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TRANSFORMATIONAL LEADERSHIP IN OPERATIONAL COMPETITIVENESS IMPROVEMENT: A CASE STUDY IN MALAYSIAN AUTOMOTIVE INDUSTRY

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Abstract
The purpose of this paper is to analyze operational competitiveness by two core factors, i.e. manufacturing strategy and transformational leadership with technology level. In additional, CFI models in sense and respond (S&R) method are introduced to optimize strategic adjustments, which give supports in fast strategic decision-making process. The analysis results of case study show that leaders in automobile companies in Malaysia should deeply develop their leadership by inspirational motivation, intellectual stimulation and building trust and confidence etc. to improve operational competitiveness. Agile operations strategy should be utilized towards automobile enterprises in Malaysia in order to be competitive under dynamic and tightrope business situations.

Keywords
operational competitiveness, transformational leadership, strategic adjustment, Malaysia, automobile company.

Introduction

The world has been experiencing the economic downturn since 2008, primarily due to the property market meltdown in the USA [1]. Besides, the current manufacturing scenario is really dynamic with acute competitive pressures in business markets [2]. Therefore, manufacturing companies in Malaysia notice that agile, flexible and opportunity-oriented operations strategies are important to strive against the turbulent business situations during the economic crisis. However, the operational competitiveness is not easy to be sustainably improved even under unpredictable environments, such as global competitive environment, increasing customer needs and government policy changing etc.

Competitiveness is the ability and performance of a firm to offer products and services that meet the quality standards in a given market [3]. Industrial competitiveness refers more to dynamic improvement based on the changes in the international economy [4]. Therefore, strategic flexibility of manufacturing or operations responds to various demands and opportunities existing in a dynamic and uncertain competitive environment [5]. Takala [6] presents a justification of multi-focused manufacturing strategies to evaluate manufacturing strategy in changing business environments. Moreover, though strategic agility leads to more difficulties in decision-making [7], it shows ability to continuously adjust and adapt strategic direction in core business and to create value for a company in changing circum-

stances [8]. Transformational leadership is another core factor, besides manufacturing strategy etc., to impact on industrial competitiveness. Burns [9] defines transformational leadership as a process where leaders and followers engage in a mutual process of raising one another to higher levels of morality and motivation. Menguc et al. [10] suggest that improvements in transformational leadership based competencies should lead to marketplace positional advantages through competitive strategies. Takala et al. [11] introduce unique analytical models to evaluate the level of outcome direction, leadership behavior and resource allocation of transformational leadership. The term sense and respond (S&R) as a business concept first appeared in 1992 Management Review article by Haeckel [12]. The S&R thinking is developed by Bradley and Nolan [13] and Markides [14] to analyze dynamic business strategies. S&R approach is required in developing strategic plans when facing unpredictable and fast changing economic environment [15–16]. The ability to quickly adjusting processes will also become a decisive factor in the concurrent economy.

The paper aims to analyze operational competitiveness by two core factors, i.e. manufacturing strategy and transformational leadership with technology level. In additional, CFI models in sense and respond (S&R) method are introduced to optimize strategic adjustments, which give supports in fast strategic decision-making process.

Research methodologies

Analytical method

The study uses analytical models to analyze the operational competitiveness of case companies in Malaysian manufacturing industry. First, the paper utilizes analytical models to evaluate overall competitiveness based on two core factors, i.e. manufacturing strategy and transformation leadership with technology level. Second, the sense and respond (S&R) method is used as decision-making support on strategic adjustment to meet the performance requirements by describing, evaluating and optimizing the firm internal resource allocations in changing business environments. Existing analytical models of overall competitiveness evaluation are from Liu and Takala's [17] research.

(1) Manufacturing strategy index (MSI)

The analytical models for manufacturing strategy (MSI) are used to calculate the operational competitiveness of case companies in different groups, which are prospector, analyzer and defender [18]. According to Takala [6], the responsiveness, agility and leanness (RAL) holistic model supports the theory of analytical models by using four main criteria, i.e. cost (C), quality (Q), time/delivery (T) and flexibility (F). Therefore, the three types of competitive groups can be measured by the analytical models based on the four main criteria.

(2) Transformational leadership index (TLI)

The analytical models for transformational leadership are used to evaluate leadership indices and outcomes of transformational leadership by integrating technology into resource allocation. The leadership index (LI) is based on the weighting of factors, i.e. deep leadership (DL), passive leadership (PL), controlling leadership (CL) and individualized consideration (IC), inspirational motivation (IM), intellectual stimulation (IS), building trust and confidence (BT), and therefore LI is modeled as the function

$$LI = f_{LI}(DL, PL, CL, IC, IM, IS, BT).$$

The total leadership is based on the weighting of factors, i.e. outcome index (OI), leadership index (LI), resource allocation index (RI), and therefore TLI is modeled as the function $TLI = f_{TLI}(OI, LI, RI)$.

(3) Overall competitiveness Index (OCI)

Overall competitiveness is evaluated by considering two core factors, i.e. manufacturing strategy and transformational leadership with technology level. Thus, the analytical model for overall competitiveness index (OCI) is as follows.

$$OCI{=}f_{OCI}(f_{MSI}, f_{TLI}){=}f_{MSI} \cdot f_{TLI}{=}MSI \cdot TLI$$

(4) Sense and respond models

In order to implement sense and respond method, critical factor index (CFI) is introduced in this study as an important managerial tool to interpret and evaluate the critical factors of strategic adjustment which can support the strategic decision-making phase [19]. The former S&R model proposed by Ranta and Takala [19] has been used in many case studies already. However, the S&R model has several flaws which do not reflect real situation when only using deviations after tested in case studies. The models established by Ranta and Takala [19] does not consider the situation of Std$\{experience\} = 0$, which means that they do not consider the situation that if the given answers for each index are the same, thus the implication of different values can not been distinguished by the models, so does Std$\{expectation\}$.

If that happens, the models make no sense to analyze the real value of CFI. Therefore, this paper improves the S&R model and makes a modification which can be shown in Eqs. (1)–(4).

$$Gap\ index = |(\mathrm{Avg}\{experience\} - \mathrm{Avg}\{expectation\})/10 - 1|, \tag{1}$$

$$Direction\ of\ development\ index = |(Better - Worse) * 0.9 - 1|, \tag{2}$$

$$Importance\ index = \mathrm{Avg}\{expectation\}/10, \tag{3}$$

$$CFI = \frac{\sqrt{\frac{1}{n} \cdot \sum_{i=1}^{n} (experience(i) - 1)^2}}{a^*} \cdot \frac{\sqrt{\frac{1}{n} \cdot \sum_{i=1}^{n} (expectation(i) - 10)^2}}{a^*}, \tag{4}$$

where $a^* = Gap\ index \cdot Direction\ of\ development \cdot Importance\ index$.

Case study

The case study is based on two automobile manufacturing companies in Malaysia, which are the two biggest car manufacturers in the country. The case companies are represented by MY_A (the second national car manufacturer in Malaysia) and MY_B (the first national car manufacturer in Malaysia). Company A, whose headquarter and manufacturing facilities are located at vicinity of Rawang, Selangor, Malaysia, is a young automobile company with about 20 years in operation and focuses on market segment of compact cars. MY_A is seen as a more agile, flexible and opportunity-oriented type of automobile maker which adapts fast to technological changes and market demand. Company B is the largest automobile manufacturing company with 25 years in the automobile section in Malaysia. MY_B have evolved into an international automotive carmaker, which are now being exported to 50 countries including the highly competitive United Kingdom and continental European markets.

Data collection and analysis

The data of case companies, MY_A and MY_B, have been collected by answering questionnaires from senior managers or directors of each company. In each case company there are around 3 respondents who have more than 5 years of working experience. The interviewees are normally decision makers or middle management groups, who have good knowledge about the operation of the case companies. The data are from the year of 2010 when the global economic situation was very difficult and about to recover at that time.

Operational competitiveness analysis of case study

The following are evaluation results of manufacturing strategy and transformational leadership obtained from case study. The paper presents the study results of MSI by contrast method. Thus Fig. 1 to Fig. 3 show the comparisons of each index in MSI. Meanwhile, Table 1, Table 2, Fig. 4 and Fig. 5 show the evaluation results of transformational leadership.

Manufacturing strategy analysis

Manufacturing strategy analysis is based on the four main criteria, i.e. cost (C), quality (Q), time/delivery (T) and flexibility (F). Fig. 1 and Fig. 2 are the analysis results of the four indices in the two case companies, and Fig. 3 is the analysis results of each competitive group based on the analytical models. It can been seen in Fig. 1 that quality index ($Q = 0.4340$) is the highest to MY_A before crisis, while flexibility index ($F = 0.3873$) is the highest during crisis. The Fig. 1 shows that the manufacturing strategy in MY_A focuses more on quality factor during normal time (before crisis) but it turns to both quality and flexibility factors during pressing time (during crisis). However, the situation in MY_B is not quite the same as MY_A. It can been seen in Fig. 2 that quality index ($Q = 0.4225$) is the highest to MY_B before crisis, while cost index ($C = 0.3700$) is the highest during crisis. The Fig. 2 shows that the manufacturing strategy in MY_B focuses more on quality factor before crisis but it turns to cost factor during crisis.

To study the MSI of case companies, Fig. 3 shows that MY_A and MY_B both consider analyzer group as the most competitive group in both normal and turbulent economic environments. While viewed Fig. 3 when combined with Fig. 1 and Fig. 2, the manufacturing strategies between these two companies are quite different. Though MY_A and MY_B both consider quality factor very important before crisis, MY_A pays much more attention to flexibility factor during crisis, while MY_B considers cost factor as the most important factor during crisis situation.

Therefore, as the dominant automobile manufacturing companies in Malaysia, MY_A and MY_B are seen as quality-oriented, agile, and flexible type of automobile makers. The difference of manufacturing strategies between MY_A and MY_B mainly focuses on the strategic preference when facing dynamic and turbulent business situations. MY_A has more flexible manufacturing strategies for it is young automobile company. However, as a leading enterprise flagship of the automobile industry, MY_B tends to relatively conservative manufacturing strategies which are considered more on reducing operating costs.

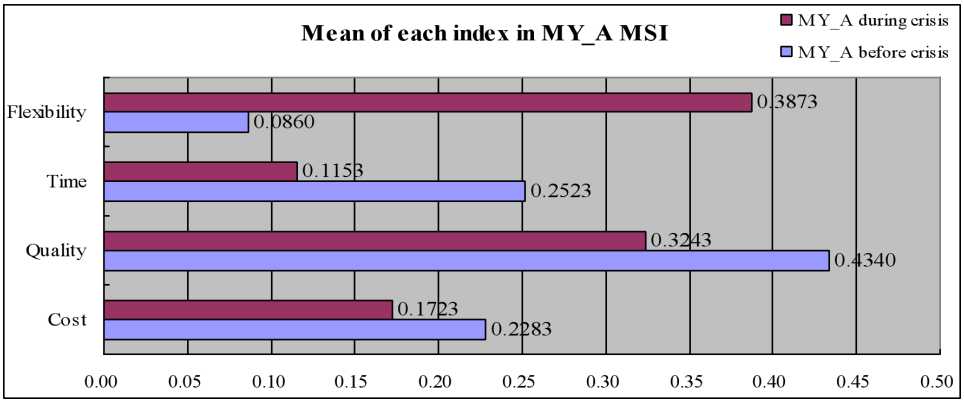

Fig. 1. Mean of each MSI index before vs during crisis in MY_A.

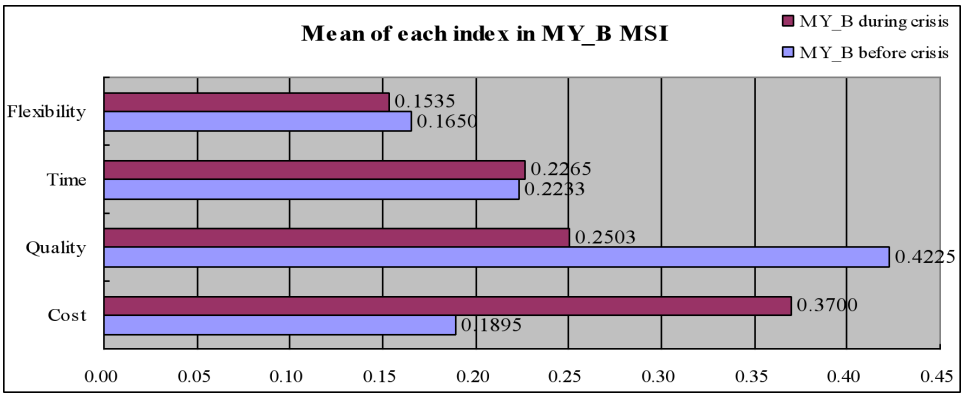

Fig. 2. Mean of each MSI index before vs during crisis in MY_B.

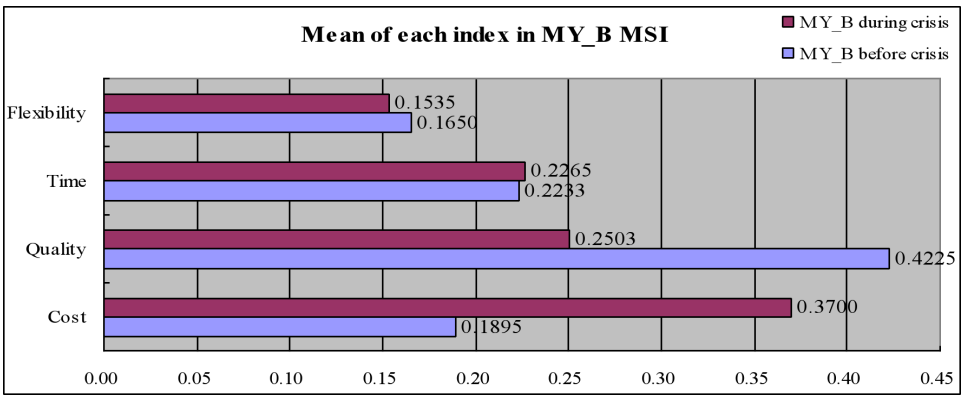

Fig. 3. Competitive strategy indices of case companies.

Transformational leadership analysis

Table 1 and Table 2 show the total leadership indices (TLI) of each leader in case companies before crisis and during crisis. Compared the two different situations (before crisis vs. during crisis), MY_A has a great improvement in the TLI from normal economic situation to pressing economic situation, while MY_B only makes slight improvement in the TLI. First, the TLI of the second leader (MY_A-2) in MY_A reaches to excellent high value (0.1031) during crisis. The other two leaders also greatly develop their total leadership indices under turbulent situations. It can be seen in Table 1 that the big changes of TLI in MY_A are mainly caused by the LI index; second, the TLI of the first leader (MY_B-4) in MY_B decreases (from 0.0577 to 0.0116) when the company faces the economic crisis which is seldom seen in other case studies. Therefore, Table 1 and Table 2 show that LI factor is one of the leading factors to the TLI improvement in case companies which can not be ignored.

Table 1
Transformational leadership analysis (TLI) results of case companies before crisis.

Leaders	Before crisis				
	OI	LI	TI	RI	TLI
MY_A-1	0.9378	0.0187	0.5000	0.0757	0.0013
MY_A-2	0.9451	0.0185	0.7000	0.2856	**0.0050**
MY_A-3	0.9356	0.0210	0.7000	0.2634	0.0052
MY_B-4	0.9368	0.3694	0.6000	0.1668	**0.0577**
MY_B-5	0.8982	0.1373	0.7000	0.1653	0.0204
MY_B-6	0.9424	0.1557	0.7000	0.2456	0.0361
MY_B-7	0.9008	0.0355	0.5000	0.1267	0.0040

Table 2
Transformational leadership analysis (TLI) results of case companies during crisis.

Leaders	During crisis				
	OI	LI	TI	RI	TLI
MY_A-1	0.9112	**0.1018**	1.0000	0.1170	0.0109
MY_A-2	0.9310	**0.4545**	0.9000	0.2438	0.1031
MY_A-3	0.9402	**0.3688**	0.9000	0.0986	0.0342
MY_B-4	0.9366	**0.1094**	0.8500	0.1133	0.0116
MY_B-5	0.9508	0.1561	0.9000	0.1905	0.0283
MY_B-6	0.9353	0.2111	0.9000	0.2491	0.0492
MY_B-7	0.8932	0.2252	0.5000	0.1128	0.0227

Fig. 4 and Fig. 5 show the leadership indices (LI) of each leader in case companies. It can be seen in Fig. 4 that DL and BT indices are greatly improved to higher values, while the values of PL and CL indices during crisis are much lower than before crisis. The analysis results in Fig. 4 show that the leaders in MY_A try to build an active and responsible atmosphere in the company and they encourage the group members in the company to develop trust and confidence, and inspire technological innovation as well.

Fig. 5 shows the comparison of LI analysis results between normal and turbulent situation to MY_B-4 leader who has poor performance of transformational leadership during crisis. It can be seen in Fig. 5 that DL and IS indices are lower than before crisis, while CL and IC indices increase during crisis. The analysis results in Fig. 5 show that MY_B-4 leader pay little attention to intellectual stimulation but individualized consideration. Moreover, the leader turns to higher supervision in employees and business operations, which discourage the intellectual stimulation in the company.

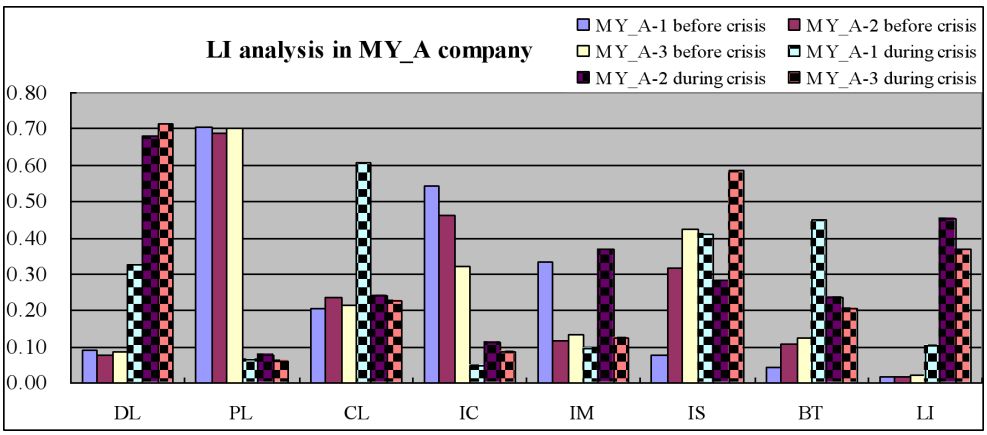

Fig. 4. LI detail analysis in MY_A company.

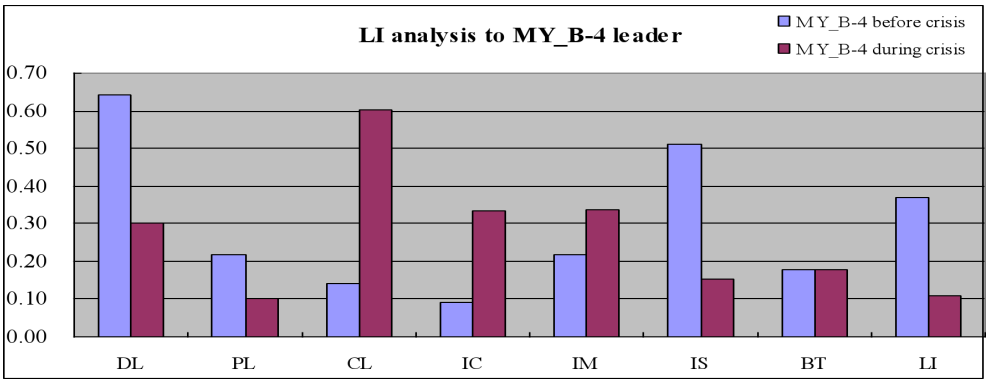

Fig. 5. LI detail analysis to MY_B-4 leader.

Overall competitiveness analysis

Manufacturing strategy and transformational leadership are integrated together to evaluate the overall competitiveness. The MSI and TLI analysis results of the case companies are plotted with Matlab to show the correlations of MSI in different groups (prospector, analyzer and defender) versus TLI which can be seen in Figs. 6–9. Table 3 shows the optimal competitive groups of case companies based on the visible results in Figs. 6–9.

(1) Correlation analysis of MSI vs. TLI

Figs. 6–9 plot the correlations between MSI and TLI before and during economic crisis. By comparing with the two case companies and economic situations, it can be seen that optimal competitive groups in each company are slightly different with the results in Fig. 3.

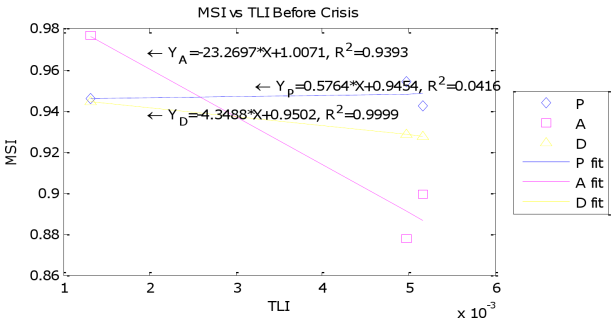

Fig. 6. MSI vs. TLI of MY_A before crisis.

The optimal competitive groups are chose based on the following four criteria: (a) value distribution; (b) slope of the correlation; (c) significance of regression measured by R-square; (d) general business backgrounds of case companies. Therefore, the optimal competitive groups to each company can be seen in Table 3. Table 3 shows that MY_A and MY_B have totally different operational strategies under the

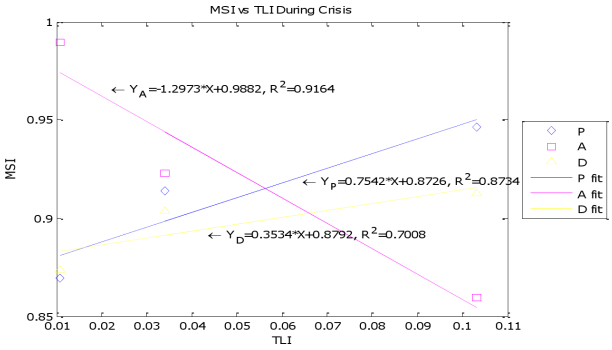

Fig. 7. MSI vs. TLI of MY_A during crisis.

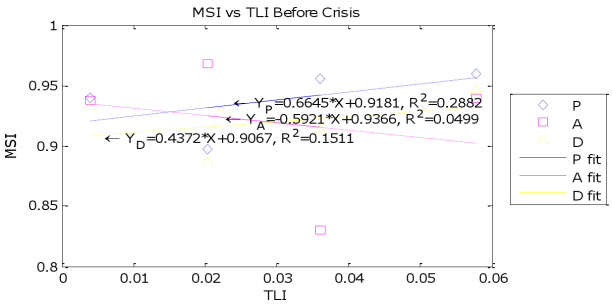

Fig. 8. MSI vs. TLI of MY_B before crisis.

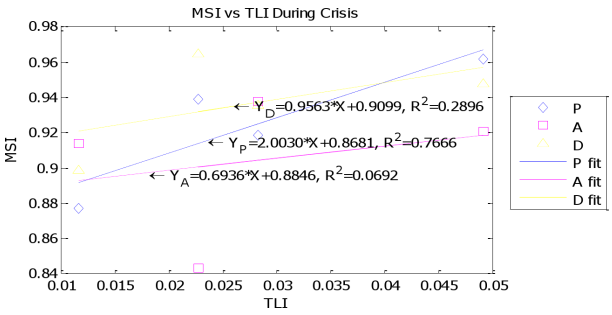

Fig. 9. MSI vs. TLI of MY_B during crisis.

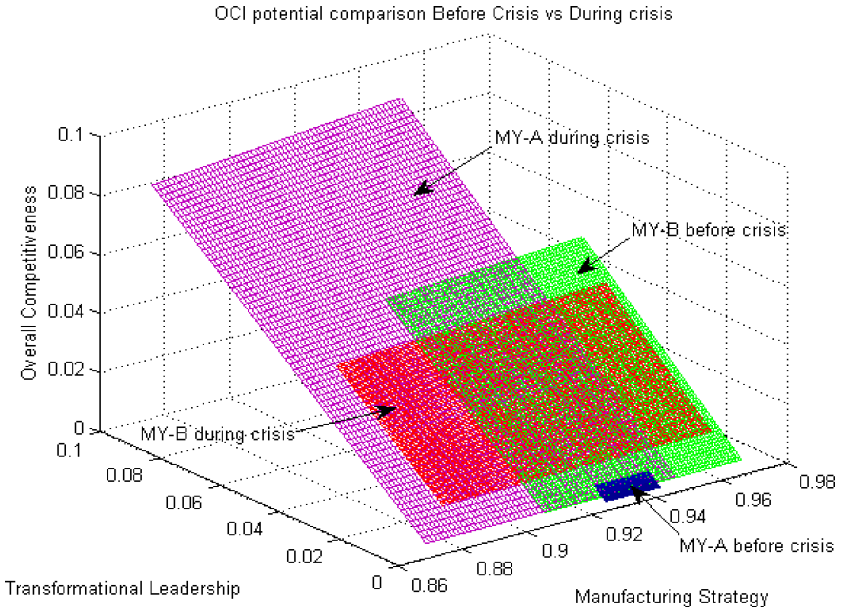

Fig. 10. OCI of the two case companies before and during crisis in Malaysia.

same global business situations. It is seen in Table 3 that MY_A has multi alternative operational strategies under each situation. For example the optimal competitive group of MY_A before crisis can be prospector or defender, which means the leaders in the company have inconsistent opinions towards the operational strategy. The operational strategy of MY_A during crisis is more flexible and positive which chooses prospector or analysis group. However, MY_B is inclined to choose defender group which indicates that it pays more attention to cost saving during crisis.

Table 3
The optimal competitive groups among case companies.

Market	Case company	Before crisis	During crisis
Malaysia	MY_A	Prospector (P) or Defender (D)	Prospector (P) or Analyzer (A)
	MY_B	Prospector (P)	Defender (D)

(2) Development analysis of OCI potential

Fig. 10 shows the 3-dimentional plots of MSI, TLI and OCI respectively before crisis and during crisis with forecasted results based on the above analysis. It can be seen in Fig. 10 that MY_A makes a great improvement in OCI potential while MY_B makes a slight decline in OCI potential. The OCI of MY_A can reach to 0.08 during crisis compared with 0.01 before crisis. However, the OCI of MY_B declines to 0.05 during crisis compared with 0.06 before crisis. The analysis results show great implication that MY_A has much more potential in operational competitiveness improvement than MY_B which leads to better business performance in turbulent environment.

Sense and respond analysis of case study

Sense and respond analysis is based on the results of operational competitiveness by AHP methods. This process consists of evaluation and benchmarking the operational competitiveness of case companies in a turbulent business environment against the highest benchmarks in the world by taking into account operations, technology strategies and transformational leadership [19]. There are four key factors of CFI, including knowledge & technology management (PT), processes & work flows (PC), organizational systems (OR) and information systems (IT), are introduced into S&R models to analyze CFI of case companies. In order to make comparison to each index between the two case companies, the CFI values are transferred into percentage.

The S&R analysis results are based on the data of case companies during crisis. The CFI models calculate the CFI of resource index. According to Fig. 11, MY_A and MY_B have different resource strategies and resource distributions. For MY_A, the case company pays more attention to IT and less attention to PT and PC. For MY_B, the case company pays much more attention to the "Innovativeness and performance of research and development" index and less attention to PC.

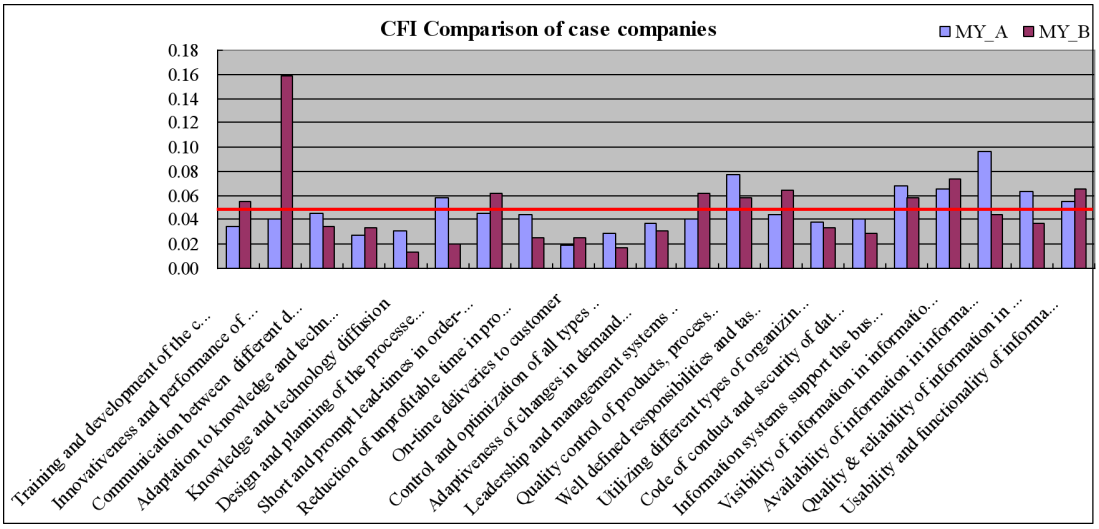

Fig. 11. CFI analysis results of the case companies during crisis.

Discussions and conclusions

This paper studies the operational competitiveness of two national automobile manufacturers which aims to provide efficient methods to evaluate operations and competitiveness, and to optimize available resource in order to improve the operational performance of case companies under dynamic and turbulent economic environments. Based on the analysis results of case companies, the managerial implications of this paper are described as follows.

(1) Adaptive manufacturing strategies during crisis

Based on the analysis results of the two case companies, agile, flexible and opportunity-oriented strategies seem adaptive to the crisis situations. MY_A adapts fast to technological changes and market demand, while MY_B pays too much attention to cost saving in operations, which results in totally two different performance in OCI potential. The manufacturing strategies at MY_A also show much consideration to cost but it can be implemented by innovation behaviours and stimulation measures, which brings added values that the company has more active, energetic and confident atmospheres to cope with the turbulent business situations.

(2) Transformational leadership improvement

The statistical research finding indicates that TLI at MY_A is extremely low before crisis. Managers in MY_A during non-crisis period tend to apply and practice normal guidelines which seem to be more relaxed and easing. However, managers in MY_A enhance their TLI through organizational structure reconsolidation during crisis. Compared with managers in MY_B, managers and employees in MY_A are more receptive to changes, instead of resisting them; employees in MY_A tend to work and move quickly under management of their leaders, as there are pressing targets to meet. The TLI analysis results show that managers in MY_A are much more adaptive to work based on tightrope environment than MY_B, which contributes to great improvement at OCI potential and to operational innovation under difficult time.

In the future research, several ideas have been proposed as follows:

1) For the case study, the samples are not enough to make reliable and rational analysis conclusions or get regular laws to automobile companies in Malaysia. Therefore, more case companies should be added into the study in the future.
2) For the S&R study, there are other factors should be considered besides resource factor, for instance technology level and manufacturing strategy. Therefore, CFI models will be improved by adding these two indices to make deeper research.

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