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The Impact of Enterprise Resource Planning and Entrepreneurial Orientation on SME Performance: A Mediated Analysis through Organizational Excellence

Muhammad Amir bin Abdullah[1], Nur Aisyah binti Rahman[2*]

1. Faculty of Accountancy and Management, Universiti Tunku Abdul Rahman, Kajang 43000, Selangor, Malaysia.
2. Faculty of Management, Multimedia University, Cyberjaya 63100, Selangor, Malaysia.

Abstract

This study aims to explore how enterprise resource planning (ERP) systems and entrepreneurial orientation (EO) shape the performance of organizations, emphasizing the mediating function of organizational excellence (OE). Drawing on data from manufacturing SMEs in Pakistan, a total of 340 questionnaires were distributed, and 260 valid responses were obtained, representing a response rate of 76.47%. Data were analyzed using structural equation modeling with the partial least squares (SEM-PLS) approach. The results reveal that ERP and EO both exert a significant positive influence on organizational performance, while OE serves as a partial mediator in this association. Specifically, the findings indicate that organizations demonstrating higher levels of excellence tend to achieve superior performance outcomes, validating the proposed hypotheses at a 0.01 significance level. These insights highlight the strategic value of integrating ERP implementation and entrepreneurial orientation within SMEs to foster organizational excellence and improve overall effectiveness. The study offers practical guidance for policymakers, business leaders, and researchers seeking to strengthen performance through technological and entrepreneurial capabilities in emerging economies.

Keywords: Enterprise resource planning, Entrepreneurial orientation, Organizational excellence, SMEs, Pakistan

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Corresponding author: Nur Aisyah binti Rahman
E-mail ✉ n.m.rahman@outlook.com

Background

In today's rapidly changing and highly competitive business landscape, organizations must remain responsive to both internal and external challenges to sustain growth and competitiveness. Achieving organizational excellence, particularly through innovation and proactive management strategies, has become vital for long-term success. Although improving performance remains a primary objective for most organizations, the mechanisms that drive such improvement continue to require further investigation.

Information technology has long been recognized as a central determinant of organizational performance and competitive advantage [1]. Among the most influential innovations of the past two decades is enterprise resource planning (ERP), a system capable of integrating various business functions and optimizing processes across departments [2]. Despite its potential, the outcomes of ERP implementation have been inconsistent. Prior research attributes these inconsistencies to variations in organizational practices, contextual factors, and implementation processes. Elements such as communication, culture, project management, and training significantly shape ERP performance [1], and the absence of supportive management practices has often led to mixed results.

Organizational excellence (OE) offers a potential explanation for these inconsistencies. As a management approach, OE enhances the effectiveness of ERP by fostering innovation, commitment, and customer focus—dimensions that directly contribute to improved organizational performance [3]. Modern ERP systems increasingly serve as comprehensive planning tools that promote integration and excellence throughout the organization [4].

Entrepreneurial orientation (EO) has also been widely acknowledged as a strategic driver of growth and sustainability [5]. Previous studies have found both positive and inconclusive results regarding the relationship between EO and performance [6-8]. These discrepancies may stem from methodological differences, limited sample diversity, or the absence of mediating variables explaining how entrepreneurial behavior translates into superior outcomes [9, 10]. To address this gap, scholars have recommended incorporating mediating mechanisms such as organizational excellence to better explain the EO–performance link [11].

Empirical evidence supports the idea that organizational excellence mediates the relationship between EO and organizational performance, clarifying how entrepreneurial behaviors drive positive results [12]. Excellence-oriented practices such as innovation and continuous improvement provide the structural support necessary for entrepreneurial orientation to generate sustainable success.

Similarly, organizational culture (OC) has been identified as another variable that may influence this relationship. Since Pettigrew's foundational work in 1979 [13], numerous studies have examined the impact of culture on system success and strategy execution, including ERP and EO [14, 15]. Despite these efforts, few empirical investigations have explored these relationships within developing economies. Further research is needed to understand how contextual differences in national and sectoral environments shape the interaction between culture, technology, and entrepreneurship [16, 17].

Literature Review

Organizational excellence (OXEL)

The concept of *excellence* refers to the continuous pursuit of superior standards and the consistent attainment of top-tier performance outcomes. Found *et al.* [18] noted that the notion of excellence remains ambiguous unless its scope and attributes are clearly defined. The term is frequently used interchangeably with "business excellence" or "organizational excellence," though the former is often associated with private enterprises, while the latter is more applicable to public sector organizations. According to Azrol [19], empirical evidence linking business excellence directly to sustainable competitive advantage remains limited, and the theoretical foundation of this association is still underdeveloped.

Although many organizations strive for excellence, most fall short due to a limited understanding of its principles and practical dimensions. In today's fast-changing business environment, both public and private organizations are compelled to pursue strategies that enhance performance and competitiveness. Thus, this study examines organizational performance (OP) in relation to organizational excellence (OXEL). Despite numerous studies focusing on performance outcomes, little research has explicitly addressed how excellence contributes to performance improvement. Lee [20] highlighted that OXEL as an academic construct was first conceptualized by Mahdi *et al.* [21], marking the start of a more systematic inquiry into its relationship with performance.

Enterprise resource planning (ERP)

Technological innovation has reshaped the contemporary organizational landscape, compelling firms to adopt systems that ensure operational efficiency, cost reduction, and process optimization. To sustain competitiveness and productivity in an increasingly demanding environment, organizations are required to establish strategic objectives that promote quality enhancement and resource integration. Over the past two decades, enterprise resource planning (ERP) systems have emerged as one of the most transformative technological advancements in improving organizational effectiveness. Chadhar and Daneshgar [22] emphasized the growing prominence of ERP systems due to their ability to enhance efficiency, minimize costs, and strengthen global competitiveness.

ERP systems integrate various organizational functions, thereby streamlining processes, reducing redundancies, and facilitating informed decision-making. The global ERP market has experienced steady expansion, with revenues estimated between $61 and $65 billion between 2008 and 2010 . Historically, the roots of ERP can be traced back to the 1950s and 1960s, when early computing technologies were introduced to automate basic administrative tasks such as invoicing and bookkeeping . Modern ERP solutions are comprehensive, modular software systems that integrate finance, production, human resources, and supply chain operations within a single digital platform. As Amalnik and Ravasan [23] argued, rapid advances in information technology and global competition continue to drive ERP adoption, making it a key enabler of efficiency and organizational transformation.

Entrepreneurial orientation (ENTO)

Although the concept of entrepreneurship has been studied for decades, it continues to lack a universally accepted definition [24]. Across the literature, it has been described as the creation of enterprises, innovation, employment, growth, and value. Through an extensive analysis of key terms used in defining entrepreneurship, Okangi [25] offered a concise interpretation: "Entrepreneurship is a process of creating value by assembling unique resources to exploit an opportunity." Earlier, Jessop (2019) characterized it as a behavioral process involving initiative, the reorganization of socio-economic mechanisms, and the willingness to accept risks and potential failure.

Entrepreneurial orientation (EO) reflects an organization's propensity to innovate, take risks, and act proactively—qualities essential for success in an increasingly competitive global economy. EO has been widely acknowledged as a determinant of organizational success, performance, and sustainable competitive advantage [26, 27]. Magaji *et al.* [28] noted that entrepreneurship has become one of the fastest-growing fields in management research, with both scholars and practitioners recognizing its significant role in enhancing organizational performance [16].

Theoretical Framework

The conceptual framework of this study builds upon the literature reviewed above, focusing on the interrelationships among enterprise resource planning (ERP), entrepreneurial orientation (EO), organizational excellence (OXEL), and organizational performance (OP). While prior research has examined these variables independently, limited attention has been given to their combined effects and the mechanisms linking them.

Existing studies have frequently overlooked the mediating role of organizational excellence, despite growing evidence that it may influence performance outcomes [1, 20]. Although several studies have found a positive and significant relationship between OXEL and performance [1, 29], the results remain inconsistent, highlighting a clear research gap. This study aims to address this gap by empirically testing the mediating role of OXEL and contributing to the limited body of research in this area, particularly within developing economies such as the UAE.

In today's rapidly evolving business environment, effective integration of processes through robust technological systems has become vital for achieving competitiveness and long-term success. Information technology, particularly ERP, plays a central role in improving performance and creating value [30, 31]. Nonetheless, the evidence remains mixed, as some studies have reported adverse effects of ERP on performance due to challenges in implementation and contextual factors. This inconsistency points to the importance of mediating mechanisms such as OXEL in explaining how and why ERP influences performance outcomes.

Accordingly, this study draws on the framework of Dhaafri *et al.* [1], positioning organizational excellence as a mediating construct that enhances performance through effective leadership and strategic integration. The inclusion of ERP, based on the work of Chen *et al.* [32], further enriches the framework by linking technological innovation and entrepreneurial orientation to overall organizational performance through the mechanism of excellence.

ENTO is recognized as a key strategy for ensuring organizational survival and growth [5]. Leaders and managers who adopt an entrepreneurial orientation tend to exert a more positive influence on organizational performance (OP) compared to those who do not. Despite the extensive body of research exploring the link between ENTO and OP, findings remain inconclusive. These inconsistencies are often attributed to the lack of a mediating variable in previous studies [11, 12]. OXEL has been proposed as a potential mediator capable of explaining this relationship. Furthermore, entrepreneurial traits involve behaviors and initiatives that are reinforced through the diffusion of an entrepreneurial culture. Accordingly, entrepreneurial culture plays a crucial role in fostering entrepreneurial awareness. The conceptual framework of this study is therefore built upon prior research that positioned ENTO as an independent variable influencing OP through the mediating effect of OXEL.

In today's dynamic and uncertain environment, organizations must develop the capacity to build, integrate, and reconfigure internal competencies to remain competitive [33]. To achieve a competitive edge, organizations enhance their capabilities by leveraging various resources—particularly information systems—to meet customer demands, reduce operational costs, and improve service delivery and process efficiency [33]. Among the most transformative systems supporting these goals is the Enterprise Resource Planning (ERP) system [22]. ERP enables organizations to adapt to technological advancements and evolving market expectations by providing timely, accurate, and integrated data that enhances decision-making [34].

ERP is a multifaceted system characterized by its integrated modules and automated business processes that manage an organization's information flow, financial resources, and materials through a centralized database. Its proper implementation and alignment with organizational processes can lead to significant improvements in responsiveness, flexibility, cost reduction, quality enhancement, and overall performance. However, literature presents mixed findings regarding its impact on OP. While many studies have shown ERP systems to enhance financial performance [30, 33], non-financial performance [35], customer service, and communication efficiency, others have reported negative effects [31]. These adverse outcomes are frequently linked to cultural misalignment, insufficient training, and lack of top management commitment. Research also indicates that ERP failures are more common in financial performance within private organizations and operational efficiency within public organizations. Nonetheless, ERP implementation tends to yield more success in the public sector due to factors

such as strong leadership support, adequate funding, and advanced technological infrastructure. Based on these findings, the following hypothesis is proposed:

H1: Enterprise Resource Planning (ERP) has a significant impact on Organizational Performance (OP)

Entrepreneurial Orientation (ENTO) encompasses the practices, processes, behaviors, and decision-making styles that enable organizations to penetrate new markets with existing or novel products and services [11, 27]. Arham *et al.* [36] emphasized ENTO's importance for achieving growth and profitability. According to Jelenc *et al.* (2016), ENTO consists of three core dimensions—innovativeness, proactiveness, and risk-taking—to which aggressiveness and autonomy have also been added in later studies. Most entrepreneurship literature supports the notion that these dimensions positively influence OP [11, 26]. Research generally adopts two approaches: assessing ENTO as a composite construct or evaluating each dimension individually [28]. This study employs the latter approach to formulate hypotheses regarding the ENTO–OP relationship. Although most studies report a positive association between ENTO and OP, a few have shown the opposite. The limited examination of ENTO's impact within public organizations highlights a gap in the literature. Nonetheless, consensus remains that higher ENTO leads to better performance, profitability, and competitive advantage [37]. Given the conflicting evidence, further empirical exploration is warranted. Therefore, the following hypothesis is proposed:

H2: Entrepreneurial Orientation (ENTO) has a significant impact on Organizational Performance (OP)

Although ERP has been widely studied, a universal definition of the concept is still lacking. Generally, ERP is described as an enterprise-wide software system that integrates and streamlines various business functions [38], an information technology platform uniting all aspects of an organization's operations, and a strategic tool supporting best management practices [39]. As a technological enabler, ERP delivers multiple organizational benefits, including enhanced efficiency, sustained competitive advantage, and improved performance. Given the limited research on the link between ERP and Organizational Excellence (OXEL), this study aims to investigate this relationship further. Hence, the following hypothesis is proposed:

H3: Enterprise Resource Planning (ERP) has a significant impact on Organizational Excellence (OXEL)

Ghosh and Biswas [40] observed that as globalization reshaped organizational practices, small and medium-sized enterprises (SMEs) increasingly leveraged entrepreneurial and marketing approaches to enhance competitiveness and attain business excellence. Dawabsheh *et al.* [29] further emphasized that organizations must cultivate key dimensions of entrepreneurial orientation (ENTO)—including innovativeness, proactiveness, risk-taking, competitive aggressiveness, and autonomy—to strengthen internal capabilities and sustain superior performance.

In explaining why certain ventures outperform others, Dhaafri *et al.* [1] identified entrepreneurial orientation as a decisive factor influencing success, noting its positive contribution to performance excellence. Fok [41] reinforced this view, arguing that leaders play a central role in fostering creativity, learning, and effective knowledge management—practices that underpin innovation-driven excellence. The author also maintained that entrepreneurship acts as a fundamental driver of sustainable advantage. Together, these insights suggest that entrepreneurial orientation and organizational excellence (OXEL) are closely linked. Consequently, this study proposes:

H4: Entrepreneurial Orientation (ENTO) significantly influences Organizational Excellence (OXEL)

Both OXEL and organizational performance (OP) are regarded as pivotal determinants of success, progress, and long-term viability. Their interaction implies that higher levels of excellence contribute directly to improved performance outcomes. The European Foundation for Quality Management (EFQM) characterizes excellent organizations as those achieving at least 60 percent of targeted performance benchmarks. Lee [20] described excellence as a state of exceptional achievement, while Wahab and Yaakub (2019) portrayed it as a holistic framework for advancing performance. Empirical findings also support this connection: Dawabsheh *et al.* [29] confirmed a positive association between OXEL and business outcomes, and a study by Dhaafri *et al.* [1] on Turkish firms demonstrated a statistically significant impact of OXEL on OP. Hence, the following hypothesis is presented:

H5: Organizational Excellence (OXEL) has a significant positive effect on Organizational Performance (OP)

Enterprise Resource Planning (ERP) systems play a critical role in integrating and automating essential business operations—such as procurement, finance, distribution, and project management—thereby enhancing overall efficiency and competitiveness [4, 38]. The scope of ERP has evolved from a functional management tool into a comprehensive system that supports strategic planning and organizational excellence [4]. While legacy systems often fail to synchronize cross-functional activities, ERP ensures process integration and alignment with organizational goals, fostering excellence in performance [38]. Research by Dhaafri *et al.* [1] showed that combining ERP implementation with quality management techniques such as Six Sigma leads to improved business practices and process excellence. Kothandaraman and Kamalanabhan [42] proposed that mediating variables can clarify the indirect effects between ERP and performance, particularly when direct relationships yield

inconsistent results. They suggested that OXEL acts as a facilitating mechanism through which technological initiatives translate into enhanced growth and value creation. This reasoning supports the assumption that OXEL mediates the ERP–OP relationship.

Similarly, while prior studies have documented a link between ENTO and OP, the processes through which this relationship unfolds remain insufficiently explained. This study posits that OXEL represents a key mediating construct connecting entrepreneurial orientation with organizational outcomes. Previous evidence shows that ENTO influences OXEL, which subsequently drives performance [1, 20]. Moreover, several scholars have found that indirect effects—mediated by organizational factors—tend to be stronger than direct effects [11, 12]. Nevertheless, few empirical works, approximately fifteen according to Scopus, have explored this mediating mechanism in depth.

Based on these arguments, the study proposes the following hypotheses:

H6: Organizational Excellence (OXEL) mediates the relationship between Entrepreneurial Orientation (ENTO) and Organizational Performance (OP).

H7: Organizational Excellence (OXEL) mediates the relationship between Enterprise Resource Planning (ERP) and Organizational Performance (OP).

Methods and Measures

This study employed a combination of statistical approaches to analyze the collected data, including descriptive and inferential techniques. Descriptive statistics were computed using SPSS version 22.0, while inferential analyses were conducted through Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS 3.0 [43-45].

A total of 340 questionnaires were distributed to the selected respondents, with 260 returned, yielding a response rate of 76.47%. This rate exceeds the minimum threshold of 30% recommended for survey-based research in social sciences [46]. PLS-SEM was chosen for this study due to its popularity in multivariate analysis and its growing application in education and organizational research. This technique is particularly suitable for examining relationships between latent and observed variables, especially when dealing with constructs that cannot be measured directly, such as intentions, attitudes, perceptions, and capabilities [47].

The measurement scales for this study were adopted from established literature. Organizational performance (OP) was assessed using a 12-item scale developed by Al-Dhaafri *et al.* [48], while a 12-item unidimensional scale for ERP systems was adapted from Jenatabadi *et al.* [49]. Organizational excellence (OXEL) was measured as a unidimensional construct following Antony and Bhattacharyya [50]. Entrepreneurial orientation (ENTO) was assessed based on scales from Kantur [51] and Cho and Lee [52].

Results

Structural Equation Modeling (SEM) integrates linear regression and factor analysis to examine complex relationships among variables. For SEM analysis, two main approaches are generally employed: Partial Least Squares SEM (PLS-SEM) and Covariance-Based SEM (CB-SEM). CB-SEM can be performed using software such as LISREL, AMOS, and MPLUS, with different assumptions and estimation methods.

PLS-SEM was selected for this study for several reasons. It is highly effective for complex models and does not require strict assumptions regarding residual distributions or error terms. It accommodates both formative and reflective measurement models, and efficiently estimates mediation and moderation effects, even in hierarchical or complex models [53]. PLS-SEM also provides more comprehensive and valid results compared to alternative approaches that often require multiple separate analyses [47]. Consequently, PLS-SEM was the preferred method for data analysis in this research.

The analysis followed a two-step procedure. The first step involved evaluating the outer (measurement) model to determine indicator loadings for each construct. Reliability tests were conducted to assess internal consistency, while validity tests were used to examine the measurement properties of the instruments [54]. Construct validity was confirmed by evaluating discriminant, convergent, and content validity, establishing the robustness of the measurement model [55-57]. The finalized measurement model is presented in **Figure 1**.

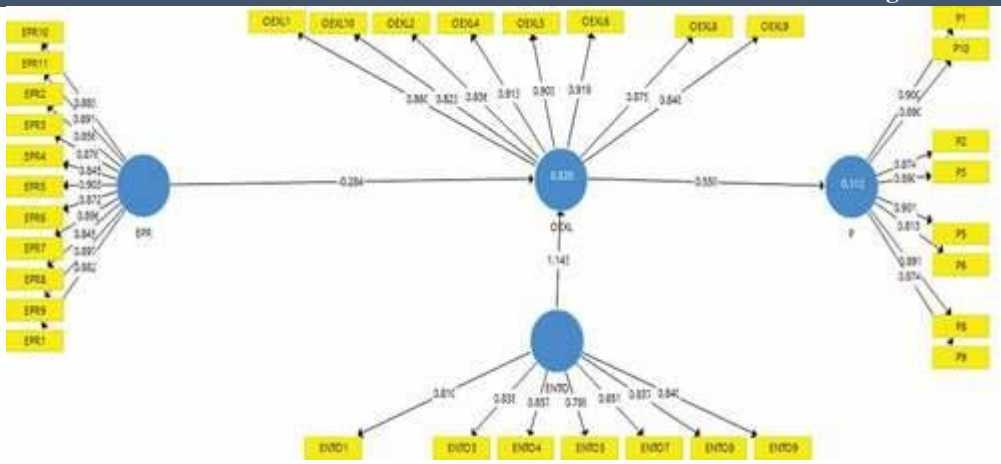

Figure 1. Measurement model

Using the PLS-SEM approach, the reliability of individual items was evaluated by examining their outer loadings. In general, indicator loadings ranging from 0.40 to 0.70 are considered acceptable, although values of 0.70 or higher are preferred for stronger reliability [57]. Naala *et al.* [58] classified loadings between 0.81 and 1.00 as very strong, those from 0.51 to 0.80 as moderate, and values between 0.51 and 0.99 as very good [45, 53, 55]. For examining relationships among constructs, it is recommended that item loadings exceed 0.70 to ensure robustness [59]. The outer loadings for the constructs in the current study are presented in **Table 1**.

Table 1. Outer loadings

	ENTO	EPR	OEXL	P
ENTO1	0.810			
ENTO3	0.838			
ENTO4	0.857			
ENTO5	0.789			
ENTO7	0.851			
ENTO8	0.837			
ENTO9	0.840			
EPR10		0.883		
EPR11		0.891		
EPR2		0.856		
EPR3		0.876		
EPR4		0.845		
EPR5		0.903		
EPR6		0.872		
EPR7		0.896		
EPR8		0.845		
EPR9		0.897		
OEXL1			0.860	
OEXL10			0.823	
OEXL2			0.836	
OEXL4			0.913	
OEXL5			0.903	
OEXL6			0.919	
OEXL8			0.875	
OEXL9			0.848	
P1				0.900
P10				0.890
P2				0.874
P3				0.890
P5				0.901
P6				0.813
P8				0.891
P9				0.874
EPR1		0.882		

Convergent validity assesses whether multiple indicators of a construct are consistent with the theoretical concept they intend to measure. In the first step, all item loadings were examined, and each exceeded the 0.50 threshold recommended by Ong and Puteh [59], indicating adequate indicator performance. The study then evaluated composite reliability (CR) to determine the internal consistency of the constructs. All constructs in this study demonstrated high reliability, with CR values ranging from 0.872 to 0.968, well above the 0.70 benchmark [55-57, 59, 60].

Next, the average variance extracted (AVE) was calculated to measure the proportion of variance captured by each construct relative to measurement error. Following the standards outlined by Hair and Ringle [55], Ong and Puteh [59], and Singh and Prasad [47], an AVE of 0.50 or higher indicates acceptable convergent validity. In this analysis, AVE values ranged from 0.512 to 0.834, confirming that the constructs adequately capture the underlying theoretical concepts. **Table 2** presents the CR values for the second-order constructs.

Table 2. Reliability

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
ENTO	0.926	0.933	0.940	0.692
EPR	0.970	0.971	0.973	0.769
OEXL	0.955	0.958	0.962	0.762
P	0.958	0.963	0.965	0.774

Discriminant validity evaluates whether a construct is truly distinct from other constructs in the model. In this study, discriminant validity was assessed by comparing the square root of each construct's AVE with the correlations between that construct and all other latent variables. For satisfactory discriminant validity, AVE values must be at least 0.50, and the square root of the AVE should exceed the inter-construct correlations. The results of this analysis are presented in **Table 3**.

Table 3. Validity

	ENTO	EPR	OEXL	P
ENTO	0.892			
EPR	0.874	0.877		
OEXL	0.865	0.714	0.873	
P	0.584	0.554	0.558	0.880

Following the assessment of the measurement (outer) model, the structural (inner) model was estimated to examine the path coefficients, t-values, and test the study hypotheses. The structural model for this research is illustrated in **Figure 2**. To evaluate the significance of the proposed relationships, a bootstrapping procedure with 500 resamples was conducted. The results of the direct effects are summarized in **Table 4**. The analysis indicates that all hypothesized direct paths—ENTO → OXEL, ENTO → OP, ERP → OXEL, ERP → OP, and OXEL → OP—are statistically significant, with p-values below 0.05.

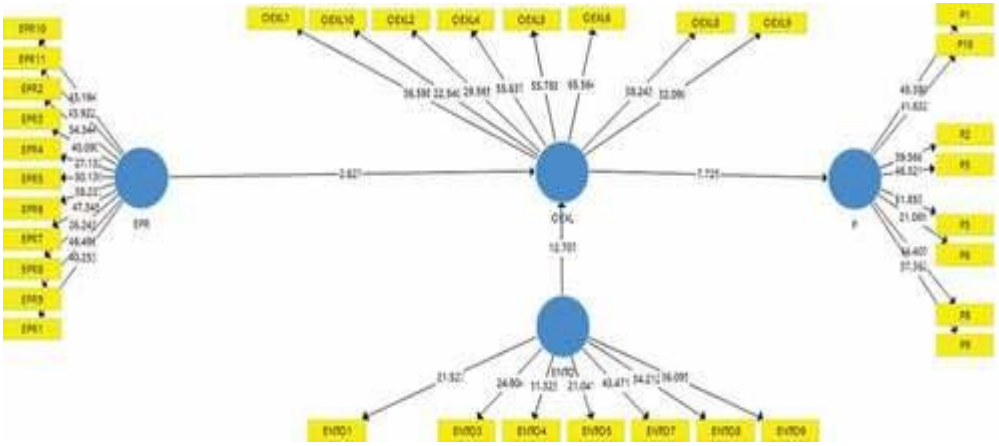

Figure 2. Structural model

Table 4. Direct results

	(O)	(M)	(STDEV)	(|O/STDEV|)	P Values
ENTO -> OEXL	1.143	1.127	0.090	12.707	**0.000**
ENTO -> P	0.638	0.632	0.086	7.383	**0.000**
EPR -> OEXL	0.284	0.266	0.108	2.627	**0.004**
EPR -> P	0.159	0.148	0.061	2.598	**0.005**

OEXL -> P	0.558	0.562	0.072	7.725	**0.000**

The results of the mediation analysis are shown in **Table 5**. The findings revealed that all the mediation paths namely ENTO -> OEXL -> P, and EPR -> OEXL -> P are significant at a p value of less than 0.0.

Table 5. Mediation

	(O)	(M)	(STDEV)	(|O/STDEV|)	P Values
ENTO -> OEXL -> P	0.638	0.632	0.086	7.383	**0.000**
EPR -> OEXL -> P	0.159	0.148	0.061	2.598	**0.005**

In evaluating the structural model, R^2 was used as the primary indicator of model explanatory power [61]. For endogenous constructs, the R^2 value reflects the proportion of variance explained by the predictor (exogenous) variables, providing an indication of the model's overall strength. Following Mikalef and Pateli [62], R^2 values of 0.19, 0.33, and 0.67 are interpreted as representing small, moderate, and substantial levels of explained variance, respectively. The R^2 results for the current study are presented in **Table 6**.

Table 6. R-square

	R Square
OEXL	0.820
P	0.312

Finally, the predictive relevance of the structural model was assessed to evaluate its overall quality [61]. This was done using the cross-validated redundancy measure (Q^2), which is a resampling-based technique that indicates the model's ability to predict endogenous constructs. A Q^2 value greater than 0 suggests that the model possesses predictive relevance. The Q^2 results for this study are presented in **Table 7**, and the blindfolding procedure is illustrated in **Figure 3**.

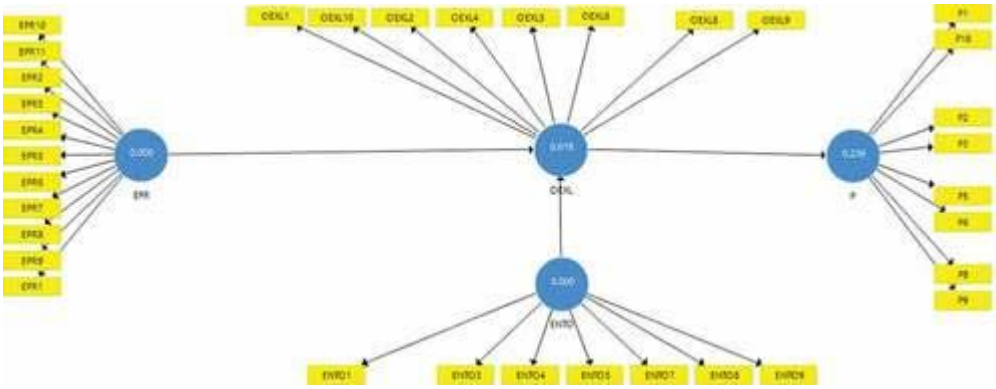

Figure 3. Blindfolding

Table 7. Q^2

	SSO	SSE	Q^2 (=1-SSE/SSO)
ENTO	1519.000	1519.000	
EPR	2387.000	2387.000	
OEXL	1736.000	663.644	0.618
P	1736.000	1325.990	0.236

For assessing predictive relevance, the blindfolding technique was applied using PLS software, whereby certain cases were omitted to estimate the model parameters [45, 57, 61].

Discussion

Despite extensive research on entrepreneurial orientation (ENTO) and organizational performance (OP), prior studies have reported mixed results. Several scholars have found that ENTO dimensions—namely innovativeness, proactiveness, and risk-taking—positively influence performance outcomes [11, 63]. However, other studies reported contradictory findings [37]. Notably, the impact of ENTO on public-sector performance remains underexplored. To resolve these discrepancies, additional contextual or mediating factors must be considered [37]. In today's fast-paced global and technologically advanced

environment, organizations need to adopt an entrepreneurial mindset to foster growth, competitiveness, and long-term sustainability [64].

The findings of this study demonstrate a significant positive relationship between ENTO and organizational excellence (OXEL). This suggests that entrepreneurial practices in SMEs contribute to higher levels of organizational excellence, supporting the results of Aslam *et al.* [65]. Entrepreneurial behaviors and activities appear to be essential for organizational survival and growth [37]. While some studies [8, 66] reported no significant impact of ENTO on OP, the majority support its positive influence. The current results confirm that organizations with stronger entrepreneurial practices achieve superior performance compared to those with lower levels of entrepreneurial activity.

Similarly, the relationship between ERP and OXEL was positive and significant, indicating that SMEs adopting ERP systems are more likely to achieve excellence. These findings align with prior studies by Al-Dhaafri *et al.* [48]. Furthermore, OXEL serves as a key explanatory mechanism linking ENTO to OP, highlighting how excellence-oriented practices—such as innovation, customer focus, and employee commitment—can strengthen the positive effects of entrepreneurial orientation on organizational performance.

The study also confirmed direct positive effects of ENTO and ERP on OP. These results suggest that entrepreneurial orientation and effective ERP implementation enhance SME performance in Pakistan, corroborating prior research [11, 29, 63]. Additionally, OXEL itself exhibited a significant positive relationship with OP, further emphasizing its role as a critical determinant of organizational success.

This research is among the first to introduce organizational excellence as a mediating factor between ENTO, ERP, and SME performance in Pakistan. The findings indicate that OXEL can effectively explain the mechanism through which entrepreneurial orientation and ERP influence organizational outcomes. OXEL, considered a holistic approach for improving performance, has a substantial impact on business success [29]. Given the inconsistent results reported in previous studies regarding ERP and ENTO, OXEL provides a meaningful framework to clarify these relationships. By integrating best practices such as ERP and entrepreneurial activities, organizations can achieve superior performance outcomes.

The literature review highlights the inconsistent findings related to the effects of ENTO and ERP on performance. The current study suggests that including OXEL as a mediating variable helps address these inconsistencies and provides a comprehensive approach for evaluating organizational effectiveness. The proposed framework offers a valuable tool for future research to empirically examine the determinants of organizational performance in the context of contemporary technological advancements.

In conclusion, this study extends existing knowledge on the interplay between ERP, ENTO, and OXEL. The theoretical model presented here is both novel and practical, as it integrates organizational excellence to explain the effects of entrepreneurial orientation and ERP on overall organizational performance. This framework can serve as a guide for future empirical investigations aimed at understanding how knowledge-based organizational capabilities influence performance outcomes.

Limitations and Recommendations

The present study offers several directions for future research:

1. **Research Design:** This study employed a cross-sectional approach, collecting data at a single point in time. Future studies could adopt a longitudinal design to better capture the dynamic interplay between entrepreneurial orientation (ENTO), enterprise resource planning (ERP), organizational excellence (OXEL), and organizational performance (OP). A longitudinal approach would enable researchers to track the evolution of these relationships over time and provide deeper insights into how these variables develop and interact.
2. **Methodological Approach:** The current research design limits the ability to examine complex, dynamic relationships among the variables in depth. Future research could employ a case-study methodology to explore the effects of ENTO and ERP on organizational performance in greater detail. This approach allows for a more nuanced understanding of the mechanisms and contextual factors influencing these relationships and can provide actionable insights into the critical success factors for SMEs.
3. **Role of Organizational Culture:** While organizational excellence is a key mediator linking ENTO and ERP to performance, the influence of entrepreneurial culture warrants further examination. Future studies should investigate how the development of an organizational culture that encourages innovation, tolerates failure, and supports risk-taking contributes to the effectiveness of ENTO and ERP strategies. Without a supportive culture, organizations may face significant resistance to change, which could hinder improvement efforts and increase operational risks. In essence, achieving organizational excellence and superior performance depends not only on implementing ERP and fostering entrepreneurial practices but also on cultivating a culture that embraces technology-driven innovation and anticipates future business opportunities.

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References

1. Dhaafri HS, Swidi AK, Yusoff RZB. The mediating role of TQM and organizational excellence, and the moderating effect of entrepreneurial organizational culture on the relationship between ERP and organizational performance. TQM J. 2016;28(6):991-1011.
2. Kaaria SK, Njuguna R. Organizational attributes and implementation of enterprise resource planning: a case of Kenya Medical Research Institute, Kilifi County. Int J Curr Aspects. 2019;3(II):231-42.
3. Kocsis D. A conceptual foundation of design and implementation research in accounting information systems. Int J Account Inf Syst. 2019;34:100420.
4. Shiau WL. The intellectual core of enterprise information systems: a co-citation analysis. Enterp Inf Syst. 2016;10(8):815-44.
5. Dedy AN, Zakuan N, Bahari AZ, Ariff MSM, Chin TA, Saman MZM. Identifying critical success factors for TQM and employee performance in Malaysian automotive industry: a literature review. IOP Conference Series: Materials Science and Engineering. 131: IOP Publ; 2016. p. 012016.
6. Amin M, Thurasamy R, Aldakhil AM. The effect of market orientation as a mediating variable in the relationship between entrepreneurial orientation and SMEs performance. Nankai Bus Rev Int. 2016.
7. Głodowska A, Maciejewski M, Wach K. How entrepreneurial orientation stimulates different types of knowledge in the internationalisation process of firms from Poland? Entrepreneur Bus Econ Rev. 2019;7(1):61-73.
8. Rochdi D, Khatijah O, Muhammad A. Mediating role of the innovation effectiveness on the relationship between entrepreneurial orientation and the SMEs performance in Algeria. Pol J Manag Stud. 2017;15.
9. Monteiro AP, Soares AM, Rua OL. Linking intangible resources and entrepreneurial orientation to export performance: the mediating effect of dynamic capabilities. J Innov Knowl. 2019;4(3):179-87.
10. Buli BM. Entrepreneurial orientation, market orientation and performance of SMEs in the manufacturing industry. Manag Res Rev. 2017;40(3):292-309.
11. Jelenc L, Pisapia J, Ivanušić N. Demographic variables influencing individual entrepreneurial orientation and strategic thinking capability. J Econ Soc Dev. 2016;3(1):2016.
12. Platin N, Ergun HS. The relationship between entrepreneurial orientation and performance: evidence from Turkish SMEs. Bus Manag Stud. 2017;3(2):78-89.
13. Naseem K. Is organizational culture an antecedent of organizational performance. Int J Econ Empir Res. 2016;4(12):619-22.
14. Akanmu MD, Hassan MG, Bahaudin AYB. A preliminary analysis modeling of the relationship between quality management practices and sustainable performance. Qual Manag J. 2020;27(1):37-18.
15. Alghamdi F. Total quality management and organizational performance: a possible role of organizational culture. Int J Bus Adm. 2018;9(4):186-200.
16. Amoah J, Danso A, Adomako S. Entrepreneurial orientation, environmental sustainability and new venture performance: does stakeholder integration matter? Bus Strateg Environ. 2019;28(1):79-87.
17. Riazi Z. Investigating the relationship between educational dimensions of entrepreneurial organizational culture and creativity in faculty members of Tehran University. Iran J Educ Sociol. 2018;1(8):16-32.
18. Found P, Lahy A, Williams S. Towards a theory of operational excellence. Total Qual Manag Bus Excell. 2018;29(9-10):1012-24.
19. Azrol MD. Business excellence model and its impact on organizational performance: Univ Utara Malays; 2016.
20. Lee HW. How does sustainability-oriented human resource management work?: examining mediators on organizational performance. Int J Public Adm. 2019;42(11):974-84.
21. Mahdi S, Maktabi S, Julae S. Investigating organizational excellence of Mahab Gas Company based on Peters and Waterman model. Eur Online J Nat Soc Sci Proc. 2016;4(1 Suppl):1615-26.
22. Chadhar MA, Daneshgar F. Organizational learning and ERP post-implementation phase: a situated learning perspective. J Inf Technol Theory Appl. 2018;19(2):7.
23. Amalnik MS, Ravasan AZ. An investigation and classification of ERP project managers' required skills. Int J Serv Sci Manag Eng Technol. 2018;9(1):10-23.

24. Jamil NR, Obeidat B. Reviewing the mediating role of organizational learning capability on the effect of transformational leadership on entrepreneurial orientation. J Bus Manag (COES & RJ-JBM). 2019;7(2):111-36.
25. Okangi FP. The impacts of entrepreneurial orientation on the profitability growth of construction firms in Tanzania. J Glob Entrepren Res. 2019;9(1):14-.
26. Gupta VK, Dutta DK. The rich legacy of Covin and Slevin (1989) and Lumpkin and Dess (1996): a constructive critical analysis of their deep impact on entrepreneurial orientation research. Found Res Entrepren Stud2018. p. 155-77.
27. Khalid S. Explorative and exploitative strategies and export performance. J Res Mark Entrepren. 2019;22(1):21-36.
28. Magaji MS, Baba R, Entebang H. Entrepreneurial orientation and financial performance of Nigerian SMEs. J Manag Train Ind. 2017;4(1):25-.
29. Dawabsheh M, Hussein A, Jermsittiparsert K. The triangular relationship between TQM, organizational excellence and organizational performance: a case of Arab American University Palestine. Manag Sci Lett. 2019;9(6):921-32.
30. Sislian L, Jaegler A. ERP implementation effects on sustainable maritime balanced scorecard: evidence from major European ports. Supply Chain Forum Int J. 2020.
31. Kanchana V, Sri RS. Investigation and study of vital factors in selection, implementation and satisfaction of ERP in small and medium scale industries. Int J Electr Comput Eng. 2018;8(2):1150.
32. Chen S, Elbashir M, Peng X. The effect of ERP systems competences on business process and organizational performance. Int J Manag Theory Pract. 2016;17(1):5-35.
33. Rodrigues J, Ruivo P, Oliveira T. Mediation role of business value and strategy in firm performance of organizations using software-as-a-service enterprise applications. Inf Manag. 2020:103289.
34. Rouhani S, Mehri M. Empowering benefits of ERP systems implementation: empirical study of industrial firms. J Syst Inf Technol. 2018;20(1):54-72.
35. Manthou V, Stefanou CJ, Tigka K. The evaluation of business performance in ERP environments. Automated Enterprise Systems for Maximizing Business Performance: IGI Global; 2016. p. 88-96.
36. Arham AF, Sulaiman N, Kamarudin FH. Understanding the links between transformational leadership and entrepreneurial orientation in Malaysian SMEs. The Palgrave Handbook of Leadership in Transforming Asia: Springer; 2017. p. 541-58.
37. Semrau T, Ambos T, Kraus S. Entrepreneurial orientation and SME performance across societal cultures: an international study. J Bus Res. 2016;69(5):1928-32.
38. Menon D. Critical challenges in enterprise resource planning (ERP) implementation. Int J Bus Manag. 2019;14:7-.
39. Li Y, Wu F, Zong W. Supply chain collaboration for ERP implementation. Int J Oper Prod Manag. 2017;37(10):1327-47.
40. Ghosh I, Biswas S. A novel framework of ERP implementation in Indian SMEs: kernel principal component analysis and intuitionistic fuzzy TOPSIS driven approach. Account. 2017;3(2):107-18.
41. Fok O. The mediating role of lean engagement on lean practices and business excellence in Malaysia electrical and electronics companies. Int J Acad Res Econ Manag Sci. 2016;5(2):35-45.
42. Kothandaraman K, Kamalanabhan T. People process excellence and business outcomes: a structural equation modelling-based analysis. Int J Bus Excell. 2018;15(1):1-17.
43. Basheer HM, Hassan SGH, Haroon U. Exploring the role of TQM and supply chain practices for firm supply performance in the presence of organizational learning capabilities: a case of textile firms in Pakistan. Paradigms. 2018;12(2):172-8.
44. Basheer S, Awn AM, Hassan S. Exploring the role of TQM and supply chain practices for firm supply performance in the presence of information technology capabilities and supply chain technology adoption: a case of textile firms in Pakistan. Uncert Supply Chain Manag. 2019;7(2):275-88.
45. Hameed BM, Iqbal J, Anwar A, Khalil AH. Determinants of firm's open innovation performance and the role of R&D department: an empirical evidence from Malaysian SMEs. J Glob Entrepren Res. 2018;8(1):29.
46. Ramayah T, Cheah J, Memon M. Partial least squares structural equation modeling (PLS-SEM) using SmartPLS 3.0. An Updated Guide and Practical Guide to Statistical Analysis: Pearson; 2018.
47. Singh T, Prasad T. Application of PLS-SEM in modeling the significance of social valuation in the determination of entrepreneurial intention of business management students. IUP J Entrepren Dev. 2018;8(3).
48. Al-Dhaafri HS, Al-Swidi AK, Yusoff RZB. The mediating role of TQM and organizational excellence, and the moderating effect of entrepreneurial organizational culture on the relationship between ERP and organizational performance. TQM J. 2016;28(6):991-1011.
49. Jenatabadi HS, Huang H, Ismail NA, Satar NBM, Radzi CM. Impact of supply chain management on the relationship between enterprise resource planning system and organizational performance. Int J Bus Manag. 2013;8(19):107.
50. Antony JP, Bhattacharyya S. Measuring organizational performance and organizational excellence of SMEs–Part 2: an empirical study on SMEs in India. Meas Bus Excell. 2010;14(3):42-52.

51. Kantur D. Strategic entrepreneurship: mediating the entrepreneurial orientation-performance link. Manag Decis. 2016;54(1):24-43.
52. Cho YH, Lee JH. Entrepreneurial orientation, entrepreneurial education and performance. Asia Pac J Innov Entrepren. 2018;12(2):124-34.
53. Henseler J. Partial least squares path modeling: quo vadis? Qual Quant. 2018;52(1):1-8.
54. Hatamifar P, Darban A, Rezvani MR. Analyzing quality of supply chain management in hotels of Isfahan using the partial least squares (PLS). J Qual Assur Hosp Tour. 2018;19(2):172-91.
55. Hair HM, Ringle C. A primer on partial least squares structural equation modeling (PLS-SEM): Sage Publ; 2016.
56. Hair ML, Matthews RM, Sarstedt M. PLS-SEM or CB-SEM: updated guidelines on which method to use. Int J Multivariate Data Anal. 2017;1(2):107-23.
57. Henseler J, Hubona G, Ray PA. Using PLS path modeling in new technology research: updated guidelines. Ind Manag Data Syst. 2016;116(1):2-20.
58. Naala M, Nordin N, Omar W. Innovation capability and firm performance relationship: a study of PLS-structural equation modeling (PLS-SEM). Int J Organ Bus Excell. 2017;2(1):39-50.
59. Ong MHA, Puteh F. Quantitative data analysis: choosing between SPSS, PLS, and AMOS in social science research. Int Interdiscip J Sci Res. 2017;3(1):14-25.
60. Zahra M, Hameed WU, Fiaz M, Basheer MF. Information technology capability: a tool to expedite higher organizational performance. UCP Manag Rev. 2019;3(1):94-112.
61. Hair SM, Sarstedt CM. Rethinking some of the rethinking of partial least squares. Eur J Mark. 2019;53(4):566-84.
62. Mikalef P, Pateli A. Information technology-enabled dynamic capabilities and their indirect effect on competitive performance: findings from PLS-SEM and fsQCA. J Bus Res. 2017;70:1-16.
63. Kranich P, Wald A. Does model consistency in business model innovation matter? a contingency-based approach. Creat Innov Manag. 2018;27(2):209-20.
64. Kim KC, ElTarabishy A, Bae ZT. Humane entrepreneurship: how focusing on people can drive a new era of wealth and quality job creation in a sustainable world. J Small Bus Manag. 2018;56(1):10-29.
65. Aslam HD, Zafar JM, Ahmad N, Ayub A. Determining the performance of small and medium enterprises influenced by total quality management practices and organizational learning: mediating role of organizational excellence among furniture industry of Pakistan. Hamdard Isl. 2020;43(1):282-94.
66. Boohene R. Entrepreneurial orientation, strategic orientation and performance of small family firms in the Kumasi Metropolis. Acad Entrepreneur J. 2018;24(2):1-16.