Received 18 December 2020
Revised 7 March 2021
Accepted 17 March 2021

Integration of TQM and ERP to enhance organizational performance and excellence: empirical evidence from public sector using SEM

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Abstract

Purpose – The study aims to examine the joint effect of total quality management (TQM), enterprise resource planning (ERP) and organizational performance on organizational excellence.

Design/methodology/approach – To achieve the goal of this study through the hypothesized model, a survey questionnaire research design was employed. The data were collected from a Dubai Police organization. Out of 550 questionnaires, 320 questionnaires were returned. The structural equation modelling (SEM) partial least squares approach was used to analyze the data for measurement and structural models.

Findings – The statistical results confirmed the positive and significant effects of TQM, ERP and organizational performance on organizational excellence. The mediation role of organizational performance between TQM, ERP and organizational excellence also was confirmed.

Practical implications – Throughout this study, further details and valuable implications have been discussed. Findings provide several practical implications. Findings also help practitioners and managers make proper decisions when implementing TQM, ERP and excellence practices in their organizations. With the joint effect of TQM, ERP and organizational performance, organizations can achieve maximum strong excellence and remain in a competitive market. This current study presents potential to be used in didactical initiatives.

Originality/value – This study is a unique empirical research that examines the joint effect of TQM, ERP and performance on excellence relationships. In other words, the current study is one of the few studies that investigate the mediating role of organizational performance beside the organizational excellence as the ultimate variable in developing country, specifically in UAE.

Keywords Total quality management, Organizational excellence, Organizational performance, ERP

Paper type Research paper

1. Introduction

In the last few years, the importance of quality has increased amongst organizations around the world to remain in a competitive environment. At present, quality, as a final goal, is not a choice but a mandatory strategy to satisfy customers and enhance organizational performance. Thus, organizations have begun searching for practices and strategies to achieve quality. Amongst these strategies and practices is total quality management (TQM), which is considered by many researchers as a prerequisite philosophy to achieve the desired goals represented by enhancing the quality of products and services to satisfy customers (Douglas and Judge, 2001).

Many studies have focused on the important role of TQM in improving organizational performance (Abdullah and Tari, 2012; Chopra and Mendl, 2013; Thai and Jie, 2018). They have discussed the role of TQM and its dimensions, such as strategic planning, leadership,

World Journal of Entrepreneurship, Management and Sustainable Development
Vol. 17 No. 4, 2021
pp. 822-845

2042-5961
DOI 10.1108/WJEMSD-12-2020-0170

customer focus, human resource management, continuous improvement, information and analysis and benchmarking, on helping organizations achieve their objectives and enhance overall organizational performance. In addition, many arguments have focused on the relationship between TQM and organizational excellence and how they can affect and complement each other to maximize performance.

The resource-based view theory of the firm has been implemented in IT business to examine and develop theories about the effect of innovative IT potential on sustainable competitive advantages (Al-Dhaafri *et al.*, 2016a, b). In this regard, enterprise resource planning (ERP) system is considered as one of the leading IT systems. As innovative system, ERP is an innovation along with big organizations, and further extend to deal with other organizations, for instance, small and medium-sized organizations (SMEs) (Everdingen *et al.*, 2000) and organizations that are running in the public sector (Kumar *et al.*, 2002). Organizational performance and organizational excellence are the ultimate results that organizations fight to get, but which one is affecting the other, and which one is more importance to organizations. Most of researchers identified organizational excellence as antecedent to organizational performance such as Al-Dhaafri *et al.* (2016a, b); however, in other studies, organizational excellence is considered as the ultimate goal.

Owing to the importance of TQM, ERP and organizational performance for any organization, an empirical examination is conducted to show their joint effect on organizational excellence.

2. Theoretical literature and hypothesis development

The resource-based view (RBV) of firms is established by Barney (1991) to focus on the internal capabilities that can help organizations enhance performance and achieve competitive advantages over rivals. TQM and ERP are important internal factors for any organization as intangible resources that can differentiate them in the competitive market.

2.1 Organizational excellence

Business excellence is a strategic tool that enables organizations to achieve their objectives for improved performance and a competitive advantage (Ahmad, 2019). Excellence is a way for organizations to assess their performance, search for other opportunities for improvement and secure a competitive position amongst competitors in the market. Excellence also helps companies have a sustainable environment for continuous improvement (Tsiotras *et al.*, 2016). Specifically, organizational excellence helps organizations stimulate their functional areas and deliver their desired results (Lasrado and Uzbeck, 2017).

In the relationship between organizational excellence and organizational performance, one question cannot easily be answered: which one can lead to the other? The answer to this question should consider many factors, such as importance, organizational objectives and implemented practices. Therefore, organizational excellence can be the ultimate goal to achieve awards and recognition and can be a practice and strategy to maximize and enhance performance (Al-Dhaafri *et al.*, 2016a, b). Antony and Bhattacharyya (2010) examined the relationship between organizational excellence and organizational performance. They found the relationship positive, and that organizational excellence assists managers in understanding their organizations more than organizational performance does. Oncharoen and Ussahawanitchakit (2008) also obtained the same result; organizational excellence positively and considerably affects organizational performance.

Given these issues, another important variable, organizational excellence, is considered in this study to empirically strengthen the examination of the TQM–performance relationship with a particular focus on service industries. Thus, the following hypotheses in the following sections are examined.

2.2 Organizational performance

In literature, organizational performance is considered as the most important variable especially in organizational level research. Therefore, mostly describes as the ultimate goal that organizations are willing to achieve. Based on the organization's sector, organizational performance is measured by different tools and measurements. For example example, in private sectors where organizations have a business of selling products and services, it is measured mostly through financial measurement; however, customers' satisfaction, employees' satisfaction, reputation and others are also added tools and measurements. On the other side, in public sector non-financial measurements are applied to understand the impact of services on customer and society. Many researchers and practitioners prefer to use indicators that concentrate on both financial and non-financial success appraisal metrics (Grawe *et al.*, 2009; Saunila *et al.*, 2014). For example, a balanced scorecard (BSC) approach has been generated to provide a balanced measure for the evaluation of organizational performance. The BSC then retained the financial measures and introduced three other perspectives (customer, internal process and learning and growth) to achieve balanced measurement (Kaplan and Norton, 1992, 1996).

2.3 Total quality management

Total quality management (TQM) has been recognized for its potential to enhance competitive outcomes for organizations through continual improvement (Alofan *et al.*, 2020). They argued that there is evidence in the literature that TQM practices differ significantly across organizations, with each organization having individual TQM profiles. Quality journey represents quality programs, which are implemented by organizations to improve and adapt in response to changing customer requirements (McGregor, 2004). Therefore, successful quality management systems are not easily achieved due to the requirement from all parties to work towards one direction (Uluskan *et al.*, 2018). TQM has been widely recognized as the management process that enables organizations in different sectors to address the rapid changes in business environment (Talib *et al.*, 2011). TQM is an important strategy that can help improve the quality of goods and services and customer satisfaction; TQM can also reduce waste, cost and time and increase productivity (Fuzi and Gibson, 2013; Oprescu, 2012; Valmohannadi, 2011; Pakdil, 2010; Besterfield *et al.*, 2003; Goetsch and Davis, 2006).

Al-Dhaafri and Alosani (2020) asked about the relationship between TQM and organizational excellence relationship, and how they can affect and complement each other to maximize efficiency and performance. They confirmed in their study in public sector a positive and significant impact of TQM on organizational excellence and organizational performance.

According to Kassem *et al.* (2018), excellent organizations achieve and maintain exceptional results that meet or go beyond the expectations of stakeholders within society. Organizational excellence has several main principles, such as emphasis on performance and customer satisfaction, leadership and specific priorities, process and fact management, employee growth and involvement, learning, innovation and creativity and social responsibility (Goetsch and Davis, 2014; Houshi and Taleghani, 2016). There is a fear in organizations when implementing TQM practices due to many complicated factors. In his contribution to explore the role and the meaning of fear in organizations implementing TQM, Bugdol (2020) reviewed many articles in a systematic review of the literature. His study presents the causes of fear in the TQM components, the main types of fear and its consequences. He argued that fear appears when, for various reasons, TQM is improperly implemented and maintained, but also when resources are allocated incorrectly.

Organizational performance as the ultimate goal that organizations want to achieve. It has different meaning depending on the organization sector, industry and its purpose. In some

cases, customers' satisfaction and employees' satisfaction are of the desired outcome. In this regard, many studies found positive and significant impact of TQM on customers and employees' satisfaction (Abu-Rumman *et al.*, 2021; Ahmed and Idris, 2020).

According to Khalaf and Salem (2018), TQM literature emphasizes two issues related to the TQM–performance relationship. The first issue is the differences between service and manufacturing organizations that implement TQM practices to enhance their performance (Rönnbäck and Witell, 2008). Implementing TQM practices in the service sector is not always as successful as that in manufacturing organizations; therefore, TQM studies in the services sector are lacking compared with those in the manufacturing context (Psomas *et al.*, 2017). That is, most empirical studies related to the TQM–performance relationship have focused on the manufacturing industry (Demirbag *et al.*, 2006; Abusa and Gibson, 2013) or in certain cases, a combination of both sectors (Gustafsson *et al.*, 2003). A few studies (Al-Dhaafri *et al.*, 2016a, b; Brah *et al.*, 2000; Hasan and Kerr, 2003; Singh and Sushil, 2013) have examined the relationship in the context of service organizations. The second issue, however, involves many authors who have confirmed the positive and significant findings achieved by implementing TQM dimensions. Other studies have reported insignificant or negative effects of TQM on performance (Barouch and Kleinhans, 2015). Due to these negative and insignificant results, certain researchers have suggested factors apart from TQM implementation to achieve improved results (Calvo-Mora *et al.*, 2014; Longbottom and Hilton, 2011). Thus, the following hypothesis is postulated.

H1. TQM has a positive and significant effect on organizational excellence.

H2. TQM has a positive and significant effect on organizational performance.

2.4 Enterprise resource planning

For the last 20 years, enterprise resource planning (ERP) have been the cornerstone of centralized business process control in organizations (Kamdjoug *et al.*, 2019). While these programs have proved to be essential to business process productivity and, as a result, business growth, successful adoption of ERPs remains a major challenge for many modern companies. This resulted in a number of reports on ERP critical success factors (CSFs) in particular related to the introduction of ERP in both large and medium-sized enterprises (SMEs). International organizations increasingly use ERP programs to successfully consolidate and maintain their diverse knowledge and processes within the organization (Alsharari, 2019).

ERP integrates both processes and functions of an organization creating a seamless, efficient and more transparent way of executing business operations (Gupta *et al.*, 2018). An ERP system entails a change in the operational functioning of the organization. Hence, an ERP system should be selected in accordance with the requirements of organization's processes (Bagchi *et al.*, 2005). There is a need to map the functionality of cloud ERP to the current business processes (Jede and Teuteberg, 2016). Any mismatch in the same may cause problems and delay in implementation. Integrating ERP into a service management department allows the organization to reduce its dependency on human effort and eliminates the need to maintain a number of scattered and distinct systems. The global success of ERP has captured the interest of business, information technology, and information systems researchers.

RBV helps to understand contextual implications on resources and capabilities that eventually impact the performance of an organization (Brandon-Jones *et al.*, 2015) . Utilizing a contingent resource-based perspective, we attempt in this study to conceptualize the impact of cloud ERP to excellence and overall organizational performance. Therefore, the integration of strong variables, namely, TQM and ERP are capable to enhance performance and attain competitive advantages which supposed by RBV theory.

A growing number of public organizations with minimal financial capital are searching for a modern and cost-effective ERP solution that incorporates upgraded functionality of regular on-site ERP programs, including enhanced internal operational management as well as improved organizational performance and effectiveness; thus, many organizations are moving towards adoption.

ERP system has been implemented in public organizations in Dubai since 2003 from Oracle corporation. As one of the authors was part of the team who implemented the system in 2003 and the following years, the system started with problems that have been solved in the pilot period. However, in later years, the system achieved huge successfulness by integrating all entities in Dubai Government. Therefore, in this paper after 17 years of implementation, we provide empirical evidence that support the practical benefits of ERP.

Many previous studies found a strong effect of ERP on organizational performance (Al-Dhaafri *et al.*, 2016a, b; Elsayed *et al.*, 2021; Maiga *et al.*, 2014; Sislian and Jaegler, 2020); however, this conclusion still has many contradictions, which encourages us to examine this relationship based on the following hypotheses:

H3. ERP has a positive and significant effect on organizational excellence.

H4. ERP has a positive and significant effect on organizational performance.

2.5 Mediating role of organizational performance

In relation to organizational excellence, organizational performance is expected to have its results by providing excellent products and services. However, organizational performance can be also considered as a predictor due to its role in achieving excellence awards, which in this situation considered, as ultimate goal. Therefore, they used by many researchers in interchangeable situations. As a result, in this study organizational performance is put as a mechanism to explain the relationships between TQM, ERP and organizational excellence. One question related to the excellence–performance relationship is difficult to answer: which one can contribute to the other? Many factors, such as importance, organizational goals and implemented practices should be considered in addressing this question. Organizational excellence can therefore be the ultimate goal for attaining rewards and recognition and can be a method and technique for optimizing and improving performance (Al-Dhaafri *et al.*, 2016a, b). Given the above concerns, another significant factor, organizational excellence, is considered in the current research to empirically improve the analysis of the TQM-performance relationship with a particular focus on service industries (Al-Dhaafri and Alosani, 2020). Therefore, the following hypothesis is introduced.

H5. Organizational performance has a positive and significant effect on organizational excellence.

H6. Organizational Performance has a mediating role between TQM and organizational excellence.

H7. Organizational Performance has a mediating role between ERP and organizational excellence.

3. Research methodology

To examine the hypothesized theoretical framework, a quantitative methodology approach was used to investigate the significant relationships amongst variables. To achieve this purpose, a survey questionnaire was used to collect data from the Dubai Police as a type of field study (see Figure 1).

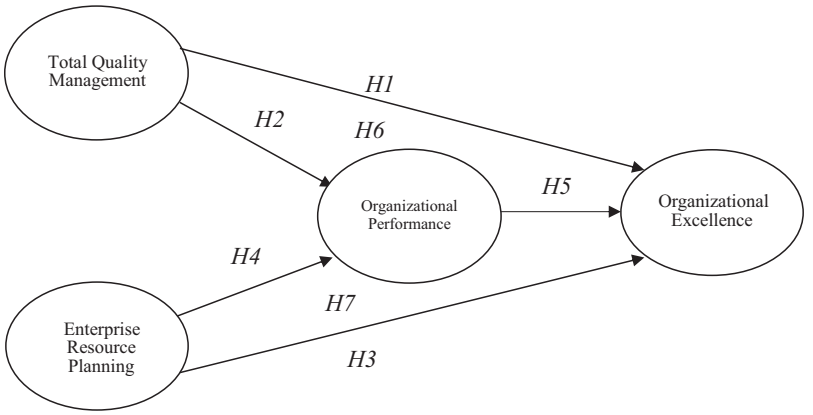

Figure 1.
Research framework

3.1 Survey instrument and measurement

The survey questionnaire had 97 items to measure TQM, ERP, organizational excellence and organizational performance. Initially, the survey questionnaire was pretested with three practitioners and two academics to check the content and face validities. Then, the English version questionnaire was translated into Arabic (the mother tongue of the respondents) and then back-translated to guarantee the right translation and that the two versions were comparable. In addition to that, Cronbach's alpha was used to validate items consistency with their respective constructs.

The independent variables were TQM and ERP. A total of 32 items were adopted and adapted to measure TQM developed by Brah *et al.* (2000), Terziovski and Samson (1999), Anderson and Sohal (1999) and Rao (2000); however, 40 items were adopted Stratman and Roth (2002) to ERP. By contrast, 10 were used to measure organizational excellence developed by Pinar and Gerard (2008). A Likert-type seven-point scale was used for independent variables that ranged from 1 = "strongly disagree" to 7 = "strongly agree." Dependent variable "organizational performance" was measured by 15 items adapted from Kaplan and Norton (1992) using a Likert-type five-point scale that ranged from 1 = "strongly disagree" to 5 = "strongly agree." There were three demographic variables namely, gender, qualifications and experiences used in the questionnaire survey to study the characteristics of study's respondents. SPSS was used to extract demographic and descriptive data, however, SmartPLS to test hypotheses.

The emergence of multivariate analytical techniques transforms empirical validation of social science and corporate analysis theoretical principles (Akter *et al.*, 2017). Structural equation modeling (SEM) has been established in this sense as a powerful means by which conceptual models are calculated that bind two or more latent constructions. The current study highlights the suitability of the SEM (PLS-SEM) approach to partial less quadratic models in estimating a dynamic model drawing on verisimilitude and soft modeling assumptions methodology. PLS-SEM became popular after it was introduced by Herman Wold in 1966 for survey research in recent years. In particular its benefits in distributional assumptions, lack of factor indeterminacy and models with more parameters than observations contribute to the creation of PLS-SEM (Dijkstra and Henseler 2015). The PLS-SEM is considered as a variance-based approach to SEM (Tenenhaus, 2008). One key advantage of the PLS-SEM is that even with small samples, a model with multiple latent variable and indicators can be estimated (Chin *et al.*, 2008). Due to its versatile iterative algorithm and the soft modeling assumptions, PLS-SEM has many advantages in estimating

complex models (Akter *et al.*, 2017). Therefore, the soft modeling assumptions of PLS-SEM helps in avoiding positively-biased model fit indices for our large-complex model (Chin and Newsted 1999; Hair *et al.*, 2012, 2011). In this study, there are many constructs and latent variables in the inner or outer model which make the framework complex. Therefore, a PLS software is needed to solve the problem of normality distribution and complex relationships between variables.

3.2 Pretesting

Originally, 97 items representing the instrument were used to collect data from the respondents for all variables. These items were a combination of different sources. To ensure that the instrument is valid and reliable, a pre-test was conducted using 30 questionnaires in the pilot study. Cronbach's alpha was used to calculate the construct validity using SPSS (Sekaran, 2003). The results showed an adequate internal consistency, indicating that the values exceeded the cut-off value suggested by Nunnally (1978), that is, 0.70.

3.3 Sampling and data collection

Dubai Police was selected as a field of study to collect data from its departments and then test the proposed framework. Top and middle managers from sub-departments were selected, owing to their knowledge about the variables in this study. The questionnaire was sent to respondents by e-mail and as a hard copy. Finally, out of 550 questionnaires, 320 useable questionnaires were received, representing a 58% response rate.

4. Statistical analysis and results

As a non-parametric model testing technique, partial least squares structural equation modelling (PLS-SEM) has become popular in management literature.

Wold (1982a, b) proposed the PLS-SEM. PLS is a common method used in path models to calculate latent constructs in the estimation of casual relationships. The PLS algorithm is also primarily a sequence of regression to achieve convergent fixed-point equations. The approach can estimate path models with a small sample even though they have highly skewed distribution (Bagozzi, 1994). In this study, the measurement model was examined on the basis of the validity and reliability of the model prior to examining the hypotheses as detailed in the following sections.

4.1 Measurement (outer model)

As illustrated next, the validity and reliability of the construct are examined through the content, convergent and discriminant validities.

4.1.1 Content validity. In multivariate analysis literature, content validity is defined as the case when the items used to measure a construct possess higher loads on their constructs in the same system than on other constructs. According to Chin (1998) and Hair *et al.* (2011), factor loading is used to test content validity. If items are loaded higher on other constructs than on their own, then they are deleted. The test reveals that all things highly loaded on their respective constructs are more than the constructs of other types. Table 1 shows the importance of factor loading on the respective structures of the items of all variables. This finding verifies the validity of the measurement model's data.

4.1.2 Convergent validity. Convergent validity, according to Hair *et al.* (2011), is the degree to which a set of items converges to measure a defined construct. In SEM literature, convergent validity can be examined by factor loadings, composite reliability and average variance extracted (AVE). Accordingly, the loading should be highly loaded and statistically significant in measuring variables with at least 0.7 of factor loadings, at least 0.7 of composite

Construct	Author/Year	Journal	Index
TQM	Douglas and Judge (2001)	Academy of Management Journal	Web of Science (ISI)/Scopus
	Abdullah and Tari (2012)	Asia Pacific Management Review	Web of Science (ISI)/Scopus
	Thai and Jie (2018)	Asia Pacific Journal of Marketing and Logistics	Web of Science (ISI)/Scopus
	Uluskan *et al.* (2018)	International Journal of Lean Six Sigma	Web of Science (ISI)/Scopus
	Talib *et al.* (2011)	Benchmarking: An International Journal	Web of Science (ISI)/Scopus
	Fuzi and Gibson (2013)	International Journal of Quality and Reliability Management	Web of Science (ISI)/Scopus
	Oprescu (2012)	Metalurgia International	Scopus
	Valmohannadi (2011)	The TQM Journal	Scopus
	Al-Dhaafri and Alosani (2020)	Benchmarking: An International Journal	Web of Science (ISI)/Scopus
	Houshi and Taleghani (2016)	Mediterranean Journal of Social Sciences	Scopus
	Bugdol (2020)	The TQM Journal	Scopus
	Abu-Rumman *et al.* (2021)	Management Science Letters	Scopus
	Ahmed and Idris (2020)	The TQM Journal	Scopus
	Psomas *et al.* (2017)	International Journal of Quality and Service Sciences	Web of Science (ISI)/Scopus
	Demirbag *et al.* (2006)	Journal of Manufacturing Technology Management	Web of Science (ISI)/Scopus
	Abusa and Gibson (2013)	International Journal of Quality and Reliability Management	Web of Science (ISI)/Scopus
	Brah *et al.* (2000)	International Journal of Operations and Production Management	Web of Science (ISI)/Scopus
	Singh and Sushil (2013)	International Journal of Productivity and Performance Management	Web of Science (ISI)/Scopus
	Barouch and Kleinhans (2015)	International Journal of Quality and Service Sciences	Web of Science (ISI)/Scopus
	Calvo-Mora *et al.* (2014)	International Journal of Operations and Production Management	Web of Science (ISI)/Scopus
ERP	Al-Dhaafri *et al.* (2016a, b)	The TQM Journal	Scopus
	Everdingen *et al.* (2000)	Communication of the ACM	Scopus
	Kumar *et al.* (2002)	International Journal of Production Research	Web of Science (ISI)/Scopus
	Alsharari (2019)	International Journal of Disruptive Innovation in Government	Emerald
	Gupta *et al.* (2018)	International Journal of Logistics Management	Web of Science (ISI)/Scopus
	Bagchi *et al.* (2005)	International Journal of Logistics Management	Web of Science (ISI)/Scopus
	Jede and Teuteberg (2016)	International Journal of Logistics Management	Web of Science (ISI)/Scopus
	Brandon-Jones *et al.* (2015)	International Journal of Production Research	Web of Science (ISI)/Scopus
	Elsayed *et al.* (2021)	Enterprise Information Systems	Web of Science (ISI)/Scopus
	Maiga *et al.* (2014)	British Accounting Review	Web of Science (ISI)/Scopus
	Sislian and Jaegler (2020)	Supply Chain Forum: An International Journal	Scopus

(*continued*)

Table 1.
Literature review summary

Construct	Author/Year	Journal	Index
Organizational Excellence	Al-Dhaafri *et al.* (2016a, b)	The TQM Journal	Scopus
	Ahmad (2019)	International Journal of Contemporary Hospitality Management	Web of Science (ISI)/Scopus
	Tsiotras *et al.* (2016)	Global Business and Organizational Excellence	Scopus
	Lasrado and Uzbeck (2017)	Benchmarking: An International Journal	Web of Science (ISI)/Scopus
	Ooncharoen and Ussahawanitchakit (2008)	International Journal of Business Research	Scopus
	Kassem *et al.* (2018)	Benchmarking: An International Journal	Web of Science (ISI)
Organizational Performance	Al-Dhaafri *et al.* (2016a, b)	The TQM Journal	Scopus
	Grawe *et al.* (2009)	International Journal of Physical Distribution and Logistics Management	Web of Science (ISI)/Scopus
	Saunila *et al.* (2014)	International Journal of Productivity and Performance Management	Web of Science (ISI)/Scopus
	Kaplan and Norton (1992, 1996)	Harvard Business Review	Web of Science (ISI)/Scopus

Table 1. **Source(s):** The study's authors

reliability and at least 0.5 of AVE for each construct, as presented in Table 2. The results obtained have exceeded the cut-off values; therefore, the convergent validity of the model is confirmed (Bagozzi and Yi, 1988).

In addition, construct reliability is examined by comparing the Cronbach's alpha and composite reliability values, as explained in Table 2, with the cut off value of 0.7 suggested by previous authors, such as Nunnaly (1978) and Hair *et al.* (2011). The results show that the Cronbach's alpha and composite reliability values of all the constructs are higher than 0.7, indicating that all the constructs' items have an adequate reliability in measuring their respective constructs.

4.1.3 Discriminant validity. The discriminant validity in SEM literature is defined as the degree to which a set of items can differentiate a construct from other variables in the model. According to Dijkstra and Henseler (2015), the value of HTMT should be less than 1 for determining discriminant validity, while Gold *et al.* (2001) suggested the value should be lower than 0.90. Besides, Kline (2011) proposed the value should be below 0.85. According to that, the values in Table 3 shows that the HTMT ratio values within the acceptable level. Therefore, the result confirms that the measurement model has the required discriminant validity.

4.2 Structural model (inner model) and hypothesis testing

After achieving the construct validity and reliability in previous steps, the proposed hypotheses are examined by running the SmartPLS algorithm and bootstrapping. Figure 2 and Table 4 illustrate the results (see Table 5).

Table 4 and Figure 3 show that TQM has a positive and significant effect on organizational excellence at 0.05 level of significance ($\beta = 0.084, t = 2.051, p < 0.05$). Similarly, the results also indicate a positive and significant effect of ERP on organizational Excellence ($\beta = 0.096, t = 2.020, p < 0.05$). These results support H1 and H3. The relationships between TQM and ERP on organizational performance were also found to be positive and significant at 0.05 of significance ($\beta = 0.397, t = 2.586, p < 0.05$) and ($\beta = 0.277, t = 2.340, p < 0.05$) respectively, which confirm H2 and H4. In addition, organizational performance has a

Items	ERP	Organizational Excellence	Organizational Performance	TQM
ERPB1	*0.843*	0.428	0.427	0.620
ERPB2	*0.862*	0.535	0.535	0.666
ERPB3	*0.790*	0.468	0.503	0.596
ERPB4	*0.811*	0.444	0.459	0.626
ERPB5	*0.735*	0.436	0.424	0.606
ERPC1	*0.798*	0.498	0.485	0.591
ERPC2	*0.731*	0.423	0.426	0.477
ERPC3	*0.757*	0.360	0.350	0.548
ERPC4	*0.803*	0.426	0.406	0.536
ERPC5	*0.817*	0.423	0.401	0.627
ERPE1	*0.787*	0.502	0.483	0.740
ERPE2	*0.814*	0.520	0.519	0.784
ERPE3	*0.780*	0.557	0.560	0.775
ERPE4	*0.752*	0.575	0.564	0.744
ERPE5	*0.781*	0.572	0.541	0.677
ERPI1	*0.835*	0.488	0.469	0.684
ERPI2	*0.771*	0.434	0.434	0.603
ERPI3	*0.829*	0.503	0.504	0.693
ERPI4	*0.884*	0.482	0.490	0.688
ERPI5	*0.821*	0.485	0.481	0.584
ERPL1	*0.751*	0.390	0.386	0.541
ERPL2	*0.765*	0.393	0.391	0.587
ERPL3	*0.794*	0.414	0.397	0.571
ERPL4	*0.763*	0.317	0.298	0.523
ERPL5	*0.750*	0.307	0.289	0.546
ERPP1	*0.781*	0.590	0.572	0.638
ERPP2	*0.784*	0.604	0.578	0.696
ERPP3	*0.812*	0.585	0.574	0.641
ERPP4	*0.750*	0.586	0.586	0.676
ERPP5	*0.659*	0.585	0.551	0.606
ERPS1	*0.770*	0.454	0.458	0.733
ERPS2	*0.793*	0.510	0.517	0.785
ERPS3	*0.669*	0.350	0.340	0.704
ERPS4	*0.751*	0.396	0.385	0.742
ERPS5	*0.733*	0.425	0.402	0.722
ERPT1	*0.752*	0.439	0.415	0.554
ERPT2	*0.688*	0.479	0.469	0.510
ERPT3	*0.773*	0.451	0.452	0.622
ERPT4	*0.755*	0.388	0.384	0.564
ERPT5	*0.710*	0.386	0.350	0.539
EX1	0.362	*0.735*	0.765	0.470
EX10	0.433	*0.648*	0.678	0.360
EX2	0.269	*0.631*	0.639	0.408
EX3	0.478	*0.777*	0.744	0.494
EX4	0.580	*0.776*	0.755	0.458
EX5	0.423	*0.798*	0.764	0.384
EX6	0.582	*0.713*	0.686	0.524
EX7	0.482	*0.824*	0.801	0.468
EX8	0.360	*0.529*	0.498	0.345
EX9	0.337	*0.563*	0.511	0.336
OP1	0.362	0.735	*0.765*	0.470
OP2	0.360	0.529	*0.498*	0.345
OP3	0.337	0.563	*0.511*	0.336

(*continued*)

Table 2.
Cross loading of the items

Items	ERP	Organizational Excellence	Organizational Performance	TQM
OP4	0.433	0.648	*0.678*	0.360
OP5	0.342	0.584	*0.677*	0.294
OP6	0.432	0.704	*0.776*	0.424
OP7	0.526	0.731	*0.786*	0.525
OP8	0.314	0.588	*0.675*	0.509
OP9	0.299	0.561	*0.649*	0.511
OP10	0.269	0.631	*0.639*	0.408
OP11	0.478	0.777	*0.744*	0.494
OP12	0.580	0.776	*0.755*	0.458
OP13	0.423	0.798	*0.764*	0.384
OP14	0.582	0.713	*0.686*	0.524
OP15	0.482	0.824	*0.801*	0.468
B1	0.687	0.458	0.469	*0.840*
B2	0.669	0.382	0.409	*0.833*
B3	0.625	0.377	0.396	*0.794*
CI1	0.751	0.565	0.581	*0.877*
CI2	0.743	0.552	0.563	*0.906*
CI3	0.635	0.476	0.486	*0.823*
CI4	0.673	0.442	0.445	*0.837*
HRE1	0.630	0.377	0.383	*0.744*
HRE2	0.740	0.467	0.486	*0.806*
HRE3	0.660	0.427	0.432	*0.749*
HRI1	0.618	0.437	0.486	*0.802*
HRI2	0.612	0.415	0.445	*0.813*
HRI3	0.661	0.457	0.497	*0.839*
HRT2	0.595	0.520	0.538	*0.785*
HRT3	0.636	0.431	0.466	*0.774*
HRTI	0.562	0.389	0.443	*0.775*
IA1	0.624	0.562	0.578	*0.744*
IA2	0.655	0.477	0.497	*0.854*
IA3	0.590	0.414	0.443	*0.815*
IA4	0.696	0.468	0.465	*0.843*
IA5	0.775	0.594	0.601	*0.871*
ML1	0.656	0.514	0.507	*0.795*
ML2	0.558	0.495	0.482	*0.728*
ML3	0.662	0.491	0.499	*0.735*
ML4	0.624	0.531	0.515	*0.708*
SD1	0.721	0.443	0.457	*0.831*
SD2	0.753	0.518	0.531	*0.850*
SD3	0.690	0.476	0.473	*0.827*
SP1	0.551	0.486	0.515	*0.723*
SP2	0.682	0.536	0.565	*0.785*
SP3	0.689	0.559	0.606	*0.766*
SP4	0.667	0.554	0.572	*0.783*

Table 2.

positive and significant effect on organizational excellence at 0.001 level of significance ($\beta = 0.975$, $t = 66.229$, $p < 0.001$), and therefore support H5 (see Table 6).

Mediation hypotheses were also tested in SmartPLS. Organizational performance was found to have a partial mediating role between TQM and organizational excellence ($\beta = 0.387$, $t = 2.533$, $p < 0.05$) which supports hypothesis H6. Also, organizational performance has a partial mediating role between ERP and organizational excellence ($\beta = 0.270$, $t = 2.343$, $p < 0.05$) and therefore, supports hypothesis H7.

Construct	Items	Loadings	Cronbach's alpha	CR[a]	AVE[b]
ERPB	ERPB1	0.843	0.983	0.984	0.603
	ERPB2	0.862			
	ERPB3	0.790			
	ERPB4	0.811			
	ERPB5	0.735			
ERPC	ERPC1	0.798			
	ERPC2	0.731			
	ERPC3	0.757			
	ERPC4	0.803			
	ERPC5	0.817			
ERPE	ERPE1	0.787			
	ERPE2	0.814			
	ERPE3	0.780			
	ERPE4	0.752			
	ERPE5	0.781			
ERPI	ERPI1	0.835			
	ERPI2	0.771			
	ERPI3	0.829			
	ERPI4	0.884			
	ERPI5	0.821			
ERPL	ERPL1	0.751			
	ERPL2	0.765			
	ERPL3	0.794			
	ERPL4	0.763			
	ERPL5	0.750			
ERPP	ERPP1	0.781			
	ERPP2	0.784			
	ERPP3	0.812			
	ERPP4	0.750			
	ERPP5	0.659			
ERPS	ERPS1	0.770			
	ERPS2	0.793			
	ERPS3	0.669			
	ERPS4	0.751			
	ERPS5	0.733			
ERPT	ERPT1	0.752			
	ERPT2	0.688			
	ERPT3	0.773			
	ERPT4	0.755			
	ERPT5	0.710			
People Commitment	EX1	0.735	0.885	0.907	0.501
	EX10	0.648			
	EX2	0.631			
	EX3	0.777			
Customer Focus	EX4	0.776			
	EX5	0.798			
	EX6	0.713			
Innovation	EX7	0.824			
	EX8	0.529			
	EX9	0.563			

(*continued*)

Table 3.
Convergent validity analysis

Construct	Items	Loadings	Cronbach's alpha	CR[a]	AVE[b]
Customer	OP1	0.765	0.923	0.934	0.552
	OP2	0.498			
	OP3	0.511			
	OP4	0.678			
Financial	OP5	0.677			
	OP6	0.776			
	OP7	0.786			
Internal Process	OP8	0.675			
	OP9	0.649			
	OP10	0.639			
	OP11	0.744			
Learning and Growth	OP12	0.755			
	OP13	0.764			
	OP14	0.686			
	OP15	0.801			
Benchmarking	B1	0.840	0.982	0.983	0.645
	B2	0.833			
	B3	0.794			
Continuous Improvement	CI1	0.877			
	CI2	0.906			
	CI3	0.823			
	CI4	0.837			
HRM	HRE1	0.744			
	HRE2	0.806			
	HRE3	0.749			
	HRI1	0.802			
	HRI2	0.813			
	HRI3	0.839			
	HRT2	0.785			
	HRT3	0.774			
	HRTI	0.775			
Information and Analysis	IA1	0.744			
	IA2	0.854			
	IA3	0.815			
	IA4	0.843			
	IA5	0.871			
Management Leadership	ML1	0.795			
	ML2	0.728			
	ML3	0.735			
	ML4	0.708			
Service Design	SD1	0.831			
	SD2	0.850			
	SD3	0.827			
Strategic Planning	SP1	0.723			
	SP2	0.785			
	SP3	0.766			
	SP4	0.783			

Note(s): a: CR = (Σ factor loading) 2/{(Σ factor loading) 2) + Σ (variance of error)}
b: AVE = Σ (factor loading) 2/(Σ (factor loading) 2 + Σ (variance of error)}

Table 3.

4.3 Predictive relevance of the model

Predictive relevance measures the model's power by using cross-validated redundancy and cross-validated communality and *R*-square. *R*-square is the variance of dependent variable (endogenous construct) that is explained by independent variable (exogenous construct).

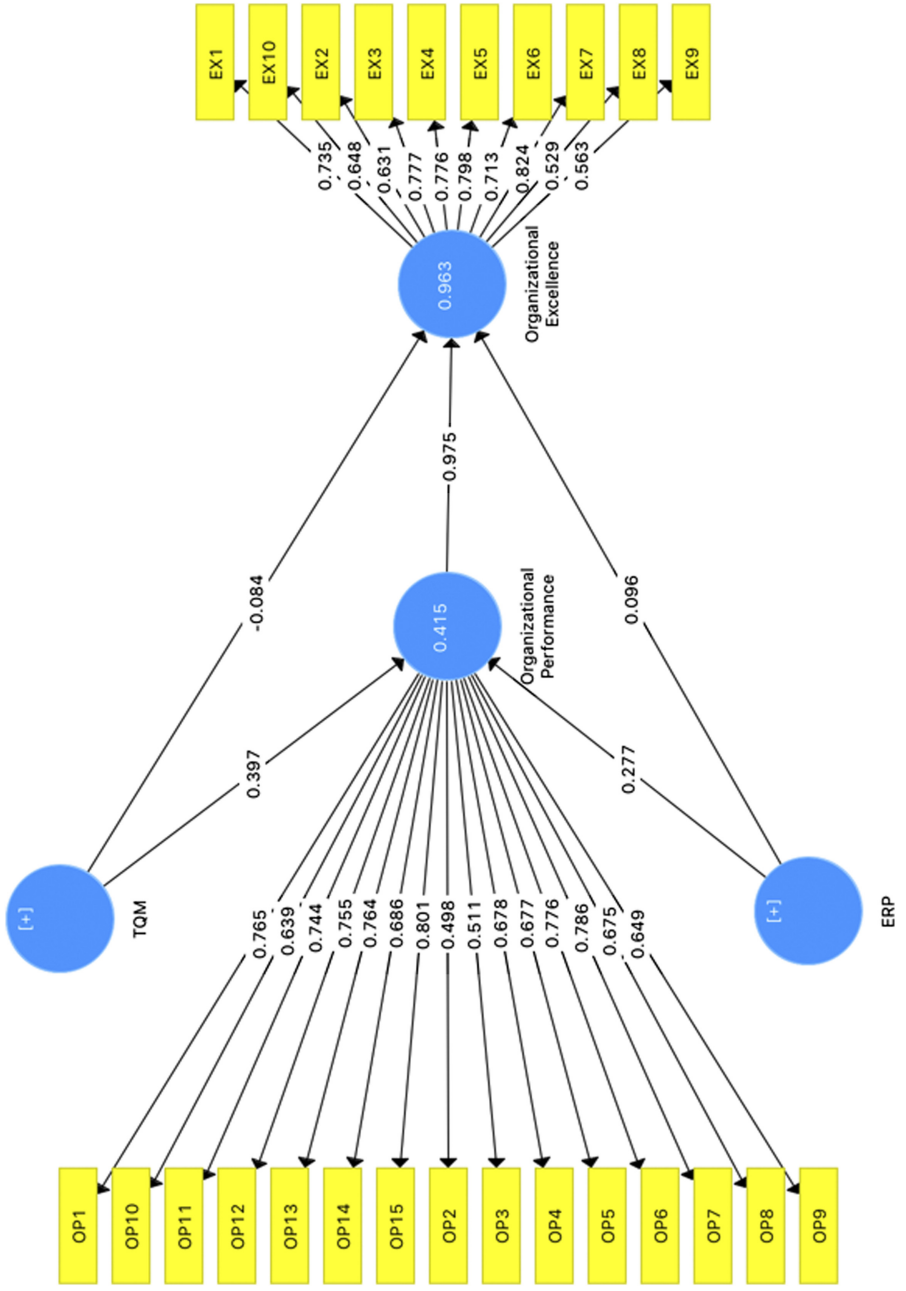

Figure 2.
Path coefficient

Table 7 shows that 96% of organizational excellence is explained by TQM, ERP and organizational performance. As a cut-off suggested by Cohen (1988), *R*-square is considered substantial with values more than 0.26, moderate with values more than 0.13–0.26 and weak with values more than 0.02–0.13. On the basis of the results, the values are considered substantial, indicating the power of the constructs contained in this model to explain organizational performance.

Both values of cross-validated redundancy and cross-validated communality are used to assess the quality of the model. These values are extracted by running the blindfolding method in SmartPLS. This method removes certain data values and then estimates them as missing values. After generating their values, a comparison is made to examine the closeness of the real result from the implied results. The predictive quality of the model is assessed on the basis of the result of the cross-redundancy values, which should be more than 0, or it will not be confirmed. Table 7 shows that the value of cross-validated redundancy is 0.458 for organizational excellence. Therefore, the value confirms that the model has an adequate prediction quality.

4.4 Goodness-of-fit of the model

The goodness-of-fit (GoF) has only one measure in PLS–SEM according to Tenenhaus *et al.* (2005). The average of *R*-square and the geometric mean of AVE for the endogenous constructs are measured in the following formula:

$$\text{Gof} = \sqrt{\left(\overline{R^2} \times \overline{\text{AVE}}\right)}.$$

According to Wetzels *et al.* (2009), the cut-off values are 0.36 (large), 0.25 (medium) and 0.1 (small). Based on the values in Table 8, the GoF of this study is 0.748, which is considered large and confirms the adequacy of the model validity.

Table 4.
Correlations of discriminant validity

Construct	ERP	Organizational excellence	Organizational performance	TQM
ERP				
Organizational Excellence	0.643			
Organizational Performance	0.610	0.832		
TQM	0.829	0.641	0.648	

Table 5.
Hypothesis testing results

Hypothesis	Hypothesis	Path coefficient	Standard error	*T* value	*p* value	Decision
H1	TQM → Organizational Excellence	*0.084	0.041	2.051	0.041	Supported
H2	TQM → Organizational Performance	*0.397	0.153	2.586	0.010	Supported
H3	ERP → Organizational Excellence	*0.096	0.047	2.020	0.044	Supported
H4	ERP → Organizational Performance	*0.277	0.118	2.340	0.020	Supported
H5	Organizational Performance → Organizational Excellence	***0.975	0.015	66.229	0.000	Supported

Note(s): *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$

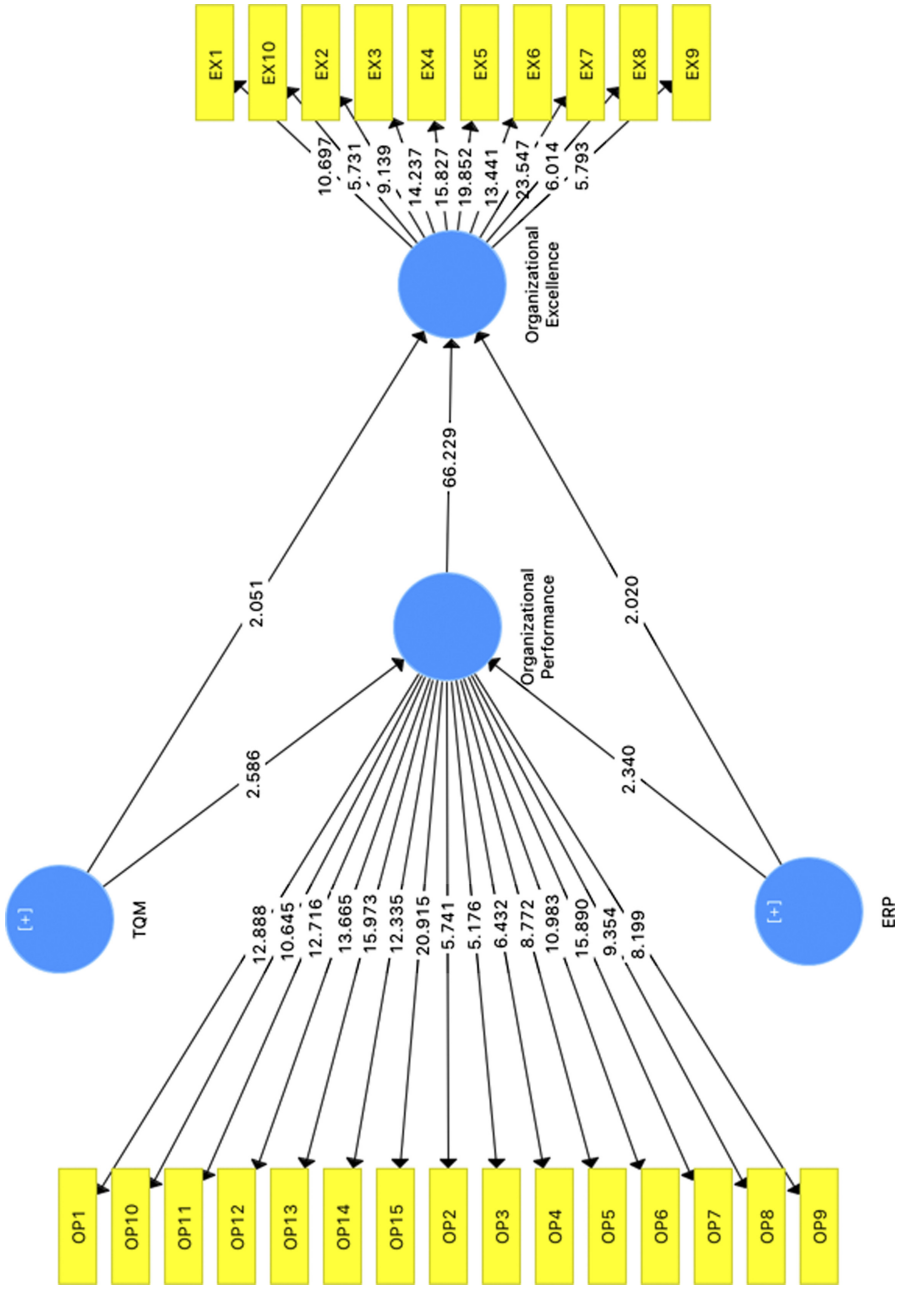

Figure 3.
Hypothesis testing results

Table 6.
Mediation testing results

Hyp. No	Hypothesis	a		b		a*b		c		c'		Bootstrapping method	Baron and Kenny method
		Path coefficient	T.Value	Path coefficient	T.Value	Path coefficient	T.Value	Path coefficient	T.Value	Path coefficient	T.Value		
H6	There is a mediation role of OP between TQM and Organizational Excellence	0.397	2.586	0.975	66.229	0.387	2.533	0.288	1.843	−0.084	2.051	Mediation Effect	Partial Mediator
H7	There is a mediation role of OP between ERP and Organizational Excellence	0.277	2.340	0.975	66.229	0.270	2.343	0.390	3.147	0.096	2.020	Mediation Effect	Partial Mediator

Note(s): *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$

5. Discussions

The main objective of this study is to examine the effects of TQM, ERP and organizational performance on organizational excellence. Owing to the inconsistency in the previous results about the relationships amongst these variables, a new model is formed to further assess such relationships. Therefore, data are needed to examine the developed model. Such data are collected from the Dubai Police department and analyzed using PLS–SEM methodology through SmartPLS.

The statistical results confirm and support the proposed hypotheses. The result indicates a positive and significant effect of TQM on organizational excellence and performance at 0.05 level of significance ($\beta = 0.084$, $t = 2.051$, $p < 0.05$), ($\beta = 0.397$, $t = 2.586$, $p < 0.01$). These results are in line with those of previous studies that report a positive and significant relationship amongst these variables (Al-Dhaafri and Alosani, 2020; Abu-Rumman *et al.*, 2021; Abdullah and Tari, 2012; Ahmed and Idris, 2020; Al-Dhaafri and Alosani, 2020; Chopra and Mendl, 2013; Chong and Rundun, 2004; Faisal *et al.*, 2011; Hassan and Kerr, 2003; Gunday *et al.*, 2011; Hendricks and Singhal, 2001; Joiner, 2007; Kumar *et al.*, 2009; Miyagawa and Yoshida, 2010; Thai and Jie, 2018). Similarly, ERP was found to have positive and significant effect on organizational excellence and performance ($\beta = 0.096$, $t = 2.020$, $p < 0.05$), ($\beta = 0.277$, $t = 2.340$, $p < 0.05$) which is consistent with finding of Al-Dhaafri *et al.* (2016a, b), Al-Dhaafri and Al-Swidi (2014), Bendoly and Kaefer (2004), Elsayed *et al.* (2021), Maiga *et al.* (2014), Park *et al.* (2007), Poston and Grabski (2001) and Sislian and Jaegler (2020).

It was also found significant, confirming the positive and significant effect of organizational excellence on organizational performance at a 0.001 level of significance ($\beta = 0.975$, $t = 66.229$, $p < 0.001$). This result is consistent with that of a previous study in the same line of research (Ahmad, 2019; Al-Dhaafri *et al.*, 2016a, b; Lasrado and Uzbeck, 2017). The results also showed the importance of organizational performance as a mechanism on the relationships between TQM, ERP and organizational excellence (= 0.387, $t = 2.533$, $p < 0.05$), $\beta = 0.270$, $t = 2.343$, $p < 0.05$) which is in line with previous studies (Al-Dhaafri and Alosani, 2020). The role of organizational performance is not limited to be the final goal as most of researches indicated, but as a practice and strategy to enhance the overall organizational excellence.

6. Conclusion

In this study, all proposed hypotheses are supported. Empirically, it is confirmed that TQM has positive and significant effect on both organizational performance and excellence.

Table 7. Prediction relevance of the model

Construct	*R*-square	Cross-validity Redundancy	Cross-validity Communality
Organizational Excellence	0.963	0.458	0.382
Organizational Performance	0.415	0.189	0.404

Table 8. GoF

Construct	*R*-square	AVE
TQM		0.645
ERP		0.603
OP	0.415	0.489
OE	0.963	0.499
Average	0.689	0.559
GoF	*0.621*	

Similarly, ERP is also found to have positive and significant impact on organizational performance and organizational excellence. The most important conclusion of this study is the mediation mechanism of organizational performance on the relationship between TQM, ERP and organizational excellence. Public organization in general and police department in particular plays a critical role in every society due to its huge impact on other sector in the country. Safety and security are crucial to drive economy and lead to achieve competitiveness. Using a sample 320 middle managers in Dubai, we demonstrate that the relationships of TQM-performance and ERP-performance have significant effect on organizational excellence. Therefore, this study explores the role of performance mechanism that can explain the inconsistent relationships in proposed framework. The current study is one the few studies that investigate the mediating role of organizational performance beside the organizational excellence as the ultimate variable in developing country, specifically in UAE.

7. Implications

7.1 Theoretical implications

The outcomes of this study report many theoretical contributions. The examination of the joint effect of TQM, ERP and organizational performance and excellence has not been covered well by scholarly attention. Therefore, this research is one the most important studies that close the gaps in existing body of knowledge by involving important internal factors, such as TQM, ERP and performance, that can enhance organizational excellence. TQM and ERP are considered in certain situations of practices that can lead to excellence. However, in other cases, excellence is considered an integral part when implementing the TQM strategy. Owing to these conflicts, the current study attempts to understand their effect as one role to enhance performance. In addition, studies in the public sector remain limited in general and in the police department in particular, especially in Middle-East countries.

This study also attempts to contribute to RBV theory by examining two important variables as internal resources that can enhance performance and achieve competitive advantage.

7.2 Practical implications

In practice, the results of this study can increase the awareness amongst managers, practitioners and decision makers to implement its variables for enhancing their organizational excellence through implementing strategies of performance. As important internal resources, TQM, ERP and organizational excellence can help organizations gain a competitive advantage by enhancing organizational performance where it differentiates an organization from its competitors and improve its market position.

Owing to certain difficulties to implement TQM and organizational practices, an important outcome from this study is that organizations should always consider planning to implement any strategy or new practice by developing a supportive culture. Without this supportive culture, organizational changes can lead to a huge failure.

7.3 Suggestions for future research

Despite the many contributions and insights of this study, it still has limitations that should be recommended as future research topics. The data are collected from the Dubai Police department, suggesting a gap in generalizing the outcomes to other public organizations. Therefore, future studies are recommended to collect data from other public sector organizations to obtain several insights or from private sector organizations. Future research may also investigate the study's model by conducting a longitudinal research approach to detect the dynamic changes of the relationships amongst variables.

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