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The Effect of Strategic Planning on Quality Control in The Iron and Steel Industry in Libya

Omar Ibrahim Azouza^{1*}, Khairi Ahmed R. Masaud¹

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ABSTRACT

The present study aims to investigate the phenomenon under examination through a rigorous academic lens. The determinant of a company's competitive edge and sustainability in the marketplace is primarily attributed to the factor of quality. Strategic planning plays a pivotal role in influencing quality control outcomes. Therefore, the objective of this study is to examine the influence of strategic planning on quality control within the Iron and Steel sector in developing nations. The study's objectives were accomplished through the implementation of a quantitative methodology. During the data collection phase of this study, a sample of 384 employees employed at the Libyan Iron and Steel Company was obtained. The study employed Structural Equation Modeling (SEM) to assess the influence of strategic planning on quality control. The results of this study demonstrated a statistically significant and positive relationship between strategic planning and quality control. The present study provides practical implications, offers recommendations for future research directions, and acknowledges certain limitations.

INTRODUCTION

Public organizations in developing nations encounter substantial obstacles in addressing development requirements, particularly within politically and economically unstable countries such as Libya (Ghumim *et al.*, 2022). The public institutions involve various sectors, including the industrial sector, which is widely regarded as the fundamental driver of modern economic progress. According to Ghumim *et al.* (2023), establishing basic infrastructure is of utmost importance as it is the foundation upon which various initiatives and strategies for industrial and civil development, housing, and services rely. Strategic planning and substantial investments in technology and infrastructure are imperative for the industrial sector to attain holistic progress and surmount the challenges mentioned above.

Libya is widely acknowledged as a significant oil-producing nation within the African continent. Nevertheless, Libya endeavors to enhance its corporate performance in an alternative industry, aiming to mitigate its reliance on oil and broaden its portfolio of national revenue streams, including ventures in foreign nations (Alsamawi *et al.* (2019a; Azouza, & Masaud, 2013), and Alsamawi *et al.* (2019b)). In addition, Libya possesses substantial reserves of iron ores and is actively pursuing strategies to broaden its domestic revenue streams and decrease its reliance on petroleum. Consequently, allocating resources to the iron and steel sector becomes imperative as it is pivotal in fulfilling domestic demands across numerous nations (Azouza, & Masaud, 2013). The resource mentioned above plays a significant role in job creation and enhancing the quality of life for individuals. Organizations have come to recognize that the quality of

their product and services plays a critical role in setting them apart from their competitors (Zumrah, 2019; Alrefaei *et al.*, 2019). In market success, it is evident that organizations that offer products of superior quality are poised to attain a substantial competitive edge (Al-refaei *et al.*, 2023). Quality is the primary determinant in the iron and steel industry.

Quality in the iron and steel industry is the element that determines a company's ability to compete, survive in the market, and maintain its operations (Godina & Matias, 2018). As a result, industrialized countries in Europe, the United States, and China have shown increasing interest in advanced manufacturing technology (European Commission, 2010; Zhou, 2015). This growing interest can be attributed to the emergence of new challenges resulting from advances in industrial technology (Al-Muhrami *et al.*, 2021), and the adoption of smart manufacturing practices. According to Chen *et al.* (2017), there has been a gradual increase in industrialization and relocation of industries for export (p. 6505). The emergence of smart manufacturing is expected to have significant and long-lasting impacts on the global manufacturing landscape.

Given that this production process is characterized by its continuous nature, the ongoing detection and testing process poses significant challenges. It necessitates substantial investment in the company's effort, time, and financial resources. This point originated from the concept of optimizing efficiency and cost-effectiveness through three fundamental processes. In order to maintain and guarantee quality, as defined by Juran (2000), a development process is implemented in the management of production processes. This process

¹ Iqra Business School, Universiti Geomatika Malaysia, Malaysia

* Corresponding author's e-mail: omarazouza@gmail.com

incorporates strategic planning mechanisms to ensure the quality of products and their adherence to internationally approved specifications set by the Libyan Iron and Steel Company - Misrata. This approach also aims to minimize production time, effort, and cost while enhancing the company's productivity.

In fact, these companies seek to reduce production interruptions due to failure to keep up with the industry or poor product quality, to reduce waste of resources, and to better adapt to customer needs and remain competitive in the market (Ait-El Cad *et al.*, 2021). Enterprises need mutual standards and strategic planning for production, maintenance, and quality, as production process management and quality controls must be developed together (Wang *et al.*, 2019). Because production systems deteriorate over time, and in fact, most failures depend on the deterioration of machines and lead to poor quality because quality deteriorates with the deterioration of management of production processes (Bouslah *et al.*, 2018).

Since this production process is a type of continuous production, the continuous detection and testing process is an extremely difficult process and costs the company a lot of effort, time, and money. From here emerged the idea of saving time and effort and reducing costs through the three basic processes. To control and ensure quality, which was defined by Juran (2000), through conducting the development of production processes using strategic planning mechanisms to ensure the quality of the products and their conformity with the international specifications approved by the Libyan Iron and Steel Company - Misrata - not to mention reducing time, effort, and cost of production and increasing the company's productivity. On the other hand, the absence of a strategic vision by industrial companies in Libya and weak strategic planning are considered among the most important obstacles facing the industrial sector in Libya, and make it unable to compete with the quality level of its products in the international market (Bin Saleh & Al-Rutimi, 2019, p. 3). Although there is a relationship between strategic planning and quality control (Al Kadri & Widiawati, 2020; Hitt *et al.*, 2021), researchers have not been interested in studying the relationship between strategic planning and quality control, and therefore, this study attempts to cover this research gap through conducting a study of the role of strategic planning and quality control in the Libyan Iron and Steel Company, Misrata.

LITERATURE REVIEW

The field of strategic management has transformed, shifting from a primary focus on planning to a more encompassing management strategy. This approach aids organizations in aligning their overall direction with specific aims, thereby facilitating strategic change. scholars provided an early exploration of strategic management in industry, wherein he defined it as the process of establishing the fundamental long-term goals and objectives of an enterprise (Vinzant, & Vinzant,

1999). It is the process of developing organizational methods and structures (Aminu Umar *et al.* 2020). Additionally, strategic management involves the selection of appropriate courses of action and the allocation of resources essential for the achievement of these goals.

Strategic planning becomes very important to pay attention to every company, companies face challenges in achieving competitive advantage in a highly competitive business environment. One of the primary problems is the inefficiency of production costs, which hinders their ability to offer competitive prices and create unique products. Therefore, strategic planning has a critical role in solving many problems of the companies and enhancing competitive advantage. Companies need to take into account external stakeholder desires, internal company motivation, and company databases when crafting effective strategies to gain a competitive edge in the market (Mulyaningsiha *et al.*, 2021).

The literature suggests that strategic planning plays a crucial role in quality control and has a significant impact on quality performance and cultural changes. Strategic planning helps organizations define their long-term quality goals and allocate resources to achieve them. It involves continuous improvement in processes, procedures, and administrative systems, leading to the development of a new product that is different from the original product (Abdualdaem, 2021). It also promotes continuous learning and the use of global product development practices. The Toyota Way, for example, emphasizes the importance of strategic planning in achieving quality and performance excellence (Anh, Yen, & Matsui, 2015). Studies have shown that strategic planning has a positive effect on the performance of organizations, It helps organizations improve their economic performance, enhance their environmental and social aspects, and achieve sustainable development (Sadeghifar *et al.* 2015; Mokhlis *et al.*, 2019). Production process management that is included in the company's strategic planning has a positive effect on quality control in the iron and steel industry in Libya (Azouza, & Masaud, 2013).

Strategic planning also includes steps such as determining the customer, understanding their needs and expectations, developing products and services to meet those needs, and developing systems to provide the necessary skills for quality provision. Achieving total quality management in the organization can lead to benefits such as quality control, evaluation, and development of curricula, evaluating performance in the organizational system, developing teamwork style, and creating of organizational structures that focus on the quality of control (Abdualdaem, 2021). Strategic planning helps create a quality culture within the organization, where employees work as a team and accept their responsibilities for quality, it emphasizes the importance of leadership and communication in promoting a quality culture, which leads to improved quality control (Oludele, 2021).

Previous studies have found that strategic planning plays a crucial role in quality control. One study conducted

by Qara-Mohammed Al-Zwainy (2021) emphasized that strategic planning is essential for organizations to be proactive in shaping their future and exert control over their product quality. Strategic planning allows organizations to create and sustain competitive advantages (Hunitie, 2018). Another study conducted by Oludele (2021) found that, strategic planning has a positive effect on organizational efficiency and effectiveness, and then overall performance. Furthermore, the application of SWOT analysis, which is a part of strategic planning, can help identify weaknesses and strengths in the quality control system and guide the treatment of problems and defects (Kitagawa *et al.* 2016).

MATERIALS AND METHODS

The researcher utilized a quantitative approach in this study to obtain accurate information of the variables and to examine the hypothesis by analyzing data related to the influence of strategic planning improvement on quality control at the Libyan Iron and Steel Company in Misurata. The survey in this research comprises eleven inquiries about strategic planning and thirteen questions addressing quality control. Nonprobability sampling, specifically purposive sampling, was utilized in this inquiry. This sampling technique was chosen in consideration of the study's objective, which is to examine the effects of improving strategic planning on quality control at the Libyan Iron and Steel Company in Misurata. The approach described in the study can achieve the intended goals (Malhotra *et al.*, 2016). This is because personnel in the quality control and strategic planning divisions possess the most expertise regarding the variables under investigation. Participants are invited to answer the survey inquiries, which will be utilized to further the research objectives (Sarstedt & Mooi, 2019). The probability sample technique might not yield precise responses concerning those variables. Due to the probability sample indicating that the respondent is employed in a department distinct from production and quality control and possesses adequate expertise to respond to the questionnaire inquiries, it is possible that his answers will not contribute to the study's goals or be of sufficient assistance (Denis, 2020).

The questionnaire was developed based on previous studies, strategic planning was measured by 11 items developed for this study, the example of the items "The company exercises strategic planning in all its operations and activities, Opportunities and threats are considered in the development of strategic plans, The company identifies areas that distinguish it from other competing firms". The Cronbach's Alpha Coefficient was 94.6%. While quality control construct was measured by 13 items developed by Azouza and Masaud (2023), the example of the items "The company allocates time to ensure that quality improvement plans are implemented, The company allocates time to ensure that quality improvement plans are implemented" The Cronbach's Alpha Coefficient was 93.3%.

Self-administration is a data collection approach wherein questionnaires are distributed to participants for their independent completion. For this investigation, a total of 550 employees from diverse departments were surveyed utilizing the aforementioned methodology. A total of 406 questionnaires were examined. As of 394 valid responses, 71.63 percent of the total were received. When compared to prior research conducted in Libya, such as that of Ghumiem *et al.* (2023), the response rate appears to be reasonable and rational. For the purposes of this inquiry, 394 questionnaires were deemed complete and legitimate for analysis.

RESULTS AND DISCUSSION

The measurement model was assessed in this investigation by employing AMOS and Confirmatory Factor Analysis (CFA). Evaluation of the measurement model was carried out in two phases: The degree of alignment was initially assessed. Following an assessment of convergent and divergent validity, we proceeded to analyze the construct validity. Through analysis of the structural model, the significance level of the relationships between the variables was ascertained. In accordance with the methodology proposed by Byrne (2016), the significance level of the relationships was ascertained using the critical ratio value, which is assumed to be below 1.96. as used by previous studies such as (Alshuhumi *et al.*, 2023).

Demographic Profile of Respondents

Table 1 displays the demographic and profile information of the respondents; the total study sample consisted of 394 Misurata employees of the Libyan Iron and Steel Company. 2.0% (N=8) of the respondents were younger than 30 years old; 23.4% (N=92) were between 30 and 40 years old; 33.5% (N= 132) were between 41 and 50 years old; and 41.1% (N=161) were older than 50 years old. Regarding their level of education, 22.3% (N=88) hold a secondary school diploma, 32.0% (N=126) hold a high school diploma, 41.6% (N=164) hold a bachelor's degree, and 4.1% (N=16) hold a master's degree. 1.8% (N= 7) have been in the company for less than five years, 7.9% (N= 31) have been in the company between five and ten years, 15.5% (N= 61) have been working between eleven and fifteen years, and 74.8% (N= 295) have been working for more than fifteen years. The demographic profiles of the respondents are shown in Table 1.

Assessment of Measurement Model

The measurement model includes two latent variables (strategic planning and quality control). Estimates of factor loadings for all variables included in the model exceeded the recommended level, ranging from 0.71 to 0.82 for strategic planning and from 0.70 to 0.86 for quality control, which were greater than the cutoff value determined previously by (Hair *et al.* 2020; Zumrah *et al.* 2021). The CFA results for the measurement model depicted in Figure 1 indicated a satisfactory model fit for the metrics: χ^2 statistic = 643.184, $p < 0.000$, $df =$

249, CMINDF = 2.58, TLI = 0.94, CFI = 0.95, RMSEA = 0.063 (Hair *et al.* 2019); These metrics are adequate for evaluating model fitness (Kline, 2016; Zumrah *et al.*, 2021). listed below.

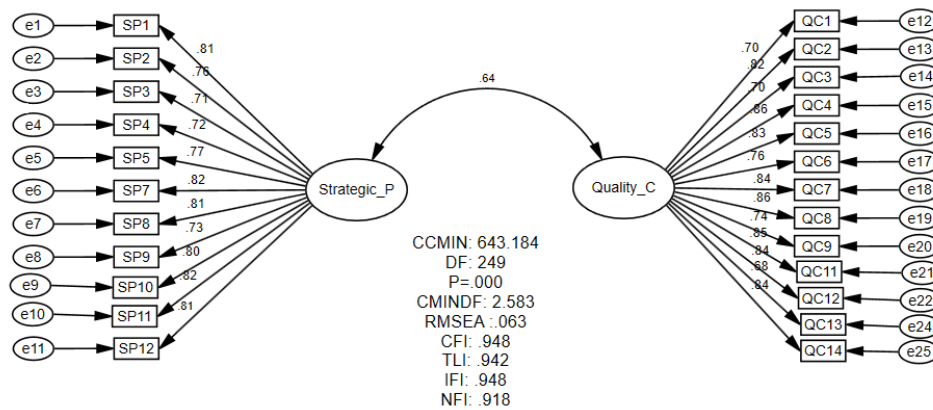


Figure 1: Measurement Model of the study

The current model's reliability and validity were determined by calculating Cronbach's Alpha and composite reliability (C.R) of the constructs. On the other hand, the factor loadings for each item were evaluated to ascertain the convergent validity (CV) of the models, as well as the average extracted variance (AVE) as suggested

by Kline, (2016), and (al-refaei *et al.* (2023). Cronbach's Alpha was 0.94 for strategic planning and 0.95 for quality control. The C.R. for each construct had satisfying values; for strategic planning, it was 0.96; and for quality control, it was 0.96; these values were above the specified cut-off value of 0.70. (Hair and others, 2019; Al-refaei, Zumrah,

Table 1: Reliability, indicators' factor loading, and constructs' validity

Construct and Indicators	Loading	Alpha	CR	AVE
Strategic Planning				
SP1	0.81	0.94	0.94	0.61
SP2	0.76			
SP3	0.71			
SP4	0.72			
SP5	0.77			
SP7	0.82			
SP8	0.81			
SP9	0.73			
SP10	0.80			
SP11	0.82			
SP12	0.81			
	0.81			
Quality Control				
QC1	0.70	0.95	0.96	0.64
QC2	0.82			
QC3	0.70			
QC4	0.86			
QC5	0.83			
QC6	0.76			
QC7	0.84			
QC8	0.86			
QC9	0.74			
QC11	0.85			
QC12	0.84			
QC13	0.68			
QC14	0.84			

and Al-shuhumum, (2019). In contrast, the AVE ranged from 0.061 to 0.64 for each construct, which was greater than 0.50 and less than the C.R. value predicted by Hair *et al.* (2019). Consequently, the convergent validity (CV) of the measurement model is established.

The concept of discriminant validity (DV) assesses the degree of difference between two variables. Al_alrefaei *et al.* (2021). report that the Fornell Larcker Criterion (FLC) is commonly used to assess discriminant validity. (Fornell & Larcker, 1981) FLC requires that the value of the AVE square root coefficients in the correlation matrix be greater than the value of the squared correlation estimates of the

Table 2: FLC of all the constructs

Variables	Strategic Planning	Quality Control
Strategic Planning	0.78	
Quality Control	0.636***	0.80

construct. The result revealed that the square root of the AVE values was higher than the squared correlation of all the constructs as shown in table (2)

Structural Model

The structural equation model of the current study,

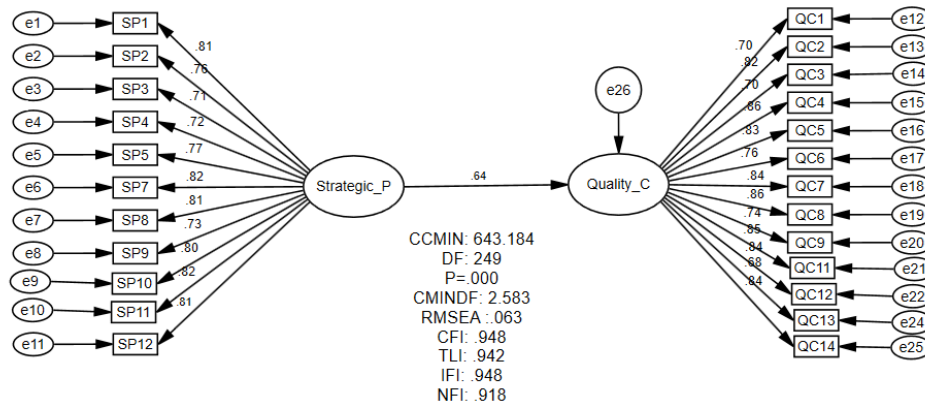


Figure 2: Structural Model of the study

shown in Figure 1, evaluates the direct effect of strategic planning on quality control. Model fit indices for the structural model indicate a reasonable fit (see Figure 1) with the following metrics: χ^2 statistic = 643.184, df = 224, CMINDF = 2.58, p 0.000, CFI = 0.95, TLI = 0.94, and RMSEA = 0.063. these metrics demonstrated a reasonable model fit for this model using these metrics as suggested by Hair *et al.* (2020).

Hypothesis Testing and Results

As shown in Table 4, the result structural model highlights the significance of the relationship between strategic planning and quality control. The t-statistic must be greater than 1.96, and the p-value must be less than 0.05, according to Byrne (2016). The standardized path coefficients for the influence of strategic planning on quality control were positive and statistically significant

Table 4: Standardized Regression Estimation

Path	Estimate		Standard Error	t-value (C.R)	p-value	Result
	USD	SD				
SP → QC	0.64	0.63	0.058	11.08	0.000	Supported

*Note: USD= Unstandardized. SD= Standardised, SP = Strategic Planning, QC =Quality Control

(= 0.64, t = 11.08, p = 0.000). Table 4 also depicts the result of the standardized regression estimation for the structural model.

DISCUSSION

The hypothesis in this study stated that there is a direct relationship between strategic planning and quality control from the point of view of the study sample in the Libyan Iron and Steel Company in Misurata. The results of statistical analyses showed a direct relationship between strategic planning and quality control in the Libyan Iron and Steel Company in Misurata. This means that the strategic planning process plays an important role in ensuring quality control within the Libyan Iron and Steel Company in Misurata because it helps it know, define and arrange its priorities and goals and plan its

activities by determining the required quality percentage in the product, planning the production process, and planning to ensure the availability of raw materials and the required quality. Setting goals and implementing methods and standards to measure quality all positively impact the quality control process in the Libyan Iron and Steel Company. In addition, the result of this study can be explained by the important role of strategic planning in quality control through proper planning of trained and qualified human resources that can play an important role in maintaining product quality assurance. The result of this hypothesis is considered an answer to the third question of the study, which asks about the extent of there being a direct relationship between strategic planning and quality control, as the result of the study indicated that there is a direct relationship between strategic planning and quality

control in the Libyan Iron and Steel Company in Misrata. The result of this study is consistent with the resource-based theory, which indicates that the ability of companies to exploit their internal resources and work to develop their production processes through strategic planning to exploit their available capabilities, gives them a competitive advantage through developing and improving the quality of their products (Hitt *et al.*, 2021). Therefore, when the Libyan Iron and Steel Company - Misurata conducts a detailed analysis of its capabilities and capabilities, determines its strengths, develops strategic plans to exploit its capabilities, works on the continuous development of production processes, studies market requirements and the capabilities of competitors, and knows the level of quality of their products, all of this leads to the development of The company's products, achieving the required quality of products and ensuring their continued development.

The result of this study is consistent with the findings of (Al Kadri, & Widiawati., 2020) that developing strategic planning based on the analysis of internal and external conditions, focusing on strengths and weaknesses, and analyzing opportunities and threats to determine positions and identify strategic issues works to improve quality in the education sector in Indonesia. The results of this study are also consistent with the results of the study conducted by Reskino (2021), which found that there is a significant and important impact of strategic management on the quality of information systems, and that implementing strategic planning works to improve the quality of accounting information systems by adopting changes in policies and rules that come from the internal environment. And external. The result of this study is also consistent with the results of the study conducted by Manning (2020), which indicated a relationship between strategic planning and the overall quality of local program management in local districts.

Implications of the Study

This study is regarded as one of the limited and rare studies that offer practical evidence on the enhancement of the quality of the final product of the Libyan Iron and Steel Company - Misurata. It sheds light on the significant factors that contribute to achieving the desired quality control, thereby granting Libyan production a substantial competitive edge. The present study aims to offer practical insights for managers involved in quality control at the Libyan Iron and Steel Company - Misurata. It seeks to provide them with a practical framework for strategic planning, leveraging accurate information to enhance production quality. The ultimate goal is to enable the continuous improvement of product quality, ensuring it meets the desired standards and is effectively controlled. The integration of production processes, strategic planning, and quality control has resulted in a seamless connection between the quality management and control process and other sequential processes within the company. The achievement of quality control

is contingent upon the ongoing enhancement of the production processes within the company.

LIMITATIONS

This section discusses the limitations of the study and provides suggestions for future research. The data collection process in this study utilized the cross-sectional method, as it involved the collection of data within a specific time frame. This study posits that conducting a comparable study utilizing data collection in two distinct periods, such as gathering data at different points of time and subsequently comparing the outcomes in the quality control process, would be advantageous. Additionally, it is recommended to investigate mediating variables such as employees' attitudes and behaviors (e.g. organizational commitment, organizational citizenship behavior, job satisfaction, job involvement, turnover) and performance to accurately ascertain the impact of strategic planning. The present investigation was carried out within the confines of a single organization, namely the Libyan Iron and Steel Company - Misurata. Conducting similar studies on multiple companies, either within the same sector or across different sectors, is advantageous in order to obtain more comprehensive and generalizable research findings.

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