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The Effect of Enterprise Risk Management Implementation and Information Technology Security on Organizational Performance in Jordan Manufacturing Industry

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Abstract

The implementation of Enterprise Risk Management (ERM) has been increased globally due to the financial crisis and COVID-19. Consequently, the importance of implementing ERM received considerable attention in the recent years. Thus, this research examined the relationship between the implementation of ERM and the mediating role of information technology security (IT security), in relation to financial and non-financial organizational performance. Furthermore, a quantitative methodology was employed to analyze the research framework. Data was gathered from 587 Jordanian manufacturing firms. The Statistical Package for the Social Sciences (SPSS) was utilized to analyze the data. Furthermore, Partial Least Squares Structural Equation Modelling (PLS-SEM) was employed to evaluate the conceptual framework. Seven (7) hypothesis tested in the research were supported. More specifically, the present research found a positive and significant impact of ERM on IT security, financial, and non-financial performance. It also found that a positive relationship exists between IT security and both financial as well as non-financial performance. Moreover, present research found that IT security fully mediated ERM- financial performance and partially mediated ERM non-financial performance. Consequently, the findings provided significant contributions to expanding the theoretical knowledge especially in ERM and IT security. Also, this research presented suggestions to the owners/managers of manufacturing companies in Jordan should pay extra attention to their internal resources and capabilities, such as ERM practices and IT security in order to enhance their companies' non- financial and financial performance. Similarly, the present research offered some suggestions to the policy makers in Jordan to establish short/long term policies to aid the development of the manufacturing field in Jordan. Consequently, enhance the economy in Jordan.

Keywords: *ERM, IT Security, Manufacturing, Jordan.*

Introduction

In response to corporate scandals, organizations have transitioned their risk management approaches to Enterprise Risk Management (Saranza et al., 2024). Integrated risk management leads to a reduction in overall risks and positively enhancing the organizational performance (Fakir & Jusoh, 2020). Also, the digitalization within companies have highlighted the significance of the information technology security as a crucial factor for achieving sustainable business success (Bose & Leung, 2019). Furthermore, ERM implementation is important factor in achieving goals for the organization, and enhancing IT security (Owusu Kwateng et al., 2022). In particular, the adoption of ERM is significance in industrial sector, given their considerable influence over the national economy. For instance, there is a positive relation between the growth of the industrial industry in emerging countries and the rise in per capita income (Attiah, 2019).

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In Jordan, the United Nations (2025) classifies the country as developing and emerging. Furthermore, it is relatively small and has limited resources (Al Amosh & Khatib, 2023). The importance of ERM implementation is recognized by firms (Ahmad Jaber & Mohammed Shah, 2023), driven by the challenges of the business environment and the benefits of ERM (Pangestuti et al., 2023), Notably, Jordan has three major sectors: financial, industrial (including manufacturing and mining), and services (Economic Policy Council, 2018-2022). Furthermore, Jordan industrial sectors divides into "Mining and Quarrying" and "Manufacturing" (Central Bank of Jordan, 2022). Particularly, according to Industrial Estates Company of Jordan (2022), the manufacturing sector including the following industries: food, pharmaceutical, engineering, plastic and rubber, chemical, textile and cotton, wood and furniture, paper, leather and knitting, and construction. According to Jordan Strategy Forum (2022), the industrial sector is the second largest in employment, following the education sector. Furthermore, the industrial sector plays a substantial influence on several sectors, including insurance and transportation, contributing to nearly 40% of GDP and strengthening the stability of the Jordanian dinar exchange rate. Specifically, the manufacturing sectors which will be on the scope of this research considered as crucial contributors to the country economy (Central Bank of Jordan, 2022).

Research Gap

The COVID-19 pandemic crisis had an impact on various countries and industries, and it affected both the overall economy and individual businesses (Al Amosh et al., 2022). It has also changed how companies and economies managing risks (Aldaas, 2022). Also, the pandemic crisis had affected mostly the manufacturing sector (Statista., 2021). In Jordan, the economy had been facing slow and continuous growth patterns since the financial crisis of September 2008, which impacted all sectors, and in particular, the manufacturing sector has been adversely impacted by the Iraqi and Syrian conflicts, which restricted trade routes, hence negatively affecting national export levels , and the GDP growth rates stayed static at an average of approximately 2.4% from 2010 to 2019, in contrast to the average growth rates of 6.5% observed between 2000 and 2009 (World Bank, 2024). Furthermore, the country manufacturing sector impacted by rising production costs , and faces strong competition from countries like Turkey and the Gulf nations (Alshourah, 2021). Also, Dhaman (2023) report provides insights into the potential risks in subsequent years, including the rising commodity prices and a decline in investment. And those risks can be attributed to the increased production cost (Ministry of Planning and International Cooperation, 2023).

One of the key strategies employed worldwide to ensure reducing costs, time, enhances competitiveness and business continuity is the adoption of digital technologies. Particularly after the pandemic, various industries and governments have recognized this necessity (Alsalem et al., 2023). Cross the manufacturing sector, the Jordan Industrial Estate Company, which oversees nine industrial estates, as well as assist and support industrial investors in Jordanian industrial cities by utilizing the latest IoT technologies. These IoT solutions aim to improve governance, quality, resource monitoring and machinery. By facilitating device communication and coordination via the internet, executing activities autonomously, and depending heavily on big data, artificial intelligence, and internet infrastructure. Which in turn, boost corporate efficiency, minimize expenses, stimulate innovation, provide new opportunities, improve profitability and organizational processes (Jordan Industrial Estates Company, 2021). However, it is important to note that the manufacturing sector is the most targeted industry for cyber-attacks globally (Statista., 2023). In particular, Jordan increasingly becoming a target for data breaches and attacks (AlSobeh et al., 2023). Therefore, greater emphasis should be placed on IT

security to minimize IT security risks and capitalize on digital technology, which in turn reduce cost, time improve production processes, increase competitive advantage, enhanced reputation, and increased customer satisfaction.

Literature Review and Theoretical Background

The effect of ERM on organizational performance (financial and non-financial)

ERM considered as intangible resource (Al-Nimer et al., 2021a). Based on the RBV theory, both tangible and intangible resources play a critical role in achieving superior organizational performance (Rehman & Anwar, 2019). Notably, past literature has received a considerable attention on the relationship between ERM and financial performance. Particularly, the positive effect of the relation has been confirmed in different countries and industries. For example, in Asia a study that done across different countries including Indonesia, Malaysia, Philippines, Singapore and Thailand within manufacturing, service and trade industry reported a significant and positive impact of ERM on the financial performance (Chairani & Siregar, 2021). Similarly, in Iran, among financial institution, Saeidi et al. (2019) indicated that ERM has a significant positive effect on financial indicators. Likewise, (Shad et al., 2022), investigated the effect of ERM implementation on the firm value for the oil and gas industry, the results indicated that an increase in the level of ERM implementation increases firm value by reducing cost of capital. Consequently, the relationship between ERM and financial performance has been widely studied (Horvey et al., 2020; Otero González et al., 2020; Silva et al., 2018). In fact, Shad et al. (2022) in their study recommended that future research may investigates ERM and non-financial indicators, such as reputation, human resources and marketing. In the same way, Chairani and Siregar (2021)recommended future studies to explore ERM and company non-financial performance. In that regard, Al-Nimer et al. (2021b), has studied ERM effect on financial and non-financial performance. The author found that ERM practices have an insignificant influence on financial performance. Whilst, a significant impact on non-financial performance. Nevertheless, the study only conducted on financial sector in Jordan and it has their own central bank regulation. Therefore, based on the preceding discussion, it is reasonable to argue that ERM can lead to organizational performance (Financial and non-Financial) Consequently, researcher was proposed the following hypothesis:

H1: There is a positive relationship between ERM and organizational performance(financial) in the Jordan manufacturing Sector?

H2: There is a positive relationship between ERM and organizational performance(non-financial) in the Jordan manufacturing Sector

2.2 The effect of ERM and Information Technology Security

The COVID-19 pandemic has demonstrated the significance of being ready for the worst-case scenario in every situation especially in today's digital era given the multitude of technological risks including cyberattacks, password breaches, service interruptions, power outages, and more. Notably, many enterprise risks are interdependent, these interdependencies make enterprise managers recognize that information technology risk and business risks are not isolated issues (Stine et al., 2020).Therefore, organizations should integrate the technology risks as essential components within their ERM framework (Muhidin & Dahlan, 2022). Previous study conducted by Owusu Kwateng et al. (2022) examined ERM as its relation to IT security in term of CIA security objectives within the financial sector of Ghana. The study results highlighted a substantial and positive influence of ERM on the level of IT security within financial institutions.

Nevertheless, the authors concluded that the research on enterprise security risk management is limited and recommended for further research to assist organizations to recognizing the interconnections among various risks including information security risks. Additionally, Kurdi et al. (2019), have proposed a conceptual framework to examine the relationship between ERM and IT quality proxied by CIA requirement. However, the study didn't empirically test the relationship. The present research posited that with the more ERM implementation, a firm would have better IT security. Therefore, based on the previous studies the following hypothesis was proposed:

H3: There is a positive relationship between ERM and IT security in the Jordan manufacturing Sector.

The Effect of IT Security and Organizational Performance (Financial & Non-Financial)

The security of information technology within the organizations plays a crucial role in their overall performance. In other word, cybersecurity breaches may negatively affect business performance and ignoring them will result in a significant loss of business value (Berkman et al., 2018; Kamiya et al., 2021). Furthermore, the impact of these incidents encompasses not only the direct financial loss, but also extends to indirect financial loss, including the firm's reputation (Nicholson, 2019). Moon et al. (2018), showed that the level of information security system effectiveness positively influenced organizational performance including financial and business process performance. Similarly, a study done by Hasan et al. (2021), found that cyber security positively affects financial and non-financial performance. Nevertheless, the study limited to Bahrain, and recommended future work to cover different industries and countries. Likewise, T. Hasani et al. (2023), studied the impact of cybersecurity improvement on organizational financial and non-financial performance, the author indicated that cybersecurity technologies adoption positively impacts both financial metrics such as revenue and profit margin as well as non-financial metrics including enhances customer satisfaction and increases client retention of SMEs. However, based on authors limitation the study focused solely on a sample of UK SMEs. Thus, the result is not generalizable even to other SMEs. Moreover, the mentioned research measured cybersecurity improvement level accordance technology adoption in specific and not focused on a cybersecurity requirement in general. Notably, the author argued that there is limited empirical work to study the effects of cybersecurity adoption on organizational performance. Thus, taking into account the above discussion the following hypothesis is developed:

H4: There is a positive relationship between IT security and Organizational performance (financial) in Jordan manufacturing sector.

H5: There is a positive relationship between IT security and Organizational performance (non-financial) in Jordan manufacturing sector

2.4 The effect of IT security mediated ERM and Organizational performance (Financial &Non-Financial)

The implementation of a holistic risk management (ERM) proactively, strategically, and comprehensively manages IT risks (Althonayan & Andronache, 2019). In contrast, a lack of unified risk oversight can have ripple effects due to unclear paths of how controls apply to asset valuation, risk prioritisation, risk reporting, analysis, mitigation, and resiliency (Webb et al., 2016). Relevantly, Erin et al. (2020),indicated that an ERM has positive and significant effect on cybercrime reduction. Similarly, Hess (2021) reported that ERM positively influence IT

security. In addition, several studies have confirmed that the security of information technology within organizations plays a crucial role in their overall performance (Ahmad et al., 2020; Hasan et al., 2021; Putra et al., 2022). Furthermore, there is enough evidence to support the assertion that ERM enhances firm performance (Horvey, 2022). Based on previous literature, Vinh Quang et al. (2024), investigated the mediation role of using advanced technology in the relation between ERM and firms' non-financial and financial performance. The results showed that technology adoption is fully mediated ERM-non financial performance and partially mediated with financial performance. Yet, the authors recommended to enhance generalizability and expand the sample size in future research. Additionally, the study emphasesd on the advantages of IT adoption, and didn't cover the possible security risks. Where without evaluation of cybersecurity level, it persists uncertain whether technology adoption could reduce or improve ERM effectiveness.

Similarly, Yoewono and Ananto (2024) investigated the relationship between ERM and financial besides non-financial banks performance in Indonesia, and discovered that banking mobile application broadened market reach, sustained operations, enhanced customer experience as well as operational efficiency, and increase profitability. Thus, using mobile banking positively mediated ERM and bank performance. However, mentioned studies didn't directly assess the actual level of security of e-commerce adoption and mobile banking applications. Also, the studies were based on specific scope including E-commerce and mobile app, and can't be generalized to all industries with different IT systems. Thus, present research examined the mediating role of IT security between ERM and organizational performance, the following hypothesis were proposed.

H6: IT security mediates ERM and Organizational performance (financial) relation in Jordan manufacturing sector.

H7: IT security mediates ERM and Organizational performance (non-financial) relation in Jordan manufacturing sector.

Methodology

Data Collection

The current research employed a positivist viewpoint. Measuring the reality through collecting data using a questionnaire distributed to manufacturing firms in Jordan, and analyzed it in order to test the research hypothesis and generalize the results. The target population research is 587 consists of the Jordanian manufacturing firms which are basically located in the Abdullah II Ibn AL-Hussein and AL-Hassan Jordanian Industrial Estate. Thus, the unit of analysis for this study consisted of manufacturing organizations. In addition, data were obtained from individuals who has risk management responsibilities, the sample size is 250 based on Krejcie and Morgan (1970) table.

Questionnaire Development and Instrument

The present research has been used COSO 8 elements based on (COSO, 2004), for the ERM implementation scale item includes internal environment, objective setting, event identification, risk assessment, risk response, controls activity, information and communication, and monitoring, and adopted from (Oyewo, 2021). These COSO 8 elements based on (COSO, 2004), have been used in manufacturing sector (Ai Ping & Muthuveloo, 2015). While, the scale items for the financial and non-financial performance variable were adapted from (Hasan et al., 2021),

since it has been used in the context of manufacturing sector and the context of ERM, and IT security. Furthermore, the scale items for the IT security variable are adapted from (Owusu Kwateng et al., 2022), and have been used in the context of manufacturing sector (Ernest Chang & Lin, 2007) and the context of ERM, and IT security (Owusu Kwateng et al., 2022).

Statistical Technique

Data analysis starting with data screening and followed by respondents 'descriptive statistics sections using SPSS software. Next this research employs SEM-PLS as a tool in analyzing process using SMART-PLS4software.For the measurement model, it has Cronbach alpha, composite reliability, convergent validity, AVE and discriminant validity. Meanwhile, for structural model, it has collinearity assessment, path coefficient, R2, effect sizes (f2) and predictive relevance (Q2). Additionally, the analysis includes mediation tests using SEM-PLS.

Results / Findings

Demographics

The demographic profile was retrieved from the respondents to descriptively analyse the demographic variables. More specifically, the demographic section measured in the present research consisted of respondents' demographics including gender, age group, education level, and. A total of 250 respondents were included in the demographic profile, out of which (67%) were males and (33%) were females. Besides, the results for age group in the range (20-30) years were (17%), and the largest group of respondents in the range of (31-40) years were (41%), whereas (41-50) years were (30%), age group of 51 and above were (12%). As for the education level, Diploma accounted for (6%), Bachelor's degree represented (65%), Master's degree accounted for (25%) and PhD represented (4%) of the respondents. As for positions the results of CRO were (0%), CEO (23%), quality manager (46%), project manager (5%), CFO (19%), Bods (3%), secretary (4%). In reviewing the companies' profiles, the companies' age less than 10 were (9%), ranged from 11 to 20 years were (32%), and more than 20y were (59%). In addition, the number of employees less than 50 were (33%) ranged from 50 to 250 were (34%) and lastly above 250 were (33%). Finally, the number of firms attacked are (2%).

4.2 Measurement Model Analysis

The measurement model describes the relationships between the latent variables and indicators that make up each latent variable. In this study, reflective indicators are used in the measurement model. Construct validity is carried out to determine the degree to which an item positively correlates with other items of the same construct (Hair Jr et al., 2020).It can be measured via the item's outer loading (at item level), and average variance extracted (AVE) (at construct level) (Ramayah et al., 2018), validity tested using Fornell and Larcker (1981) criteria.

4.2.1 Outer loading

In the current study, data analysis revealed that out of 50 items, only one item (IT Security 10 = 0.69) had an outer loading below 0.7, which did not meet the required threshold. Nevertheless, since the AVE was above 0.5, all items, including IT Security 10, satisfied the criteria for convergent validity and were retained for further analysis. Details of the results of the reflective model are displayed in Table 4.1.

	ERM	Financial Performance	IT Security	Non-Financial Performance
ERM1	0.754			
ERM10	0.814			
ERM11	0.806			
ERM12	0.771			
ERM13	0.737			
ERM14	0.783			
ERM15	0.774			
ERM16	0.770			
ERM17	0.764			
ERM18	0.766			
ERM19	0.797			
ERM2	0.763			
ERM20	0.798			
ERM21	0.766			
ERM22	0.745			
ERM23	0.747			
ERM24	0.778			
ERM25	0.755			
ERM3	0.796			
ERM4	0.755			
ERM5	0.717			
ERM6	0.705			
ERM7	0.771			
ERM8	0.786			
ERM9	0.758			
Financial1		0.861		
Financial2		0.881		
Financial3		0.874		
Financial4		0.831		
ITsecurity1			0.710	
ITsecurity10			**0.690**	
ITsecurity11			0.701	
ITsecurity12			0.715	
ITsecurity13			0.748	
ITsecurity14			0.765	
ITsecurity15			0.769	
ITsecurity16			0.746	
ITsecurity2			0.761	

ITsecurity3			0.773	
ITsecurity4			0.751	
ITsecurity5			0.720	
ITsecurity6			0.763	
ITsecurity7			0.737	
ITsecurity8			0.723	
ITsecurity9			0.756	
non-Financial1				0.848
non-Financial2				0.860
non-Financial3				0.844
non-Financial4				0.854
non-Financial5				0.848

Table 4.1 Items Loading

Average Variance Extracted *(AVE)*

After assessing the outer loading for indicators, the AVE values for constructs were examined, it explains the variance percentage explained by a construct. AVE results of the present research met the threshold value of AVE more than 0.5 (Ramayah et al., 2018). Thus, the convergent validity was achieved in the present research. Table 4.2 show the results.

Constructs	**Cronbach's Alpha**	**Composite Reliability**	**AVE**
ERM	.97	.97	.58
IT security	.94	.95	.54
Financial Performance	.88	.92	.74
Financial Non-Performance	.90	.92	.72

Table 4.2: Results of Cronbach's Alpha, Composite Reliability, and AVE

The Discriminant Validity

Fornell-Larcker criterion is shown in Table 4.3 and it can be seen that the square root of the AVE for each construct is higher than its correlation with any other construct.

	ERM	Financial Performance	IT security	Non-Financial Performance
ERM	0.767			

Financial Performance	0.554	0.862		
IT security	0.551	0.475	0.740	
Non-Financial Performance	0.574	0.783	0.532	0.851

Table 4.3 Fornell and Lacker's Criterion

Structural Model

After the assessment and validation of the measurement model, the present research tested the structural model. The process of testing the structural model was carried out using the following processes: 1) using bootstrapping with 5,000 resampling obtained using PLS-SEM algorithm, which represents the hypothesized relationships among the constructs in the research model; 2) assessing the coefficient of determination (R2); 3) evaluating the effect size of (F2); and 4) using blindfolding to assess the predictive relevance of the path model Q2 (F. Hair Jr et al., 2014).

Path Coefficients

Based on the results in Table 4.4, H1 was supported; ERM had a positive and significant relationship with financial performance where (β=0.423, t-value =6.250, p-value = 0.000), the p-value was less than 0.05. These results were similar to the results of previous study (Jurdi & AlGhnaimat, 2021). Furthermore, H2 was supported; ERM had a positive and significant relationship with non-financial performance. Where, (β=0.403, t-value = 5.548, p-value = 0.000), the p-value was less than 0.05. These results were similar to the results of previous study (Girangwa et al., 2020).Moreover, H3 was supported; where based on the results (β=0.551, t-value = 10.125, p-value = 0.000), the p-value was less than 0.05, hence ERM had a positive and significant relationship with IT security. These results were similar to the results of previous study (Owusu Kwateng et al., 2022). In addition, H4 was supported; IT security had a positive and significant relationship with financial performance, where (β=0.243, t-value = 3.302, p-value = 0.000), the p-value was less than 0.05. These results were similar to the results of previous (Hasan et al., 2021). Finally, H5 was supported; (β=0.310, t-value = 4.080, p-value = 0.000), the p-value was less than 0.05, therefore, IT security had a positive and significant relationship with non-financial performance. These results were similar to the results of previous (Tahereh Hasani et al., 2023).

Hypothesis	Relationship	Path Coefficient	T statistics	P values	Decision
H1	ERM -> Financial Performance	0.423	6.250	0.000	SUPPORTED
H2	ERM -> Non-Financial Performance	0.403	5.548	0.000	SUPPORTED

H3	ERM -> IT Security	0.555	10.125	0.000	SUPPORTED
H4	IT Security -> Financial Performance	0.243	3.302	0.000	SUPPORTED
H4	IT Security -> Non-Financial Performance	0.310	4.080	0.000	SUPPORTED

Table 4.4 Direct Relationship of Test Results

R Square (R^2)

The R2 score for IT security in the present research's model was (0.303) which is considered moderate, and the (R2) value of financial performance in the present research's model was (0.349) which is considered moderate too. Similarly, the (R2) value of non- financial performance in the present research's model was (0.400) which is considered moderate as well. Based on the obtained results shown in Table 4.5, the research model falls within a moderate prediction power based on Chin (1998) criteria.

Construct	R-square	Explanatory Power
Financial Performance	0.349	Moderate
IT security	0.303	Moderate
Non-Financial Performance	0.400	Moderate

Table 4.5 Results of R-square (R2)

Assessment of Effect Size (f2)

Table 4.6 provides the PLS algorithm results of the effect size (f2) of the dependent variables of the structural model (IT security, Financial performance, and Non-financial performance). Based on the results obtained in Table 4.6, ERM had a large effect on IT security. Whereas ERM, had a medium effect on financial performance and non-financial performance. In addition, IT security had small effect on financial performance and non-financial performance.

	Financial Performance		IT security		Non-Financial Performance	
	f^2 value	Effect Size	f^2 value	Effect Size	f^2 value	Effect Size
ERM	0.113	medium	0.435	large	0.086	Medium

Financial Performance						
IT security	0.064	Small			0.111	Small
Non-Financial Performance						

Table 4.6. Results of Effect Size (F2)

Q^2 Predictive Relevance

The Table 4.7 shows that are values are above zero which reflects that predictive relevance have achieved with respect to the independent variable. Hair et al. (2014) that the accepted values which indicate predictive value for a dependent construct are 0.02-0.15) small, (0.15-0.35) medium, (greater than 0.35) large. Moreover, the blindfolding procedure in PLS-SEM was conducted to assess the predictive relevance. Table 4.7 provides the results of Q2 values. Based on the obtained values of Q2, IT security (0.160), non-financial performance (0.282) and financial performance (0.257), the predictive relevance level was medium for the all constructs.

Endogenous latent variable	Q^2	Predictive Relevance Level
Financial Performance	0.257	medium
IT security	0.160	medium
Non-Financial Performance	0.282	medium

Table 4.7 Predictive Relevance Scores

Mediation Effect

Present research tested the mediating effect of IT security between ERM and financial and non-financial performance. Hence, a path model was evaluated using the bootstrapping method to examine the relationship among ERM, IT security, and financial and non-financial performance. Based on the mediation test results in Table 4.8 (β= 0.136, t-value= 3.050, p-value = 0.01), and p-value was < 0.05. Hence, H6 was supported. There was a mediation effect of IT security between ERM and financial performance. Despite the significant relationship between ERM and financial performance, IT security as a mediator variable increased and enhanced this relationship. These results were similar to the findings of previous studies (Yeng et al., 2019). Moreover, the present research tested the mediating effect of IT security between ERM and non-financial performance. Hence, the bootstrapping method was used to examine the relationship among ERM IT security non-financial performance. Based on the mediation test results in Table 4.8, (β= 0.173, t-value= 3.698, p-value = 0.0), and p-value was < 0.05. Hence, H7 was supported. More specifically, IT security mediated the relationship between ERM and non-financial performance. These results were similar to the findings of previous studies (Nguegang Tewamba et al., 2019).

Hypothesis	Relationship	Standard Beta	T statistics	P values	Decision
H6	ERM -> IT security	0.173	3.698	0.000	Supported

	-> Non-Financial Performance				
H7	ERM -> IT security -> Financial Performance	0.136	3.050	0.001	Supported

Table 4.8 Indirect Relationship Test Results (Mediation)

Discussion

The present research examined the impact of ERM, IT security on the financial and non-financial performance of Jordanian manufacturing companies. The findings revealed a significant and positive impact of ERM on financial performance, and non-financial performance. Similarly, ERM have a significant relationship with IT security. Moreover, the present research found that IT security fully mediated the relationship between ERM and financial performance. However, IT security partially mediated the relationship between ERM and non-financial performance. In the present research, the research data were collected from the person who is responsible for managing risks in the manufacturing companies in Jordan and most of them were quality manager. Furthermore, the Statistical Package for Social Sciences (SPSS) version 25.0 and Structural Equation Modelling for Partial Least Squares (PLS 4.0) were used to analyze the research data.

Conclusion

the present research was based on the context of manufacturing companies in Jordan applying (a quantitative) study. The manufacturing companies in Jordan were included because of their significant contribution to the national economy. Based on the results obtained, seven (7) hypotheses were supported. More specifically, the present research found a positive and significant impact of ERM, IT security financial performance, and non-financial performance. It was also found that a positive relationship exists between ERM and financial performance, non-financial performance and IT security. Moreover, present research found that IT security fully mediated ERM financial performance and partially mediated ERM non-financial performance. The present research made several contributions and enriched the body of knowledge in relevant academic areas. First, the research model in this study supplemented literature on ERM, IT security, and financial and non-financial performance (Kurdi et al., 2019; Maharani & Yonnedi, 2023; Owusu Kwateng et al., 2022; Pérez-Cornejo et al., 2019) by considering a broad perspective on the associations of ERM implementation and IT security with financial performance and non-financial performance. Also, both empirical and theoretical studies have investigated the mediating role of advanced technology and high-quality technology (Nguegang Tewamba et al., 2019; Vinh Quang et al., 2024), they have not examined the mediating role of IT security in terms of CIA in the relationship between COSO ERM implementation and financial and non-financial performance, particularly in the Jordanian manufacturing sector. In addition, this study could help owner/managers to continue invest and deploy robust, integrated risk management in order to create a secure IT environment and enhance the firm performance. Furthermore, managers/ owner should improve their knowledge in the area of risk management where they have the power to promote integrated risk management that addresses all risks types, including IT security risks, in a holistic manner including all firms level. ERM help them to make more informed and effective decisions, reduce conflict between managers and shareholders, decrease the costs associated with the wasting

resources and controls redundancy, ensures long-term sustainability by addressing risks strategically, proactively managing risks therefore preventive actions taken to minimize potential damages and exploit opportunities.

Research Limitations and Recommendation for Future Research

Despite the significant contribution to the theoretical, managerial, and policymakers' perspective, the present research had several limitations, which can be addressed in future research. First, the results cannot be generalized to all manufacturing companies around the world since this research was based on manufacturing companies operating Jordan Industrial Estate Company. Thus, future research can consider a wider scope of the study and test the present research's theoretical model in other sectors or in other developing countries. Second, the findings of this research, are context-based; they differ from other findings due to differences in countries, amounts of resources employed in countries, and regulations or governmental support. As a result, future scholars may do comparative studies in other countries. Third, this research was based on a (quantitative) cross-sectional approach designed to access the causal relationship between variables. Hence, future studies could utilize different methodologies, such as qualitative or mixed methods to validate the results. Fourth, the present research used the COSO to investigate ERM implementation; therefore, future studies could include other practices for measuring ERM (ISO 31000 for example). Moreover, the present research conceptualized and operationalized IT security as a unidimensional variable. As a result, future studies may study IT security dimensions separately (confidentiality availability and integrity). Besides, future research may investigate other mediating/moderating variables that affect the relationship between ERM practices and both financial and non-financial performance**.**

References

Ahmad, A., Desouza, K. C., Maynard, S. B., Naseer, H., & Baskerville, R. L. (2020). How integration of cyber security management and incident response enables organizational learning. Journal of the Association for Information Science and Technology, 71(8), 939-953.

Ahmad Jaber, T., & Mohammed Shah, S. (2023). Enterprise risk management literature: emerging themes and future directions. Journal of Accounting & Organizational Change. https://doi.org/10.1108/jaoc-07-2022-0106

Ai Ping, T., & Muthuveloo, R. (2015). The Impact of Enterprise Risk Management on Firm Performance: Evidence from Malaysia. Asian Social Science, 11(22). https://doi.org/10.5539/ass.v11n22p149

Al-Nimer, M., Abbadi, S. S., Al-Omush, A., & Ahmad, H. (2021a). Risk Management Practices and Firm Performance with a Mediating Role of Business Model Innovation. Observations from Jordan. Journal of Risk and Financial Management, 14(3). https://doi.org/10.3390/jrfm14030113

Al-Nimer, M., Abbadi, S. S., Al-Omush, A., & Ahmad, H. (2021b). Risk management practices and firm performance with a mediating role of business model innovation. Observations from Jordan. Journal of Risk and Financial Management, 14(3), 113.

Al Amosh, H., & Khatib, S. F. A. (2023, Mar). ESG performance in the time of COVID-19 pandemic: cross-country evidence. Environ Sci Pollut Res Int, 30(14), 39978-39993. https://doi.org/10.1007/s11356-022-25050-w

Al Amosh, H., Khatib, S. F. A., & Ananzeh, H. (2022). Environmental, social and governance impact on financial performance: evidence from the Levant countries. Corporate Governance: The International Journal of Business in Society, 23(3), 493-513. https://doi.org/10.1108/cg-03-2022-0105

Aldaas, A. A. (2022). Modelling for default risk in companies: evidences from Jordan. International Journal of Business Continuity and Risk Management, 12(1), 76-89.

Alsalem, G. M., Hammad, M., & Shishan, A. (2023). ICT Impact on Jordan's Economic Growth from 2000 to 2019. 2023 International Conference on Sustainable Islamic Business and Finance (SIBF),

Alshourah, S. (2021). Assessing the influence of total quality management practices on innovation in Jordanian manufacturing organizations. Uncertain Supply Chain Management, 57-68. https://doi.org/10.5267/j.uscm.2020.12.001

AlSobeh, A. M. R., AlAzzam, I., Shatnawi, A. M. J., & Khasawneh, I. (2023). Cybersecurity awareness factors among adolescents in Jordan: Mediation effect of cyber scale and personal factors. Online Journal of Communication and Media Technologies, 13(2), e202312.

Althonayan, A., & Andronache, A. (2019). Resiliency under strategic foresight: The effects of cybersecurity management and enterprise risk management alignment. 2019 International conference on cyber situational awareness, data analytics and assessment (Cyber SA),

Attiah, E. (2019). The role of manufacturing and service sectors in economic growth: an empirical study of developing countries. European Research Studies Journal, 22(1), 112-127.

Berkman, H., Jona, J., Lee, G., & Soderstrom, N. (2018). Cybersecurity awareness and market valuations. Journal of Accounting and Public Policy, 37(6), 508-526.

Bose, I., & Leung, A. C. M. (2019). Adoption of identity theft countermeasures and its short-and long-term impact on firm value. MIS Quarterly, 43(1).

Central Bank of Jordan. (2022). Annual report 2022. https://www.cbj.gov.jo/EBV4.0/Root_Storage/AR/f2022.pdf

Chairani, C., & Siregar, S. V. (2021). The effect of enterprise risk management on financial performance and firm value: the role of environmental, social and governance performance. Meditari Accountancy Research, 29(3), 647-670. https://doi.org/10.1108/medar-09-2019-0549

Chin, W. W. (1998). The partial least squares approach to structural equation modeling. Modern methods for business research, 295(2), 295-336.

COSO. (2004). Enterprise risk management—Integrated framework. Committee of Sponsoring Organizations of the Treadway Commission (COSO). https://www.coso.org

Dhaman. (2023). Investment climate report. https://www.dhaman.org/investment-climate-report-ar.html

Economic Policy Council. (2018-2022). Jordan Economic Growth Plan 2018–2022. https://www.ssif.gov.jo/UploadFiles/JEGProgramEnglish.pdf

Erin, O. A., Kolawole, A. D., & Noah, A. O. (2020). Risk governance and cybercrime: the hierarchical regression approach. Future Business Journal, 6(1). https://doi.org/10.1186/s43093-020-00020-1

Ernest Chang, S., & Lin, C. S. (2007). Exploring organizational culture for information security management. Industrial Management & Data Systems, 107(3), 438-458. https://doi.org/10.1108/02635570710734316

F. Hair Jr, J., Sarstedt, M., Hopkins, L., & G. Kuppelwieser, V. (2014). Partial least squares structural equation modeling (PLS-SEM) An emerging tool in business research. European business review, 26(2), 106-121.

Fakir, A. N. M. A., & Jusoh, R. (2020). Board Gender Diversity and Corporate Sustainability Performance: Mediating Role of Enterprise Risk Management. The Journal of Asian Finance, Economics and Business, 7(6), 351-363. https://doi.org/10.13106/jafeb.2020.vol7.no6.351

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of marketing research, 18(1), 39-50.

Girangwa, K. G., Rono, L., & Mose, J. (2020). The influence of enterprise risk management practices on organizational performance: Evidence from Kenyan State Corporations. Journal of Accounting, Business and Finance Research, 8(1), 11-20.

Hair, J., Ringle, C., & Sarstedt, M. (2014). PLS-SEM: Indeed a Silver Bullet. Journal of Marketing Theory and Practice. Taylor Francis Online, 19(2).

Hair Jr, J. F., Howard, M. C., & Nitzl, C. (2020). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. Journal of Business Research, 109, 101-110.

Hasan, S., Ali, M., Kurnia, S., & Thurasamy, R. (2021). Evaluating the cyber security readiness of organizations and its influence on performance. Journal of Information Security and Applications, 58. https://doi.org/10.1016/j.jisa.2020.102726

Hasani, T., O'Reilly, N., Dehghantanha, A., Rezania, D., & Levallet, N. (2023). Evaluating the adoption of cybersecurity and its influence on organizational performance. SN Bus Econ, 3(5), 97. https://doi.org/10.1007/s43546-023-00477-6

Hasani, T., O'Reilly, N., Dehghantanha, A., Rezania, D., & Levallet, N. (2023). Evaluating the adoption of cybersecurity and its influence on organizational performance. SN Business & Economics, 3(5), 97.

Hess, W. (2021). Enterprise Risk Management as a Measurement of Cybersecurity Effectiveness: A Correlational Study Capella University].

Horvey, S. S. (2022). Enterprise Risk Management, Corporate Governance, Performance and Risk-Taking Behaviour of the Insurance Industry: Empirical Evidence from Ghana and South Africa University of the Witwatersrand].

Horvey, S. S., Ankamah, J., & McMillan, D. (2020). Enterprise risk management and firm performance: Empirical evidence from Ghana equity market. Cogent Economics & Finance, 8(1). https://doi.org/10.1080/23322039.2020.1840102

Industrial Estates Company of Jordan. (2022). Investor directory. https://www.jiec.com/ar/investor_directory/

Jordan Industrial Estates Company. (2021). Memorandum of understanding to implement the Internet of Things in Jordanian industrial estates. https://www.jiec.com/ar/news/137/

Jordan Strategy Forum. (2022). Manufacturing sector: Jordan's economic vision roadmap. https://jsf.org/uploads/2022/12/manufacturing-1.pdf

Jurdi, D. J., & AlGhnaimat, S. M. (2021). The effects of ERM adoption on European insurance firms performance and risks. Journal of Risk and Financial Management, 14(11), 554.

Kamiya, S., Kang, J.-K., Kim, J., Milidonis, A., & Stulz, R. M. (2021). Risk management, firm reputation, and the impact of successful cyberattacks on target firms. Journal of Financial Economics, 139(3), 719-749. https://doi.org/10.1016/j.jfineco.2019.05.019

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. Educational and psychological measurement, 30(3), 607-610.

Kurdi, I. A., Fareed Naji, A., & Nawar Naseef, A. (2019). Enterprise risk management and performance of financial institutions in Iraq: The mediating effect of information technology quality. Journal of Information Technology Management, 11(4), 80-91.

Maharani, C., & Yonnedi, E. (2023). The Influence of Advanced Enterprise Risk Management Implementation Analyses: The Role Of Environmental, Social and Governance Performances. Ilomata International Journal of Management, 4(3), 267-286.

Ministry of Planning and International Cooperation. (2023). Economic modernization vision: 2023–2033. https://mop.gov.jo/EBV4.0/Root_Storage/EN/EB_HomePage/final_english_13-9.pdf

Moon, Y. J., Choi, M., & Armstrong, D. J. (2018). The impact of relational leadership and social alignment on information security system effectiveness in Korean governmental organizations. International Journal of Information Management, 40, 54-66.

Muhidin, N. N., & Dahlan, A. R. A. (2022). INTEGRATED ENTERPRISE RISK MANAGEMENT (IERM) FOR PENSION FUND ORGANISATIONS: FROM A TECHNOLOGY POINT OF VIEW.

Journal of Information Systems and Digital Technologies, 4(2).
Nguegang Tewamba, H., Robert Kala Kamdjoug, J., Bell Bitjoka, G., Fosso Wamba, S., & Nkondock Mi Bahanag, N. (2019). Effects of Information Security Management Systems on Firm Performance. American Journal of Operations Management and Information Systems, 4(3). https://doi.org/10.11648/j.ajomis.20190403.15
Nicholson, S. (2019). How ethical hacking can protect organisations from a greater threat. Computer Fraud & Security, 2019(5), 15-19.
Otero González, L., Durán Santomil, P., & Tamayo Herrera, A. (2020). The effect of Enterprise Risk Management on the risk and the performance of Spanish listed companies. European Research on Management and Business Economics, 26(3), 111-120. https://doi.org/10.1016/j.iedeen.2020.08.002
Owusu Kwateng, K., Amanor, C., & Tetteh, F. K. (2022). Enterprise risk management and information technology security in the financial sector. Information & Computer Security, 30(3), 422-451. https://doi.org/10.1108/ics-11-2020-0185
Oyewo, B. (2021). Enterprise risk management and sustainability of banks performance. Journal of Accounting in Emerging Economies, 12(2), 318-344. https://doi.org/10.1108/jaee-10-2020-0278
Pangestuti, D. C., Muktiyanto, A., & Geraldina, I. (2023). Modified of ERM Index for Southeast Asia. Cogent Business & Management, 10(2), 2199906.
Pérez-Cornejo, C., de Quevedo-Puente, E., & Delgado-García, J. B. (2019). How to manage corporate reputation? The effect of enterprise risk management systems and audit committees on corporate reputation. European Management Journal, 37(4), 505-515.
Putra, R. D., Mulyani, S., Poulus, S., & Sukmadilaga, C. (2022). Data quality analytics, business ethics, and cyber risk management on operational performance and fintech sustainability. International Journal of Data and Network Science, 6(4), 1659-1668. https://doi.org/10.5267/j.ijdns.2022.4.008
Ramayah, T., Cheah, J., Chuah, F., Ting, H., & Memon, M. A. (2018). Partial least squares structural equation modeling (PLS-SEM) using smartPLS 3.0. An updated guide and practical guide to statistical analysis, 1(1), 1-72.
Rehman, A. U., & Anwar, M. (2019). Mediating role of enterprise risk management practices between business strategy and SME performance. Small Enterprise Research, 26(2), 207-227. https://doi.org/10.1080/13215906.2019.1624385
Saeidi, P., Saeidi, S. P., Sofian, S., Saeidi, S. P., Nilashi, M., & Mardani, A. (2019). The impact of enterprise risk management on competitive advantage by moderating role of information technology. Computer Standards & Interfaces, 63, 67-82. https://doi.org/10.1016/j.csi.2018.11.009
Saranza, C., Paqueo-Patosa, L., Gegona, D., Sulapas, R. R., Gorde, P. L., & Villanueva, M. J. (2024). Enterprise Risk Management on Business Performance: A Quantitative Analysis of Local Businesses in Surigao del Norte, Philippines. IJBTSR International Journal of Business and Technology Studies and Research, 5(2), 15 pages-15 pages.
Shad, M. K., Lai, F.-W., Shamim, A., McShane, M., & Zahid, S. M. (2022). The relationship between enterprise risk management and cost of capital. Asian Academy of Management Journal, 27(1).
Silva, J. R., Silva, A. F. d., & Chan, B. L. (2018). Enterprise Risk Management and Firm Value: Evidence from Brazil. Emerging Markets Finance and Trade, 55(3), 687-703. https://doi.org/10.1080/1540496x.2018.1460723
Statista. (2021). Impact of the coronavirus pandemic on the global economy. Impact of the coronavirus pandemic on the global economy
Statista. (2023). Distribution of cyberattacks across worldwide industries in 2023. https://www.statista.com/statistics/1315805/cyber-attacks-top-industries-worldwide
Stine, K., Quinn, S., Witte, G., & Gardner, R. (2020). Integrating cybersecurity and enterprise risk

management (ERM). National Institute of Standards and Technology, 10.
United Nations, D. o. E. a. S. A. (2025). World economic situation and prospects 2025. Retrieved 1 April 2025 from https://www.un.org/development/desa/dpad/publication/world-economic-situation-and-prospects-2025/
Vinh Quang, L., Ngoc-Long, N., & Xuan Giang, P. (2024). Enterprise risk management and firm performance: Exploring the roles of knowledge, technology, and supply chain. Problems and Perspectives in Management, 22(2), 150-164. https://doi.org/10.21511/ppm.22(2).2024.13
Webb, J., Ahmad, A., Maynard, S., & Shanks, G. (2016). Foundations for an intelligence-driven information security risk-management system. Journal of Information Technology Theory and Application (JITTA), 17(3), 3.
World Bank. (2024). Jordan overview. https://www.worldbank.org/en/country/jordan/overview
Yeng, P., Yang, B., & Snekkenes, E. (2019). Observational Measures for Effective Profiling of Healthcare Staffs' Security Practices 2019 IEEE 43rd Annual Computer Software and Applications Conference (COMPSAC),
Yoewono, H., & Ananto, P. (2024). Enhancing Bank Performance: Integrating Enterprise Risk Management with Mobile Banking Applications. Journal of Economics, Business, and Accountancy Ventura, 27(2), 207-216. https://doi.org/10.14414/jebav.v27i2.4572.