

Benchmarking Critical Success Factors Perceptions and Practices in Malaysian Automotives Manufacturing Companies

Baba Md Deros¹, Sha'ri Mohd Yusof² and Azhari Md Salleh³

¹Faculty of Engineering, Universiti Kebangsaan Malaysia,
43600 UKM Bangi, Selangor

²Faculty of Mech. Engineering, Universiti Teknologi Malaysia
81310 UTM Skudai, Johor Darul Takzim

³Akademi Tentera Malaysia (ATMA)
81310 UTM Skudai, Johor Darul Takzim

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ABSTRACT

This article is based on a survey conducted on the top management's perceptions and practices of critical success factors (CSFs) with respect to benchmarking implementation in Malaysian automotive components manufacturing companies. The main objective of this paper is to provide empirical evidence on top management's practices of CSFs for implementing benchmarking among eight different companies categories, comprising of all respondents; quality certified; non-quality certified; Small and Medium Enterprise (SME); large; 100% locally owned; 100% foreign owned; and joint venture companies. To achieve this objective, the authors developed a questionnaire comprising of nine major CSFs and 49 elements, checked for reliability and validity by experts and practitioners. The analyses from 68 respondent companies showed the CSFs for benchmarking implementation were practiced at low to moderate level. On overall, there is a significant difference between the CSFs perceived level of importance and extent of practice by the respondent companies. Pair samples t-test results showed there is a significant difference between the level of importance and practices in all CSFs in quality certified, large, SME, 100% local and joint venture companies. The survey results also showed no significant difference in terms of level of importance and practice of all the CSFs in 100% foreign companies. In non-quality certified companies there is no significant difference in terms of level of importance and practice except for four CSFs. Finally, the paper concludes with some suggestions on the steps on how to improve the CSFs adoption rate and thus enhanced business competitiveness and excellence in Malaysian automotive manufacturing companies.

Keywords: Benchmarking, competitiveness, survey, critical success factors

ABSTRAK

Makalah ini ditulis berdasarkan sebuah kaji selidik yang telah dijalankan ke atas pengurusan atasan di syarikat pembuatan komponen automotif di Malaysia mengenai persepsi dan amalan mereka terhadap

faktor kejayaan kritikal (CSFs) ketika melaksanakan ukur rujuk. Matlamat kajian ini ialah untuk mendapatkan bukti empirikal mengenai persepsi dan amalan CSFs pihak pengurusan atasan bagi lapan kategori berikut: keseluruhan responden; responden yang mempunyai sijil kualiti; responden yang tidak mempunyai sebarang sijil kualiti; enterpris kecil dan sederhana (SME); syarikat besar; syarikat 100% milik tempatan; syarikat 100% milik asing; dan syarikat usahasama. Untuk mencapai objektif ini, penulis telah membangunkan satu set soalan kaji selidik yang terdiri daripada sembilan CSFs utama dan 49 elemen yang telah disemak dari aspek keboleharapan dan kesahannya oleh para pakar dan pengamal ukur rujuk. Analisa daripada 68 buah syarikat responden menunjukkan tahap pengamalan CSFs yang rendah hingga sederhana ketika melaksanakan ukur rujuk. Pada umumnya, terdapat perbezaan yang signifikan diantara tahap persepsi dan amalan di syarikat responden. Ujian-t sampel berkembar menunjukkan perbezaan yang signifikan diantara tahap persepsi dan amalan untuk semua CSFs di syarikat yang mempunyai persijilan kualiti, syarikat besar, SME, syarikat 100% milik tempatan dan syarikat usahasama. Keputusan kaji selidik juga menunjukkan tidak ada perbezaan yang signifikan di antara persepsi dan amalan untuk semua CSFs di syarikat 100% milik asing. Dalam pada itu, syarikat yang tiada sijil kualiti tidak menunjukkan perbezaan yang signifikan tahap persepsi dan amalan kecuali untuk empat CSFs. Makalah ini diakhiri dengan memberikan beberapa cadangan yang perlu diambil demi meningkatkan kadar pemakaian CSFs dan seterusnya dapat membantu mengukuhkan daya saing perniagaan dan kecemerlangan untuk syarikat pembuatan komponen automotif di Malaysia.

Kata kunci: Ukur rujuk, daya saing, kaji selidik, faktor kejayaan kritikal

INTRODUCTION

The last ten years had shown intense market competition among companies providing similar products and services. To survive and prosper in this market environment, companies have to be more responsive and focused towards satisfying customer's needs and expectations (Cassell et al. 2001; Chin et al. 2001; Drew 1997). In addition to this, improving product and service quality standards through the use of benchmarking and implementing best practices are essential in raising business competitiveness level and excellence (NPC 2002; Voss et al. 1997). Benchmarking is a continuous, systematic process of measuring and assessing products, services and practices of recognised leaders in the field to determine the extent to which they might be adopted to achieve superior performance. Business managers can utilise benchmarking to review their existing performance for resetting priorities, reallocating resources and promoting substantial improvement through the adoption and adaptation of management best practices in their products and services they deliver. Benchmarking involves the break down of business processes and results into elements that can be compared across a number of different types of companies. For example, Xerox was the market leader for the sale and rental of photocopy machines until 1975. However, by 1980, Xerox had lost virtually 50% of its market share to

Canon and Ricoh, which match Xerox's quality, reliability and service but lower in price (Amir 1994). In an attempt to gain back its market share, Xerox benchmarked its operation and quality standards to its competitors and realized there was a need to change the corporation's culture and management style (Ramabadron et al. 1997; Elmuti et al. 1997; Amir 1994). As a result, Xerox was able to secure significant improvements in quality, costs and time to market by learning best practices from its Japanese joint-venture partner, Fuji-Xerox. Xerox success in benchmarking is widely publicized (Ramabadron et al. 1997; Ahmed and Rafiq 1998). Tölösi and Lajtha (2000) believed an efficient company will be able to withstand market competition; less sensitive to unfavourable changes in the environment; and more likely to use indicators to link the best of its short, medium and long-term goals. The research issue that the authors would like to address in this paper is providing empirical evidence on the SMEs top management's perceptions and practices of CSFs during benchmarking implementation.

WHAT IS BENCHMARKING AND CRITICAL SUCCESS FACTORS?

Numerous definitions have been proposed for benchmarking by different authors. However, most authors have provided almost similar views on benchmarking and they can be characterised

into three major areas, which are measurement via comparison, continuous improvement and systematic process in carrying out benchmarking (Ramabadron et al. 1997; Brah et al. 2000; Tölösi and Lajtha 2000). It is believed that these three areas encompass pertinent aspects of any benchmarking process. Benchmarking is aimed at importing best practices across the organization through implementing change. In this paper, the authors define benchmarking as "a continuous, systematic process for evaluating the products, services and work processes of organizations recognized as sector/industry or world class leaders for the purposes of organizational improvement within an organization".

Rockart (1979), one of the first authors to define CSFs, define CSFs as "the areas in which results, if they are satisfactory will ensure competitive performance for the organization". Clarke and Manton (1997) define CSFs as "a collation of practices, activities and methods regarded as critical enablers of successful change". Yusof (2000) interpreted CSFs as "those circumstances or practices which already exist, or those that need to be developed in ensuring the success of TQM implementation". Meanwhile, Keck and Lollet (1995) believe CSFs should be given much attention because they strongly drive performance and could act as an agent in weaving through the process of successful change. What is important in a change process is not what one does but how well one does it that really matters. In the authors' opinion, the CSFs for benchmarking implementation are very similar to the CSFs for TQM implementation due to its close relationship with TQM program (i.e. benchmarking is one of the tools found in TQM).

CRITICAL SUCCESS FACTORS AND PITFALLS IN BENCHMARKING

Generally, best practice transfer from other companies to one's own company can be a difficult and daunting process. Barriers originate from lack of motivation to adopt practices and inadequate process of identifying, understanding and adapting outstanding practices.

Betzig and Fleming (1992) reported that several authors suggest a number of conditions for top management to address first such as "learning organization", before attempting to implement benchmarking initiatives. According

to Garvin (1993) a "learning organization" is skilled in five main activities, which comprise of systematic problem solving, experimentation with new approach, learning from past experience, learning from the best practices of others, and transferring knowledge quickly and efficiently throughout the organization. Amongst the CSFs and pitfalls, which will determine success or failure in benchmarking efforts, are summarized into four groups. They are techniques and methods, top management commitment, employees' involvement and training, and culture and environment as shown in Table 1. It can be concluded that the success of any benchmarking activity largely depends on the organisation's ability to overcome logistical, structural and cultural hurdles, which may lead to unsuccessful benchmarking adoption.

RESEARCH METHODOLOGY

The survey questionnaire was generally developed based on previous benchmarking studies found in the literature and the general rules by Fowler (1998) on questions and answers basic characteristics, which are fundamental to a good measurement process. The final survey instrument was based on nine CSFs and 49 elements, believed to be critical for benchmarking implementation. The CSFs comprises of top management leadership, systems and processes, creativity and innovation management, human resource management, policy and strategic planning, resources management and business results, customer satisfaction management, employee satisfaction management, and organizational culture and work environment.

In this survey, respondents were asked to rate two aspects on a five point Likert scale. The first was on the level or degree of importance placed on each statement in each critical factor and secondly, the extent to which they thought it is currently a practice in the organisation. For the perceived importance, the rating scales ranged from 1 = not important at all, 2 = not important, 3 = neutral, 4 = important, to 5 = very important; while for the extent or degree of practice was given as 1 = very low, 2 = low, 3 = moderate, 4 = high, 5 = very high. An additional scale (0) was provided for both aspects to allow for those respondents who did not know or unsure of the answer.

TABLE 1. Critical Success Factors and Common Pitfalls in Benchmarking

	Critical Success Factors	Common Pitfalls
Techniques and Methods	Select the correct activity or business partner; Using an appropriate benchmarking process; Choosing and empowering the right team members; Knowing and understanding of one's own process first in terms of, its workflow and value added at each stage of the process, to truly recognise learning opportunities that exist before comparing against others.	Choosing the wrong partner or choosing the wrong activity to benchmark; Selecting the wrong team members, team leaders, and facilitators; Focusing on results rather than processes; Establishing inappropriate performance measures; Inappropriate or inaccurate data gathering methods.
Top Management Commitment	Full commitment, support and active role in benchmarking initiative; Committed to implementing the results; Expectations at the right level; Must accept the need to learn first before they can improve and competing requires being open to new ideas and willing to adapt feasible ideas.	Lack of visible commitment from senior management; Lack of follow-up to implement the findings of the benchmarking process; and also lack of depth in the benchmarking studies performed.
Employees Involvement and Training	Must accept the need to learn first before they can improve and competing requires being open to new ideas and willing to adapt feasible ideas; High level of involvement, participation and teamwork; Everyone has to understand the objectives and benefits of benchmarking; should be trained in the skills to participate in, interpret the meaning of, and apply the results of benchmarking studies.	Failure to involve employees in the decision-making about benchmarking and its implementation; and lack of the appropriate training to employees involved in benchmarking activities.
Culture and Environment	Part of organizational strategy; It is well planned, organized and managed (i.e. doing the right study and at the right time); Adhering to the code of conduct; Testing adaptability of practices and enablers; Awareness of quality; An understanding of the process driving the organization; Set realistic timetables for the benchmarking project. Existence of learning organisation, empowerment, reward system, continuous improvement and customer satisfaction programs.	Failure to adapt benchmarking partner's process to one's organisational culture; Poor timing; Moving too fast or too slow; Organizational environment not ready to make the necessary changes; Lack of adequate planning for implementation; and Not linking benchmarking to strategic plans.

(Source: APQC 2001; NPC 2002; Sarkis 2001; Brah et al. 2000; Comm and Mathaisel 2000; Burpo 1998; Elmuti 1998; Cooper and Kleinschmidt 1995; De Toro 1995; The Benchmarking Portfolio 1995; Tutchter 1994; Garvin 1993; Betzig and Fleming 1992)

The pilot study was performed by sending-out the final draft questionnaire to benchmarking experts (i.e. universities academicians and consultants) and benchmarking practitioners for validation, comments and suggestions on the survey questions clarity and appropriateness. The response rate for pilot study was almost 37%. The comments and feedback from the experts and practitioners were very useful in rectifying and improving the survey instrument's quality.

The sample for the full survey consisted of 350 companies, which were randomly selected from the Malaysian automotive industry first and second-tier vendor's lists for PROTON and PERODUA. A questionnaire was mailed to the top management of each company. A reply-paid self-addressed envelope was included. A total of 68 companies responded to the questionnaire, giving a response rate of about 19%. For comparison, a postal survey on 400 manufacturing SMEs in the United Kingdom by Reed et al. (2001) received a low response rate of 5.5%. Another 11 of the questionnaire were returned due to companies having moved to new locations or ceased operations. Given the low response associated with mail surveys, this response rate was considered reasonably adequate.

RELIABILITY AND VALIDITY OF SURVEY INSTRUMENT

In this survey, an internal consistency analysis was performed for the elements of each CSF by using the SPSS reliability analysis procedure. The items in each factor were grouped into nine scales and coefficient alpha was calculated for each group. Nunnally (1967) and Scott (1981) as quoted by Saraph et al. (1989) held the same view that α value of 0.7 and above are considered to be adequate for testing the reliability of the factors. Referring to Table 2, the reliability coefficient (α) of the factors ranged between 0.7193 and 0.8865. In summary, the reliability analysis (see Table 2) indicated that all the nine factors have alpha values of more than 0.7. Thus, it can be concluded that on overall the survey instrument is reliable, since it has high internal consistency.

A measure has content validity if the instrument has measurement items that adequately cover the content domain of the variable being measured (Nunnally 1967). The nine CSFs measures and their respective elements for benchmarking implementation developed in this survey have high content validity because they were based on exhaustive literature review, have undergone detailed evaluation and verification

TABLE 2. Results of Internal Consistency Analysis and Construct Validity Tests

	Critical Factors	No. of items	(α) value	KMO	% Variance explained by Comp. 1
F1	Top Management Leadership	6	0.8175	0.838	67
F2	Systems and Processes	7	0.7493	0.801	59
F3	Creativity and Innovation Management	5	0.7898	0.763	57
F4	Human Resource Management	6	0.7451	0.764	63
F5	Policy and Strategic Planning	6	0.8736	0.872	69
F6	Resources Management and Business Results	4	0.7193	0.750	66
F7	Customer Satisfaction Management	5	0.8865	0.810	71
F8	Employee Satisfaction Management	3	0.7253	0.739	80
F9	Organizational Culture and Work Environment	7	0.8623	0.880	59
	Total	49			

by academicians, experts and practitioners. Furthermore, the factors found in the instrument were very close to those previous developed by authors such as Jeffcoate et al. (2002), McAdam and Kelly (2002), and Motwani (2001). In addition, the survey instrument had also been pilot tested in practising companies, which indicated that the content of each factor was well represented by the measurement items employed. Thus, the authors firmly believe that the CSFs in this survey instrument have high content validity since all the pilot companies have positively accepted it.

The construct validity test is carried out to ensure that each construct actually represents one factor. Factor analysis is often used in data reduction to identify a small number of factors that explain most of the variance observed in a much larger number of manifested variables (SPSS 2001). A measure has construct validity if it measures the theoretical construct that it was designed to measure (Saraph et al. 1989; Woon 2000). The construct validity for each of the nine CSFs was evaluated by factor analysing the measurement items of each of the CSFs using the "practice" data. In this analysis, each critical factor was assumed to be a separate construct (Saraph et al. 1989). The SPSS Data Reduction and Factor Analysis Procedure and steps provided by Isa (2003) were used in performing the analysis.

The items assigned to each of the CSFs for benchmarking were submitted to principal component factor analysis to determine the number of factors and factor loadings extracted by the Kaiser criterion (with Eigenvalue greater than one). The first run proved to be quite satisfactory because 7 of the 9 factors were found to be uni-factorial and the remainder 2 factors were bi-factorial. Prior to secondary factor analysis, elements that did not have strong correlation with the component and those having low communalities (i.e. proportion of the variance of that variable that can be explained by the components) were eliminated. In this case, elements of the two bi-factorial factors (F2.6, F2.7, F4.2 and F4.4) were eliminated to improve the reliability of the instrument and the revised loadings were calculated. As a consequence, the results of the secondary factor analysis showed that all the nine CSFs were uni-factorial. The revised loadings ranged between 0.658 and 0.907. These results are broadly similar to those of Rahman (2001), Black and Porter (1996), and Terziovski and Samson (1999).

The Kaiser-Mayer-Olkin (KMO) measure of sampling adequacy was used to assess the suitability of the sample for each uni-factorial determination. Referring to Table 2, in general the KMO values found are considered acceptable (Kim and Mueller 1978). All factors in each uni-factorial test accounted for at least 57% of the variance of the respective variable sets. This suggests that only a small amount of the total variance for each group of variables is associated with causes other than the factor itself.

DISCUSSION OF RESULTS AND FINDINGS PROFILE OF THE RESPONDENTS

The survey data shows that 42.6% of the respondents companies are producing metal parts, 20.6% plastic parts, 17.6% electronic parts, 16.2% electrical parts, 13.2% rubber parts, and 25.0% other parts (i.e. comprise of carpet, lamps, glass, oil, paint, etc.) for the automotive industry. This indicates that the respondents come from multi-products and employing diverse production techniques. With regards to quality system certification, about 82% of the respondents had at least one certification in place. However, it is surprising to discover that almost 18% of the respondents did not have any quality certification. When the results are examined closer, it was found that almost 40% (ISO 9002:1994); 24% (ISO 9000:2000); 13% (ISO 9001:1994) and 13% were certified to other types quality standards. In addition, it is also quite surprising that only 31% of the respondents companies are certified to the more stringent QS 9000 although it has almost become a requirement for companies involved in the automotive industry. The low adoption rate may probably due to SMEs' lack of exposure and awareness on the importance of quality certification when competing in the market place. In terms of benchmarking knowledge, almost 72% of the respondents have prior knowledge before embarking on the benchmarking initiatives acquired through seminar, conference, workshop, training or the mass media. Meanwhile, the other 26% had embarked in benchmarking activities through "trial-and-error" due to lack of knowledge of the benchmarking technique and the remaining 2% did not know or unsure how to answer.

The four benchmarking initiatives with the highest implementation rate ranked in terms of

percentage are knowing and understanding own process (60.3%), establishing benchmarking measures (33.8%), education and training in benchmarking (27.9%) and identifying benchmarking partner (27.9%). Only 19% of the respondents companies had actually set-up a formal benchmarking unit in their respective companies. The survey results and findings revealed majority of the respondents did not have a proper unit to organize and monitor its implementation progress and success. This may probably due to human resource constraints faced by majority of the SMEs surveyed. Apart from that, normally SME's employees are expected to perform multi-tasks. For example, an employee may perform the management tasks; while at the same time conduct the benchmarking effort, monitor its implementation progress and success all on his own. Thus, creating a separate unit for conducting benchmarking activities might need the SME companies to employ additional human resource. The authors believe that it is important to set-up a benchmarking unit prior to embarking on benchmarking initiatives because it can help top management. For examples in identifying and selecting key business

performance measures to be benchmarked, decides on the benchmarking technique to be adopted and to review all activities in the benchmarking process, etc. Members of this unit should comprise of representatives from managerial, supervisory and operator level

PERCEPTION OF IMPORTANCE AND EXTENT OF PRACTICE (OVERALL)

In this study, the authors have analysed the means on the perceptions of importance for the CSFs. First of all, the overall mean for each CSF as perceived by the respondents was calculated. Table 3, gives the overall results on the level of importance the respondents perceived the nine CSFs. They range from 3.74 to 4.22, which correspond to neutral to important. It can be seen that the two most critical factors with the highest means as perceived by the respondents were customer satisfaction management (4.22) and top management leadership (4.16). The two least important factors found in terms of perception of importance were human resource management (3.74) and creativity and innovation management (3.74). However, the difference between the highest and lowest mean values was small.

TABLE 3. Mean Importance and Practice of the CSFs (Overall Results)

Factor	Description	Import. (Mean)	Import. (Rank)	Practice (Mean)	Practice (Rank)	Differ. in mean
F1	Top Management Leadership	4.16	2	3.40	2	0.76
F2	Systems and Processes	3.96	6	3.24	3	0.72
F3	Creativity and Innovation Management	3.78	8	3.07	6	0.71
F4	Human Resource Management	3.74	9	2.92	8	0.81
F5	Policy and Strategic Planning	3.84	7	2.91	9	0.93
F6	Resources Management and Business Results	4.06	3	3.19	4	0.87
F7	Customer Satisfaction Management	4.22	1	3.44	1	0.78
F8	Employee Satisfaction Management	4.03	4	3.01	7	1.02
F9	Organizational Culture and Work Environment	3.97	5	3.12	5	0.85

Note: Bold (i.e. top 2 factors); italics (bottom 2 factors); Total = 68 companies.

The next item investigated was the extent of practice of each of the nine CSFs. Table 3 shows the respondents' overall mean values on extent of practice for the nine CSFs. The mean values ranges from 2.91 to 3.44, which correspond to a "low to moderate" level of practice (i.e. 2 to 4) on the Likert scale. It can be seen that the two most critical factors practiced by the respondents were customer satisfaction management (3.44) and top management leadership (3.40). On the other hand, human resource management (2.92) and policy and strategic planning (2.91) were the two least important factors. It can be seen that the overall results for the mean practice of the CSFs are lower than the perception of importance. This may probably be due to the companies' failure to translate what they perceived to be important into practice. In summary, these survey results shows that respondents' perceptions of importance and practice on the CSFs were consistent. On overall, the respondents have "neutral to important" level of perception on the importance on the CSFs, however in terms of practice, the level was from "low to moderate". These results show that a lot of efforts need to be focussed on improving these companies' perceptions and practices of the benchmarking CSFs particularly the human resource management and to incorporate policy and strategic planning in their management and execution of benchmarking initiatives. In order for the benchmarking implementation and adoption to be successful, it requires the expertise and knowledge of the human resource. Furthermore, policy and strategic planning is important towards ensuring benchmarking implementation success. In other words, without proper human resource and systematic planning, the benchmarking implementation efforts will face many problems and could end up in failure.

HYPOTHESIS TESTS BETWEEN DIFFERENT COMPANIES CATEGORIES

From the survey results, it was shown that on overall the respondent companies had placed high degree of perception of importance on most of the factors, however the extent of practice was generally lower. The authors have made an attempt to find out whether there was any significant difference between the level of importance and the extent of practice of the nine CSFs. To facilitate for easy comparison and

interpretation, the respondents companies were divided into eight different categories. They are all the companies, quality certified companies, non-quality certified companies, SMEs, large companies, 100% local companies, 100% foreign companies, and joint venture companies.

The following hypotheses were formulated for conducting the significance tests for the eight companies categories. (Note: μ_1 = mean of importance; μ_2 = mean of practice).

- (a) To test for a significant difference between the importance and practice means for all companies.
- (b) To test for a significant difference between the importance and practice means for quality certified companies.
- (c) To test for a significant difference between the importance and practice means for non-quality certified companies.
- (d) To test for a significant difference between the importance and practice means for SMEs.
- (e) To test for a significant difference between the importance and practice means for large companies.
- (f) To test for a significant difference between the importance and practice means for 100% local companies.
- (g) To test for a significant difference between the importance and practice means for 100% foreign owned companies.
- (h) To test for a significant difference between the importance and practice means for joint venture companies:

$H_0: \mu_1 - \mu_2 = 0$ (i.e. there is no significant difference between the two means).

$H_1: \mu_1 - \mu_2 \neq 0$ (i.e. there is a significant difference between the two means).

DISCUSSIONS FOR HYPOTHESIS TEST RESULTS

The authors used the t-test for testing the Null hypothesis that two population means are equal when the variable being investigated has a normal distribution in each population and the population variances are equal. Basically, there are two types of t-tests, first the independent samples t-test and second, the paired samples t-test (Puri 1996). The independent samples t-test can be utilised when the data are a sample from a population in which the mean of a test variable is equal in two independent (unrelated) groups of

cases. Meanwhile, the paired samples t-test can be employed when the two population means are equal and when the observations for the two groups can be paired in some way. In this study, the authors employed a paired samples t-test and the SPSS compare means procedure to test the hypothesis because the two population means are equal (Puri 1996; Cramer 1998).

For (a), the area explored was the level of importance and practice for all companies on all the CSFs. Referring to Table 4, all the nine CSFs have zero p-values (i.e. which is less than 0.05); hence the Null hypothesis H_0 was rejected. Thus, it can be concluded that the paired samples comparison t-test indicated that there is a significant difference between the perceived level of importance and extent of practice by the respondents' companies. In other words, these survey results shows the respondents companies had failed to translate their perceived importance of the CSFs into actual practice.

For (b), it is expected that quality certified companies have the similar level of importance and practice of the nine CSFs. The t-test was conducted with the main aim to find out whether the nine CSFs were practiced differently between level of importance and extent of practice. Referring to Table 5, all the p-values for the nine CSFs have zero values (i.e. less than 0.05); hence

the Null hypothesis H_0 was rejected. Thus, it can be concluded that the paired samples t-test shows that there is a significant difference between the level of importance and extent of practice by the quality certified companies (see Table 5). In short, these survey results shows that the quality certified companies have not translated into practice what they believe to be important.

For (c), the t-test was performed with the objective to find out whether the non-quality certified companies were practising the nine CSFs differently between level of importance and extent of practice. With reference to Table 6, the p-values for the five CSFs (i.e. F1, F2, F3, F4 and F9) are more than 0.05 (i.e. significant level); hence accept the Null hypothesis H_0 . Thus, it can be concluded that the paired samples t-test shows that there is no significant difference between the level importance and extent of practice by the non-quality certified companies in the five CSFs. In the authors' opinion, the top managements' of both the quality and non-quality certified companies perceived these five CSFs as very important and translate them in actual practices in managing their respective companies.

Meanwhile, referring to Table 6, the other four CSFs (i.e. F5, F6, F7 and F8) have p-values

TABLE 4. Paired Sample Statistics for Mean Importance and Practice (Overall)

Factor	Description	Import. (mean)	Practice (mean)	Diff. in mean	p - value	t -calculated
F1	Top Management Leadership	4.1592	3.4039	0.7553	0.000	6.091
F2	Systems and Processes	3.9562	3.2354	0.7208	0.000	6.039
F3	Creativity and Innovation Management	3.7765	3.0706	0.7059	0.000	6.207
F4	Human Resource Management	3.7374	2.9241	0.8133	0.000	6.636
F5	Policy and Strategic Planning	3.8407	2.9068	0.9339	0.000	8.292
F6	Resources Management and Business Results	4.0625	3.1912	0.8713	0.000	8.302
F7	Customer Satisfaction Management	4.2176	3.4412	0.7764	0.000	8.274
F8	Employee Satisfaction Management	4.0294	3.0097	1.0197	0.000	8.459
F9	Organizational Culture and Work Environment	3.9706	3.1238	0.8468	0.000	8.288

Note: p = 0.05 level of significance; All respondents = 68 companies.

TABLE 5. Paired Sample Statistics for Mean Importance and Practice (Quality Certified Companies)

Factor	Description	Import. (mean)	Practice (mean)	Diff. in mean	p - value	t -calculated
F1	Top Management Leadership	4.2976	3.3831	0.9145	0.000	8.186
F2	Systems and Processes	4.0718	3.2628	0.8090	0.000	7.240
F3	Creativity and Innovation Management	3.8786	3.0500	0.8286	0.000	7.773
F4	Human Resource Management	3.8151	2.9198	0.8953	0.000	7.572
F5	Policy and Strategic Planning	3.8987	2.9167	0.9821	0.000	7.502
F6	Resources Management and Business Results	4.1161	3.2098	0.9063	0.000	7.587
F7	Customer Satisfaction Management	4.2286	3.3964	0.8321	0.000	7.751
F8	Employee Satisfaction Management	4.0298	2.9166	1.1132	0.000	8.061
F9	Organizational Culture and Work Environment	4.0001	3.0534	0.9466	0.000	8.458

Note: p = 0.05 level of significance; Quality certified = 56 companies

less than 0.05 (i.e. significant level); hence reject the Null hypothesis H_0 . Therefore, it can be concluded that the paired samples t-test shows that there is a significant difference in four of the CSFs between the level of importance and extent of practice by the non-quality certified companies. In short, these survey results shows that the non-quality certified companies have not translated four of the CSFs (i.e. F5, F6, F7 and F8) they believe to be important into actual practice.

For (d), the t-test was performed with the objective to investigate whether the large companies were practising the nine CSFs differently between the level of importance and extent of practice. Referring to Table 7, all the nine CSFs have zero the p-values (i.e. less than 0.05); hence the Null hypothesis H_0 was rejected. Therefore, it can be concluded that the paired samples t-test shows that there is a significant difference between the level of importance and extent of practice by the large companies in all the CSFs. In other words, the large companies have not put into actual

practice all the nine CSFs they perceived to be important in ensuring benchmarking activities are implemented successfully. This may be due to their believes that they already have large market share and practicing these CSFs are not critical in maintaining and enhancing their competitiveness in the market place.

For (e), the t-test was conducted with the main aim to find out whether the SMEs were practising the nine CSFs differently between the perceived level of importance and actual practice. Referring to Table 8, all the p-values for the nine CSFs have zero values (i.e. less than 0.05); hence reject the Null hypothesis H_0 . Thus, it can be concluded that the paired samples t-test shows that there is a significant difference between the level of importance and extent of practice of the nine CSFs by the SMEs. In short, these survey results shows that the SMEs have yet to translate into actual practice the CSFs they believe to be important in improving their business efficiency and competitiveness.

(f) In this case, the paired samples t-test was conducted to investigate whether the level of

TABLE 6. Paired Sample Statistics for Mean Importance and Practice (Non-Quality Certified Companies)

Factor	Description	Import. (mean)	Practice (mean)	Diff. in mean	p - value	t -calculated
F1	Top Management Leadership	3.5133	3.5008	0.0125	0.977	0.030
F2	Systems and Processes	3.4167	3.1073	0.3094	0.483	0.726
F3	Creativity and Innovation Management	3.3000	3.1667	0.1333	0.733	0.350
F4	Human Resource Management	3.3750	2.9444	0.4306	0.327	1.026
F5	Policy and Strategic Planning	3.5700	2.8608	0.7092	0.002	3.938
F6	Resources Management and Business Results	3.8125	3.1042	0.7083	0.006	3.364
F7	Customer Satisfaction Management	4.1667	3.6500	0.5167	0.010	3.113
F8	Employee Satisfaction Management	4.0275	3.4442	0.5833	0.010	3.093
F9	Organizational Culture and Work Environment	3.8333	3.4525	0.3808	0.097	1.814

Note: p = 0.05 level of significance; Non-Quality certified =12 companies

TABLE 7. Paired Sample Statistics for Mean Importance and Practice (Large Companies)

Factor	Description	Import. (mean)	Practice (mean)	Diff. in mean	p - value	t -calculated
F1	Top Management Leadership	4.3336	3.4840	0.8496	0.000	6.102
F2	Systems and Processes	4.0624	3.2794	0.7830	0.000	5.386
F3	Creativity and Innovation Management	3.9739	3.2261	0.7478	0.000	7.422
F4	Human Resource Management	3.9778	2.9712	1.0067	0.000	7.344
F5	Policy and Strategic Planning	4.1891	3.1377	1.0514	0.000	6.393
F6	Resources Mgt. and Business Results	4.3696	3.5000	0.8696	0.000	6.270
F7	Customer Satisfaction Management	4.5478	3.5739	0.9739	0.000	7.004
F8	Employee Satisfaction Management	4.3045	3.1304	1.1741	0.000	9.102
F9	Organizational Culture and Work Environment	4.2859	3.2296	1.0563	0.000	8.058

Note: p = 0.05 level of significance; Large = 22 companies

perception of importance and practice of the nine CSFs in 100% locally owned companies were significantly different. Referring to Table 9, all the p-values for the nine CSFs have zero values (i.e. less than 0.05); hence reject the Null hypothesis. In short, it can be concluded that the level of perception of importance and practice for nine CSFs were significantly different at the 100% locally owned companies.

(g) It is expected 100% foreign owned companies have higher perception level of importance and practice of the nine CSFs. This may probably due to the fact that majority of the foreign owned companies operating in Malaysia are actually the subsidiaries of large multi-national organizations, which might already have practiced all the CSFs. In this study, the paired samples t-test was performed to find out whether the nine CSFs were practiced significantly different between the perception level of importance and actual practice. Referring to Table 10, all the p-values for the nine CSFs are more than 0.05 (i.e. significant level); hence accept

the Null hypothesis. In short, it can be concluded that the perception level of importance and actual practice of the nine CSFs were not significantly different at 100% foreign owned companies.

(h) In general, joint-venture companies are formed between local and foreign partners companies. Normally, the foreign partners brought together with them new management concepts, expertise and technology. Therefore, it is expected that joint-venture companies have higher level of perceptions of importance and practice for the nine CSFs. In this case, the paired samples t-test was conducted with the main aim to discover whether the nine CSFs were perceived and practiced significantly different at joint venture companies. Table 11 shows the all p-values of the nine CSFs are lower than 0.05 (i.e. significant level); hence the Null hypothesis H_0 was rejected. In short, it can be concluded that there was a significant difference in the level of perception of importance and practice of all the CSFs at joint venture companies.

TABLE 8. Paired Sample Statistics for Mean Importance and Practice (SMEs)

Factor	Description	Import. (mean)	Practice (mean)	Diff. in mean	p - value	t -calculated
F1	Top Management Leadership	4.0701	3.3630	0.7071	0.000	4.064
F2	Systems and Processes	3.9019	3.2128	0.6891	0.000	4.170
F3	Creativity and Innovation Management	3.6756	2.9911	0.6844	0.000	4.155
F4	Human Resource Management	3.6145	2.9001	0.7144	0.000	4.188
F5	Policy and Strategic Planning	3.6627	2.7888	0.8739	0.000	5.887
F6	Resources Mgt. and Business Results	3.9056	3.0333	0.8722	0.000	6.102
F7	Customer Satisfaction Management	4.0489	3.3733	0.6756	0.000	5.584
F8	Employee Satisfaction Management	3.8887	2.9480	0.9407	0.000	5.547
F9	Organizational Culture and Work Environment	3.8095	3.0698	0.7397	0.000	5.386

Note: p = 0.05 level of significance; SME = 44 companies

TABLE 9. Paired Sample Statistics for Mean Importance and Practice (100% Local Companies)

Factor	Description	Import. (mean)	Practice (mean)	Diff. in mean	p - value	t -calculated
F1	Top Management Leadership	4.1559	3.4676	0.6883	0.000	4.515
F2	Systems and Processes	3.9911	3.2796	0.7115	0.000	5.059
F3	Creativity and Innovation Mgt.	3.8565	3.1348	0.7217	0.000	5.210
F4	Human Resource Mgt.	3.8148	3.0110	0.8038	0.000	5.300
F5	Policy and Strategic Planning	4.0472	3.0471	1.0001	0.000	8.666
F6	Resources Mgt. and Business Results	4.2500	3.3152	0.9348	0.000	7.959
F7	Customer Satisfaction Mgt.	4.4217	3.6913	0.7304	0.000	7.355
F8	Employee Satisfaction Mgt.	4.2609	3.1883	1.0725	0.000	7.376
F9	Organizational Culture and Work Environment	4.1398	3.3042	0.8356	0.000	7.399

Note: p = 0.05 level of significance; 100% Locally Owned = 45 companies

TABLE 10. Paired Sample Statistics for Mean Importance and Practice (100% Foreign Companies)

Factor	Description	Import. (mean)	Practice (mean)	Diff. in mean	p - value	t -calculated
F1	Top Management Leadership	5.0000	4.2500	0.7500	0.068	9.375
F2	Systems and Processes	4.4300	4.2143	0.2157	0.200	3.082
F3	Creativity and Innovation Mgt.	4.0000	3.9000	0.1000	0.500	1.000
F4	Human Resource Mgt.	4.5000	4.2500	0.2500	0.504	0.987
F5	Policy and Strategic Planning	4.1650	3.9167	0.2483	0.202	3.041
F6	Resources Mgt. and Business Results	4.2500	4.1250	0.1250	0.500	1.000
F7	Customer Satisfaction Mgt.	4.6000	4.2000	0.4000	-	-
F8	Employee Satisfaction Mgt.	4.5000	3.8333	0.6667	0.295	2.000
F9	Organizational Culture and Work Environment	3.9300	3.9286	0.0014	0.994	0.010

Note: p = 0.05 level of significance; 100% Foreign Owned = 2 companies

TABLE 11. Paired Sample Statistics for Mean Importance and Practice (Joint Venture Companies)

Factor	Description	Import. (mean)	Practice (mean)	Diff. in mean	p - value	t -calculated
F1	Top Management Leadership	4.0828	3.1728	0.9100	0.001	3.848
F2	Systems and Processes	3.8286	3.0358	0.7929	0.005	3.200
F3	Creativity and Innovation Management	3.5700	2.8400	0.7300	0.004	3.315
F4	Human Resource Management	3.4832	2.5917	0.8915	0.001	3.893
F5	Policy and Strategic Planning	3.3335	2.4832	0.8503	0.006	3.082
F6	Resources Management and Business Results	3.6125	2.8125	0.8000	0.003	3.470
F7	Customer Satisfaction Management	3.7100	2.7900	0.9200	0.001	4.124
F8	Employee Satisfaction Management	3.4498	2.5165	0.9333	0.001	3.907
F9	Organizational Culture and Work Environment	3.5856	2.6286	0.9570	0.000	4.230

Note: p = 0.05 level of significance; Joint Venture = 20 companies

CONCLUSIONS AND LIMITATIONS

This study indicates that majority of the respondents are Malaysian owned companies involved in the automotive components manufacturing sector. The findings from postal survey revealed that majority of the Malaysian automotive companies are still new with the benchmarking technique. This is evidenced by the fact that about 60% of the companies had just started implementing only one initiative (i.e. knowing and understanding own process) out of the seven benchmarking initiatives for full implementation.

Reliability and validity tests were utilised in validating the nine CSFs for benchmarking implementation. The reliability and factor analysis results showed that all the nine CSFs have Cronbach alpha (α) values more than 0.7 and are uni-factorial, thus indicating it as a reliable and valid survey instrument. The respondents' overall perception of importance for the nine CSFs and their practice was shown to be significantly different. It was observed that

most of the companies placed high perception of importance on the CSFs, however in practice it was still at low to moderate level.

The level of perception of importance and actual practice of the nine CSFs in quality certified, SMEs, large, 100% local, and joint venture companies were shown to be significantly different. On the other hand, the level of perception of importance and actual practice of five CSFs (i.e. F1, F2, F3, F4 and F9) in non-quality certified were not significantly different. However, the survey shows there is a significant difference in the level of perception of importance and practice in the other four CSFs (F5, F6, F7 and F8). The survey results also indicates that 100% foreign owned companies did not show significant different in terms of the level of perception of importance and actual practice of the all the CSFs. With respect to the most important CSFs in ensuring the success of benchmarking activities, the survey results indicates that the two CSFs with

the highest mean values as perceived and practice by majority of the respondents are top management leadership and customer satisfaction management.

With regards to the level of understanding and knowledge in benchmarking, it was found that a large majority of Malaysian companies in the automotive components manufacturing industry are still lacking in knowledge of benchmarking concepts and its role towards enhancing their business process effectiveness and competitiveness. With respect to CSFs practice in Malaysian companies involved in the automotive components manufacturing sector, it was found that on overall the level was between low to moderate. In other words, there is still much to be done in encouraging these companies in adopting and practising the CSFs so as to improve their business process effectiveness and thus enhancing their competitiveness in the local, regional and global market. In order to achieve this goal, the Malaysian government through its agencies such as SIRIM Berhad and National Productivity Corporation (NPC) is urged to intensify their efforts in promoting the awareness, usage of the

benchmarking technique and practice of CSFs while implementing benchmarking efforts by conducting seminars, workshops, road-shows, education and training, publishing articles in the local mass media related to the benchmarking concept.

The survey methodology used in this study has several limitations. The reliability and validity tests and the analysis were conducted based on 68 companies only, which is considered to be quite small sample size. Therefore, the results of this study must be treated with caution. This paper is a part of an on-going research on benchmarking implementation in Malaysian automotive companies.

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