather than harmful						Competition among colleagues is harmful rather than beneficial

III. Please answer the following questions according to your situation from strongly disagree to strongly agree. 1 means “Absolutely disagree”; 7 means “Absolutely agree”.

Note: “Family” including family members, relatives and so on; “Friend” including close friends, colleague, classmate, neighbors and so on; “Acquaintance” including not so close friends, colleague, classmate, neighbors and so on

1.1 I want to obtain business information (on government policies/market trends etc.) by using my relationship with my family .	1	2	3	4	5	6	7
1.2 I want to obtain business opportunities (job hunting/promotion etc.) by using my relationship with my family .	1	2	3	4	5	6	7
1.3 I want to solve some business problems (hefty fine/punish/some actions against rules etc.) by using my relationship with my family .	1	2	3	4	5	6	7
1.4 I think such kinds of actions above are general in my country.	1	2	3	4	5	6	7
1.5 I think such kinds of actions above are correct.	1	2	3	4	5	6	7
1.6 Keeping in touch or emotional communication is very important to maintain my relationship with my family .	1	2	3	4	5	6	7
1.7 Giving a gift or help each other is very important to maintain my relationship with my family .	1	2	3	4	5	6	7
1.8 Giving interests and benefits to each other is very important to maintain my relationship with my family .	1	2	3	4	5	6	7
2.1 I want to obtain business information (on government policies/market trends etc.) by using my relationship with my friends .	1	2	3	4	5	6	7
2.2 I want to obtain business opportunities (job hunting/promotion etc.) by using my relationship with my friends .	1	2	3	4	5	6	7
2.3 I want to solve some business problems (hefty fine/punish/some actions against rules etc.) by using my relationship with my friends .	1	2	3	4	5	6	7
2.4 I think such kinds of actions above are general in my country.	1	2	3	4	5	6	7
2.5 I think such kinds of actions above are correct.	1	2	3	4	5	6	7
2.6 Keeping in touch or emotional communication is very important to maintain my relationship with my friends .	1	2	3	4	5	6	7
2.7 Giving a gift or help each other is very important to maintain my relationship with my friends .	1	2	3	4	5	6	7
2.8 Giving interests and benefits to each other is very important to maintain my relationship with my friends .	1	2	3	4	5	6	7
3.1 I want to obtain business information (on government policies/market trends etc.) by using my relationship with my acquaintance .	1	2	3	4	5	6	7
3.2 I want to obtain business opportunities (job hunting/promotion etc.) by using my relationship with my acquaintance .	1	2	3	4	5	6	7
3.3 I want to solve some business problems (hefty fine/punish/some actions against rules etc.) by using my relationship with my acquaintance .	1	2	3	4	5	6	7
3.4 I think such kinds of actions above are general in my country.	1	2	3	4	5	6	7
3.5 I think such kinds of actions above are correct.	1	2	3	4	5	6	7
3.6 Keeping in touch or emotional communication is very important to maintain my relationship with my acquaintance .	1	2	3	4	5	6	7
3.7 Giving a gift or help each other is very important to maintain my relationship with my acquaintance .	1	2	3	4	5	6	7
3.8 Giving interests and benefits to each other is very important to maintain my relationship with my acquaintance .	1	2	3	4	5	6	7

文化についてアンケート調査

本アンケートは、文化に関する研究用の基礎データにするための調査です。ご回答頂く内容は一切公表せず、本研究の目的以外で使用することは致しません。所要時間は5分程度です。お忙しいところ恐縮ですが、本アンケート調査にご協力下さいますようお願い申し上げます。

東京工業大学 経営工学専攻 鈴木研究室

一、基本情報

1. 性別： 男性 () 女性 ();
2. 年齢： 10代(); 20代(); 30代(); 40代(); 50代(); 60以上 ()
3. 業種： 学生(); 主婦(専業)(); 主婦(勤務有)(); 会社員(事務系)(); 会社員(技術系)(); 公務員(); 教職員(); 商工自営者(); その他()
4. 出身地： 都 道 府 県();
5. 世帯人数： 1人(); 2人(); 3人(); 4人(); 5人(); 6人以上()

二、次にあげることにについて、あなたの考えは左側と右側の間のどの位置に該当しますか？番号でお答え下さい。5段階でお答え下さい。

1-1. 人々の間の不平等は最小限にすべきである。	1	2	3	4	5	人々の間に不平等が存在することは当然である。
1-2 子供は親と対等な関係として扱われるべきである。	1	2	3	4	5	子供は親に従うべきである。
1-3. 学生は教師を対等な関係として扱うべきである。	1	2	3	4	5	学生は教師に敬意を払うべきである。
2-1. 温かな人間関係を大切にする。	1	2	3	4	5	金銭と物質を大切にする。
2-2. 人間というものは男女に関わらず謙虚でやさしく、人間関係に気を配るべきである。	1	2	3	4	5	男性は自己主張が強く、野心的でたくましいものであり、女性はやさしく、人間関係に気を配るべきである。
2-3. 対立は妥協と交渉によって解決されるべきである。	1	2	3	4	5	対立は徹底交戦によって解決すべきである。
3-1. 自分は周囲の環境から影響を受けやすい。	1	2	3	4	5	いつもマイペースで生きている。
3-2. 「われわれは」という視点から物事を考える。	1	2	3	4	5	「私は」という視点から物事を考える。
3-3. 人間関係が職務よりも優先されるべきだ。	1	2	3	4	5	職務が人間関係よりも優先されるべきだ。
4-1. あいまいさは、あってしかるべきもので、それを受け入れられる。	1	2	3	4	5	あいまいさは、あってはならないもので、取り除かれねばならない。
4-2. 周囲と違うということはむしろ興味をそそる。	1	2	3	4	5	周囲と違うということに不安を感じる。
4-3. 絶対必要な規則以外は必要ない。	1	2	3	4	5	暗黙のルールも含め、規則を求める気持ちがある。
4-4. 神経質になったり、緊張したりすることはほとんどない。	1	2	3	4	5	神経質になったり、緊張したりすることがしばしばある。
4-5. 仲間同士の競争は、害になるよりも利益になるのが普通だ。	1	2	3	4	5	仲間同士の競争は、利益になるよりも害になるのが普通だ。

三、次にあげることについて、どの程度該当しますか。番号でお答え下さい。

注:ここでの「家族」には親戚等を含むものとする;「友人」とは友達、同級生、同僚、隣人など比較的近い間柄の人々を指すものとする;「知人」とは仕事上のつきあいやそれ程近くはない間柄の人々を指すものとする。

1-1.就職活動や昇進等のビジネスチャンスを「家族」の関係を介して得たいと思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
1-2.国家情勢や市場動向等を含むビジネスに関連した情報を「家族」の関係を介して得たいと思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
1-3.ビジネスにおいて発生した罰金等の処罰を含む問題において、「家族」の関係を介して罰から逃がれたいと思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
1-4.上記の 1-1～1-3 のような行動は一般的にあることだと思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
1-5.上記の 1-1～1-3 のような行動は正しいことだと思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
1-6.「家族」関係を構築、維持するためには、連絡を取りとりあったり、感情的なコミュニケーションが重要であると思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
1-7.「家族」関係を構築、維持するためには、贈り物をしたり、相互に助け合うことが重要であると思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
1-8.「家族」関係を構築、維持するためには、相手に利益をもたらすことが重要であると思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
2-1.就職活動や昇進等のビジネスチャンスを「友人」の関係を介して得たいと思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
2-2.国家情勢や市場動向等を含むビジネスに関連した情報を「友人」の関係を介して得たいと思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
2-3.ビジネスにおいて発生した罰金等の処罰を含む問題において、「友人」の関係を介して罰から逃がれたいと思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
2-4.上記の 2-1～2-3 のような行動は一般的にあることだと思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
2-5.上記の 2-1～2-3 のような行動は正しいことだと思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
2-6.「友人」関係を構築、維持するためには、連絡を取りとりあったり、感情的なコミュニケーションが重要であると思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
2-7.「友人」関係を構築、維持するためには、贈り物をしたり、相互に助け合うことが重要であると思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
2-8.「友人」関係を構築、維持するためには、相手に利益をもたらすことが重要であると思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
3-1.就職活動や昇進等のビジネスチャンスを「知人」の関係を介して得たいと思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
3-2.国家情勢や市場動向等を含むビジネスに関連した情報を「知人」の関係を介して得たいと思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
3-3.ビジネスにおいて発生した罰金等の処罰を含む問題において、「知人」の関係を介して罰から逃がれたいと思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
3-4.上記の 3-1～3-3 のような行動は一般的にあることだと思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
3-5.上記の 3-1～3-3 のような行動は正しいことだと思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
3-6.「知人」関係を構築、維持するためには、連絡を取りとりあったり、感情的なコミュニケーションが重要であると思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
3-7.「知人」関係を構築、維持するためには、贈り物をしたり、相互に助け合うことが重要であると思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う
3-8.「知人」関係を構築、維持するためには、相手に利益をもたらすことが重要であると思う	全くそう思わない	1	2	3	4	5	6	7	極めてそう思う