Empirical Study on Transferability of Kaizen Practices in Vietnamese Manufacturing Companies

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Abstract

This study examines the link between Kaizen practices and different culture dimensions in Vietnamese manufacturing companies. The study follows the cultural framework suggested by House et al. (2004) and three typical Kaizen practices implemented in Vietnam such as Small Group Problem Solving, Process Control and Employee's Suggestion. Statistical techniques such as path analysis and regression analysis are applied to analyze the data collected from 124 Vietnamese manufacturing companies through a questionnaire survey during 2011-2012. The findings indicate that there is positive correlation on Kaizen practices and culture's dimensions in relation to performance of manufacturing companies in Vietnam.

Keywords: kaizen practices, culture, manufacturing

1. Introduction

In Japanese management, Kaizen means "continuous improvement", a business strategy involving the entire workforce from the top management to middle managers and workers. Everyone is encouraged to come up with small improvement suggestion on a regular basis. This is not a once a month or once a year, it is continuous. Kaizen is often seen as a key element in Japanese management and has been presented as one of the sources of the competitiveness of Japanese manufacturers (Imai, 1986).

Since late of the 1980s, a larger number of studies, which have focused on different Kaizen systems, approaches and practices such as Japanese manufacturing techniques (Brunet & New, 2003; Schonberger, 1986), the Toyota production system (Liker, 2004; Ohno, 1988), and lean production (Womack et al., 1990) have illustrated the effectiveness of Kaizen. Furthermore, studies of kaizen activities in the countries outside Japan, such as Australia (Chapman et al., 1997), Sweden (Lindberg & Berger, 1997) and the UK (Oliver & Wilkinson, 1992) suggest that the concept, approaches, and practices of Kaizen have become routinely accepted throughout the world.

Quality improvement is now regarded as the key management issue in Vietnamese companies. Though the attention of Kaizen and quality management practices in Vietnamese companies is constantly increased, there is a lack of Kaizen studies. There is several questions regarding the performance of Japanese management techniques implemented in Vietnamese companies and how do they fit to the culture and organization structure of Vietnamese companies. These issues should be further examined for better understanding on the transformation of Japanese management in Vietnam.

The main objective of this study is to examine the relationship between the implementation of Kaizen practices and organizational culture in Vietnam. In other words, the study raises a question that "*Is the level of the implementation of Kaizen practices related to the Vietnamese national and organizational culture?*" Specifically, the study analyzes how the culture's dimensions influence the implementation of Kaizen practices and just the performance in Vietnamese manufacturing companies.

The remainder of this paper is structured as follows. Section 2 and section 3 summary the literature review on Japanese management transformation and the analytical framework respectively. Subsequently, section 4 explains the methodology and data collection. Section 5 presents data analysis and discusses the main findings.

The last section will be concluding remarks.

2. Literature Review

The Kaizen is an originally Japanese management concept for incremental change. According to Imai (1986), Kaizen is defined as continuous improvement involving employees in all levels of an organization. Unlike Western business concepts, generally summarized by the terms innovation or drastic change in order to create fast results, the Japanese Kaizen management system was made popular because it was adapted to adhere to a continual process of improvement (Becker & Snow, 1997). More specifically, in business context, Kaizen includes quality control, automation, workers suggestion system, just-in-time delivery system and the 5S process (Note 1) (Genobz, 2010).

Kaizen involves everyone in the organization and largely depends on cross-functional teams that can be empowered to challenge the status and commit to better quality and improve productivity. Kaizen involves bottom-up decision-making and practices an employee-driven management style that heavily emphasizes teamwork. Kaizen is also process-oriented, that is before results can be improved process must be improved, as opposed to result-orientation where outcomes are all that counts (Imai, 1986). Kaizen encompasses several techniques including 5S (sorting, setting in order, shining, standardizing and sustaining), mudadori (eliminating the seven types of waste: transport, inventory, motion, waiting, overproduction, over-processing and defects), quality control circle (groups of workers who regularly brainstorm on productivity and quality, bringing improvement from the bottom up), the seven quality control tools, and many other approaches and techniques of Total Quality Management (TQM). The key objectives of Kaizen are elimination of waste, control quality of products process, standardization of work, delivery on time and efficient use of resources. With such improvement that relates to the key objectives, the organization will achieve superb quality levels, greater efficiencies, teamwork with improved employee morale and higher level of profitability.

Kaizen is a hot topic in Japanese management studies over the past few decades. Many studies have been conducted to examine the transferability of Kaizen from Japan to other countries such as US (Kenney & Florida, 1993), UK (Saka, 2004; Elger & Smith, 2005), China (Taylor, 1999; Hong et al., 2006), Kenya (Kariuki, 2011).

Those studies suggest that the results of the implementation of Japanese Kaizen practices in oversea plants depend on cultural and social context. Essentially, some scholars suggest that Kaizen practices are embedded in Japanese culture and hence difficult to transfer to another culture. Others suggested that only the rational aspects of Kaizen practices were transferable overseas. Recent studies show that Kaizen approaches were not easily adopted in abroad due to such environmental factors as the differences in national culture and working ethics. Along with national culture aspects, scholars argue that the adoption of Kaizen highly depends on some specific organizational culture (Recht & Wilderom, 1998).

There are a number of studies on transferability of the Japanese management practices but very limited studies focus on practices compatible with Vietnam working culture. Such research literature is by Anh & Minh (2013) on relationship between Japanese management practice and company's performance. The findings indicated that Japanese continuous improvement practices have positive relationship with companies' performance on quality, cost, and delivery. The authors also suggest that companies in Vietnam should further emphasis on implementing Japanese management practices to enhance the performance. Although Kaizen practices are increasingly implemented in Vietnam in recent year, little attention has been paid to have a better understanding the problem of Kaizen implementation in Vietnamese companies. Therefore this study will not only enrich the literature on Kaizen practices in the world in general and in Vietnam in particular but also provide some interesting findings about the link between Kaizen practices and culture's dimensions in relation to performance in Vietnamese manufacturing companies.

3. Analytical Framework

Many studies have been conducted based on Hofstede's (2001) four cultural dimensions model: Power Distance, Uncertainty Avoidance, Individualism/Collectivism, and Masculinity/Femininity (Flynn & Saladin, 2006; Lagrosen, 2003; Recht & Wilderom, 1998; Smeds, Olivari, & Corso, 2001).

According to Hofstede (1980), national culture is defined as collective programming of mind that distinguishes members of one group from another, organizational culture is regarded as the specific collection of values and norms that are shared by people and groups in an organization and that control the way they interact with each other and with stakeholders outside the organization. When Kaizen practices are adopted in an organization, those factors would moderate the teamwork, decision-making process for problem solving, and autonomous activities. Whereas, House et al. (2004) defines culture as shared motives, values, beliefs, identities, and

interpretations or meanings of significant events that result from common experiences of members of collectives that are transmitted across generation. This section focuses on two distinguished approaches on culture studies suggested by Hofstede (1980) and House et al. (2004).

The four now-well-known dimensions that Hofstede examines are Power Distance (Note 2), Uncertainty Avoidance (Note 3), Individualism/Collectivism (Note 4) and Masculinity/Femininity (Note 5). Hofstede (1980, 2001) collected empirical data on value orientations of approximately 116,000 employees in 72 countries of one large multinational business organization (IBM). Initially four dimensions were uncovered based on these data: Power Distance (PDI), Uncertainty Avoidance (UAI), Individualism-Collectivism (IDV), and Masculinity-Femininity (MAS). Hofstede (1980, 2001) provided a framework to study Kaizen transferability in countries outside Japan.

According to Hofstede, Japanese culture is characterized by long-term orientation (LTO=80), high uncertainty avoidance (UAI=92), moderate power distance (PD= 54), moderate individualism (IDV=46), and strong masculinity (MAS=95), whereas Vietnam culture is characterized by long-term orientation (LTO=80), low uncertainty avoidance (UAI=30), relatively high power distance (PD=70), low individualism (IDV=20) and moderate masculinity (MAS=40).

The culture of Vietnam is quite different from that of Japan. While Vietnam witnesses high level of Power Distance, Japanese culture appreciates Uncertainty Avoidance (UAI) and Masculinity-Femininity (MAS). Interestingly, both Vietnam and Japanese share the same cultural features of Long-term orientation and Individualism. These differences in culture may suggest that Kaizen practices need an adjustment when being transferred in Vietnam.

Table 1. Hofstede's culture dimensions of Asian countries

Country	PDI	IDV	MAS	UAI	LTO
China	80	20	66	30	118
Japan	**54**	**46**	**95**	**92**	**80**
Indonesia	78	14	46	48	-
Philippine	94	32	64	44	19
Singapore	74	20	48	8	48
Thailand	64	20	34	64	56
Malaysia	104	26	50	36	-
Vietnam	**70**	**20**	**40**	**30**	**80**

Source: Hofstede (1980, 2001)

Extending Hofstede's culture dimension, House et al. (2004) introduces other national culture frameworks as the results of Global Leadership and Organizational Behavior Effectiveness (GLOBE) program. GLOBE involved 170 researchers working in 62 different societies and collected data from approximately 17,000 middle managers in 951 organizations. House et al. (2004) suggests the following dimensions:

Power distance (or power concentration versus decentralization) (Note 6), Uncertainty avoidance (Note 7), Institutional Collectivism (I) (Note 8), In-Group Collectivism (II) (Note 9), Future orientation (Note 10), Performance orientation (Note 11), Humane orientation (Note 12).

Many scholars adopt the culture dimensions suggested by Hofstede (1980, 2001) and House et al. (2004) to study the transferability of Kaizen practices in the countries outside Japan, (Anwar & Jabnoun, 2006; Lagrosen, 2003; Flynn & Saladin, 2006). The results suggest some culture dimensions have significant relationship with the implementation of Kaizen practices.

First, Power distance influences the amount of formal hierarchy, the degree of centralization and the amount of participation in decision making in organizations. The plants that are located in high power distance countries tend to be more centralized and employees participate less in decision making. Implementation of such Kaizen practices as group problem solving or autonomous activities requires empowerment and participative decision making, which mirrors low power distance.

Second, in term of Uncertainty Avoidance, clarity of plans, policies, procedures and systems helps to avoid uncertainty. Kaizen practices emphasizes on the improvement of processes through scientist improvement

methods and statistical process control. This relates to the cultures with high uncertainty avoidance, which greater emphasizes on procedure and routines.

Third, literature on Kaizen studies indicated that the implementation of Kaizen requires cooperation, teamwork, and joint decision-making, which means that the collectivism supports Kaizen practice.

To study the transferability of Kaizen in Vietnam, House et al.'s approach is selected because it sharply differentiates between national and organizational cultural components. The study will examine how such House et al.'s cultural dimensions impact three typical Kaizen practices in Vietnam as follows:

1) Small Group Problem Solving: plants use the small group/team to solve the quality problems.

2) Process Control: Activities involved in ensuring a process is predictable, stable, and consistently operating at the target level of performance with only normal variation.

3) Employee's Suggestion: plants implement the employee suggestion and give feedback to the employees.

The main research questions are:

1) Is the level of implementation of Kaizen practices significantly related to culture dimensions of the manufacturing companies?

2) Is quality performance significantly related to culture dimensions and Kaizen practices?

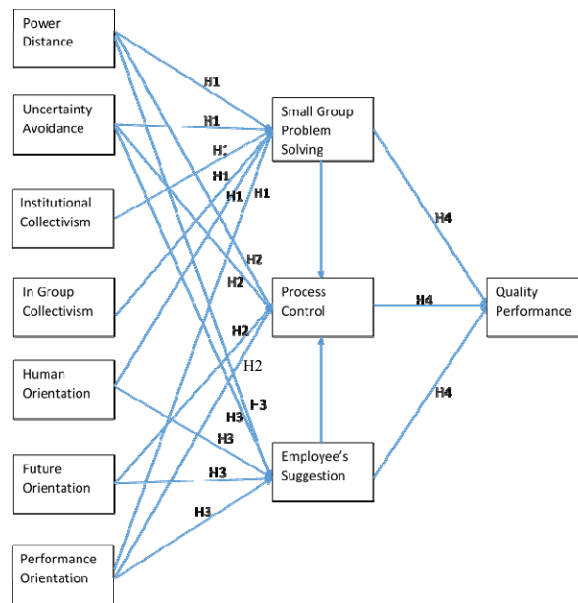The framework of this study is presented in the Figure 1.

Figure 1. Analytical framework

Based on literature of Kaizen and culture studies, we establish four hypotheses on the relationship between organizational culture aspects and adoption of Kaizen practices in manufacturing plants (as shown in Figure 1) as follows:

H1: Small Group Problem Solving is significantly related to Power Distance, Uncertainty Avoidance, Institutional Collectivism, In Group Collectivism, Human Orientation, and Performance Orientation

H2: Process Control is significantly related to Power Distance, Uncertainty Avoidance, Future Orientation, and Performance Orientation.

H3: Employee's Suggestion is significantly related to Power Distance, Uncertainty Avoidance, Human Orientation, Future Orientation, and Performance Orientation.

H4: Quality Performance is significantly related to Small Group Problem Solving, Employee Suggestion, and Process Control.

4. Methodology and Data Collection

The methodology employed in this study is applying path analysis and regression analysis to analyze the data collected based on questionnaire survey conducted in 152 Vietnamese manufacturing companies.

Path analysis is a statistical method of finding cause/effect relationship. It has been used widely in empirical quality management studies (Flynn et al., 1995; Anderson et al., 1995; Kaynak, 2003; Yeung et al., 2005). In this study, path analysis is selected to test the framework and hypotheses, with regression analysis determining the significance of the relationships between the independent and dependent variables. Path coefficients between each independent variable and dependent variable are presented by standardized regression coefficients.

There were 124 Vietnamese manufacturing companies responded the survey with a response rate of 83%. They are belonging to five industries: Electronics (29), Machinery (38), Transportation (26), Textile (24) and Food (7). In each company, quality manager was asked to indicate his/her opinion about how the plant compares to its competitors in the same industry on a global basis of conformance quality on a five-point Likert scale (1=Poor or low end of the industry, 2=Below average, 3=Average, 4= Equivalent to competitor, 5=Superior or top of the industry).

Kaizen and culture dimension constructs (scales) are formulated and evaluated by 3 positions in each company: quality managers, production engineer and direct labor on a seven-point Likert scale (1 = strongly disagree, 4 = neither agree nor disagree, 7 = strongly agree).

The first step of analytical process is the analysis of reliability and validity which are performed to evaluate the measurement properties of the individual scales. Reliability is an estimate of measurement consistency. In this study, Cronbach's alpha coefficient is calculated for each scale to evaluate the reliability.

Table 2. Descriptive analysis of data

	Cronbach's Alpha	Mean	Minimum	Maximum	Std. Deviation
Small Group Problem Solving	**0.78**	4.96	3.70	6.83	0.61
Employee Suggestion	**0.76**	5.12	3.42	6.43	0.63
Process Control	**0.81**	4.74	2.20	6.46	083
Power Distance	**0.76**	5.03	3.40	6.62	0.64
Uncertainty Avoidance	**0.73**	5.35	3.60	6.60	0.64
Institutional Collectivism	**0.69**	5.52	4.00	6.80	0.62
In group Collectivism	**0.65**	5.12	3.42	6.50	0.54
Humane Orientation	**0.77**	5.21	3.44	6.67	0.57
Future Orientation	**0.66**	4.98	2.93	6.50	0.67
Performance Orientation	**0.65**	4.62	2.54	7.00	0.82

Table 2 shows the Cronbach's alpha values for all scale. As can be seen all of the scales have alpha value above 0.60 which is minimum acceptable value of alpha suggested by Nunnally (1967), indicating that the scales are internally consistent. The content validity and construct validity are also conducted to ensure the validity of data. An extensive review about empirical literature on quality management and organization performance was conducted to ensure the content validity. The construct validity is tested to ensure that in a scale, all question items measure the same construct. The tested results indicate that data is reliable and valid for using to test the hypotheses.

5. Data Analysis and Result Discussion

5.1 Data Analysis

To answer the research questions, statistical methods such as path analysis and regression analysis are employed to analyze the collected data. This section will present the results of data analysis and then some key findings will be discussed.

First, the results of path analysis indicate the cause/effect relationships between culture's dimensions suggested by House et al. (2004) and three Kaizen practices as shown in Figure 2.

Each path in the figure indicates the estimated path coefficients and t-values.

The fit indices used in this study to estimate measurement models are Chi square, Root Mean Square Error of

Approximation (RMSEA), Normed Fit Index (NFI), Incremental Fit Index (IFI) and Parsimony Normed Fit Index (PNFI). Recommended values of these fit indices for satisfactory fit of a mode to data are presented in Table 3.
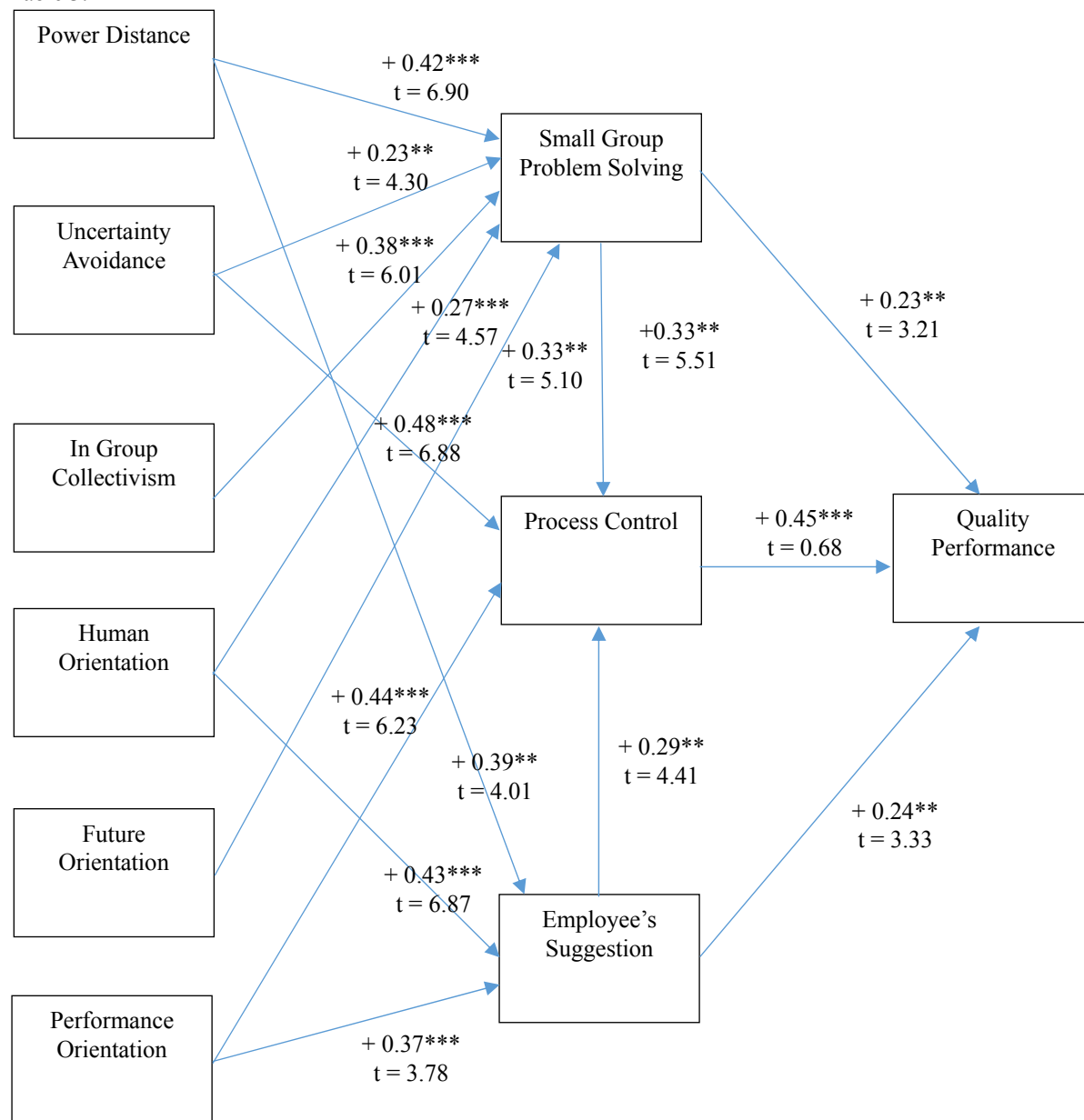

Figure 2. Result of path analysis

Note: *** significant at 1%, ** significant at 5%

Table 3. Model fit summary

Model Fit	Value	Recommend Value
Chi-square	42.54	
Comparative Fit Index (CFI)	**0.94**	>= 0.90
Root Mean Square Error of Approximation (RMSEA, 90% confidence interval)	**0.07**	(0.00; 0.08)
Normed Fit Index (NFI)	**0.94**	>= 0.90
Incremental Fit Index (IFI)	**0.98**	>= 0.90
Parsimony Normed Fit Index (PNFI)	**0.79**	>= 0.70

A comparison of goodness-of-fit statistics relating to each measurement model to the recommended values of these fit indices as shown in Table 3 reveals satisfactory fit of the measurement models to the data or in other words the model fits the data well.

Second, the multiple regression models are developed. The dependent variables are Small Group Problem Solving, Process Control, Employee Suggestion and Quality Performance, respectively. The results of regression are given in Table 3.

As indicated in Table 4, Small Group Problem Solving is found to be affected by Power Distance, Uncertainty Avoidance, In Group Collectivism, Human Orientation and Future Orientation. Specifically, Power Distance, Human Orientation, and In Group Collectivism are 1% statistically significant whereas Uncertainty Avoidance and Future Orientation are 5% statistically significant. Moreover, Power Distance and In Group Collectivism are found to have greater impact than other variables. It is worth noting that Institutional Collectivism and Performance Orientation do not have significant influences on Small Group Problem Solving. Hence, Hypothesis 1 is partially accepted.

Table 4. Regression results

Dependent Variable	F	P	R²	VIF	Independent Variable	B	t	P
Small Group Problem Solving	41.84	0.000	0.58	1.000	Power Distance	**0.42**	6.90	0.00
					Uncertainty Avoidance	**0.23**	4.30	0.03
					Institutional Collectivism	0.13	2.32	0.12
					In group Collectivism	**0.38**	6.01	0.00
					Human Orientation	**0.27**	4.57	0.01
					Future Orientation	**0.33**	5.10	0.02
					Performance Orientation	0.09	1.65	0.41
Process Control	34.81	0.000	0.36	1.000	Power Distance	0.16	4.10	0.11
					Uncertainty Avoidance	**0.48**	6.88	0.00
					Future Orientation	0.07	1.11	0.78
					Performance Orientation	**0.44**	6.23	0.00
					Small Group Problem Solving	**0.33**	5.51	0.02
					Employee's Suggestion	**0.29**	4.41	0.05
Employee's Suggestion	26.34	0.000	0.51	1.000	Power Distance	**0.39**	4.01	0.05
					Uncertainty Avoidance	0.13	2.11	0.28
					Human Orientation	**0.43**	6.87	0.00
					Future Orientation	0.16	2.55	0.25
					Performance Orientation	**0.37**	3.78	0.01
					Process Control	**0.45**	0.68	0.00
Quality Performance	18.22	0.01	0.21	1000	Small Group Problem Solving	**0.23**	3.21	0.05
					Employee Suggestion	**0.24**	3.33	0.05

Process Control is found to be influenced not only by culture's dimension as Uncertainty Avoidance and Performance Orientation at 1% but also by other Kaizen practices as Small Group Problem Solving and Employee's Suggestion at 5%. It should be noticed that the impacts of Uncertainty Avoidance and Performance Orientation on Process Control are greater than those of other Kaizen practices as Small Group Problem Solving and Employee's Suggestion. Meanwhile, Power Distance and Future Orientation have no impact on Process Control. Thus, Hypothesis 2 is also partially accepted.

Employee's Suggestion is significantly related to Power Distance, Human Orientation and Performance Orientation. Specifically, Human Orientation is found to have the greatest impact compared to Power Distance and Performance Orientation. Whereas, Uncertainty Avoidance and Future Orientation are found to have no significant impact on Employee's Suggestion. Therefore, Hypothesis 3 is also partially accepted. The last

dependent variable Quality Performance is found to have strong relationship with three Kaizen practices as Process Control, Small Group Problem Solving. Therefore, Hypothesis 4 is accepted.

5.2 Implications and Discussion

The results of path analysis and regression analysis indicate the strong link between Kaizen practices and culture dimensions in relation to performance of manufacturing companies in Vietnam.

The implementation of such Kaizen practices as Small Group Problem Solving requires empowerment and participative decision making, which mirrors low Power Distance and high Collectivism. It is suggested that Small Group Problem Solving should be implemented in the companies characterized as low Power Distance and high Collectivism to yield the higher performance. The analysis results also confirm that Power Distance and In Group Collectivism have greater impact on Small Group Problem Solving compared to other variables.

Kaizen is process-oriented, that is before results can be improved, and process must be improved (Imai, 1986). The process begins with by measuring or defining the current process using value stream mapping to map the current state and future state map so as to identify the gap. The analysis results reveal that Uncertainty Avoidance and Performance Orientation have greater impact on Process Control. This means that such Kaizen practice should be implemented in the organization that is characterized as high Uncertainty Avoidance and high Performance Orientation to yield the higher performance. It is worth noting that other Kaizen practices as Small Group Problem Solving and Employee's Suggestion also have significant influence on result of Process Control. This implies that Kaizen practices tend to be dependent on each other and thus they should be implemented together to give the best result performance.

Employee's Suggestion aims at generating many small improvement and morale boosting benefits of positive employee participation. Literature indicates that a total of 60 to 70 suggestions per employee per year are written down, shared, and implemented in Toyota Motor Company. The analysis results also confirm that Power Distance, Human Orientation and Performance Orientation have great impact on Employee's Suggestion and the implication should be made here is that such Kaizen practice should be implemented in the organization that is characterized as low Power Distance, high Human Orientation and high Performance Orientation to generate higher performance.

The analysis results also indicate the link between Kaizen practices and firm's quality performance. Although Process Control is found to have greater impact on quality performance compared to Small Group Problem Solving and Employee's Suggestion, firm should apply and implement such Kaizen practices flexibly and effectively to yield the highest performance.

6. Conclusion

This study examines the link between Kaizen practices and different culture dimensions in Vietnamese manufacturing companies. The study follows the cultural framework suggested by House et al. (2004) and three typical Kaizen practices implemented in Vietnam as Small Group Problem Solving, Process Control and Employee's Suggestion. Statistical techniques such as path analysis and regression analysis are applied to analyze the data collected from 124 Vietnamese manufacturing companies through a questionnaire survey during 2011-2012. The findings indicate that there is positive correlation on Kaizen practices and culture's dimensions in relation to performance of manufacturing companies in Vietnam. The results of the study suggest that manufacturing firms in Vietnam should adopt and adapt Kaizen practices effectively and flexibly to enhance the performance and achieve competitive advantage.

The study enriches the literature of Kaizen from the cultural perspective. Kaizen literature suggested scholars to look deeply into a specific culture to determine why certain Kaizen practices may or may not be effective. The results are also critical to practitioners. The manager needs to understand the dynamics of national culture and focus on the Kaizen practices that are more effective under that culture. For any organization, resources are limited or even scare. Consequently, allocating resources to the right practices at the right time becomes critical to success. The conclusion will benefit quality managers working in Vietnam or those working with their Vietnamese partners who want to develop a competitive advantage along quality dimensions.

Although this study makes a significant contribution to the Kaizen research in a certain cultural settings, there is certain limitation we would like to recognize. First, the sample used to estimate national culture consists of only five industries. The culture in these areas is of more interest to foreign companies as most of their subsides or supply chain is located there. Second, culture can be studied at different levels and with several approaches, and this study only focuses at the national level suggested by House et el. (2004) without taking organizational culture into account. As such, it would be fruitful to add in organizational culture once a good understanding of

national culture has been obtained.

Future studies should expand the sample to have better and comprehensive data and information. Scholars should also take organizational culture into account as well as use another culture approach. Future studies should also attempt to explore the reasons behind the adoption of Kaizen practices and organizational culture in the manufacturing companies in Vietnam.

Acknowledgements

References

Abo, T. (1994). *Hybrid factory: The Japanese production system in the United States*. New York: Oxford University Press.

Anderson, J. C., Rungtusanatham, M., Schroeder, R. G., & Devaraj, S. (1995). A path analytic model of a theory of quality management underlying the Deming Management Method: Preliminary empirical findings. *Decision Sciences, 26*(5), 637-658. http://dx.doi.org/10.1111/j.1540-5915.1995.tb01444.x

Anh, P. C., & Minh, N. D. (2013). *Japanese Continuous Improvement Practices Implementation in Vietnamese Manufacturing Companies.*

Anwar, S. A., & Jabnoun, N. (2006). The development of a contingency model relating national culture to total quality management. *International Journal of Management, 23*(2), 272-280.

Aoki, K. (2008). Transferring Japanese Kaizen activities to overseas plant in China. *International Journal of Operations& Production Management, 28*(6). http://dx.doi.org/10.1108/01443570810875340

Becker, K. H., & Snow, J. (1997). American KAIZEN: A Perspective on American Management Theories. *Journal of Industrial Technology*.

Brunet, A. P., & New, S. (2003). Kaizen in Japan: An empirical study. *International Journal of Operations & Production Management, 23*(11), 1426-1446. http://dx.doi.org/10.1108/01443570310506704

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*, 297-334. http://dx.doi.org/10.1007/BF02310555

Elger, T., & Smith, C. (2005). *Assembling work*. New York: Oxford University press. http://dx.doi.org/10.1093/acprof:oso/9780199241514.001.0001

Flynn, B. B., & Saladin, B. (2006). Relevance of Baldrige constructs in an international context: A study of national culture. *Journal of Operations Management, 24*(5), 583-603. http://dx.doi.org/10.1016/j.jom.2005.09.002

Flynn, B. B., Schroeder, R. G., & Sakakibara, S. (1995). The impact of quality management practices on performance and competitive advantage. *Decision Sciences, 26*(5), 659-691. http://dx.doi.org/10.1111/j.1540-5915.1995.tb01445.x

Genobz. (2010). *Understanding Kaizen and 5S: Japan widely acclaimed key to competitive success*. Retrieved March 30, 2011, from http://genobz.wordpress.com/2010/07/15

Hofstede, G. (1980). *Culture's Consequences: International Differences in Work-related Values*. Sage, London.

Hofstede, G. (2001). *Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations across Countries*. Thousand Oaks, CA: Sage.

Hong, J. F., Easterby-Smith, M., & Snell, R. S. (2006). Transferring Organizational Learning Systems to Japanese Subsidiaries in China. *Journal of Management Studies, 43*(5), 1027-1058. http://dx.doi.org/10.1111/j.1467-6486.2006.00628.x

House, R. J., Hanges, P. J., Javidan, M., Dorfman, P. W., & Gupta, V. (2004). *Culture, Leadership and Organizations: The GLOBE Study of 62 Societies*. London: Sage.

Imai, M. (1986). *Kaizen: The Key to Japan's Competitive Success*. New York: Random House.

Kaynak, H. (2003). The relationship between total quality management practices and their effects on firm performance. *Journal of Operations Management, 21*(4), 405-435. http://dx.doi.org/10.1016/S0272-6963(03)00004-4

Kenney, M., & Florida, R. (1993). *Beyond mass production: The Japanese system and its transfer to the U.S.*

New York: Oxford University Press.

Lagrosen, S. (2003). Exploring the impact of culture on quality management. *International Journal of Quality & Reliability Management, 20*(4/5), 473-482. http://dx.doi.org/10.1108/02656710310468632

Liker, J. K. (2004). *The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer*. New York, NY, US: McGraw-Hill.

Naor, M., Goldstein, S. M., Linderman, K. W., & Schroeder, R. G. (2008). The role of culture as driver of quality management and performance: Infrastructure versus core quality practices. *Decision Sciences, 39*(4), 471-702. http://dx.doi.org/10.1111/j.1540-5915.2008.00208.x

Nunnally, J. (1967). *Psychometric Theory*. New York: McGraw-Hill.

Ohno, T. (1988). *Toyota Production System: Beyond Large-Scale Production*. New York, NY, US: Productivity Press.

Oliver, N., & Wilkinson, B. (1992). *The Japanimation of British industry*. Cambridge: Blackwell Publishers.

Recht, R., & Wilderom, C. (1998). Kaizen and culture: On the transferability of Japanese suggestion systems. *International Business Review, 7*(1), 7-22. http://dx.doi.org/10.1016/S0969-5931(97)00048-6

Saka, A. (2004). The Cross-National Diffusion of Work Systems: Translation of Japanese Operations in the UK. *Organization Studies, 25*(2), 209-228. http://dx.doi.org/10.1177/0170840604040036

Schonberger, R. J. (1986). *World Class Manufacturing: The Lessons of Simplicity Applied*. New York, NY, US: Free Press.

Smeds, R., Olivari, P., & Corso, M. (2001). Continuous learning in global product development: A cross-cultural comparison. *International Journal of Technology Management.* http://dx.doi.org/10.1504/IJTM.2001.002970

Taylor, B. B. (1999). Patterns of control within Japanese manufacturing plants in China: Doubts about Japanization in Asia. *The Journal of management studies, 36*(6), 853-874. http://dx.doi.org/10.1111/1467-6486.00161

Womack, J. P., Jones, D. T., & Roos, D. (1990). *The machine that changed the world*. Rawson Associates, New York.

Yeung, A. C. L., Cheng, T. C. E., & Lai, K. H. (2005). An empirical model for managing quality in the electronic industry. *Production and Operations Management, 14*(2), 189-204. http://dx.doi.org/10.1111/j.1937-5956.2005.tb00018.x

Notes

Note 1. 5S process includes sorting (serri), setting straight (seiton), cleanliness (seiso), standardization in the workplace (seiketsu) and sustaining self-discipline and promoting a sense of pride in workers in their work and being owners of their responsibility (shitsuke).

Note 2. Power Distance is the extent to which less powerful members of institutions and organizations accept that power is distributed unequally.

Note 3. Uncertainty Avoidance is the degree to which people within a culture are made uncomfortable by situations they perceive to be unstructured, unclear or unpredictable.

Note 4. Individualism/collectivism describes the degree to which people are oriented towards acting as individuals versus acting as part of a group.

Note 5. Masculinity/femininity describes the extent to which aggressiveness and success are valued, versus concern for relationships.

Note 6. The degree to which members of an organization or society expect and agree that power should be stratified and concentrated at higher levels of an organization or government.

Note 7. The extent to which members of an organization or society strive to avoid uncertainty of future events by relying on established social norms, rituals, and bureaucratic practices.

Note 8. The degree to which organizational and societal institutional practices encourage and reward collective distribution of resources and collective action.

Note 9. The degree to which individuals express pride, loyalty, and cohesiveness in their organizations or families, this emphasis on collaboration, cohesiveness, and harmony.

Note 10. The degree to which individuals in organizations or societies engage in future-oriented behaviors such as planning, investing in the future, and delaying individual or collective gratification.

Note 11. The degree to which an organization or society encourages and rewards group members for performance improvement, innovation, high standards and excellence.

Note 12. The degree to which individuals in organizations or societies encourage and reward individuals for being fair, altruistic, friendly, generous, caring, and kind to others.

Appendix

Uncertainty Avoidance

1) In my view, organizations should use objective data as the basis for making decisions.

2) Our employees will make better decisions if they are trained in data gathering and analysis.

3) In this organization, management is based on facts, not on intuition or tradition.

4) Our plant has a formal strategic planning process, which results in a written mission, long-range goals and strategies for implementation.

5) This plant has a strategic plan, which is put in writing.

Power Distance

1) Our organization structure is relatively flat.

2) There are few levels in our organizational hierarchy.

3) Managers in this plant believe in using a lot of face-to-face contact with shop floor employees.

4) Our plant manager is seen on the shop floor almost every day.

5) Managers are readily available on the shop floor when they are needed.

Institutional Collectivism

1) We work as a partner with our suppliers, rather than having an adversarial relationship.

2) We encourage employees to work together to achieve common goals, rather than encourage competition among individuals.

3) We work as a partner with our customers.

4) We believe that cooperative relationships will lead to better performance than adversarial relationships.

5) We believe that the need for cooperative relationships extends to both employees and external partners.

6) We believe than an organization should work as a partner with its surrounding community.

In-group Collectivism

1) I talk up this organization to my friends as a great organization to work for.

2) I find that my values and this organization's values are very similar.

3) I am proud to tell others that I am part of this organization.

4) This organization really inspires the best in me in the way of job performance.

5) I am extremely glad that I chose this organization to work for, over others I was considering at the time I joined.

6) For me, this is the best of all organizations for which to work.

Future Orientation

1) We pursue long-range programs, in order to acquire manufacturing capabilities in advance of our needs.

2) We make an effort to anticipate the potential of new manufacturing practices and technologies.

3) We are constantly thinking of the next generation of manufacturing technology.

4) We plan for the long-term, rather than optimizing short-term performance.

5) We believe that focusing on the distant future will lead to better overall performance than worrying about short-term goals.

Humane Orientation

1) In my view, most employees are more concerned with personal gain than with helping our organization accomplish its goals.

2) I believe that our employees are good people.

3) I believe that employees want to help our organization achieve its long-term goals and objectives.

4) Although there may be a few "bad apples," most of our employees try to help our organization achieve its goals.

5) Employees who aren't able to help our organization achieve its goals probably haven't been properly trained.

6) Some of our employees are probably only out to get what they can from this organization.

Performance Orientation

1) Our incentive system encourages us to vigorously pursue plant objectives.

2) The incentive system at this plant is fair at rewarding people who accomplish plant objectives.

3) Our reward system really recognizes the people who contribute the most to our plant.

4) The incentive system at this plant encourages us to reach plant goals.

5) Our incentive system is at odds with our plant goals.

6) In our plant, people who achieve plant goals are rewarded the same as those who don't.

Employee's suggestions - implementation and feedback

1) The management takes all product and process improvement suggestions seriously.

2) We are encouraged to make suggestions for improving performance at this plant.

3) The management tells us why our suggestions are implemented or not used.

4) Many useful suggestions are implemented at this plant.

5) My suggestions are never taken seriously around here.

Small group problem solving

1) During problem solving sessions, we make an effort to get all the team members' opinions and ideas before making a decision.

2) Our plant forms teams to solve problems.

3) In the past three years, many problems have been solved through small group sessions.

4) Problem solving teams have helped improve the manufacturing processes at this plant.

5) Employee teams are encouraged to try to solve their own problems, as much as possible.

6) We do not use problem solving teams much, in this plant.

Process control

1) Processes in our plant are designed to be 'foolproof'.

2) A large percent of the processes on the shop floor are currently under statistical quality control.

3) We make extensive use of statistical techniques to reduce variance in processes.

4) We use charts to determine whether our manufacturing processes are in control.

5) We monitor our processes using statistical process control.