Mediating Role of Operational Performance in the Relationship of Total Quality Management, Green Information Technology, Supply Chain Management and Firm Performance

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In recent years, there has been a surge of interest in the influence of operational performance activities on the performance of manufacturing organizations. In comparison to other industrialized countries, Iraq's manufacturing enterprises' supply chain management (SCM), total quality management (TQM), and green information technology (GIT) are still in their early stages of improving their operational performance (OP) and firm performance (FP) (FP). However, the

Iraq manufacturers companies should place a bigger emphasis on the importance. In this regard, the current study's purpose is to check mediating role of OP in the interaction of SCM, TQM, GIT and FP of manufacturing enterprises in Iraq. The data collection, self-administered by employing a convenient sampling strategy, was distributed across the manufacturing enterprises in Iraq and employed a quantitative research approach, cross-sectional research design and Partial Least Square (PLS)-Structural Equation Modeling (SEM) technique. The PLS-SEM results reveal that overall, TQM has a minor impact on OP while also having an insignificant and favorable impact on FP. In comparison, SCM has a favorable and considerable impact on the OP and FP. GIT also have a beneficial and big impact on OP and FP. The direct influence of OP also reveals that it has a good and significant impact on FP. The indirect mediating impact OP suggests that it did not mediate between the TQM and FP while considerably mediates the relationship between SCM and FP and GIT and FP. These added a body of literature to the earlier literature by employing GIT as an independent and OP mediating variable regarded as a pioneer study.

Keywords: supply chain management, green information technology, total quality management, Iraq

Introduction

Today's company operates in a highly dynamic business climate characterized by scarce vital resources and unclear commercial opportunities (Hult et al., 2007). Companies that fail to meet the market's stringent efficiency requirements will soon be eliminated. Under these circumstances, a business must carefully optimize its internal resources to maintain a competitive advantage (Chavez et al., 2012). This must be followed by constantly improving the company's internal operations (Lambert, 2008). Operational performance (OP) can play a major role in accomplishing this objective, particularly for industrial organizations. This is because manufacturing organizations typically lose corporate supply chain management that could be utilized to control these operations directly. Total quality management (TQM) and supply chain management (SCM) are two business philosophies that have resulted in the adoption of numerous operations planning (OP) techniques (Abbas, 2020; Malik et al., 2018). In other words, it was also proposed that green information technology (GIT) is an integral aspect of the OP that helps to improve the organization's overall performance (Chuang & Huang, 2018).

SCM has evolved from a passive to a proactive role in defining competitiveness and profitability in the current economy. Diverse authors acknowledged that implementing effective SCM (Kerdpitak, 2022) can generate a sustainable competitive advantage. They considerably impact competitive advantages, such as product availability and customer service. On the other side, Kerdpitak (2022)'s SCM was a key signal for increasing OP and FP. Alshurideh et al. (2022) also discovered that SCM is a major predictor of boosting FP (Habib et al., 2021). In other words, expanding production capacity does not necessarily necessitate the addition of capital or resources but rather the adoption of efficient quality management (Faraj et al., 2021). Alshourah (2021) elaborated on the positive effects of boosting quality in

several aspects of an organization's performance and activities. Alshourah (2021) also discussed the necessity of quality commitment for the spread of quality. Additionally, the usage of quality substantially affects OP and corporate performance (FP). TQM has been demonstrated to significantly enhance FP (Faeq et al., 2021). Numerous empirical examinations of quality management strategies resulted in the FP model (Haris & Tanpubolon, 2022; Syoemantri et al., 2021). On the other hand, green information technology (GIT) is a vital part of an organization's performance improvement (Cao et al., 2021). Moreover, the beneficial and substantial effects of GIT on FP were identified (Chou et al., 2022).

Prior research has demonstrated that SCM, TQM, and GIT are significant indications for OP and FP. In addition, earlier research has a variety of shortcomings. Prior research has primarily concentrated on industrialized nations (Daddi et al., 2021), while developing nations (Kerdpitak, 2022), particularly Iraq, have received less attention. In addition, past research has mostly concentrated on the two components, TQM and SCM on FP (Atnafu & Balda, 2018), while GIT on FP has received minimal attention (Llach et al., 2013). In addition, OP has received minimal consideration in prior research as a mediating variable.

On the other hand, past studies have primarily concentrated on other sectors, such as SMEs (Atnafu & Balda, 2018) and the service industry (Llach et al., 2013). In contrast, the manufacturing industry of Iraq has received little attention. "Manufacturing businesses have historically played a significant role in Iraq's economy, particularly as a major source of employment, and are thus a primary or secondary source of income for many people. In 2017, 62.9 million business units in Iraq were manufacturing companies, representing 99.99% of all business units in Iraq. Iraq's empowerment can provide employment opportunities for the community due to the country's growing number of businesses. Also minimized is unemployment caused by a workforce not integrated into the labor force. A prudent policy must promote the expansion of all businesses. This strength can facilitate the expansion and development of micro to massive commercial enterprises (Hussein et al., 2021). This talk demonstrates that manufacturing firms in Iraq are crucial for maintaining social and economic development. Consequently, this area could not be neglected.

Considering prior discussion gaps, TQM, GIT, and SCM are crucial indications for improving OP and FP. Consequently, these warnings could not be disregarded. The current study's purpose is to analyze the mediating effect of OP on the relationship between TQM, GIT, SCM, and FP in Iraqi manufacturing firms, based on the best available research knowledge and on the knowledge gaps that have been identified in the past. The data for the study was gathered from supply chain specialists. Therefore, the study could help policymakers, owners, and supply chain departments understand the significance of the following FP improvement metrics.

Literature Review and Research Framework

Theoretical Perspective Literature

This phrase refers to how the company can fulfill its goals in the market and intrinsic goals (Arshad & Arshad, 2019). Raising productivity with the help of cheap costs and increased profit gaining is a key aspect of achieving (OP) organizational performance

(Franco-Santos et al., 2007). Also, the position of OP is garnering significant attention nowadays as organizations aim to establish creative capabilities in enhancing their performance. The new paradigm to be a successful business is to adopt those abilities that can develop various items with the least efficiency (Morgan, 2012). Various elements boost the performance of the company but among them are total quality management (TQM), supply chain management (SCM), green information technology (GIT) and operational performance.

Among such factors, TQM describes it in many ways. According to Farooq et al. (2007), quality is defined as "satisfaction with specifications. Quality was described by Elshaer (2012) as "ability to be utilized". In other words, TQM is an integrated effort to achieve and maintain a high-quality service based on the maintenance of continuous improvement of processes and error prevention at all levels and in all activities of a company, striving to meet and even exceed customer needs and expectations (Herzallah et al., 2014). There are three stages of quality: quality, total quality, and TQM (Pimentel & Major, 2014). Uluskan et al. (2017) moulded the development of TQM into an all-encompassing management philosophy (1986, 1988) that helps to boost performance.

In addition to TQM, SCM has become increasingly crucial as the competition shifts from organization to organization to acquire performance. Because SCM is so crucial to the success of retail firms, Green Jr et al. (2008) discovered that market leaders are always exploring new methods to deliver value and push the limits of performance. To survive and expand in today's competitive market, organizations must embrace SCM as a crucial strategic instrument (Ho, 2011). The Council of Supply Chain Management Professionals (CSCMP) regularly assesses and revises the SCM definition to ensure that it can keep up with the growth of supply networks around the world. The most important reason for upgrading the phrase is that the concept of SCM became a major aspect of boosting business performance. This is one of the most crucial factors in determining whether the definition must be expanded. Nevertheless, according to Arlbjørn et al. (2011), SCM encompasses the planning and administration of all procurement, sourcing, and logistics-related processes. Further, the CSCMP refers to SCM" as the set of activities that begins with procuring raw materials that could enhance firm performance (Tan et al., 1998).

In addition to TQM and SCM, the GIT that demonstrates the concept of eco-friendly computing is known as GIT (Jenkin et al., 2011). The eco-friendly design, construction, use, and disposal of computers and computer-related products aim to reduce the negative environmental impact of IT operations (Bai & Sarkis, 2013). This is known as GIT in environmentally friendly computing (Mithas et al., 2010). GIT attempts to limit the environmental impact of IT operations by creating, manufacturing, operating and discarding computers and computer-related products in an eco-friendly manner (Mithas et al., 2010). Further, it was proposed that GIT should become a major performance measure (Mithas et al., 2010). Based on the preceding discussion, it could be argued that three indicators are significant in enhancing performance directly and indirectly: TQM, SCM, and GIT as independent variables, operational performance (OP) as a mediating variable, and firm performance (FP) as the dependent variable, as predicted in Figure 1.

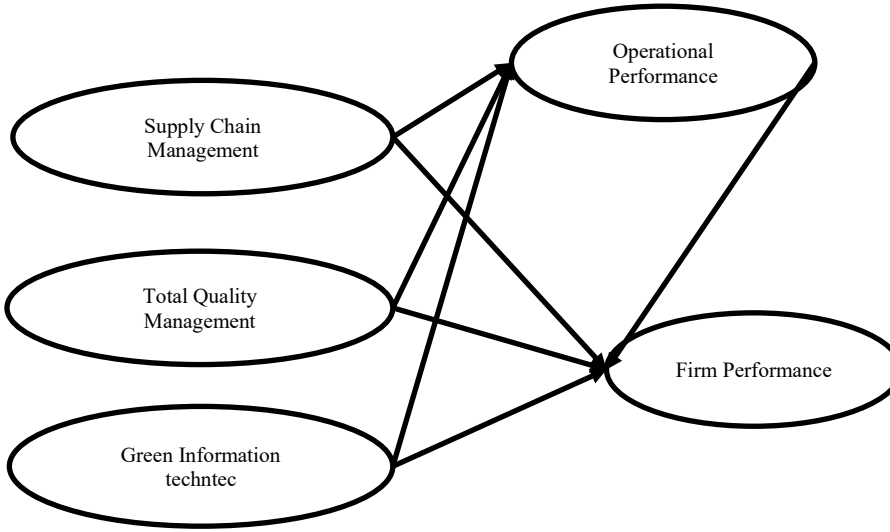

Figure 1: *Theoretical Framework*

Empirical studies

Several empirical investigations have been undertaken on the relationship between TQM, SCM, GIT, OP, and FM, as documented in the existing literature. According to the existing literature, TQM has a favorable and significant relationship with FP (Pambreni et al., 2019). Further, it was suggested that TQM encourages continual improvement through its values, tools, and processes. The long-term objective of Total Quality Management (TQM) is to maximize performance by continuously enhancing the quality of products and services while maximizing the use of available resources (Abbas et al., 2021). Businesses can improve their performance by focusing on identifying and satisfying consumer needs (Dereń et al., 2017). The dedication of senior management and staff involvement is vital in this regard Botha et al. (2014). Top management supports the organization's learning TQM to improve FP (Morais & Gonçalo, 2018). Further, Buenechea-Elberdin et al. (2018) claimed that TQM has enormous potential to steer their company toward OP, ultimately increasing FP.

SCM has beneficial and significant effects on performance in addition to TQM (Kerdpitak, 2022). Further, it was suggested that it is difficult for a company to establish a competitive advantage through internal growth alone (Miguel & Brito, 2011). To adapt to shifting environmental conditions and intensifying global competition, businesses must devise plans to develop new competencies (Truong et al., 2017). According to Jeong and Hong (2007), corporate supply chain strategies are crucial instruments for supporting innovation and performance, and they can assist organizations in expanding and adapting to environmental changes. Consequently, an SCM strategy can help companies overcome these difficulties. Numerous studies have been conducted on typical manufacturing organizations operating in an SCM setting. Ireland and Bruce (C. Y. Wong et al., 2011) investigated the connection between SCM and corporate success in this sector. In addition, C. W. Wong et al. (2020) reinforced the notion that typical

organizations can increase the likelihood that SCM will positively affect performance. Given that CPFR and SCM increase financial return on investment, competitive advantage increases sales in a crowded market with numerous consumers and suppliers.

There has been numerous research on SCM methodologies and performance (Shahbaz et al., 2018). SCM strategies affect performance. By illustration, supply chain approaches such as internal integration, information exchange, and postponement were discovered to have a large and positive impact on supply chain performance and efficiency (Al-Ghwayeen & Abdallah, 2018). Advanced SCM strategies can result in a bigger competitive advantage and higher organizational performance (Al-Ghwayeen & Abdallah, 2018). However, supply chain strategy is a less dependable indicator of SCM performance. Appropriately evaluating SC performance is a topic of heated controversy (Arzu Akyuz & Erman Erkan, 2010). In addition, other research discovered that as SCM and GIT increased, OP and FP increased. Based on the preceding discussion, the following research hypotheses are formulated:

H1: Total quality management positively and significantly impacts operational performance.
H2: Supply chain management positively and significantly impacts operational performance.
H3: Green information technology has a positive and significant impact on operational performance.
H4: Organizational performance has a positive and significant impact on operational performance.
H5: Total quality management positively and significantly impacts firm performance.
H6: Total quality management positively and significantly impacts firm performance.
H7: Total quality management positively and significantly impacts firm performance.
H8: Total quality management positively and significantly impacts firm performance through the mediating effect of operational management.
H9: Supply chain management positively and significantly impacts firm performance through the mediating effect of operational management.
H10: Green information technology positively and significantly impacts firm performance through the mediating effect of operational management.

This analysis utilized the correlation study design, which is utilized when the objective is to determine the nature of the relationships between naturally occurring variables. In addition, a quantitative methodology was employed in this investigation. According to Flynn and Pearcy (2001); Zikmund et al. (2003), the quantitative method is deemed appropriate when the association and connection between the groups are explored. In addition, the current study examined the cross-sectional design of studies with a single data collection. Matveev (2002) emphasized that the quantitative research design or cross-sectional research approach yields more valid and reliable results and that quantitative approach outcomes are significantly more efficient and productive than qualitative approach outcomes. This research strategy collects data to provide an overview of whether or not a relationship exists between two or more dependent variables (Bordens & Abbott, 2002). In this survey research

technique, structured questionnaires were used since they are regarded as a highly adaptive and suitable research tool when the objective is to identify not just a demographic but also interdependencies across variables (Churchill Jr, 1979). A structured questionnaire measuring on a five-point Point Likert scale ranging from 1 strongly disagree to 5 strongly agree was utilized as a survey approach.

Population and sample

The data for this study were collected from professionals in supply chain management, including HODs, supply chain heads, production managers, managers, logistic managers, and CEOs of manufacturing industries with a solid grasp of supply chain strategies, total quality management, operation performance, and organizational performance. The respondents were selected using a practical sampling method. The questionnaires were delivered to experts who work directly with Iraq's manufacturing sector via their email addresses and contact lists.

Data Analysis and Empirical Results

Descriptive analysis and interpretations

Because this research aimed to examine organizational practices, data from various industries were collected for this study. Through LinkedIn and email, 300 surveys were given to managerial and upper-level employees of manufacturing companies. Of the 219 valid comments obtained, only 4 multivariable outliers were eliminated, leaving 215 constructive responses. The response rate was not very slow, but reminders must be sent in a very polite manner, as medium and top-level executives are likely busy and did not respond; still, the obtained data is real and useful for this study. The respondents' industry, department, hierarchical level, and firm size are represented in Table 1 below.

Table 1: *Descriptive statistics (N=215)*

Demographics	Frequency	Percentage
Education Level		
Intermediate	2	0.9
Bachelors	71	33
Masters	139	64.7
PHD	3	1.4
Current Position in Company		
Lower Management	15	7.0
Middle Management	200	93.0
Higher Management	0	0
Work Experience		
Less than 01 years	7	3.3
1-3 years	37	17.2
4-6 years	63	29.30
7-10 years	62	28.8
11-15years	29	13.5
16 years & Above	17	7.9

Manufacturing Industry		
Textiles	53	24.7
Food & Beverages	45	20.9
Pharmaceutical Industry	18	8.4
Oil & Petroleum	17	7.90
Polymer, Plastic & Rubber	13	6.0
Machinery & equipment	11	5.1
Chemical Industry	8	3.70
Clothes & Dyeing Fur	6	2.8
Metal products	4	1.90
Leather Commodities	3	1.4
Automobile Industry	2	0.9
Tiles & Ceramic manufacturer	0	0
Other	35	16.3
No. Of Employees In Organization		
5-49	0	0
50-99	17	7.9
100-249	12	5.6
250-499	23	10.7
500-749	18	8.40
1000 & Above	145	67.4

Source: Author's illustration

Inferential Analysis

The Smart PLS 3.2.7 was used to evaluate the input further after filtering it. The gathered data was first placed via an outer evaluation before being subjected to hypothesis testing.

Outer Model Measurement

The outer model aims to determine whether detectable and fundamental constructs exist. The relationship between the variable and the Likert scale item is studied using the outer model. PLS-SEM was suggested by Joseph F Hair et al. (2016). Joseph F Hair et al. (2016) were responsible for exploratory and complex models. The first stage in adopting Smart PLS was evaluating the outer model's indicator loadings. Consequently, this study is regarded as instructive (explanatory). The researcher used PLS-SEM with Smart PLS 3 to estimate this complex model (Henseler et al., 2015). Therefore, to confirm the validity of a given construct, it is necessary to assess the suitability of the indicators (Bhise & Sunnapwar, 2019).

Reliability Testing

The following tests were run to evaluate the validity and reliability of the questionnaire constructs: Composite reliability is used to assess internal consistency, followed by item loadings and Average Variance Extracted (AVE) to assess convergent validity and the Fornell-Larcker criterion to assess discriminant validity. Joseph F Hair et al. (2016) recommended a CR value of 0.7 or above. Since

Composite Reliability (CR) considers real indicator loads, it is a more appropriate metric than Cronbach's alpha (Ahmad et al., 2020; Ahmad & Bin Mohammad, 2019; Ahmad et al., 2019). Table 2 shows that all values of CR are greater than the indicated value (CR>0.7), which is in the range of 0.821-0.935, which validates the accuracy of the data (Joseph F Hair et al., 2016).

Convergent Validity Analysis

Composite Reliability (CR), Average Variance Extracted (AVE), and Discriminant Validity (DV) can be used to examine the outer model. Additionally, as suggested by Henseler et al. (2015), Discriminant Validity (DV) further can be tested by Fornell and Larcker (1981)'s standard and Heterotrait-Monotrait Ratio of Correlations (HTMT). So, researcher must work on all three types of estimation to investigate the convergent validity of each construct used in the outer model. Joseph F Hair et al. (2016) idealized that for convergent validity, factor loadings should be above 0.65, and AVE must be 0.5 or higher. Whereas in 2014, according to Joe F. Hair Jr et al. (2014), the factor loadings for convergent validity should be over 0.7 and the threshold for the AVE should be 0.5 or more. The average variance retrieved was examined to see if there was a common degree of variance among the latent indicators (Joseph F Hair et al., 2016). Table 2 demonstrates that all gathered AVE values are higher than indicated (AVE >0.5). As a result, the questionnaire and the constructs presented here demonstrate sufficient reliability and convergent validity.

Table 2: *Convergent Validity*

Constructs	Items	Loadings	CR	AVE
Supply chain management	SCM1	0.857	0.935	0.643
	SCM2	0.806		
	SCM3	0.867		
	SM4	0.815		
Operational performance	OP1	0.831	0.879	0.644
	OP2	0.804		
	OP3	0.779		
	OP4	0.793		
Green Information technology	GIS1	0.942	0.938	0.836
	GIS2	0.923		
	GIS3	0.876		
Total Quality Management	TQM1	0.743	0.897	0.686
	TQM2	0.861		
	TQM3	0.893		
	TQM4	0.808		
Firm performance	FP1	0.861	0.844	0.718
	FP2	0.865		
	FP3	0.814		
	FP4	0.890		

Source: Author's Illustration

Discriminant Validity

Discriminant Validity is a parameter used to test whether the variables are not supposed to correlate with each other. In other words, the latent variable should differentiate from the other variable. Two estimations estimate it. Discriminant validity must be demonstrated to ensure that the data is reliable and that they do not differ statistically (Joe F Hair Jr et al., 2017). It specifies that various variables should not be correlated with one another, as well as the difference between two constructs from others (Joe F Hair Jr et al., 2017). Compared to the other variables, the Fornell and Larcker basis recommended that a specialized with its items variable should have higher volatility (Joe F Hair Jr et al., 2017). The diagonal elements in the Fornell and Larcker set of criteria denote the square root of AVE, and it should be bigger than its square correlation (Joseph F Hair et al., 2016). All diagonal line frequencies are provided in Table 3 in their corresponding rows 7 columns are higher, so the discriminant validity is confirmed.

Table 3: *Fornell and Larcker (1981)*

	SCM	OP	GIT	TQM	FP
SCM	0.802				
OP	0.602	0.803			
GIT	0.528	0.338	0.832		
TQM	0.591	0.419	0.448	0.816	
FP	0.555	0.194	0.458	0.42	0.914

Source: Author's estimation

The method for assessing the heterotrait-monotrait (HTMT) model is used to determine discriminant validity and correlation ratio. Nevertheless, some investigations imply that the Fornell and Larcker criteria are ineffective in determining discriminant validity in some situations. However, some studies suggest that the Fornell amd and Larcker criterion is ineffective in meaning the discriminant validity in certain circumstances. Consequently, Henseler et al. (2015) developed the HTMT correlation ratio as a more extensive and less constrained way to discriminant validity evaluations for researchers utilizing PLS-SEM. This approach is appropriate to all latent variable methods. The HTMT threshold value is less than 0.9 (Henseler et al., 2015), and even if the value of the HTMT surpasses this limit, discriminating validity has not been attained. Table 5 shows the HTMT results, demonstrating that all values are less than 0.90.

Table 4: *Heterotrat-Monotrait Ratio (HTMT)*

	SCM	OP	GIT	TQM	FP
SCM					
OP	0.697				
GIT	0.625	0.424			
TQM	0.699	0.540	0.570		
FP	0.610	0.226	0.547	0.491	

Source: Author's estimation

In this research study, there are eleven hypotheses. The structural equation model (SEM) was used to test hypotheses. The Smart PLS 3 program has been used to test the proposed model for this purpose (Joe F Hair et al., 2011). Table 5 displays the effects of the hypotheses that were evaluated. The PLS-SEM results indicate that total quality management (TQM) has an insignificant impact on operational performance while also having an insignificant and positive impact on firm performance (FP). In contrast, supply chain management (SCM) positively and significantly impacts the OP and FP. Green information technology (GIT) also positively and significantly impacts OP and FP. The direct impact of OP also indicates that it has a positive and significant impact on FP. The indirect mediating effect of OP indicates that it did not mediate between the TQM and FP while significantly mediates the relationship of SCM and FP and GIT and FP. A possible significant mediation effect could be that the direct effect was also insignificant, so the indirect effect's insignificant impact probability was also increased. The above-discussed results are predicted in the following Table 5 below.

Table 5*: Hypothesis testing*

No	Hypothesis	Loadings	T Statistics	P Values	Decision
H1	TQM -> OP	0.007	0.158	0.874	Rejected
H2	SCM-> OP	0.305	4.488	0.000	Accepted
H3	GIT -> OP	0.123	2.045	0.041	Accepted
H4	OP -> FP	0.153	2.101	0.036	Accepted
H5	TQM -> FP	0.082	1.255	0.210	Rejected
H6	SCM-> FP	0.249	2.401	0.016	Accepted
H7	GIT -> FP	0.145	2.008	0.045	Accepted
H8	TQM -> OP->FP	0.047	0.602	0.547	Rejected
H9	SCM-> OP->FP	0.730	12.966	0.000	Accepted
H10	GIT-> OP->FP	0.541	9.311	0.000	Accepted

Source: Author's estimation

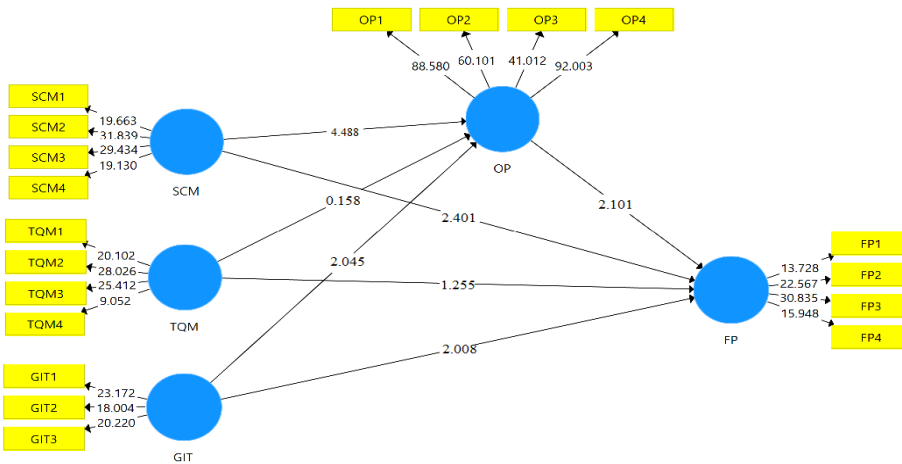

Figure 2: *Bootstrap Results*

Discussion and Conclusion

Comparatively to other developed nations, Iraqi manufacturing enterprises are just beginning to implement supply chain management (SCM), total quality management (TQM), and green information technology (GIT) to enhance their operational performance (OP) and firm performance (FP). However, the Iraqi manufacturing firms should place a greater emphasis on significance. In this regard, the purpose of this study is to examine the role of OP as a mediator between the relationships of SCM, TQM, GIT, and FP in Iraqi manufacturing organizations. Taking the relationship perspective into account Regarding this subject, the literature focuses on internal organization variables from a resource-based perspective. While this report encourages the Iraqi government and private sector to develop strategies and programs to improve green environmental practices, The findings of this study reveal that TQM has negligible effects on operational performance and negligible but positive effects on firm performance. This finding suggests that TQM is not a relevant determinant for the OP and FP. Possible explanations for these results include the overlap of other variables or the fact that respondents did not assign TQM for OP improvement sufficient weight. More investigations with the same findings corroborate these findings (Boulifa et al., 2022; Yu-Hong et al., 2021).

In contrast, SCM has large and favorable effects on the OP and FP. These data indicate that when SCM is increased, OP and FP increase, which is corroborated by additional findings (Imran et al., 2018; Kumar et al., 2018). Similarly, Green information technology (GIT) has beneficial and substantial effects on OP and FP. These results demonstrate that Iraqi manufacturing enterprises have a higher level of information technology and are investing appropriately in information technology to enhance their performance. Various research provides more evidence for these results (Tarigan et al., 2021). The direct effect of OP suggests that it has a positive and substantial effect on FP. This finding demonstrates that Iraq's manufacturing companies had a significant role in increasing their FP through OP. These findings are bolstered by Ting et al. (2019), who found the same outcomes. The indirect mediating impact OP suggests that it does not moderate the association between TQM and FP. However, it significantly mediates the relationship between SCM and FP and GIT and FP. A potential major mediation effect might be that the direct effect was also insignificant, increasing the likelihood that the indirect effect will similarly have an inconsequential influence.

Based on the findings mentioned above, it can be stated that Iraqi manufacturing companies focused mostly on SCM and GIT to enhance their OP and FP but paid little attention to TQM. On this basis, it is recommended that Iraqi manufacturing businesses pay more attention to TQM to enhance their FP. If they pay adequate attention to TQM, their share of the international market could be diminished (Talab et al., 2018).

Implications and Future Directions

This research has both theoretical and practical ramifications. First, this study contributed to the existing body of knowledge by including green information technology (GIT) as an independent variable alongside supply chain management and

total quality. Operational performance was also incorporated as a mediating variable in this study. Thirdly, prior research focused primarily on other countries and industries in Iraq, whereas manufacturing enterprises in Iraq received little attention. As a result of filling these gaps, the present study is regarded a pioneering study that adds a body of literature to the existing literature that could assist future researchers and academics in conducting their research. Practically, for manufacturing experts, practitioners & policymakers as well as authorities in the context of the manufacturing sector in developing nations such as Iraq, a body of literature was added that might aid them in decision-making. The report could assist government, and professional industry groups in implementing SCM, GIT, and TQM best practices. The study could also assist firms in prioritizing their commitment to environmental sustainability, consider environmental considerations when selecting suppliers, and provide training on green manufacturing concepts to their strategic suppliers. In addition to having both practical and theoretical consequences, this study has several drawbacks. The present study was restricted to industrial enterprises in Iraq, limiting its generalizability; consequently, future research could focus on other industries. Second, the study was limited to the mediating impact; additional moderating variables could also modify the relationship between the exogenous and endogenous variables. Future research could include a mitigating variable in this regard. Thirdly, the study was constrained by its cross-sectional, one-time data collection design. Fourthly, the TQM's effect on OP and FP was minimal; future research could be conducted using a different longitudinal research design or on a different country or nation to determine the variation or importance of the study."

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