



RESEARCH ARTICLE

Quantitative Analysis of Entrepreneurial Resilience, Leadership Style, and Employee Performance: A Structural Equation Modeling Approach

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ARTICLE INFO	ABSTRACT
Received: Nov 22, 2024 Accepted: Jan 28, 2025	This study examines the influence of entrepreneurial resilience on employee performance within small and medium-sized enterprises (SMEs) through the moderating role of leadership style, employing advanced statistical methods. Using structural equation modeling (SEM) via AMOS, data collected through a survey of 449 valid responses were analyzed to explore relationships among four key dimensions of entrepreneurial resilience: Personal Competence, Tolerance of Negative Affect, Acceptance of Change, and Control. Transformational leadership was analyzed as a mediating variable to assess its role in enhancing employee performance. The findings demonstrate statistically significant relationships: entrepreneurial resilience directly and positively impacts employee performance, while transformational leadership amplifies and partially mediates this effect. The study reveals that SMEs can benefit from fostering a resilient culture and transformational leadership to drive performance and adaptability.
Keywords	
Entrepreneurial Resilience	
Employee Performance	
Transformational Leadership	
SMEs	
Structural Equation Modeling	
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INTRODUCTION

Entrepreneurship plays a crucial role in driving economic development globally. Small and medium enterprises (SMEs) are considered the backbone of economies worldwide, accounting for approximately 90% of businesses and employing nearly 75% of the global workforce (The World Bank, 2019). These enterprises contribute significantly to employment, economic diversification, and innovation. Governments and policymakers across the world have recognized the importance of fostering a supportive ecosystem for SMEs by implementing policies and initiatives that promote entrepreneurship. This has become especially relevant in the aftermath of the COVID-19 pandemic, which underscored the need for resilience and adaptability in overcoming unexpected challenges.

Despite the government's efforts, SMEs in Egypt face different struggles to maintain stability and growth. The COVID-19 pandemic increased the existing issues, as it introduced unexpected instability to traditional business models and increased market competition. As a result, SME owners and employees struggled to adapt to these rapidly changing circumstances, which exposed weaknesses in the SMEs' operational frameworks (Samir, 2020). This highlighted the need for employees to have greater agility and resilience within the SME sector.

Entrepreneurial has become a key factor that enables businesses to survive and grow (Ungar, 2018). This is particularly important for SMEs in dynamic industries like the ICT sector, which requires developing a sustain business competitiveness through empowering the ability to change direction,

innovate, and clear competitive advantage. The ICT sector is the core of Egypt's digital transformation, as it brings various opportunities and challenges that require responsive and resilient leadership (Attia et al., 202).

SMEs operate with shortage of resources, it becomes important to maintain maximum employee performance in order to achieve sustainable growth (Appuhami, 2023). Improving employee performance presents difficulties, as it often involves addressing specific occupational and motivational issues that can decrease productivity levels. The COVID-19 pandemic helped in creating opportunities for SMEs to redesign their strategies in engaging employees in building resilience and adaptability among their teams (Pawar et al., 2024). Therefore, this study focuses on the concept of entrepreneurial resilience and its reflection on SME leaders and employees.

In addition to entrepreneurial resilience, leadership style is another factor that influences employee performance. Transformational leaders can create an environment in which employees are encouraged to go beyond their self-interest for the greater benefit of the organization. Building supportive relationships with each individual and challenging their critical thinking helps teams build resilience that boosts the overall performance (Aguilera et al., 2023). This study investigates how entrepreneurial resilience relates to employee performance with the mediation of transformational leadership in the ICT sector.

LITERATURE REVIEW

Conceptual review

Entrepreneurial resilience became increasingly acknowledged as one of the key factors contributing to business success and sustainability. Resilience is not only defined as "bouncing back" of the corporation from difficult situations, but it also involves active pushing forward, adapting, and innovating despite setbacks (Santoro et al., 2020). In its very core, entrepreneurial resilience cannot be viewed outside the context of the entity and thus, it differs from general resilience through its focus on aspects traits tailored to the challenges presented by entrepreneurship (Jones, 2018).

Employee performance is one of the most important non-financial metrics indicating business success. Thereby, especially for SMEs, high employee performance is highly linked to enhanced product and service standards, enhanced customer satisfaction, and hence sustained competitive advantage. Principal components identified as influencing employee performance include managerial support, organizational climate, intrinsic motivation of employees, job satisfaction of personnel, and effective communication within the entity. (Hilman & Gorondutse, 2020).

Individual performance can be measured by several indications, for example: total output, in-role behavior, and extra-role performance (Atatsi et al., 2019). An engaged workforce is bound to be more productive in terms of meeting their role requirements, therefore increasing the overall effectiveness and profitability of the business (Budur & Demir, 2022).

Transformational leadership is well-known leadership style among the different kinds of leadership, which is the most recognized as it focuses on people-centered development, team growth, and helping to create a motivating atmosphere (Bastari, et al., 2020). It has a significant contribution to increasing employee involvement, reducing turnover, and developing a collaborative culture that encourages performance improvement (Atan & Mahmood, 2019). This style develops behaviors such as Idealized Influence, Inspirational Motivation, Intellectual Stimulation, and Individualized Consideration. All these behaviors contribute to driving continuous development of employees to reach full potential (Ratnaningtyas et al., 2021).

Empirical review and hypotheses development.

The Relationship between Entrepreneurial Resilience and Employee Performance was examined by several studies that highlighted a positive link between entrepreneurial resilience and improved employee performance. Resilient entrepreneurs generally build an operational environment that

perceives challenges as opportunities for development; hence, a resilient workforce to deal with changes is developed (Fatoki, 2018). On the other hand, resilience in leadership positions is believed to bring morale, engagement, and productivity to teams. (Salanova et al., 2023). Furthermore, Santoro et al., 2020 suggest that there is a positive link between resilience and perceived entrepreneurial success, with enhanced outcomes for entrepreneurs with broad stakeholder connections.

The literature also highlights the relationship between entrepreneurial resilience and effective leadership styles. Resilient entrepreneurs can easily create a work atmosphere that advances employee resilience and well-being, hence providing a pathway through which sustainability could be attained inside business operations. Muhammad et al (2022) emphasize that a combination of transformational and transactional leadership styles can strengthen employee resilience, consequently allowing them to work in an environment where they are motivated to achieve excellence.

Regarding Leadership Style and Employee Performance A broad body of evidence shows that transformational leadership positively influences employee performance by enhancing job satisfaction, motivation, and engagement (Ribeiro et al., 2018). Transformational leaders are skilled at linking their teams with organizational goals, inspiring risk-taking, and promoting innovation. This method makes sure not only individual performance, but also organizational outcomes are enhanced. (Atan & Mahmood et al., 2019). Nguyen et al., 2021 found that transformational leadership significantly enhances team creativity and competitive advantage, particularly within SMEs. These leaders empower employees to take ownership of their work, fostering a culture of continuous improvement and innovation.

Based on the review of existing literature, we developed a conceptual framework for analysis of interactions between entrepreneurial resilience, leadership style, and employee performance. This framework is guided by the following hypotheses:

- H1: Entrepreneurial resilience positively influences employee performance.
- H2: Entrepreneurial resilience is significantly associated with leadership styles.
- H3: Leadership style positively affects employee performance.
- H4: Leadership style mediates the relationship between entrepreneurial resilience and employee performance.

Our framework consists of six key constructs: four independent variables, which are personal competence, tolerance for negative affect, acceptance of change, and control, one dependent variable, which is employee performance, and one mediating variable, which is transformational leadership (Figure.1).

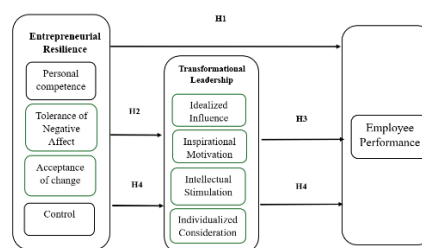


Figure 1: Conceptual Research Framework

METHODOLOGY

The study used a multi-phased approach to collect qualitative and quantitative data. A Semi-structured interviews with managers and employees in Egyptian SMEs of the ICT industry explored their experiences with resilience and leadership practices. We developed the interview questions aiming to identify the challenges posed by the rapidly changing operating environment, strategies

for resilience, and leadership styles. We analyzed responses through thematic analysis in order to get to the main insights.

In addition, a structured questionnaire was developed based on the results of interviews. The questionnaires consisted of three parts: Resilience: measured by the 10-item Connor-Davidson Resilience Scale (CD-RISC), which is well-established in terms of accuracy and reliability. Leadership style measured using the Multifactor Leadership Questionnaire (MLQ), with sub-dimensions such as Inspirational Motivation, Intellectual Stimulation, and Individualized Consideration. Employee performance: measured through an 8-item scale developed by (Al-Dmour, 2020).

The target population comprised founders, managers, and employees of SMEs in Egypt's ICT sector. 700 hundred questionnaires were distributed, with 474 responses received (67.7% response rate). After excluding incomplete or invalid responses, 449 valid responses were retained for analysis, resulting in a 64.1% rate of valid responses. Data analysis was done through SPSS and AMOS software were used in applying statistical techniques of correlation analysis, regression analysis, and Structural Equation Modeling. Such an analysis was imperative in evaluating the hypotheses and verifying the mediating role of leadership.

RESULTS

Descriptive Statistics

The demographic analysis is demonstrated in Table 1, as follows:

Table 1: Demographics analysis

Variables	Description	Frequency	Percentage (%)
Gender	Male	217	48.3
	Female	232	51.7
Age	From 31 to 40 years	176	39.2
	From 41 to 50 years	269	59.9
	Above 50 years	4	.9
Your Position in the Company	Chairman/CEO	119	26.5
	Executive Management	153	34.1
	Middle Management	64	14.3
	Employee	113	25.2
SME primary Sector within ICT	Software Development	173	38.5
	Telecommunications	72	16.0
	Hardware Manufacturing	3	.7
	IT Services	107	23.8
	Other	94	20.9
Year of Years of SME Operation	Less than 1 year	115	25.6
	From 1 to 3 years	169	37.6
	From 4 to 6 years	165	36.8
Company Size (Number of Employees)	From 1–10 Employees	183	40.8
	From 11–50 Employees	175	39.0
	From 51–200 Employees	43	9.6
	More than 200 Employees	48	10.7
Market Focus	Local	284	63.3
	Regional	67	14.9
	International	98	21.8

Research Variables

The study designates Personal Competence, Tolerance for Negative Affect, Acceptance of Change, and Control as the independent variables, Transformational Leadership as the mediating variable, and Employee Performance as the dependent variable. Each variable is represented with a frequency table displaying both absolute and relative counts to highlight participants' responses. Responses are measured on a five-point Likert scale. The transformational leadership variable in this study is assessed through five core dimensions: Idealized Influence - Behavior, Idealized Influence - Attribute, Inspirational Motivation, Intellectual Stimulation, and Individualized Consideration. The Employee Performance variable, assessed through eight items, reveals positive self-evaluations among respondents across various aspects of performance.

To identify the relationship between these variables a Structural Equation Modelling (SEM) was applied allowing for an in-depth examination of causal links between the variables (See Supplementary Table A1 Appendix file). We evaluated the measurement model using Confirmatory Factor Analysis (CFA) (Figure 2). The model includes 10 underlying constructs, which are: Personal Competence, Tolerance for Negative Affect, Acceptance of Change, Control, Idealized Influence-Behavior, Idealized Influence-Attribute, Inspirational Motivation, Intellectual Stimulation, Individualized Consideration, and Employee Performance. These underlying constructs are signified by 44 measured indicators (Supplementary Table A2 Appendix file). The internal coherence for each construct was satisfactory, with standardized loadings ranging from 0.556 to 0.902, all surpassing the required minimum threshold of 0.50 (Hair et al., 2010). The measurement model results based on the CFA are detailed in Supplementary Table A3 Appendix file.

Structural Model (Figure 3)

The structural model results revealed the following significant relationships:

- Personal Competence → Employee Performance: $\beta = 0.877$, CR = 14.650, $p < 0.05$
- Tolerance for Negative Affect → Employee Performance: $\beta = 0.732$, CR = 18.427, $p < 0.05$
- Acceptance of Change → Employee Performance: $\beta = 0.715$, CR = 13.984, $p < 0.05$
- Control → Employee Performance: $\beta = 0.170$, CR = 3.540, $p < 0.05$
- Personal Competence → Transformational Leadership: $\beta = 0.550$, CR = 8.594, $p < 0.05$
- Tolerance for Negative Affect → Transformational Leadership: $\beta = 0.908$, CR = 12.377, $p < 0.05$
- Acceptance of Change → Transformational Leadership: $\beta = 0.633$, CR = 9.125, $p < 0.05$
- Control → Transformational Leadership: $\beta = 0.143$, CR = 14.741, $p < 0.05$
- Transformational Leadership → Employee Performance: $\beta = 0.793$, CR = 9.572, $p < 0.05$

These results support the hypotheses that Entrepreneurial Resilience has a significant impact on Employee Performance and Transformational Leadership, and that Transformational Leadership mediates the relationship between Entrepreneurial Resilience and Employee Performance (Hair et al., 2010).

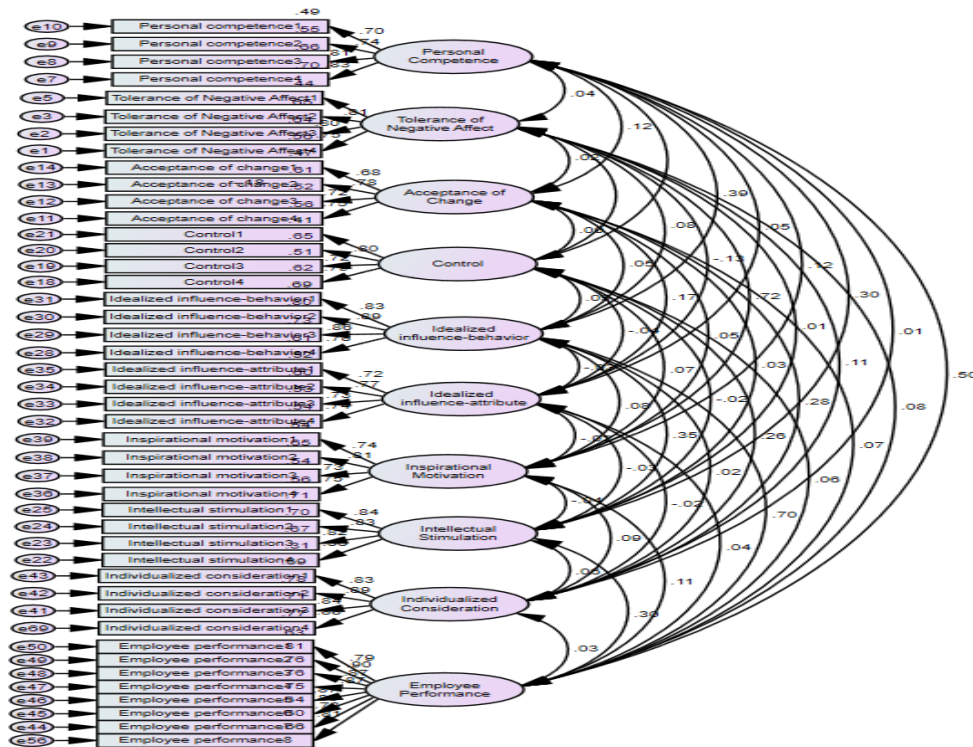


Figure 2: Measurement model - CFA

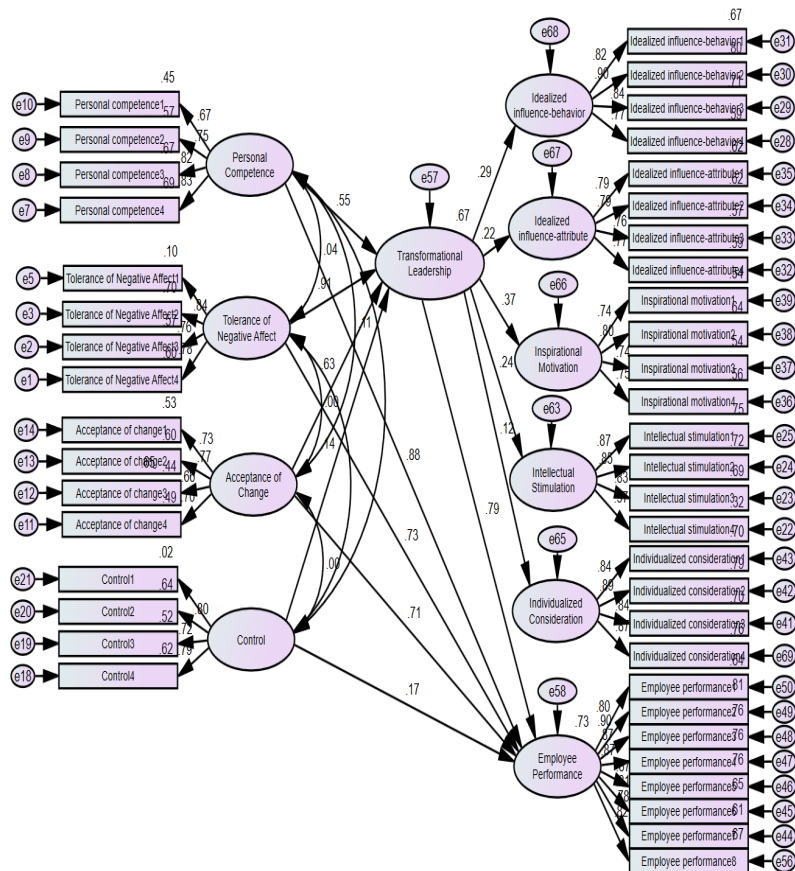


Figure 3: Structural Model

The Structural Model Validity - Result (Supplementary Table A4 Appendix file):

The structural model outcomes obtained indicate a Degrees of Freedom (DF) of 887, meeting the requirement of being above 0. The Chi-Square/DF (χ^2/DF) ratio is 2.300, which is within the acceptable limit of ≤ 3.0 , suggesting an adequate model fit. The Root Mean Square Error of Approximation (RMSEA) is 0.052, significantly under the 0.08 threshold, indicating a close alignment with the data.

Additionally, the Tucker-Lewis Index (TLI) is 0.902, and the Comparative Fit Index (CFI) is 0.908, both nearing the ideal benchmark of 1.0. These fit indices confirm that the measurement frameworks effectively uphold the factor structure established by CFA.

Direct Effects (Supplementary Table A5 Appendix file)

Entrepreneurial Resilience and Employee Performance

- The analysis established significant direct relationships between the dimensions of Entrepreneurial Resilience and Employee Performance:
- Personal Competence: ($\beta = 0.877$, CR = 14.650, $p < 0.001$) — High personal competence is strongly associated with enhanced employee performance.
- Tolerance for Negative Affect: ($\beta = 0.732$, CR = 18.427, $p < 0.001$) — Employees' ability to manage negative emotions significantly boosts performance.
- Acceptance of Change: ($\beta = 0.715$, CR = 13.984, $p < 0.001$) — Adaptability to change positively influences performance outcomes.
- Control: ($\beta = 0.170$, CR = 3.540, $p < 0.05$) — A smaller but statistically significant effect highlights the importance of self-regulation.

Entrepreneurial Resilience and Transformational Leadership

Each dimension of Entrepreneurial Resilience demonstrated significant effects on Transformational Leadership:

- Personal Competence: ($\beta = 0.550$, CR = 8.594, $p < 0.001$)
- Tolerance for Negative Affect: ($\beta = 0.908$, CR = 12.377, $p < 0.001$)
- Acceptance of Change: ($\beta = 0.633$, CR = 9.125, $p < 0.001$)
- Control: ($\beta = 0.143$, CR = 14.741, $p < 0.001$)

Transformational Leadership and Employee Performance

Transformational Leadership exhibited a significant positive effect on Employee Performance ($\beta = 0.793$, CR = 9.572, $p < 0.001$). This highlights the significance of leadership roles in enhancing performance outcomes.

Indirect Effects (Mediating Role of Transformational Leadership) (Supplementary Tables A6 and A7 Appendix file)

Bootstrapping technique was used for evaluating the influence of Transformational Leadership on the relationship between Entrepreneurial Resilience and Employee Performance, and it showed the following:

Personal Competence → Transformational Leadership → Employee Performance: $p < 0.001$
 Tolerance for Negative Affect → Transformational Leadership → Employee Performance: $p < 0.001$
 Acceptance of Change → Transformational Leadership → Employee Performance: $p < 0.002$
 Control → Transformational Leadership → Employee Performance: $p < 0.001$

These findings indicate that Transformational Leadership enhances the impact of Entrepreneurial Resilience on Employee Performance, so it is a significant mediator (Hair et al., 2010).

Variance

The model accounted for significant variance in the dependent and mediating variables:

- Entrepreneurial Resilience explained 67.1% of the variance in Transformational Leadership.
- Entrepreneurial Resilience, mediated by Transformational Leadership, explained 73.4% of the variance in Employee Performance.

DISCUSSION

Key Insights from the Research

The findings emphasize that resilience among entrepreneurs significantly enhances employee performance, especially when coupled with effective leadership. In relation to research objectives which are:

Objective 1: Analyzing the Connection between Entrepreneurial Resilience and Employee Performance in Egyptian SMEs: Results indicated a positive effect on Employee Performance ($\beta = 0.170$, CR = 3.540, $p < 0.05$), supporting H1.4.

Objective 2: Analyzing the Relationship between Entrepreneurial Resilience and Leadership Style: Results indicated a positive effect on Transformational Leadership ($\beta = 0.143$, CR = 14.741, $p < 0.05$), supporting H2.4.

Objective 3: Examining the Mediation Role of Leadership Style: Results indicated a significant influence on Employee Performance in Egyptian SMEs ($\beta = 0.793$, CR = 9.572, $p < 0.05$), affirming H3.

Objective 4: Validating the Research Model: The final research model was refined to examine the impact of leadership style (specifically transformational) on employee performance through entrepreneurial resilience within Egyptian SMEs. The hypotheses testing results are summarized in Supplementary Table A4 Appendix file, indicating support for all proposed hypotheses.

Entrepreneurial Resilience and Employee Performance

The analysis shows that entrepreneurial resilience has a positive impact on employee performance in many aspects:

- **Personal Competence:** Entrepreneurs who have confidence in their capabilities, adaptability, and resilience develop the same traits in their employees, which enhances their performance. The study verifies that a resilient leader develops a facilitation environment which achieves excellence among employees.
- **Tolerance for Negative Affect:** Entrepreneurs who can manage stressful situations and negative affects themselves, to provide a healthy working environment, encourage their employees to respond with the same attitude in terms of increasing productivity.
- **Acceptance of Change:** Flexibility and openness to new experiences enhance the performance of the employees quite significantly. Entrepreneurs are open to change and develop an innovative culture, which helps the development of organizations to achieve success.
- **Control:** The ability of leaders to maintain focus and persistence despite challenges helps instill a sense of direction and purpose among employees, ultimately driving higher performance levels.

The Role of Transformational Leadership as a Mediator

The study identifies transformational leadership as a key mediator in the relationship between entrepreneurial resilience and employee performance:

- Transformational leaders inspire, motivate, and support their teams, amplifying the positive effects of resilience on employee outcomes. Leaders who embody transformational traits, such as vision, inspiration, and individualized consideration, are able to translate their resilience into actionable strategies that enhance team performance.

- The findings suggest that leadership development programs focusing on transformational skills could benefit SMEs aiming to enhance employee performance through resilience-building.

CONCLUSION

This study gives a deep insight into certain valuable aspects that empower Egyptian SMEs and enhance their business competitiveness locally, regionally, and globally. It also leaves a wide scope for further research in the future. Future studies could explore how these concepts apply in different industries, examine other leadership styles, or consider additional factors like motivation and workplace culture. In today's fast-changing business landscape, building resilience and effective leadership is not just beneficial but essential for SMEs looking to remain competitive and thrive in challenging times.

Finally, while the study provides valuable insights, it also acknowledges several limitations that offer opportunities for future research. The results could not be generalized to other industries or regions, as the focus of the study was on Egyptian SMEs in the ICT sector. Other industries could also be studied in the future for a better understanding of how resilience and leadership affect performance. In addition, this study focused on leadership style as a link between resilience and performance but did not look at other factors like motivation or workplace culture. Future studies could explore these to get deeper insights.

Key Questions Reflecting Applicability in Real Life

1. How does entrepreneurial resilience influence employee performance?
2. In what ways do entrepreneurial resilience and leadership style interact or affect each other?
3. How does leadership style influence the connection between entrepreneurial resilience and employee performance?
4. How do the challenges and opportunities in the ICT sector influence the way entrepreneurial resilience, leadership style, and employee performance work together in Egyptian SMEs?

ACKNOWLEDGMENTS:

Authors' Contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Mohamed Abdelsalam, Fahd Hemeida and Ayman Shawky. The first draft of the manuscript was written by Hesham Abdelaziz and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Data Availability Statement

The data supporting the results of this article are available from the corresponding author, Hesham Abdelaziz upon reasonable request by e-mail.

Declarations

The authors declare that no funds, grants, or other support were received during the preparation of this manuscript. The authors have no relevant financial or non-financial interests to disclose.

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