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AIUB Journal of Business and Economics
The article is an extended version of the paper presented in the 2nd AIUB International Conference on Business and Management-2021
Volume: 18 Issue Number: 1 ISSN (Online): 2706-7076

December 2021

Citation
Tham, J., Karim, K.S., and Azam, S.M.F., "Management Practice and Project Performance among Manufacturing Industries in Malaysia." (2021) *AIUB Journal of Business and Economics*, 17 (2), 37-55.

AIUB Journal of Business and Economics

Volume 18, Issue 1

ISSN (PRINT) 1683-8742

ISSN (ONLINE) 2706-7076

December 2021 pp. 37-55

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Jacquline Tham
Senior Lecturer, Management & Science University, Malaysia

Khondaker Sazzadul Karim*
Associate Professor, Faculty of Business Administration, AIUB

S. M. Ferdous Azam
Senior Lecturer, Management & Science University, Malaysia

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Corresponding author*:
Email: kskarim@aiub.edu

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Abstract

This research examines the factors influencing management practice and project performance in Malaysia's manufacturing industries. To accomplish the study's goal, the contractors who have been chosen are divided into two categories: outstanding and first-class. The target audience consisted of 21 construction companies. In the second place, the consulting engineering offices that have been registered with the Ministry of Commerce and Industry are targeted. The third target audience consisted of business owners or top-tier operators. A sample size of 443 respondents was utilized to evaluate respondents' perceptions of critical success factors and the impact of total quality management adoption in construction facilities projects in Malaysia's manufacturing industry. According to the findings of this research, continuous improvement is also beneficial when companies seek to enhance the performance of their employees. This is because manufacturing companies will satisfy their employees most suitably with constant progress. Using this measuring methodology, it was discovered that there are positive and significant interrelationships between a company's quality culture, resource management, management practice, and overall performance in Malaysia's manufacturing industries. Furthermore, the results may be applied to other developing nations and the governments of emerging economies to take advantage of economic possibilities in a meaningful way. The research will also be helpful to companies in terms of better understanding the benefits and difficulties connected with the implementation of comprehensive quality management in this industry in a timely and effective way.

Keywords: Management practice, Project performance, Manufacturing industries, Malaysia

1. Introduction

According to recent research, business organizations and companies are being pushed to embrace various platforms that will add value to their current business processes to survive and perform better in the contemporary business environment (Tarofder et al., 2017). However, it has been observed that the number of construction projects is increasing. The size and complexity of the manufacturing organizations involved in building facilities projects in Malaysia are also growing in size and complexity (Ruqaishi and Bashir, 2013; Moha Asri and Azam, 2017). Although there are a variety of reasons for this, including project managers' concerns, lawsuits between project parties, environmental issues, loss of productivity, and even contract termination in some cases, construction projects that are currently underway in the manufacturing sector have been delayed. According to Kharusi (2012), the Manufacturing industry confronts various difficulties linked to the size, location, and maturity of the operation and the expense of sustaining the process. Apart from that, quality, pricing, flexibility, and customer service are the other significant elements that pose difficulties for the country's manufacturing industry. These are the factors that must be considered (Kharusi, 2012).

Aside from this, a lack of openness and management experience in Malaysia may also pose significant obstacles to the successful implementation of Total Quality Management techniques. Additionally, lack of cooperation between various departments, regulatory restrictions, and inadequate technical and administrative skills may all pose obstacles to manufacturing organizations' success in building facilities projects in Malaysia, amongst other difficulties (Parast and Adams, 2012).

Building facilities projects in the manufacturing industry are beset by many companies, such as a poorly organized system and a lack of integration between various divisions within the organization. To solve these types of issues, company management needs to embrace new quality management methods. Furthermore, Alsaidi (2014) stated that poor strategies adopted by oil service companies, failures of equipment performance, and a lack of skilled personnel and planning were the primary causes of the manufacturing industry, all of which were responsible for the creation of significant monetary losses. So the primary goal of this research was to assess the impact of comprehensive quality management implementation in manufacturing industries projects across Malaysia and to provide recommendations for the future.

2. Literature Review

In today's highly competitive business environment, organizations need to maintain a high level of quality in their goods to satisfy the expectations of their customers. According to the Oxford Dictionary, quality may be described as excellence compared to similar things. However, the word "quality" is most closely linked with the features of the product and service and the degree of customer satisfaction in a statistically meaningful way (England, 2013). With several methods, it is possible to define the word "quality," which may be interpreted in the following ways. According to Tayeb (2008), quality may be defined as the goodness of a product generated from philosophy in the Transcendent quality approach. According to this perspective, quality may be considered an absolute and globally recognized word that is subjective and objective. When using a product-based method, on the other hand, quality is evaluated in terms of performance at a reasonable price and the greatest possible outcome for specific client circumstances. A manufacturing-based method may determine quality by looking at the results of engineering and manufacturing processes and comparing them to expectations. A variety of factors, such as rework or product failure, cost of scrap, and deviations from design requirements, are taken into consideration in the context of assessing quality (Tayeb, 2008).

The manufacturing sector in Malaysia, on the other hand, according to Rapaport (2014), requires companies to concentrate on things like production and manufacturing, environmental stewardship, and compliance with regulations governing the health and safety of employees at their places of employment for the sector to be competitive. In this industry, supply and demand are critical variables to consider. Additionally, many kinds of expenses are associated with manufacturing development activities, such as the processing and storage of crude Manufacturing, manufacturing delivery to the customer within a specific time frame, and logistics and process control costs (Rapaport, 2014). As Tayeb (2008) points out, there are many kinds of expenses connected with quality, such as the cost of prevention, the cost of the evaluation, the cost of internal failure, the cost of external oversight, and so on. In different industries such as oil & gas and construction, quality planning, supplier quality evaluation, process control, training, and quality audit costs all fall under the category of prevention costs and are expended to prevent errors in all functions within the enterprise to prevent the mistakes. Companies incur appraisal costs in performing inspections and determining if goods and services are meeting customer expectations, among other things.

However, the costs associated with internal operations failures inside companies are substantial. These include failure analysis, downgrading, rework, and scrap costs, to name a few.

Companies must alter their business strategy, values, and culture to better compete with their key rivals and thrive in today's business climate. This will enable companies to lead employees and keep them with the firm for longer. Successful implementation of a TQM program includes incorporating quality culture as a critical component, enhancing project delivery while reducing unfavorable attitudes among employees toward the organization and their work objectives (Duh, Hsu, and Huang, 2012). However, in establishing a quality culture in Malaysian manufacturing companies, a variety of problems such as severe working conditions, insufficient regard for one's abilities, and insecure job prospects, among others, may pose a challenge. In addition, several other variables, such as leadership style, poor performance, and organizational dedication, had a significant impact on the way businesses were conducted and the culture of any organization.

According to Subramaniam (2014), management of Malaysian companies would be unable to manage multi-cultural workforces and improve the quality, performance, and profitability of firms in the global world if they did not understand the relationship between leaders and their outcomes, performance, and commitment. TQM may be beneficial for businesses in establishing a framework for organizational change and improving their ability to respond to their changing environment. In addition, companies can use quality management techniques to get the most out of employees at all levels and to get the most out of employees at all levels so that poor working conditions, delays, and rework problems can be reduced, which can cause a delay in the development of a quality culture in the organization (Subramaniam, 2014). Among other things, PDO has signed a contract with the United Nations Global Compact (UNGC) to develop a quality culture and promote different values, such as a dedication to ethical business practices, human rights, anti-corruption labor practices, and environmental protection at the workplace (PDO report, 2015).

Furthermore, Yazdani et al. (2017) discovered that for managing human resources, various HRM practices such as employee career planning, training and development, and quality performance, as well as meeting the expectations of employees by communicating with them regularly, can be beneficial for the management of Manufacturing companies in Malaysia, according to their findings (Yazdani et al.,2017). Companies' management

can benefit from intrinsic motivation, delegation, and job enrichment because it increases worker pride and involvement in decision-making processes. According to the World Economic Forum, this can help them better use their human resources while also improving their skills and performance. As a result, management in the construction industry in the United Kingdom and Jordan must be involved in strategic planning and other resource management methods to foster a positive culture geared toward continuous quality improvement. For example, the management of the Malaysian Oil Company has created an internal control framework to guarantee the dependability of the system of internal controls and support operational effectiveness to manage risks and controls in its company and keep operational effectiveness (De and Petrillo, 2008). Company resource management policies in Malaysia may influence companies by controlling conflicts of interest, improving operational efficiency, and improving operational support effectiveness. Nonetheless, technological resource management must be implemented alongside human resource management to companies to increase efficiency.

Although this is true, a variety of issues, such as technical difficulties, a lack of adequate resources to deal with maintenance issues, and a failure to keep up with technological advancements, can pose a threat to the successful completion of the manufacturing industries project sector in Malaysia within the stipulated time frame (Babatunde and Low, 2007). The absence of cooperation between various departments and the lack of administrative skills, on the other hand, may cause a stumbling block in the development of facilities in Malaysia, as can regulatory restrictions (Elfaituri, 2012).

After considering the research gaps identified by many academics in their previous studies, the researcher performed the current analysis and developed a generic model that took these factors into account. The researcher has also concentrated on developing an evaluation tool for manufacturing organizations involved in building facilities projects in Malaysia, considering a variety of variables. In addition, to achieve the goals and objectives of the current study, the researcher has collected case studies from several manufacturing companies that have effectively integrated Total Quality Management (TQM) into their business operations.

As a result, it can be said that thorough knowledge and evaluation of overall quality management procedures in facilities projects in the Manufacturing sector utilizing assessment tools are needed to overcome the obstacle and obtain substantial benefits. In addition to this, the current study provides information on current trends in the Malaysian manufacturing industry, a

detailed description of the Manufacturing industries project, TQM concepts, and related cases to help readers better understand the deployment of quality management practices in the construction of facilities projects and the improvement of manufacturing efficiency, among other things. The accompanying picture (Figure 1) shows the conceptual framework of this research centered on the variables. It explains the hypotheses that will be tested throughout this investigation, which follows the theoretical and empirical reviews:

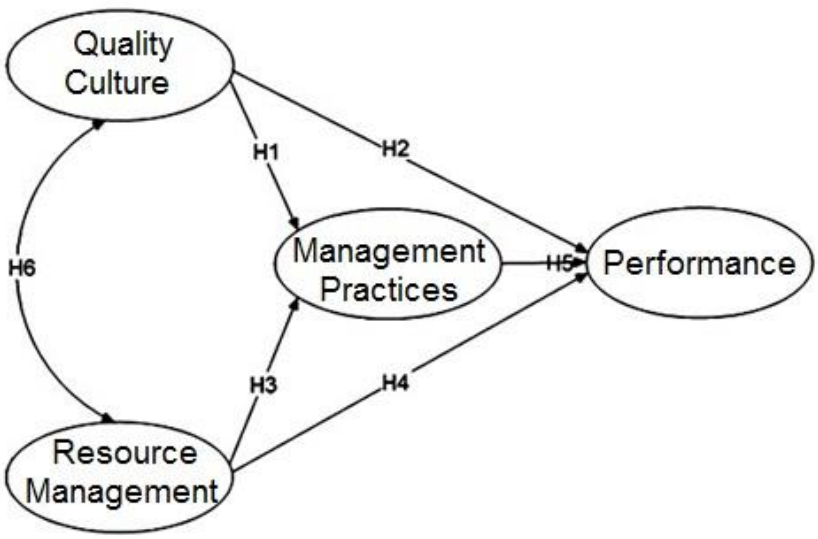

Figure 1: Conceptual Framework

Hypotheses Development

Based on the conceptual framework and the above variables, it can be seen that seven hypotheses are formulated to test whether there are significant relationships between quality culture, resource management, and management practice and overall performance.

The hypotheses that will be tested in this study are as follows:

H_1: There is a positive relationship between quality culture and management practice

H_2: There is a positive relationship between quality culture and overall performance.

H_3: There is a positive relationship between resource management and management practice

H_4: There is a positive relationship between resource management and overall performance

H_5: There is a positive relationship between management practice and overall performance

H_6: There is a reciprocal relationship between management practice and overall performance

3. Research Methodology

Contractors who have a legal registration are among the first groups of people who should be targeted. The outstanding and first-class contractors who have been chosen are listed on the website. The target audience consisted of 21 construction companies. Companies with little practical and administrative expertise in the critical success elements of TQM implementation, such as those enrolled in the second, third, and fourth classes, were overlooked for inclusion in the TQM program. Secondly, the Ministry of Commerce and Industry has identified consulting engineering offices. All of the consulting engineering services utilized in this research were provided by seven consulting firms that are legally registered in the manufacturing industry. The third target audience consisted of business owners (customers) or top-tier operators. The target audience consisted of five business owners.

This method will be helpful for the researcher in identifying the reasons that compelled companies involved in the development of manufacturing facilities projects in Malaysia to adopt Total Quality Management. When drawing a sample from a large population, it is possible to use a random sampling method. About 443 sample size has been used to assess respondents' views regarding key success elements and the effect of total quality management implementation in building facilities projects in Malaysia's manufacturing

sector. The survey will be conducted in English. According to the findings of this research, continuous improvement is also beneficial when companies seek to enhance the performance of their employees. This is because manufacturing companies will satisfy their employees most suitably with constant progress. Facilities projects in Malaysia's manufacturing industry significantly affect the overall quality management techniques used in the organization.

4. Research Findings

To conduct the research, the respondents were divided into two groups based on their gender: 228 men and 72 women. According to the questionnaire results, 76 percent of respondents were male, and 24.1 percent were female. They all expressed their opinions on the significance of quality management in the manufacturing sector in Malaysia, as shown by the percentages.

The education of responders and their knowledge of technology may be critical in the effective implementation of Total Quality Management. It is apparent from the results that respondents with varying levels of education and experience have various perspectives on the subject of TQM implementation and distinct ways of thinking and perceiving the subject.

Sixty-four percent of respondents have finished a bachelor's degree. In contrast, according to the survey results, 14 percent have obtained a postgraduate or higher degree, 15.7 percent are pursuing a certificate, and six percent have graduated from professional courses. Compared to those with a postgraduate degree and others, those with a bachelor's degree received the most significant number of responses out of 300 total responses. In addition, the professional degree holder has the lowest frequency of occurrence. In addition, the table displays the degree of education requirements met by the respondents and their level of education. According to the information collected from respondents from various manufacturing companies in Malaysia, resource and process management may play a critical role in this process. Participants presented their perspectives on the essential elements of success needed for Total Quality Management (TQM) in building manufacturing facilities projects in Malaysia based on their previous working experiences. To better understand this subject, the researcher gathered information from various profile individuals who are directly or indirectly connected with the industry and are familiar with TQM. Managers/project

managers, technical engineers, site engineers, and members of the project support team were all represented in the respondents' portfolios.

According to a responder portfolio, the most often answered position in an organization is a project manager, who has a 41 percent share of the work and a frequency of 123 in the organization, and who has the most significant proportion of the position in an organization. The second-largest balance is shared by site engineer and project support, who get 22.7 percent, followed by technical engineer and project support, who receive 22.3 percent and 14.7 percent, respectively. Different roles within an organization and a project have other points of view. Another significant result of the current research is the number of experiences individuals have had in their lives. According to the survey results, respondents range in experience from 1 to 5 years, 48.7 years to more than ten years, and 5.3 years to more than twenty-five years. It is estimated that the responding parties will be engaged in project valuation, whose division is shown in the preceding table. The total investment cost will be less than 5 million USD in 17.5 percent of the project. 40.9 percent of respondents have invested between $5 million and USD 10 million, making them the most critical group of respondents. According to the secondary research findings, a thorough understanding of the behaviors and attitudes of employees involved in the TQM process is required to increase participation of all staff members in the pursuit of common goals and the efficient management of funds in a systematic manner (Adefolalu, 2013). TQM will also assist companies in significantly lowering their costs and fulfilling the expectations of their consumers within the time frame set out by the company (Bassey, Usang, and Edom, 2007). According to the researcher's findings, there is a statistically significant difference in perception between male and female participants. According to the research results, education, total industry experience, and the organizations in which they work may all have an industry on the ability of Malaysian companies to adopt Total Quality Management in their operations.

Exploratory Factor Analysis (EFA)

A data reduction method known as factor analysis is frequently utilized to discover the underlying dimensions in multivariate data analysis. This method eliminates any redundant or highly correlated variables from the data file. It replaces them with a smaller number of variables, also known as factors, that are more closely linked to one another.

In statistics, the Kaiser- Meyer- Olkin (KMO) statistic estimates the percentage of variation in the variables that are thought to be explained by an underlying factor (or factors). In terms of statistics, it determines whether or not the partial correlations between variables are modest. Also of note is that the KMO of this research is 0.815, which means that it is more than 0.8, which is regarded to be good. Additionally, Bartlett's test is 0.000, which is less than 0.005, which is less than 0.005. This implies no significant correlation or coefficient between the items, and it also recommends that an EFA be conducted.

Furthermore, if the variances are not dependent on one another, the overall variance will equal the number of variables included in the analysis unless otherwise specified. When deciding on the number of components to have, the eigenvalue is often employed. The first component retrieved explains much more variation in the observed variances than the following factors. The variables in this research explained 61.990 percent of the total variation seen in the data. In this case, the rotation optimizes the factor structure. One of the consequences of these data is that the relative significance of the six factors is equalized throughout the sample.

It was chosen for this research because it is an orthogonal rotation technique that reduces the number of variables with a high loading on each component, which is advantageous. This approach makes it easier to understand the factors since it simplifies the process.

The next step is to examine the content of questions scored on the same factor to find any similar themes among them. The result of the rotated component matrix is shown in the following table.

Table 3: Rotated Component Matrix

Item Code	Item/Statement	Factor			
		Quality Culture	Resource Management	Management Practice	Overall Performance
Q12	Quality forms part of organizational culture.	.809			
Q13	Top management can identify the responsibilities for quality performance. To support total quality culture.	.792			
Q14	Involvement in the total quality objective task definition, budgeting, and measurement.	.443			
Q27	The recruitment/selection procedures in the organization are valid. The employees are qualified to hold the assigned responsibilities.		.574		
Q28	Career development, welfare, and training programs emphasize quality management in the organization.		.705		
Q29	Suggestions and complaints system in place, with target timescale for management to respond.		.409		
Q20	Senior Executives are directly involved in establishing, evaluating, and communicating the organization's vision and mission plans, policies, and values of the quality program.			.862	
Q21	Senior Executives stress the accuracy and reliability of all information and			.705	

	communication within the organization.				
Q22	Involvement in the total quality objective task definition, budgeting, and measurement			.409	
Q23	Top management allocated resources to maintain/improve the quality.			.405	
Q2	The cost of quality process performance is based on defined standards.				.676
Q3	The team members share responsibilities to the project objectives.				.596
Q4	Team meetings and conducted efficiently.				.549
Q5	The project delivered is expected the level of quality.				.525
Q6	Performance and commitment management of Malaysian companies can be beneficial in managing multi-cultural workforces and improving the quality, performance, and profitability of firms.				.488
	Extraction Method: Principal Axis Factoring. Rotation Method: Varimax with Kaiser Normalization.				
	a. Rotation converged in 6 iterations.				

Measurement Model

The measurement model for the framework was created by merging 15 elements derived from each final individual measurement model in turn. According to the findings, it seems that all factor loading values are more than or equal to the necessary cut-off point of 0.5. When looking at the model fit

indices, it can be observed that the model fits the data well, as shown by the absolute fit indices and incremental fit indices, as well as the RMSEA values; nevertheless, the GFI, CFI, NFI, IFI, and TLI values are closer to the typical cut-off values than the RMSEA.

Table 4: Model Fit Indices for the Measurement Model of the Framework

χ^2	df	χ^2 / df	GFI	RMS	NFI	CFI	IF	TLI
58.963	27	2.192	0.935	0.070	0.777	0.873	0.839	0.910

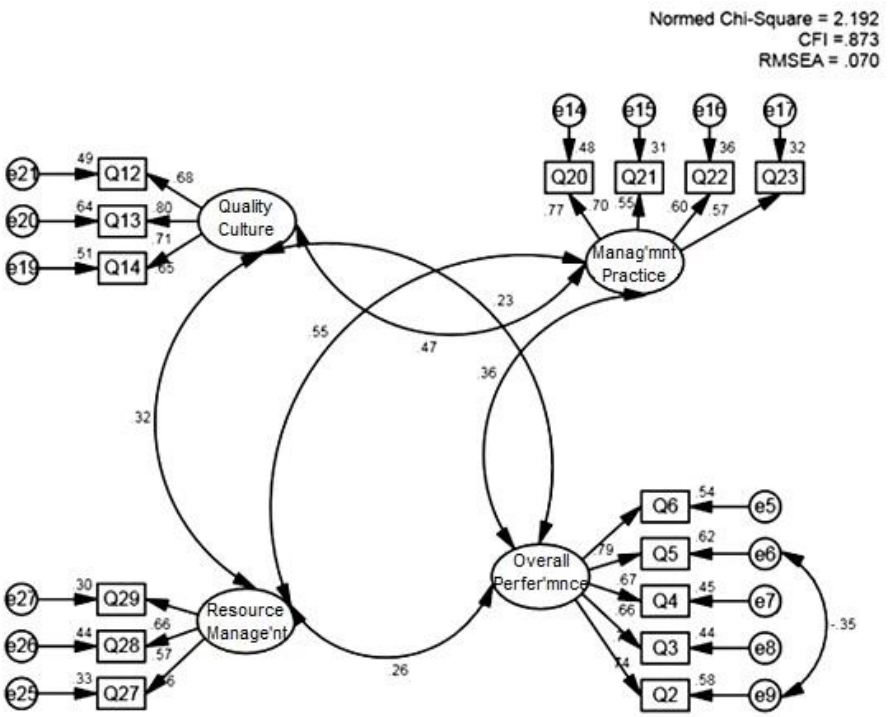

Figure 2: Measurement Model for the Framework

Table 4 demonstrates that AVE values for the entire constructs are higher than 0.5. Furthermore, the CR values are higher than the AVE values, indicating the convergent validity.

Table 4: AVE and CR Values for the Structural Model

Variables	AVE	CR
Quality Culture	0.63	0.85
Resource Management	0.59	0.82
Management Practice	0.67	0.89
Overall Performance	0.53	0.87

Hypothesis Testing

The hypothesis is a statement that the researcher sets out to accept or reject based on the data collected. The six hypotheses are summarised as follows:

Table 5: Summary of Hypothesis

Hypothesis	**Remark**	**Reference**
H1: There is a positive relationship between Quality culture and management practice	Accepted	Figure 2, path coefficient
H2: There is a positive relationship between Quality culture and Overall performance	Accepted	Figure 2, path coefficient
H3: There is a positive relationship between Resource management and management practice	Accepted	Figure 2, path coefficient
H4: There is a positive relationship between Resource management and Overall performance	Accepted	Figure 2, path coefficient
H5: There is a positive relationship between Management practice and Overall performance	Accepted	Figure 2, path coefficient
H6: There is a reciprocal relationship between Quality culture and Resource management	Accepted	Figure 2, path coefficient

CONCLUSION AND RECOMMENDATION

As per the research findings, companies must concentrate on various technologies to achieve competitive advantages in customer attention, quality, cost, and delivery of goods within the specified time frame. All of these factors, as well as the potential benefits of implementing Total Quality Management (TQM) in various sectors such as the Libyan and Saudi Arabian industrial sectors, are motivating businesses to adopt multiple platforms and techniques to add value to existing business processes and perform better in the modern business environment (Alsaid, 2014). Also mentioned was the need for comprehensive quality management in the Malaysian building industry. The actual research results will thus be discussed and summarised in this part, which will use the analysis given before to provide a relevant interpretation of the findings. The results are based on the research goals described in part one, and they address the recommendations to enhance overall performance, as indicated in section two.

The research of Al-Hatmi and Tan (2013) found that the lack of consistency and coordination in policy, the deployment of renewable energy has grown at a glacial pace, the lack of clarity in the strategic plan for renewable energy, the absence of a financing system specifically for renewable energy projects, and the inappropriate allocation of funds in development for renewable energy and rapid growth are the most significant challenges facing the renewable energy sector. A variety of policies ranging from interest-free or subsidized loans to tax exemptions and loan repayment schedules with more extended repayment periods to visas and permits for foreign workers, among other things, are favorable for domestic and international firms looking to invest money in the manufacturing sector. As a result, the current research offers fresh insight into the entire performance space, which may be beneficial to the industry and may have consequences for policymakers and the government at large. The country's administration developed the Vision 2020 plan, which aims to decrease the country's reliance on oil while focusing on diversification, modernization, and the promotion of competition at all levels. The absence of trained labor, a lack of primary education, underutilization of work, and a lack of integration of Malaysia into the global economy are significant shortcomings posing problems for the manufacturing industry. Manufacturing is the backbone of the country's economy, and it generates the majority of the country's income. As a result, the government has a difficult task regarding long-term revenue generation (Al Hatmi and Tan, 2013).

According to both external and internal analyses of the nation, Malaysia's manufacturing industry is one of the most important contributors to the country's economic growth. Along with this, it integrates with a variety of other sectors. It impacts various activities, including the creation of jobs and the stimulation of industrial growth. Overall performance is significantly influenced by the practice's cultural foundation, resource management, management practices, and organizational structure.

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