

## Mediating influence of total quality management between just-in-time techniques and projects performance evaluation

Abubkr Abdelraheem<sup>a\*</sup>

<sup>a</sup>Department of Accounting, College of Business Administration - Hawtat Bani Tamim, Prince Sattam Bin Abdulaziz University, Saudi Arabia

### ABSTRACT

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The main objective of the present research is to evaluate the influence between just-in-time technique (JIT) and total quality management TQM in project performance evaluation (PPE) in the paint industry; and to identify the important factors that should be considered for the successful application of JIT in project management in the paint industry ar Riyadh Governorate. A questionnaire was distributed to administrators, economists and accountants in the paint industry. The study used the partial least squares program for analysis purposes. The results indicated that the just-in-time technique has a positive impact on the evaluation of project performance in the balanced scorecard in its dimensions (financial, customers and internal operations), and a negative impact on the growth and learning dimension. The results also revealed a positive impact of total quality management on the evaluation of project performance in all dimensions of the balanced scorecard, and it plays an important mediating role in improving the impact of total quality management on the evaluation of performance by the balanced scorecard.

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### 1. Introduction

Despite advances in project management, research studies have shown that many projects fail. This failure may be partial or complete due to exceeding one of the measurement metrics and project standards. Situation management is considered a modern administrative method that deals with project emergencies. Appropriate resources and tools are expected to be used to express policies and ideas that deal with emergencies in the organization, which would be its primary goal (Gupta et al., 2019). Situational leadership theory emerged as a theory that highlights the different management styles that managers need in a way that is compatible with the needs of their subordinates, the nature of the situation, cost, and quality, and this prompts us to emphasize the importance of the role of the project manager and his responsibility for the project results and performance, especially the management style that the manager follows in managing these projects, which significantly affects performance. DuBois et al. (2015) indicated that organizations believe projects need a manager with leadership qualities. The goal of management is to improve project performance. Anang (2017) stated that leaders are responsible for their followers' results, outputs, and performance and thus bear primary responsibility. Some studies indicate a relationship between management styles and project performance. For example, the survey by Wahl (2015) highlighted the importance of time, cost, and quality, as these parameters significantly influence project performance. A study conducted by Dulewicz and Higgs (2005) indicated a statistically significant relationship between managers and the circumstances they deal with. Landis (2011) also showed that each manager must develop a unique style that matches a particular set of employee talents, maturity, and abilities (Agwaro et al., 2020). The study confirmed that the role of management style is considered very important in shaping and modifying the behaviors and trends of workers in the organization. Sethuraman and Suresh (2014) stated that managers must realize that their management styles influence their followers. A study by Hidayat and Hartono (2021) indicated that good project management positively affects employee productivity. On the other hand, Thompson (2019) revealed no relationship between a manager's style and project performance.

\* Corresponding author

E-mail address [a.abdelraheem@psau.edu.sa](mailto:a.abdelraheem@psau.edu.sa) (A. Abdelraheem)

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The study aims to explore the effect of JIT on projects performance evaluating along the dimensions of the balanced scorecard (financial, customers, internal operations, growth, and learning), in addition to determining the effect of total quality management as an intermediary variable between Jit and project performance evaluation, based on these objectives, the study raises these questions that previous studies have not answered: What are the potential effects of on-time production on the performance evaluation of plastic production companies in Al-Kharj Governorate through the balanced scorecard? What are the possible mediating effects of total quality management between JIT and the performance evaluation of plastic production companies in Al-Kharj Governorate through the balanced scorecard?

## 2. Theoretical Background & Hypotheses Development

### 2.1 Projects Performance (PP)

Performance is considered necessary in several aspects, as performance represents the center of strategic management, and all administrative premises contain contents and connotations related to performance, whether implicitly or explicitly; the reason for this is that performance represents a time test of the strategy followed by management, as for the experimental aspect, The importance of performance appears through most management studies and research using the performance strategy to choose different techniques and the processes resulting from them (Babatunde & Sanusi, 2020; Farida & Setiawan, 2022). The concept of performance is considered a basic and essential concept for organizations in general, as it represents the comprehensive phenomenon of all branches and fields of administrative knowledge and is regarded as a pivotal element in it, in addition to being the most critical dimension (Sabri et al., 2020; Ibrahimi & Naym, 2019), concepts of performance have varied with the number of researchers and students in this field, and management scholars have not arrived at an accurate and comprehensive concept. However, there are common and frequently used concepts, as defined by (Arokodare & Asikhia, 2020; Taouab & Issor, 2019; Siepel & Dejardin, 2020) define it as continuous improvement in market value, profitability, and liquidity. Samad (2022) considered performance as transforming organizational inputs, such as materials and semi-finished materials using work, including machines and equipment, into outputs represented in goods, services, and business results. (Nguyen et al., 2021). Performance is the efficiency of using the resources available to the project.

The performance of projects is measured by comparing the actual results achieved with those that were planned for the established programs and strategies to identify positive or negative deviations facing the institution. Measuring the institution's performance also requires defining standards reflecting project objectives. It qualifies it to take corrective measures on time in the event of any deviations. These standards vary from one project to another, but they share the criteria of profitability, market share, productivity, and resource development (Taouab & Issor, 2019; Verboncu & Zamfir, 2017; Coad et al., 2018) that profits are the optimal measure, while the majority of studies referred to the balanced scorecard, which relies on financial and non-financial measures as indicators of Performance (Duric & Topler, 2021; NGUYEN et al., 2021). The balanced scorecard appeared as one of the methods for measuring strategic performance and one of the strategic management tools that contribute to achieving organizations' strategic goals. It is also a management accounting tool that contributes to attaining organizations' strategic goals. The BSC provides a comprehensive framework for translating strategy into a coherent set of performance measures complementary to traditional (Kumar et al., 2024; Bansal et al., 2021). The balanced scorecard includes the financial dimension, the customer dimension, the internal operations dimension, and the growth and learning dimension. Therefore, this card has several benefits, including the possibility of using it to plan and evaluate project performance (Charles & Ochieng, 2023)

### 2.2 Just-in-Time (JIT)

The Just in Time (JIT) production system has become one of the systems that relies on theoretical foundations and is considered the basis for practical applications in many industrial companies. A just-in-time (JIT) production is defined as a set of production concepts and methods or a philosophy of the organization through which it seeks to reduce inventory levels to benefit from other benefits that come from implementing this (Kaynak, 2005). It is defined as a comprehensive management philosophy that focuses on policies and procedures by the manager, resulting in the efficient production of high-quality goods while maintaining the lowest possible storage level (Bryan et al., 2022). This system has also been described as reducing production costs by reducing production time and inventory availability (Khalfallah & Lakhal, 2021). The just-in-time production system is considered one of the most important developments in financial management methods, which has created something like an administrative revolution (Balkhi et al., 2022), and this is mainly due to the unparalleled success achieved by this system in Japanese industries, and the resulting results. Reducing the costs of external demand needs (Lomio et al., 2022), improving the utilization of resources in the best way (Choi et al., 2023) and achieving complete control over costs, which leads to reducing buffer stocks (Baals et al., 2023). The just-in-time (JIT) production system indicates that the start of production depends on the arrival of the customer's order (the demand-pull system), and it depends on producing small quantities at the time of demand for production and at the time of production (Ezema et al., 2017; ABDELRAHEEM & HUSSIEN, 2023).

There is a need to deliver to the customer while working to reduce delay times to the shortest possible time. It is one of the management systems of Modern Japanese, which has become an area of interest by many interested people, has been melted in the crucible of application and resulted in many present and future tangible and intangible benefits and returns (Ketokivi & Schroeder, 2004).

Just-in-time (JIT) production is a warehousing strategy that companies employ to increase efficiency and reduce Waste is eliminated by obtaining goods only as required in the production process, thus reducing cost. This method requires project management to forecast demand with appropriate accuracy. The inventory supply system represents a shift away from the strategy. The old reserve method, where producers would bear the costs of large warehouses if they needed to meet high (Kunpeng & Shihua, 2008).

### 2.3 TQM

Quality is “the set of characteristics and features of a product or service that gives the ability to satisfy declared or implicit needs, as declared needs are the characteristics that are known to the customer, while implicit needs are the characteristics that appear after using the product, such as suitability, environmental preservation” (Chaerudin & Syafarudin, 2021; Arifin et al., 2022). Quality is considered one of the most essential principles of management. Achieving quality in an organization's activities ensures customer retention and excellence over competitors (Alenezi, 2023). Total quality management is the method of managing all activities and procedures that must be accomplished to maintain a degree of excellence in getting things done, including developing and implementing Quality policy, as well as the development, implementation, quality assurance, and quality control (Jami & Muharam, 2022). The quality management process begins at the executive level with the definition of the organization's goals and objectives, which are transformed into policies and procedures implemented in all stages of business (Niyi Anifowose et al., 2022; Jami & Muharam, 2022; Alenezi, 2023). Quality management is one of the modern administrative concepts based on ideas and principles that any administration can adopt to achieve better performance and define quality (Saragih et al., 2020; Mohamad & SABRI, 2022).

Goetsch and Davis (2016) defined as efforts that aim to maximize the organization's competitiveness through the combined efforts of all staff to improve the services they provide, total quality management is no longer limited to the basis of the quality of the product or service provided. Still, its concept has expanded to include all processes and activities within the institution, which contributes to achieving a high level of quality. Total quality management is an administrative philosophy that includes all activities that fulfill the needs and expectations of individuals and seeks to achieve continuous development in the quality of services, which achieves the organization's goals with high efficiency (Mohammed et al., 2017). Total quality management is a service or commodity's overall features and characteristics that match its ability to fulfill the required or implicit needs (Alshourah, 2021). Pakdil et al. (2012) also defined quality as “meeting market requirements, in terms of good design and after-sales services”. It is a comprehensive management that aims to develop and continuously improve operations and meet the requirements of their needs to enhance customer satisfaction and organizational performance of organizations (Budayan & Okudan, 2022; Jasti et al., 2022; Saffar & Obeidat, 2020). It is also an administrative philosophy for the quality of the organization's management (Souza et al., 2022; Liu et al., 2023; Taha et al., 2024), thus increasing competitiveness and value provided to customers.

### 2.4 PPE, JIT, TQM

Total quality is related to management accounting and cost systems, including the just-in-time production system, which is concerned with planning storage costs based on customer requests and is considered one of the foundations of total quality (ABDELRAHEEM & HUSSEIN, 202; Khalfallah & Lakhali, 2021). According to (Kojima et al., 2008; Al-Tahat et al., 2012; Aksoy & Öztürk, 2011; Song & Minku, 2022), implementing the just-in-time production system contributes to improving the performance of projects. In this study, the dimensions of the balanced scorecard are used to evaluate project performance (financial dimension, customer dimension, internal operations dimension, and growth and learning dimension). The financial dimension includes several strategic criteria, including the criterion of achieving fair profit, which is an achievable strategic goal, as well as the criterion of balanced growth of the mix of revenues from investment activities, the criterion of reducing costs to a minimum to achieve the maximum possible effectiveness, the criterion of maximizing wealth for shareholders by achieving a real return on investment, and the criterion of achieving economic added value (Goharshenasan et al., 2022; ABDELRAHEEM & HUSSEIN, 2022). Customer dimension is the core of the non-financial measures in the balanced scorecard, and the strategic goal of achieving customer satisfaction and gaining their continued loyalty to the company results in increasing the company's market share through acquiring new customers and retaining existing customers (Turshan et al., 2020). The internal operations dimension focuses on the causes of cost occurrence that reflect how the bank transforms inputs into outputs of value to customers and then formulates the structure of its operational processes to determine what it is distinguished by to become more successful and developed by analyzing the operational processes into a set of activities that comprise them and identifying each of them in building the value that the product acquires and reviewing all the activities performed within the company and evaluating their importance and the extent of the need for them and comparing the value generated from them with the cost of performing these activities (El-Garaihy, 2021). The learning and growth dimension is based on organizational learning and growth, which aims to identify and diagnose the infrastructure that a company must achieve to create long-term growth and improvement (Karasneh, 2022; ABDELRAHEEM & HUSSEIN, 2022). Total quality management techniques (TQM) and just in time (JIT) have drawn significant attention in the field of project performance evaluation because of their vast potential to improve efficiency and efficiency. TQM emphasizes continuous improvement, customer-oriented strategies and the involvement of all employees to obtain better project results (Agyabeng-Mensah et al., 2021). By integrating the TQM principles, organizations can strengthen their operational capacities, as shown by studies exploring the role of mediation of TQM between the practices of the green supply chain and overall performance (Nugroho et al., 2022). Conversely, JIT techniques prioritize waste reduction and stock optimization thanks to appropriate production

processes (García-Alcaraz et al., 2019). This was particularly obvious in the competitive improvement in the basic metal industry via the management of the supply chain and the implementation of the JIT (Dametew et al., 2020). Research has shown that JIT practices considerably affect flexibility performance in international manufacturing factories (Phan et al., 2019). In addition, the interaction between TQM and JIT can have deep impacts on the results of the project. An effective deployment of JIT requires a commitment to quality at all stages of the project, facilitating immediate responses to changing requests (Hussein & Zayed, 2021). The alignment of these methodologies can lead to a sustainable improvement in performance in industries such as construction (Kong et al., 2018) and health care (Siddiqui, 2022). The integration of adaptive management methods, such as simulation models, presents the TQM and JIT combination potential to achieve strategic objectives (Novais et al., 2021). In addition, the hierarchy of Jit's facilitators through approaches such as Gra-Fuzzy Topsis helps improve project performance metrics (Kaswan et al., 2022). In the end, the implementation of TQM and JIT collectively promotes a culture of continuous improvement, leading organizations to higher operational results and competitive advantages (Xing et al., 2021). According to the findings of previous studies, the study hypotheses were developed as follows:

**H<sub>1</sub>:** *JIT has a positive effect on PPE (financial dimension, customer dimension, internal operations dimension, and growth and learning dimension).*

**H<sub>2</sub>:** *JIT has a positive effect on TQM.*

**H<sub>3</sub>:** *TQM has a positive effect on PPE (financial dimension, customer dimension, internal operations dimension, and growth and learning dimension).*

The integration of total quality management strategies (TQM) and Just-in-time (JIT) plays a crucial role in improving the evaluation of the project performance, in particular if evaluated through the balanced approach of the Scorecard. TQM promotes the continuous improvement and satisfaction of the interested parties, in the end guiding organizational effectiveness and competitiveness in sectors such as the basic metal sector (Dametew et al., 2020). At the same time, Jit simplifies the processes by reducing waste and optimizing the inventory, making it a vital component in the management of performance (Al Mannai et al., 2017; Li et al., 2015). A balanced scorecard framework provides a complete evaluation of these strategies, allowing companies to align their operational objectives with the financial results (Kshatriya et al., 2017; Stevanović & Čečević, 2018). In addition, the recent literature underlines JIT's contribution to the slimming construction, strengthening the importance of performance assessment paintings such as the balanced scorecard (Li et al., 2015; Zhao et al., 2023). The relationship between TQM and JIT was explored in various contexts, highlighting their synergistic effects on organizational performance. Dametew et al. (2020) argue that the combination of TQM and JIT improves competitiveness by rationalizing the processes and improving the quality of the product. This intersection is particularly powerful when using the BSC as a framework for evaluation, which includes financial dimension, customer satisfaction, internal processes and learning and growth (Stevanović & Čečević, 2018).

**H<sub>4</sub>:** *TQM improves the effect of JIT on PPE (financial dimension, customer dimension, internal operations dimension, and growth and learning dimension).*

### 3. Research Methodology

The study explores the mediating effects of total quality management between Just-in-Time and project performance Evaluation. A five-point Likert model (strongly agree, agree, neutral, disagree, and strongly disagree) was used, and the questionnaire was designed and distributed to the study sample at Painting companies in Riyadh Governorate (administrators, employees, suppliers, and customers). 220 were distributed, of which 209 were collected. The researcher used SPSS to analyze the sample members' data and the Partial Least Squares Structural Equation Modeling (PLS-SEM) to measure the model's validity and reliability, as well as the structural model and test the study hypotheses.

### 4. Data Analysis and Results

#### 4.1 Descriptive Statistics

According to the results of personal data analysis, 176 individuals from the sample hold a bachelor's degree, 24 master's degrees, and 9 of them have a higher diploma. Data analysis also revealed that 103 sample members majored in business administration, 74 in accounting, 25 in economics, and 7 other majors.

#### 4.2 Measurement of the Model Validity, Reliability, and Discriminant Validity

The first step in the PLS-SEM program, according to (Sarstedt et al., 2014; Hair Jr, Joe et al., 2021) is to measure the validity of the model by calculating the loading rates of the variables items and the average variance extracted (AVE). The loading rate should not be less than 60%, and the (AVE) should not be less than 50% (Hair Jr, Joe F. et al., 2017);(Sarstedt et al., 2022);(Purwanto, 2021). As shown in Table 1 and Figure 1, the loading rates of all items on the latent variables and the (AVE) are greater than 60%. This confirms the validity of the measurement model. The second step measures the model's reliability by calculating Cronbach's alpha (CA) and composite reliability (CR); the rates should not exceed 70%. Table 1. shows that (CA) and (CR) rates are greater than 70%. This confirms the reliability of the measurement model.

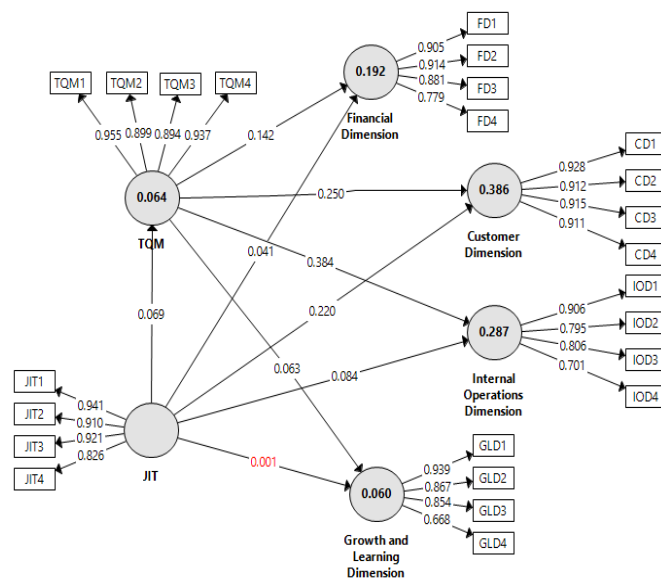
**Table 1**  
Results of Measurements Model

| Variables   | Items               | Loading | CA    | CR    | AVE   |       |
|---|---------------------|---------|-------|-------|-------|-------|
| <b>Dependent variable</b><br>(Projects Performance Evaluation -<br>Balanced Scorecard Dimensions) | Customer            | CD1     | 0.928 | 0.937 | 0.955 | 0.840 |
|   |                     | CD2     | 0.912 |       |       |       |
|   |                     | CD3     | 0.915 |       |       |       |
|   |                     | CD4     | 0.911 |       |       |       |
|   | Financial           | FD1     | 0.905 | 0.895 | 0.926 | 0.759 |
|   |                     | FD2     | 0.914 |       |       |       |
|   |                     | FD3     | 0.881 |       |       |       |
|   |                     | FD4     | 0.779 |       |       |       |
|   | Growth and Learning | GLD1    | 0.939 | 0.860 | 0.903 | 0.703 |
|   |                     | GLD2    | 0.867 |       |       |       |
|   |                     | GLD3    | 0.854 |       |       |       |
|   |                     | GLD4    | 0.668 |       |       |       |
|   | Internal Operations | IOD1    | 0.906 | 0.818 | 0.880 | 0.649 |
|   |                     | IOD2    | 0.795 |       |       |       |
|   |                     | IOD3    | 0.806 |       |       |       |
|   |                     | IOD4    | 0.701 |       |       |       |
| <b>Independent variable</b><br>(Just-in-Time)   | JIT                 | JIT1    | 0.941 | 0.922 | 0.945 | 0.811 |
|   |                     | JIT2    | 0.910 |       |       |       |
|   |                     | JIT3    | 0.921 |       |       |       |
|   |                     | JIT4    | 0.826 |       |       |       |
| <b>Mediating Variable</b><br>(Total Quality Management)   | TQM                 | TQM1    | 0.955 | 0.941 | 0.958 | 0.850 |
|   |                     | TQM2    | 0.899 |       |       |       |
|   |                     | TQM3    | 0.894 |       |       |       |
|   |                     | TQM4    | 0.937 |       |       |       |

Discriminant validity refers to the correlation of latent variables with themselves. (Rönkkö & Cho, 2022) A study showed that a variable's correlation with itself should be greater than its correlation with other variables, confirmed in Table 2.

**Table 2**  
Discriminant Validity Results

|                               | Customer Dimension | Financial Dimension | Growth and Learning Dimension | Internal Operations Dimension | JIT   | TQM   |
|-------------------------------|--------------------|---------------------|-------------------------------|-------------------------------|-------|-------|
| Customer Dimension            | 0.917              |                     |                               |                               |       |       |
| Financial Dimension           | 0.527              | 0.871               |                               |                               |       |       |
| Growth and Learning Dimension | 0.191              | 0.074               | 0.838                         |                               |       |       |
| Internal Operations Dimension | 0.196              | 0.437               | 0.289                         | 0.805                         |       |       |
| JIT                           | 0.483              | 0.277               | 0.030                         | -0.116                        | 0.901 |       |
| TQM                           | 0.501              | 0.398               | 0.243                         | 0.477                         | 0.253 | 0.922 |



**Fig. 1.** Loading rates and Assessing the Structural Model (F<sup>2</sup>& R<sup>2</sup>)

4.3 Structural Model Assessment

Structural model evaluation is done by calculating the coefficient of determination ( $R^2$ ) and the effect size ( $F^2$ ) (Hair Jr et al., 2014; Hair Jr, Joe et al., 2021). ( $R^2$ ) It measures how well the independent variable can explain the variance in the dependent variable. It indicates the percentage of the variance of the response variable that the linear model explains. ( $R^2$ ) ranges from 0 to 1 (Hair Jr, Joe F. et al., 2017). Table 3 and Fig. 1 show that all the values of ( $R^2$ ) for the dependent variables range between 0 and 1, indicating that the independent variables explain the variance in the dependent variables appropriately. Effect size ( $F^2$ ) measures the strength of the relationship and effect between variables in a population. The effect size is large if ( $F^2$ )  $\geq$  0.35, medium if it ranges between 0.15 - 0.35, small if it ranges between 0.02 - 0.15, and no effect if ( $F^2$ )  $\leq$  0.02 (Hair et al., 2011). Table 3 and Fig. 1 show that a medium effect size of JIT on the customer dimension, there is a small effect of JIT on the (financial dimension, Internal Operations Dimension), and no effect of JIT on the Growth and Learning Dimension. It was also found that there was a large effect size of TQM on the internal operations dimension, a medium effect size of TQM on the (financial dimension and customer Dimension), and a small effect size of TQM on the Growth and Learning Dimension.

**Table 3**  
Results of  $F^2$  &  $R^2$

| $F^2$                   | Customer Dimension | Financial Dimension | Growth and Learning Dimension | Internal Operations Dimension | TQM          |
|-------------------------|--------------------|---------------------|-------------------------------|-------------------------------|--------------|
| JIT                     | 0.220              | 0.041               | 0.001                         | 0.084                         | 0.069        |
| TQM                     | 0.250              | 0.142               | 0.063                         | 0.384                         |              |
| <b><math>R^2</math></b> | <b>0.386</b>       | <b>0.192</b>        | <b>0.060</b>                  | <b>0.250</b>                  | <b>0.064</b> |

**Table 4**  
Results of Hypotheses Test (Direct Effect)

|           | Direct Effects                      | Std. Beta | T Values | P Values | Decision |
|-----------|-------------------------------------|-----------|----------|----------|----------|
| <b>H1</b> | JIT → Customer Dimension            | 0.380     | 5.642    | 0.000    | Accepted |
|           | JIT → Financial Dimension           | 0.189     | 2.356    | 0.019    | Accepted |
|           | JIT → Growth and Learning Dimension | -0.034    | 0.308    | 0.758    | Rejected |
|           | JIT → Internal Operations Dimension | 0.253     | 3.673    | 0.000    | Accepted |
| <b>H2</b> | JIT → TQM                           | 0.253     | 3.347    | 0.001    | Accepted |
| <b>H3</b> | TQM → Customer Dimension            | 0.405     | 7.171    | 0.000    | Accepted |
|           | TQM → Financial Dimension           | 0.350     | 4.261    | 0.000    | Accepted |
|           | TQM → Growth and Learning Dimension | 0.251     | 2.572    | 0.001    | Accepted |
|           | TQM → Internal Operations Dimension | 0.541     | 8.664    | 0.000    | Accepted |

4.4 Hypotheses Test

According to Table 4 and Fig. 2, which specify the direct effects of the study variables, it became clear that the JIT variable positively affects the performance of industrial projects (financial dimension, customer dimension, internal operations dimension) in Riyadh Painting company, all Std. Beta Values were positive, all P Values were less than 5%, and there is no effect on the growth and learning dimension; these results are consistent with a study (El-Gibaly, 2024);(KHALID & NDOLO, 2024);(Mahajan et al., 2024), thus confirming the validity of the first hypothesis of the study (H1). It also became clear that the variable JIT positively affects TQM in industrial projects in Riyadh; these results are consistent with a study (Singhal et al., 2024), thus confirming the validity of the second hypothesis of the study (H2). It also found that the variable TQM positively affects the performance in all its dimensions (financial, customer, growth and learning dimension, and internal operations) of industrial projects in Riyadh; these results are consistent with a study (Adem & Viridi, 2024; Prashar, 2024; Khalaf Alateyyat et al., 2024; Raj et al., 2024), thus confirming the validity of the third hypothesis of the study (H3). From Table 5, it is clear that TQM has a positive mediating role in the effect of JIT on project performance dimensions (financial, customer, internal operations), and TQM has a negative mediating role in the effect of JIT on the growth and learning dimension, thus confirming the validity of the fourth hypothesis of the study (H4).

**Table 5**  
Results of Hypotheses Test (Indirect Effect)

|           | Indirect Effects                          | Std. Beta | T Values | P Values | Decision |
|-----------|---|-----------|----------|----------|----------|
| <b>H4</b> | JIT → TQM → Customer Dimension            | 0.103     | 3.137    | 0.002    | Accepted |
|           | JIT → TQM → Financial Dimension           | 0.089     | 2.615    | 0.009    | Accepted |
|           | JIT → TQM → Growth and Learning Dimension | 0.064     | 1.877    | 0.061    | Rejected |
|           | JIT → TQM → Internal Operations Dimension | 0.137     | 2.825    | 0.005    | Accepted |

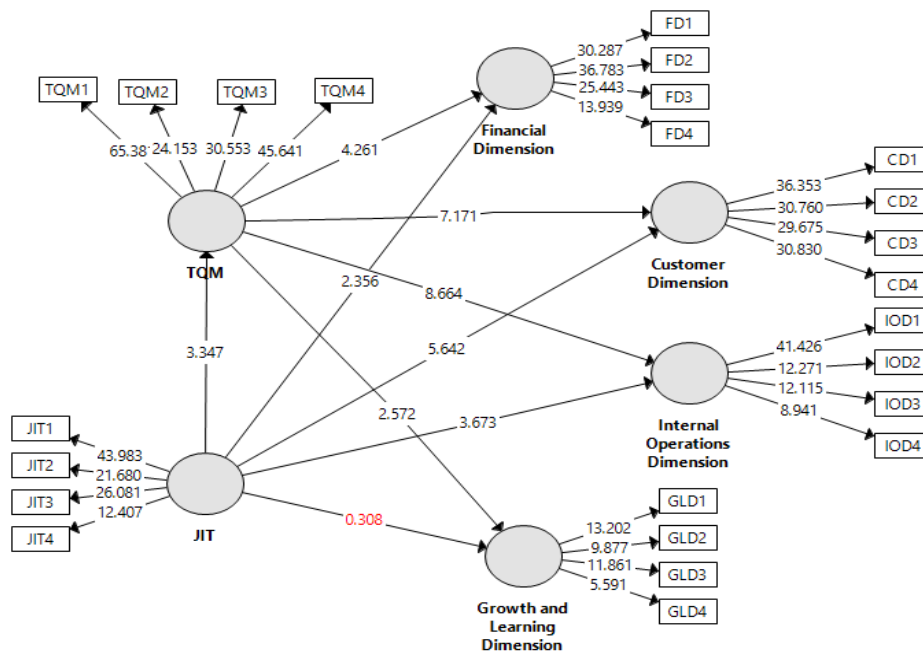


Fig. 2. SEM – Bootstrapping Result

## 5. Conclusion

The study showed that there is an average practice of on-time production, total quality, and performance evaluation through the balanced scorecard in plastic companies in Al-Kharj Governorate and that there are average effects of JIT on performance evaluation through the balanced scorecard in all its dimensions except for the growth and learning dimension. TQM is essential in mediating the effect of on-time production on the performance evaluation dimensions through the balanced scorecard, except for the growth and learning dimensions.

The present research has shown several limitations inherent to its approach that would invite recommendations for continued research in the area. First, the cross-sectional data cannot depict all the mechanisms of the development of intermediating influences, and the dynamic nature of this type of model might reveal different results. Therefore, we recommend longitudinal research designs to elaborate and compare our findings with this data type. We also encourage exploring different types of firms in different industries to ascertain the generalization of our findings and to capture a broader picture of possible differences while controlling for these various market segments. Additionally, the present research used perceptual data. The fact of relying only on the respondents' judgments may have been a concern. Finally, although our research took a multidimensional view of Just-in-Time and Total Quality Management by investigating a broader picture, many other concepts juxtaposed with this topic may represent valuable influences on TQM and performance outcomes. Based on the conclusions, the study recommends increasing attention to the application of just-in-time production and total quality management to provide plastic companies in Al-Kharj Governorate with appropriate tools to evaluate performance, as well as increasing attention to improving financial and economic performance through integration with suppliers and improving internal operations, caring for customers and maintaining them and achieving their satisfaction and loyalty, increasing attention to learning and growth, training employees and encouraging new ideas whether in providing products or services or creating competitive advantages. It also recommends conducting studies to determine the integration between JIT and total quality and the dimension of growth and learning to determine the reasons for poor performance in the field of employee learning, growth, and development.

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