

ESSENTIAL QUALITY PRACTICES IN INDONESIAN MANUFACTURING SMEs

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ABSTRACT

The importance of quality practices has considerably increased over the last years, on both a practical and theoretical levels. In competitive and global business environment, companies should create a need for managers in manufacturing sector to effectively and continually improve quality, capability and process efficiency. This paper presents the findings from the survey on the current status of fundamental 5-S quality practices and the implementation of total quality management (TQM) in Indonesian SMEs. The aims are to determine whether the essential quality practices such as 5-S quality practices have a significant contribution to the successful TQM implementation and any differences in the implementation of 5-S can be attributed mainly to the maturity of the 5-S programme. This paper outlines the results of the 5-S survey conducted among 36 Indonesian manufacturing SMEs with a total of 78 per cent are applying 5-S in their environment. The main finding from the study proved that 5-S activities provide an essential total quality environment.

Keywords: 5-S, Indonesia, Total Quality Environment, TQM

1.0 INTRODUCTION

Total Quality Management (TQM) provides the overall concept that promotes continuous improvement in an organisation. TQM philosophy stresses a systematic, integrated, consistent, organisation-wide perspective involving everyone and everything. It focuses primarily on total satisfaction for both the internal and external customers, within a management environment that seeks continuous quality improvement of all systems and processes. Total quality management and/or quality practices theory has been influenced by the contributions, mainly made by quality pioneers and/or quality leaders such as Crosby, Deming, Ishikawa, Juran, Feigenbaum, Oakland and many others. The development by all these quality experts shows significant improvement in manufacturing process and system. Improvements in the manufacturing system can lead to direct and indirect improvements to company environmental management practices, particularly in overall waste reduction. Positive relationships have been established between environmental performance and improvements to the following aspects of the manufacturing system; including quality management [1,2]; lean manufacturing practice [1,3]; worker involvement [4]; environmental technologies and advanced manufacturing technologies [1,5]; and supply strategies [4,6].

There are many manufacturing practices which are labelled as 'Japanese'. Quality practices for the Japanese manufacturer are not only linked to customer satisfaction but also to the efficiency of the production process. One of the famous Japanese quality practices is 5-S. 5-S practice is a technique employed to establish

and maintain a high-quality environment in an organisation. The 5-S offers some basic practices and requirements for producing quality of products and services with high productivity and with little or no waste, which they are, involve organisation, neatness, cleanliness, standardisation and discipline at the workplace. The technique has been practised in Japan for a long time in manufacturing systems. Most Japanese 5-S practitioners consider the 5-S useful not just for improving their physical environment but for improving their thinking processes as well [7]. Many of the everyday problems could be solved through adoption of this practice.

In an era where global competition is highly intense, countries apply quality methodologies in the form of strategic quality management, quality systems, quality assurance and quality control, to gain or sustain a competitive edge. Quality must be managed and controlled in order to be an effective system for integrating the quality development, quality maintenance, and quality improvement efforts at various groups in organisation. This will enable marketing, engineering, production and service provided at the most economical levels for achieving customer satisfaction.

Having reviewed the quality practices, the importance of Kaizen concept is necessary to be described. Kaizen is a Japanese word describing the approach of continuous improvement involving everybody. Kaizen is everybody's business, and many systems have been developed to make managers and workers Kaizen-conscious. Continuous Improvement (CI) starts with the suggestions for improvement being made, value-added

changes being implemented in the organisation, and resulting in an increase in company profits being realised [8]. In the words of the guru of Kaizen, Masaaki Imai [9], Kaizen means step-by-step gradual improvement in the nature of refinements or enhancements, doing little things better, continuously setting and achieving ever-higher standards, and is as important as breakthrough innovations. Kaizen is the truth behind Japan's economic miracle and the real reason the Japanese have become the masters of 'flexible manufacturing' technology – the ability to quickly adapt manufacturing processes to changing customer and market requirements. Indeed, most of the Japanese business philosophy is based on a successful combination of two strategies: Kaizen and innovation.

Again, in competitive markets and global environment, the possibility of an enterprise achieving and maintaining a lasting quality leadership is tied both with the capability of offering a real quality (*Q*), and the ability of applying innovative skill in renewing the products at a fast rate [10]. Concerning the time to market, design contraction offers some important competitive advantages, such as:

1. On the one hand, a shorter time allows lower investments and, therefore, asks for a shorter payback period with a reduction in risk.
2. On the other hand, a shorter time to market allows one to drug the market, artificially accelerating competitors product aging and then damaging them under the commercial profile.

This paper reports a survey conducted among a sample of Indonesian SMEs, as an initial output of the research, which ultimately aims to develop an approach to facilitate Cleaner Production (CP) implementation in Indonesia, including recommendations for public policy and considerations of infrastructure. Hence this study aimed to provide some important lessons for these companies, on improving their quality practices, 5-S and TQM implementation process. With this knowledge and the awareness of quality practices as well as global competition, SME owners and managers will be able to establish strategies that help the organisation moving towards better quality management implementation. The authors believe that the results might be relevant to SMEs in other countries; who are in the process of adopting advanced quality management and business excellence concepts or perhaps in developing networks or business joint-venture with other countries or other SME companies. SMEs are an important sector for the growth of any country, as they are the life blood of modern economies. Their survival will actually assist in improving the competitiveness of the large companies. Besides their flexibility and ability to innovate, SMEs play

a significant role in providing employment opportunities. Therefore, there is a need to study and improve the quality practices in SME companies in order to enhance their quality environment and competitiveness. The study can be started with a basic of quality practices; *i.e* 5-S as a part towards better quality management implementation, for example TQM.

2.0 5-S AND TQM

2.1 THE 5-S (SEIRI, SEITON, SEISO, SEIKETSU AND SHITSUKE) DEFINITIONS

The 5-S is the acronyms of five Japanese words: *Seiri*, *Seiton*, *Seiso*, *Seiketsu* and *Shitsuke*. As mentioned earlier, 5-S is a technique used to establish and maintain quality environment in an organization towards the success factor for the implementation of TQM. The meaning and English equivalents are shown in Table 1 [7].

Another Japanese quality leader, Hirano [11] has used different words for 5-S, which are *Seiri* – structure, sort. *Seiton* – straighten, simplify. *Seiso* – sanitise, shine. *Seiketsu* – standardise, systemise. *Shitsuke* – self-discipline, custom and practice. Commitment from the top management to all operation management in the organisation is the highest compulsory, and the importance of having a 5-S competition to improve the organisation environment is crucial. The 5-S should be practiced at managerial level and keep their commitment.

2.2 TQM DEFINITION

Quality has always been the key to business success and long-term survivability. Quality has been synonymous with the philosophies of experts such as Dr W. Edwards Deming, Dr Joseph M. Juran, Dr Genichi Taguchi and others. Each expert possesses his own sound philosophy and approached for the improvement of quality.

The word quality means different things to different people and therefore there are many definitions and approaches. Quality culture varies, not only amongst the different organizations or countries, but also among the different divisions of the same organisation. In a TQM culture, the customer is the most important part of the process, and if the process quality is attained, customer satisfaction should be assured. Quality is the system, which, when implemented, yields increased market share and reduced scrap and rework. Deming [12] stated that quality is the umbrella of a plethora of process improvement techniques and theories that starts with a company's vendors and extends beyond the sales of that company's products and services to the consumer. Quality is built on these provable process improvement techniques, which serve as components under the umbrella.

Table 1: 5-S Meanings and English Equivalent

Japanese	English	Meaning	Examples (out of 50 points of 5-S checklist)
<i>Seiri</i>	Structurise	Organisation	Throw away rubbish or return to store
<i>Seiton</i>	Systematise	Neatness	30-second retrieval of document
<i>Seiso</i>	Sanitise	Cleaning	Individual cleaning responsibility
<i>Seiketsu</i>	Standardise	Standardisation	Transparency of storage
<i>Shitsuke</i>	Self-discipline	Discipline	Do 5-S daily

Source: Ho (7)

Quality is somewhat of an intangible based on perception. The determination of quality will most likely be based on perception with the manufacturer or organisation determining performance and the customer or user determining expectations. The concept of quality can be concluded that must concern customer satisfaction and as a predictable degree of uniformity and dependability at low cost and suited to the market. It comprises a set of tools, techniques and process whose output yields customer satisfaction and continuous improvement or Kaizen. TQM requires that the executives are involved and committed, interested, and really focus on its development and implementation.

Results of TQM include error-free processes, which deliver products and services fit for use, on time, with competitive pricing and good value. In any business, there are both internal as well as external customers. Companies with a commitment to excellence need to satisfy their customer requirements in every level, internal as well as external. They should develop a corporate (or organisational) culture for continuous improvement and a customer-driven-attitude. The quality approaches highlighted above are low-cost. For instance, the 5-S is easy to apply and do not require major capital investment and they should quickly identify possible areas for further productivity-improvement drives. A gradual implementation of selected tools in the 5-S activities should lead to reduction in production waste and improve the morale of employees involved as they see the immediate visual impact of their productivity improvement and working areas.

Management has to outline the top priority of the quality goals, policies and customer satisfaction, so that employees are always reminded, not only focus on the product [13]. CI is striving organisation toward the achievement of the vision [14]. The improvement system must be applied continuously and consistently conformance to the requirement of a self-disciplined, with everyone in the organisation motivated to improve the quality of system [15]. As a conclusion, Kaizen or CI activity

is required to ensure that appropriate changes are made on an ongoing basis, so that the organisation continues to respond effectively to the changing demands made of it. CI strategy is well established that can meet the company business objectives.

2.3 INDONESIAN SMEs PROFILE

The abbreviation SME occurs commonly in the European Union and in international organisations, such as the World Bank, the United Nations and the World Trade Organisations (WTO). The term Small or

Medium-sized Business or SMB has become more standard in a few other countries. Small and Medium Enterprises or SMEs are companies whose headcount or turnover falls below certain limits, as categorised in Table 2. The terms ‘small and medium scale industries’ (SMIs) and ‘small and medium sized enterprises’ (SMEs) appear to have been used interchangeably. The authors would like to note here that in economics perspective, an ‘industry’ addresses a group of organisations or companies producing the same type of products, whereas an ‘enterprise’ addresses a business company or an organisation. SMEs can be found in almost all industries. Therefore, the term ‘enterprises’ is the more accurate and suitable term to be applied in this paper.

In Indonesia, small enterprises have grown mainly on the initiatives of private sector and its share in the manufacturing sector is more than 35 percent. It has provided the employment opportunities to be more than 13.6% (7,592,510 manpower) from the total of absorption employment [17], which is higher than other major economy/country (for example India with an employment growth rate around 5 percent only). However, the implementation and growth have been largely noticed in urban area and labor productivity has also showed undeceive. Small enterprises produce a wide range of products numbering over 7000 items in capital goods, intermediate goods and consumer items. It has been noticed that the goods produced in small scale sector do not have a good quality image and efforts have been taken for a decade now to improve the quality aspects.

Table 2 : SME definitions by number of employee and structure of capital

Country	SME Definitions by number of employees			Structure of the SME Capital		
	Micro	Small	Medium	Micro	Small	Medium
European Union [16]	less than 10 employees	fewer than 50 employees	fewer than 250 employees	Turnover ≤ Euro 2 million	Turnover ≤ Euro 10 million	Turnover ≤ Euro 50 million
Indonesia (Ministry of Industry of Indonesia [17])	1-10 employees	11-99 employees	100-300 employees	Turnover not exceeding 200 Million IDR	Turnover 200 million IDR to 10 Billion IDR	Turnover more than 10 Billion IDR
Japan [18]	≤ 300 Employees			Turnover Yen 300 million or less		
Malaysia [19]	Less than 5 employees	5 -50 employees	51 -150 employees	Turnover < RM250K	Turnover RM250K - < 10M	Turnover RM10M - < 25M
World Bank [20]	Less than 50 employees, with assets not exceeding US\$ 150,000			Medium size define as 50-199 employees, with assets US\$ 150,000 – US\$ 750,000		

Note: US\$ 1 = IDR 9,000; US\$ 1 = RM 3.42; US\$ 1 = Yen 82

Sources: European Union [16], Ministry of Industry Indonesia [17], Japan [18], SMIDEC [19], and World Bank [20]

Table 3 : GDP ratio by type of enterprises and manpower

No.	Type of Enterprises	Unit Industry (1000)	Manpower (1000)	GDP (IDR. Billion)	GDP Ratio by	
					Industry (IDR.million/unit)	Manpower (IDR. Million/MP)
1.	Small	2,874.58	7,592.51	55.69	19.37	7.34
2.	Medium	11.44	3,771.25	54.38	4,751.92	14.42
3.	Large	0.76	249.25	218.34	366,489.31	1,111.60
	<i>Total</i>	2,886.58	11,613.01	328.41	134.12	33.34

Note: US\$ 1 = IDR 9,000.

Source: Ministry of Industry of Republic Indonesia [17]

It has shown that the small scale sector created large number for employment and support the economics growth in developing country like Indonesia. The absorption of employment in Indonesian SMEs by year 2006, as shown in Table 3.

The implementation of TQM in Indonesian SMEs has appeared from implementation of the ISO 9000 some two decades ago. The ISO 9000 series of quality standards was introduced in Indonesia since 1980s but the involvement of Indonesian companies is still low compare to others developed countries [21]. For the last 20 years, a great amount of effort and promotion has been put into quality development of Indonesian SMEs. More than 10 agencies/institutions from various ministries have been involved in these efforts. The Indonesia government hopes that SMEs will play a crucial role, such as suppliers of parts and components to larger industries, for the production of final products, is crucial in the process of strengthening and expanding Indonesian manufacturing industry. The Indonesian government is well aware that SMEs constitute a very important element of the industrial community, and considers that a strong SME sector in manufacturing can help assure that industrial foundations in Indonesia are firm. Like governments in some developed countries, Indonesia's policy aims to actively assist manufacturing SMEs to upgrade their business performance to a world-class standard. A key factor in upgrading SME competitiveness is considered to be quality performance. The opening of national markets to global competition and the adoption of the ASEAN Free Trade Area (AFTA) policy indicates that Indonesian SME companies are urged to survive in the highly-competitive modern business situation.

3.0 METHODOLOGY

This research aims to describe an investigation into the 5-S and TQM implementation in Indonesian SMEs. The approach was focused on development, implementation and the operation evaluation at the selected manufacturing SMEs. The research was carried out in the SMEs in Jakarta and Bekasi, Indonesia. Mainly, the SMEs are producing variety of parts and components for various industries such as consumer, electronic and automotive.

The 5-S methodology relies on the creation and keeping well organised, clean, high effective and high quality workplace. This research has been carried out in the selected of 36 commercial development product industries, denoted as parts and components. The case- study companies were selected because they provided

specific insights into the subject of inquiry [22]. The company performance was considered essential for increasing the product's competitiveness. This research uses questionnaire survey and interviews [23, 24], and literature search in gaining empirical evidences. During these research it was executed the selection of things in production process, on each workplace. The 5-S methodology was introduced to workers and 5-S checklist score have been explained. The 5-S score was: 5–Extremely Good; 4–Very Good; 3–Good; 2–Poor; 1–Extremely Poor.

In the aim of execution the inspection of the 5-S rules' activity, it is applied from the 50 checklist [7]. The each rule of 5-S has been implemented and applied in consequence to the great changes as follows:-

- (1S): daily “things-to-do” list, one set of tools, “needed things” stored: low, medium and high usage, better usage of the working area, prevention of losing tools;
- (2S): Neat notice boards (include zoning and labels), zoning, placement marks, signage and badges, first-in-first-out arrangement, functional placement for leaflets, tools and material;
- (3S): clean the places most people do not notice, individual cleaning responsibility assigned, maintenance the clean workplace, cleaning inspections and correct minor problems, make cleaning and inspection easy (15cm);
- (4S): transparency (minimise doors, covers and locks), energy preservation (air-conditional temperature. mark/ switch), physical handling standards and instructions; 5-S responsibility labels on floor plan or at site, and;
- (5S): execute individual 5-S responsibilities, good communication and phone call (magic-word), wear if necessary (safety helmet/ gloves/ shoes/ etc), organisation chart and performance indicators.

The questionnaire was designed to obtain background information about the surveyed company, including: ownership of the company; existing workforce; management perception of existing system; methods used for improving quality; quality training frequency, the 5-S rule practice and TQM. The TQM implementation review on customer satisfaction; continuous improvement; reduce cost; reward and recognition; error prevention on not good (NG) or rejected product; co-operation and teamwork, and the implementation of quality standard (ISO 9000 series).

3.1 SELECTION OF COMPANIES

The companies were all selected based on their willingness to participate in the study. This research is focused on the SMEs in Jakarta and Bekasi as a centre and represented industrial estate area in Indonesia. Based on Japan International Cooperation Agency (JICA) [21], they are categorized into four groups based on the stage of business development and the contract situation with customers:

Stage 1 Products (parts and components) are for after-market.

Stage 2 Quality, Cost, and Delivery (QCD) of the products which have not reached the audit level of the particular customer yet.

Stage 3 Contract with the particular customer is unstable.

Stage 4 Contract with the particular customer is stable.

They are also grouped into four stages based on general features of manufacturer levels as shown below:

Stage-4 Stable parts/components suppliers. In this stage, manufacturers supply their products to assemblers regularly. The product acknowledged as genuine parts.

Stage-3 Viable suppliers. In this stage, manufacturers receive orders from particular customers (assemblers or first tier customers), occasionally (unstable).

Stage-2 Potential customers. Customers target post-sales and maintenance-purpose market because their QCD does not meet the requirement of assemblers.

Stage-1 Manufacturers apply only basic skills for aftermarket production.

The research analysis was applied and compared with the company criteria based on equipment and technology application which developed by Japan International Cooperation Agency (JICA) [21], as in Table 4.

Table 4 : Company criteria based on technology applied

Score (Mark)	Rating Criteria for Sub-Items	International Comparison
5	Equipment and Technology appropriate from the viewpoint of quality product requirement	Average level of Original Equipment Manufacture (OEM) part Industries in industrialised countries
4	Mostly appropriate equipment and technology are used, though some of them need improvement	Top level in ASEAN parts industries except for companies with foreign capital
3	Inappropriate equipment and technology are used at a considerably high rate. Some are missing	Average level in ASEAN parts industries except for companies with foreign capital
2	Inappropriate equipment and technology are used, causing poor quality of products	Lower level in ASEAN parts industries except for companies with foreign capital
1	Obsolete and out-of-date equipment and technology are used. Cottage industry level	The lowest level in ASEAN parts industries

(Source : Japan International Cooperation Agency JICA [21])

Table 5 : 5-S Implementation at company

Type of Company	5S-Score					Total
	1	2	3	4	5	
Medium	-	1 (2.8%)	15 (41.7%)	3 (8.3%)	3 (8.3%)	22
Small	1 (2.8%)	6 (16.7%)	6 (16.7%)	1 (2.8%)	-	14
Total	1 (2.8%)	7 (19.5%)	21 (58.4%)	4 (11.1%)	3 (8.3%)	36

4.0 SURVEY RESULTS

4.1 COMPANY BACKGROUND

Companies selected in this study have been in operation since 1970s and has a workforce of more than 50 employees. Thirty six factories located at different sites (Jakarta and Bekasi), and involved in the manufacturing of small and medium-size lots of the same parts and components. The machines are arranged according to their specific manufacturing technologies which defining a process layout. The wide spread of production job

orders (more than 7000 item numbers) together with working cycle interferences give rise to very complex production flows among different companies.

The first aspect analysed was the general company profile. The breakdown of the companies is based on the size of the companies. A proportion of 14 companies (38.9%), classified into medium-sized enterprises and employing between 100 to 300 employees. The other 22 companies (61.1%) classified into small sized enterprises and having less than 99 employees. Based

on company ownership, 5 companies (13.9%) are classified into joint venture and 31 companies (86.1%) classified as local investment.

4.2 RESULT OF ANALYSIS ON 5-S IMPLEMENTATION

From the 5-S practice, out of 36 companies, 29 companies (80.6%) have practiced the 5-S concept (5S score: 3, 4 and 5) in their organisations. About 7 companies (19.4%) have not come across the 5-S concept (5S score: 1 and 2). The breakdown of 5S implementation is shown in Table 5. Most of the companies believe by practising the 5-S will enhance the working environment. The remaining non-5-S companies claimed that they would increase their capabilities by conducting internal training, due to lack of awareness and company budget. Throughout the visits, the authors have convinced the companies about the benefits of 5-S implementation, as a foundation or stepping stone towards total quality environment.

4.3 RESULTS OF ANALYSIS ON TQM IMPLEMENTATION

This section examines the effects of ISO certification and 5-S-TQM implementation on company’s activities and performance, as shown in Table 6. It shows that, out of 36 companies, 30 companies (83.3%) indicate that they are certified by the quality standard system (ISO 9000 series). However, out of these 30 ISO certified companies, only 12 companies (33.3%) claimed that they have continuously implemented ISO 9000 in their organisations. Meanwhile, 36 companies (100%) admitted their involvement in the TQM implementation at their organisations. Majority of the companies have actually built the concept into their day-to-day activities without realising that it is a well established quality technique. Some SMEs may claim to have adopted TQM, which was only due to the fact that the issues and requirements for a genuine TQM company were not fully understood. Other companies do not claim to be TQM companies, but have implemented many important quality-related activities, using their own approach. However, in this study, the analysis of TQM implementation in the companies was identified by; 1) provided TQM training for the employee upon they join the company; 2) weekly TQM meeting conducted in the company (early week); and 3) daily production meeting was conducted in the company (early morning). Therefore, the cross tabulation analysis on TQM implementation versus ISO practices was carried out in the four categories as shown in Table 7.

Table 6 : TQM implementation at company

Type of Company	ISO 9000 Certification	Continuously Practicing ISO 9000 Procedure	TQM Implementation
Medium	19 (52.8%)	10 (27.8%)	22 (61.1%)
Small	11 (30.6%)	2 (5.6%)	14 (38.9%)
Total	30 (83.3%)	12 (33.3%)	36 (100%)

Table 7 : Company 5-S and TQM implementation

Company	5-S-TQM	Non-5-S-TQM	Total
ISO	12 (33.3%)	1 (2.8%)	13
Non-ISO	5 (13.9)	18 (50.0%)	23
Total	17 (47.2%)	19 (52.8%)	36

Table 8 : ANOVA list of TQM implementation in 5S-TQM and non-5S-TQM companies

Impact		N	Mean	F	Sig
Quality training	5-S-TQM	35	2.722	1.487	0.231
	Non5S-TQM	1	1.831		
	Total	36			
Customer satisfaction	5-S-TQM	35	0.347	0.566	0.457
	Non5S-TQM	1	0.614		
	Total	36			
Reduce cost	5-S-TQM	35	0.056	0.143	0.707
	Non5S-TQM	1	0.387		
	Total	36			
Reward and recognition	5-S-TQM	35	0.347	0.566	0.457
	Non5S-TQM	1	0.614		
	Total	36			
Error prevention	5-S-TQM	35	0.056	0.112	0.740
	Non5S-TQM	1	0.498		
	Total	36			
Teamwork	5-S-TQM	35	0.239	0.251	0.619
	Non5S-TQM	1	0.949		
	Total	36			
Continuous improvement	5-S-TQM	35	4.500	4.857	0.034
	Non5S-TQM	1	0.926		
	Total	36			

Table 7 showed that, out of 36 companies, only 12 companies (83.3%) claimed, they are both certified by the ISO 9000 certification and implementing the 5-S-TQM practices in their organisations. About 18 companies (50.0%) indicated that they have neither implemented the ISO 9000 and 5-S-TQM in their organisations. The data was further analysed using the analysis of variance (ANOVA) procedure, produced by the Statistical Package for Social Sciences (SPSS) version 15.0. The ANOVA list of 5-S and TQM implementation at companies as shown in Table 8. With the use of ANOVA test, the differences within each set of variables were tested at 95 per cent confidence level. The ANOVA test revealed that, out of 7 quality performance variables, 3 variables: reduce cost, error prevention, and teamwork show statistically significant differences in mean at 95 per cent confidence level. The remaining 4 variables: quality training, customer satisfaction, reward and recognition and continuous improvement show no significant differences in mean. This

implies that TQM practices have significant positive effects on company performance in both categories, and regardless of ISO certification. These findings are in contrast with those of Sohail and Hoong [25], but in accord with the findings of Rahman [26]. According to Rahman [26] (who conducted a larger postal survey on Australian SMEs), there is no significant difference between SMEs with and without ISO 9000 series certification, with regard to the impact of company performance. Sohail and Hoong [25] studied a small sample of Malaysian SMEs, and identified that customer management and quality satisfaction, and strategy planning had significant positive effects on company performance in ISO 9000 series certified companies.

From the questionnaire survey, all 36 companies (100%) have claimed that they are currently implementing TQM in their organisation, however the current situation showed that the average rejected/NG product is still performed at high percentage. As shown in Table 9, 14 companies showed the highest, indicated about or more than 15% of producing rejected/NG products, meanwhile 17 companies indicated the rejected/NG products with a range between 10% and 14.9%; and only 5 companies that claimed for both 5-S and TQM implementation, indicated the rejected/NG products with percentage of less than 10%. Percentage of the rejected/NG products for each company is also tabulated in Figure 1.

Table 9 : Percentage NG product in 5-S and TQM Implementation by Company

Company	Percentage of NG Product			Total
	($1x \geq 15\%$)	($10\% \leq x \leq 14.9\%$)	$x \leq 10\%$	
5-S-TQM	6 (16.7%)	15 (41.7%)	5 (13.9%)	26
Non-5-S-TQM	8 (22.2%)	2 (5.6%)	-	10
Total	14 (38.9%)	17 (47.3)	5 (13.9%)	36

Another reason may be related to the lack of TQM implementation. Part of that, the number of years for TQM involvement is considerably low or in a short period. This can be seen from the survey as 14 companies (38.9%) have been involved in TQM for less than two years. However, the findings have shown that both 5-S and TQM practices have a significant contribution to improve quality performance in organisations. There is no doubt that the implementation of the various quality initiatives can continuously improve business performance, sustain productivity and competitiveness in organisations. Hopefully, it would motivate more Indonesian organisations

looking forward and implementing various quality practices in their daily manufacturing operations and activities.

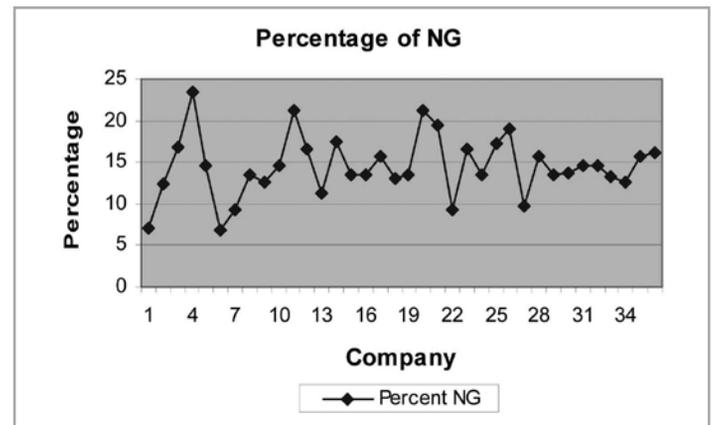


Figure 1 : Percentage of rejected/NG products

5.0 CONCLUSION

Relatively little academic research, it appears, is currently being devoted to the subject of improving quality management for Indonesian SMEs. The result of the study provides some useful information about quality management practices in Indonesian SMEs. The findings collected give a good foundation, describing essential of quality implementation levels and potential for development. Clearly, this is a great scope for the application of 5-S in the Indonesian manufacturing environment as their workplace are expected for cleanliness and orderliness. The logic behind the 5-S practice is that organisation (structurise), neatness (systemise), cleanliness (sanitise), standardisation (standardise) and discipline (self-discipline) at the workplace are basic requirements for producing high quality products and services, with little or zero waste and zero defect, while maintaining high levels of productivity.

The analysis of the survey results based on these 36 companies that manufacturing and producing parts/components, has provided evidence for the correlation between the 5-S and TQM benefits. The main finding is that the 5-S provides an essential total quality environment which is an important base for TQM implementation successfully. TQM training policy should incorporate the 5-S practice guidelines. The study also provides pertinent information about the current issues for Indonesian SME companies which are implementing 5-S and TQM, and also companies that are moving in the direction of ISO 9000 or attempting a TQM transformation. The survey methodology used in this study especially for questionnaire had several limitations. Due to time and resource constraints, the number of respondents (i.e. 36) from the thirty six case study companies that participated in the survey was quite a small sample size, therefore, the results of this study must be treated with caution. ■

REFERENCES

[1] R. Klassen, "Just-In-Time Manufacturing and Pollution Prevention Generate Mutual Benefits in The Furniture Industry", *Interfaces*, Vol.30, No.3, pp. 95-106, 2000.

[2] H. Kitazawa, and J. Sarkis, "Benchmarking for Agility", *Benchmarking An International Journal*, Vol. 8, No. 2, pp. 88-107, 2000.

[3] A.A. King, and M.J. Lenox, "Lean and Green? An Empirical Examination of the Relationship between Lean Production and Environmental Performance", *Production and Operations Management*, Vol. 10, No. 3, pp. 244-256, 2001.

- [4] C. Geffen, and S. Rothenberg, "Suppliers and Environmental Innovation – The Automotive Paint Process", *International Journal of Operations and Production Management*, Vol. 20, No.2, pp. 166-186, 2000.
- [5] R. Florida, "Lean And Green: the Move To Environmentally Conscious Manufacturing", *California Management Review*, Vol. 39, No.1, pp. 80-105, 1996.
- [6] R. Min, and F.J. Galle, "The Linkage Among Management System, Practices and Behavior in Successful Manufacturing Strategy", *International Journal of Operations and Productions Management*, Vol.7, No.10, pp. 967-983, 2001.
- [7] S.K. Ho, "Business Excellence through 5-S and 6-Sigma", *Oxford Business and Economics Conference*, 2007.
- [8] T. Hirzel, "Measuring the Productivity Impact of ICT at the Firm Level", *Discussion Paper*, Mannheim, 1997.
- [9] M. Imai, *KAIZEN: The Keys to Japan's Competitive Success*, New York: Van Nostrand and Company, 1986.
- [10] F. Franceschini, and S. Rossetto, "Design for Quality: Selecting Product's Technical Features", *Quality Engineering*, Vol. 9, No.4, pp. 681-688, 2002.
- [11] H. Hirano, *Handbook of Factory Rationalization*, Productivity Press: Oregon, 1984.
- [12] W.E. Deming, *Quality Productivity & Competitive Position*, MIT Center for Advanced Engineering Study: Cambridge, M.A., 1990.
- [13] D.H. Basterfield, *Total Quality Management*, New Jersey: Prentice Hall, 1995.
- [14] T. Richardson, *Total Quality Management*, New York: Delmar Publishing, 1997.
- [15] P. Crosby, *Quality is Free*, New York: McGraw-Hill, 1979.
- [16] European Union, E.U. *Census Bureau: European Fact Finder, Profiles of Selected Economic Characteristic*, 2003.
- [17] Ministry of Industry of Indonesia, *Strategic Planning for Indonesian Industry*, Jakarta, Indonesia, 2006.
- [18] Japan, *Overview of Japanese SMEs*, Unico International Corporation, Tokyo, Japan, 2006.
- [19] Small and Medium Industries Development Corporation SMIDEC, www.smidec.gov.my, 2008.
- [20] World Bank, *Statistical Annual Report: Indonesian Economic Review*, Jakarta, Indonesia, 2004.
- [21] Japan International Cooperation Agency JICA, *Follow-up Study of SMEs Development Focused on Manufacturing Industries in Republic of Indonesia*, Unico International Corporation, Tokyo, Japan, 2005.
- [22] R.K. Yin, *Case Study Research: Design and Methods*, California: Sage Publications, Inc., Thousand Oaks, CA, 1994.
- [23] W. Diamond, *Practical Experiment Designs*, New York: John Wiley and Sons, Inc, 2001.
- [24] K. Hinkelmann, *Experimental Design, Statistical Models, and Genetic Statistics*, New York: Marcel Dekker, Inc, 1984.
- [25] M.S. Sohail, and T.B. Hoong, "TQM practices and organizational performances of SMEs in Malaysia", *Benchmarking. An International Journal*, Vol. 10 No. 1, pp. 37-53, 2003.
- [26] S. Rahman, "A comparative study of TQM practice and organizational performance of SMEs with and without ISO 9000 certification", *International Journal of Quality and Reliability Management*, Vol. 18 No. 1, pp. 35-49, 2001.

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