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Article

The impact of cybersecurity on SMEs strategies through technological infrastructure in Balqa governorate

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Abstract: The technological infrastructure is the basis for the successful implementation and operation of information systems in small and medium enterprises. The study aimed to demonstrate the impact of cybersecurity on entrepreneurship strategies in small and medium enterprises. Through technological infrastructure in Balqa Governorate. The study population consisted of small and medium enterprises in Balqa Governorate in Jordan. The study followed the descriptive analytical approach and relied on the questionnaire to collect data. The sample size was 360 individuals were randomly select. The Statistical Package for Social Sciences (SPSS) was use to analyze the data. The study reached a set of results, including that the management of small and medium enterprises is committed to continuous supervision and control of customer information. Dealing with reliable parties to ensure the confidentiality of information, following strict standards for disclosure and circulation of customer data and information based on legal texts. Maintaining the privacy of customers' financial data, in addition to supporting the successes of individuals based on the personal efforts of employees, providing a suitable work environment for employees, sustaining excellence and achievement, and working to increase awareness among its employees of the importance of innovation and creativity in work. The study recommended that customer data confidentiality should be consider a top priority for small and medium enterprises. The data should be stored in more than one place at the same time, that project websites should follow a privacy policy, and that the customer's identity should be verify before submitting his data and documents, by involving employees in small and medium enterprises in specialized courses and workshops to demonstrate the importance of data and information confidentiality.

Keywords: cybersecurity; SMES; technological infrastructure; al Balqa governorate; Jordan

1. Introduction

Small and medium-sized businesses (SMEs) are crucial to the development of the Arab economies (Al-Samirae et al., 2020). They also help in achieving development and growth, especially in Jordan, because of the job opportunities they provide, reducing the poverty rate and achieving an optimal distribution of wealth (Moh'd AL-Tamimi and Jaradat, 2019), thus achieving their goals so that these projects can be launched to confirm their effective and vital role in economic development in Jordan (Al-Weshah et al., 2022). These projects have demonstrated the ability to adapt to market changes, which makes them flexible in performing their work. The emergence of risks related to security and personal data protection is increasing, as website users have had to understand the basic principles of data security and comply with them. Thus, there has been a need to enable and properly understand cybersecurity to repel

hacks and reduce the damage caused to electronic data (Perwej et al., 2021), which results in catastrophic damage, ranging from financial loss and loss of reputation to safety and the possibility of losing important data. The more an individual relies on cyberspace to manage his affairs, the more electronic vulnerabilities he has, and the greater the chances of being exposed to a cyber-breach (Thron et al., 2024).

The technological infrastructure is consider the basis for the success of implementing and operating information systems in SMEs. As it helps in achieving efficiency and improvements in securing and protecting data and providing access to it, as the technological infrastructure is a group of advanced technologies that are used to transform data in its various forms into information (Maraqa et al., 2021). With the increasing use of the Internet, SMEs are facing many electronic threats, and therefore they are seeking to develop their defense systems to improve their ability to confront these risks and threats (Shobande et al., 2024). SME enterprise entrepreneurship strategies are among the most important foundations related to the economic sector, that cybersecurity affects the extent to which the integrity of data and networks of SMEs is secured, which maximizes their ability to maintain their reputation and credibility (Pawar and Palivela, 2022). For this reason these projects resort to improving the infrastructure. With the technology infrastructure in the Balqa Governorate. The study aims to identify the impact of cybersecurity dimensions (confidentiality, privacy, and enhancement) on the strategies for entrepreneurship SMEs through the technological infrastructure in Balqa Governorate, as well as to demonstrate the level of application of cybersecurity, strategies for entrepreneurship for SMEs, as well as the level of technological infrastructure availability.

2. Problem of statement

SMEs seek to implement entrepreneurship strategies that will enhance their financial and economic position and thus contribute to achieving their goals in reducing the unemployment and poverty gap, as they provide a number of jobs and contribute to the optimal use of human resources. SMEs also work to achieve job opportunities in light of the difficulty of obtaining a job in the public and private sectors (Abdul-Azeez et al., 2024). In light of the growing interest in entrepreneurship with the tremendous development in the information and communication technology sector, cyber security came to contribute to preserving data and information for those projects through their technological structure. as the SMEs with entrepreneurial ideas are more capable of creativity and initiative by directing the creative and innovative ideas of their employees, and employing their human and material potential in serving their goals (Thakur et al., 2023). The main question of the study can be stated as follows: What is the impact of cybersecurity and its dimensions (confidentiality, privacy, enhancement) on the entrepreneurship strategies of SMEs through the technological infrastructure in Balqa Governorate?

3. Significance of research

This study contributed to redefining cybersecurity and its accompanying impact on the leadership of SMEs, and created a knowledge base from which other researchers could start in other studies. It also contributed to highlighting a disturbing

issue in the Jordanian economic environment, presenting a set of results and recommendations that would help SME entrepreneurs to make rational decisions and building national strategies that will enhance SME entrepreneurial strategies that will develop Jordan's economy and build economic strategies concerned with preserving projects.

4. Related study

A study by (Khader et al., 2021) aimed to enhance awareness of the application of cybersecurity and its cyber hygiene, and to clarify the importance of cybersecurity in tourism and its role in enhancing the digital trust of travel agencies. The study population consisted of Egyptian travel agencies, and a questionnaire was use as a tool to collect data. The study sample size was (403) individuals. The sample was randomly select from relevant managers and employees in Egyptian travel agencies to identify the extent of interest in cybersecurity in Egyptian travel agencies and its role in enhancing digital trust. These responses were analyzed using SPSS version 28. The research results revealed that travel agencies concerned with cybersecurity could enhance the digital trust of their customers. The study recommended the need to provide employees with the necessary skills to achieve cybersecurity, the necessity of having a department specialized in cybersecurity, and taking the necessary measures to achieve prevention and protection for tourism networks for an effective role in achieving digital trust for travel agencies.

4.1. SMEs

Entrepreneurship requires confronting economic changes and moving from industrial bases to economic systems based on modern technological knowledge in order to achieve economic development and self-employment (Szaban, 2018). Cybersecurity plays an effective role in protecting the digital infrastructure in all institutions, as it covers all necessary scales to protect data, digital information, and networks from any attack or breach. It is designed to protect systems, networks, and programs from sabotage (Cybersecurity, 2018). The technological infrastructure is considered the basis for developing the economy and providing electronic services and e-commerce, as it provides communication and access to information and enables interaction and cooperation across the various departments in the facility (Alghizzawi et al., 2024). The goals of entrepreneurship include reducing unemployment rates and relying on the public sector for employment, which suffers from inflation in numbers and disguised unemployment. This results in reducing pressure on government budgets. As well as supporting the national economy, increasing employment opportunities, and supplying the market with services and products that meet the needs of social and humanitarian projects with low initial and operational costs, in addition to developing the idea of independence, participation, and social responsibility and increasing employment rates (ERUDE et al., 2023).

Emon and Nipa (2024) indicated the dimensions of entrepreneurship as follows.

1) Innovation: It is the ability of projects to seize opportunities and invest all available resources to reach a new idea.

2) Proactive: Having the ability to renew the products or services provided to customers by responding to their needs.
3) Risk management: Using advanced techniques to predict risks before they occur.
4) Exploiting opportunities: Seizing available marketing opportunities in conjunction with changes in customers' needs and desires.
5) Customer focus: Focus on customers to know their constantly changing needs and desires.

4.2. Cybersecurity

The objectives of cybersecurity are to enhance the protection of operational technology systems at all levels, including software and hardware, to provide a secure and reliable environment for transactions in the information society, to provide the required needs to reduce electronic threats and crimes, and to protect the operational system from access attempts in an unauthorized manner for improper purposes. The importance of cybersecurity appears in increasing awareness among all segments of society about cybersecurity threats, protecting individuals from violations of privacy, confidentiality, and various types of data, and exploring weaknesses and loopholes in systems and addressing them, in addition to providing a safe environment while working over the Internet, and preserving information and its integrity (Stouffer et al., 2023). According to (Nygard et al., 2021) referred to the dimensions of cybersecurity as follows:

1) Confidentiality: Crisis scales to prevent people from accessing confidential information.
2) Privacy: Keeping people's private information and giving them the right to choose which part others can access.
3) Enhancement: The means to develop skills and ideas to raise the efficiency of workers in projects.

4.3. Technological infrastructure

The technological infrastructure in SMEs represents the basic base from which one can move to the external environment. It represents the main support for all operations in these projects. It is defined as the set of hardware, programs, software, tools, and programming systems that organizations possess to achieve their goals and which help them record, store, and process this information when they need it (Alghizzawi, 2024). As Alghizzawi et al. (2024) define it as: The basic structure of information in the organization, including hardware, software, databases, and the network system inside and outside organizations. Sutono et al. (2023) pointed out the importance of technological infrastructure is manifested in preparing and providing information in a clear and accurate manner, processing, storing and exchanging large information through means of communication in the organization, and the possibility of achieving internal self-control over computer operations. The technological infrastructure in SMEs aims to access data and information, understand the information stored in it, and infer data from complex information. It also aims to the comprehensiveness of information and data (Raji et al., 2024). In light of the previous

review of the literature, and based on relevant studies, a study model was develop that explains the relationship between the study variables as in **Figure 1**:

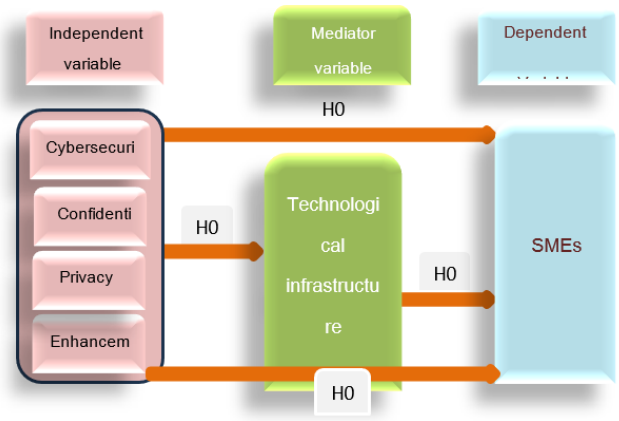

Figure 1. Study model.

5. Methodology

The study followed the descriptive analytical approach, which is an organized systematic method in which the researcher studies the subject of the study in its natural form, by collecting the amount of data and information that he deems appropriate. It explains the relationship between the research variables in the form of questions or hypotheses, where the most appropriate approach was found to achieve the objectives of the study. The study population consisted of SMEs in the Jordanian Balqa Governorate. The population was considered statistically unknown and the sample size included (384) individuals. The sample consisted of a group of titles (manager, executive director, department head, and supervisor or engineer). The sample was taken randomly.

The following **Table 1** shows the distribution of the study instrument among the study sample.

Table 1. Distribution of the study tool among the study sample.

SMEs in Balqa Governorate	Study sample size	Distributed questionnaires	Non-retrievable questionnaires	Questionnaires not suitable for analysis	Questionnaires suitable for analysis	Percentage %
Number	384	384	19	5	360	93.75%

5.1. Tool of research

(see **Table 2**) The tool of the study (questionnaire) has four components: Part one: Demographic data: included (gender, age, educational qualification, years of experience, job title).and Part two: The independent variable scale (cybersecurity): It included three dimensions (confidentiality, privacy, and enhancement) and they were measured through (14) items. Finally, Part three: Dependent Variable Scale (SME Entrepreneurship): It was measured through (16) items. Part four: Scale of the mediator variable (technological infrastructure): It included (12) items.

Table 2. Study tool, its parts and items.

Part	Part title	Dimensions	No. of items
First	Demographic data	Gender	2
		Age	4
		Academic qualification	4
		Years of experience	4
		Job title	4
Second	Independent variable	Confidentiality	6
		Privacy	4
		Enhancement	4
Third	Dependent variable	SME entrepreneurship	16
Fourth	Mediator variable	Technological infrastructure	12
The total number of questionnaire items			42

5.2. Sources of data collection

Two sources were used by the research to get its data (Aboalganam et al., 2024; Alghizzawi et al., 2024; Alhanatleh et al., 2024; Omeish et al., 2024; Sharabati et al., 2024). Primary sources: These are the data collected through the study tool, after developing it and presenting it to a number of referees, specialists and people with experience. The Secondary sources are data collected through, research, studies, books, periodicals, manuscripts. And bulletins from reliable sources on scientific databases depending in related study in the field of business (Alghizzawi, Al Shibly et al., 2024; Alghizzawi, Jado et al., 2024; Alghizzawi, Habes et al., 2024; Alghizzawi, Abushareah et al., 2024; Alghizzawi, Megdadi et al., 2024).

5.3. Validity and reliability of the study

Table 3. Alpha reliability coefficient values of Cronbach for the study scales.

Variable	Number of items	Cronbach's alpha coefficient
Confidentiality	6	0.747
Privacy	4	0.742
Enhancement	4	0.818
Independent variable: Cybersecurity	14	0.904
SME entrepreneurship	16	0.892
Mediator variable: Technological infrastructure	12	0.892
Total	42	0.962

The study tool (questionnaire) was presented to a number of referees and specialists in the field of the study variables (Zumbo, 2005), where modifications were made according to their points of view and then a linguistic editing of the questionnaire was conducted. The theoretical content of the study was based on research, books, studies, periodicals, bulletins and manuscripts on reliable scientific databases (Bonett and Wright, 2015). **Table 3** shows the value of Cronbach's alpha coefficient, which is

considered acceptable according to previous studies, equal to or greater than (0.60). The total value (0.962) is considered high.

6. Testing the hypotheses

6.1. The demographic variables results

Table 4. Population distribution in the research based on demographic variables.

Variable	Category	Frequency	Percentage %
Gender	Male	287	79.7
	Female	73	20.3
Total		360	100%
Age	Less than 30 years	23	6.4
	From 30 to less than 40 years	114	31.7
	From 40 to less than 50 years	137	38.1
	Over 50	86	23.9
Total		360	100%
Academic qualification	Technical education	21	5.8
	Bachelor	186	51.7
	Master	81	22.5
	Doctorate	72	20.0
Total		360	100%
	Less than 5 years	22	6.1
	From 5 years to less than 10 years	129	35.8
	From 10 years to less than 15 years	149	41.4
	Over 15 years	60	16.7
Total		360	100%
Job title	Manager	30	8.3
	Executive Director	68	18.9
	Head of Department	108	30.0
	Supervisor or engineer	154	42.8
Total		360	100%
Total number of study population		360	

Table 4 shows that the largest percentage was for males (79.7%) and the lowest percentage was for females (20.3%), while the group aged between (40 to less than 50) had the largest percentage (38.1%), and the category had the lowest percentage (under 30 years of age (6.4%). The largest percentage of study sample members holding a bachelor's degree was (51.7%), and the lowest percentage was for the bachelor's degree (5.8%). As for years of experience, the category (from 10 years to less than 15 years) was the largest percentage (41.4%), and the lowest percentage was for the category (five years or less) with a percentage of (6.1%). The percentage of the (supervisor or engineer) category was the largest (42.8%), and the lowest percentage was for the (manager) category (8.3%).

6.2. Analysis of arithmetic means and standard deviations results

Q1: "What is the level of cybersecurity and its dimensions (confidentiality, privacy, enhancement) from the perspective of the sample of the study in Jordan"?

The arithmetic means, standard deviations, and relative importance were analyzed to answer the first question of the study. What is the level of cybersecurity with its dimensions (confidentiality, privacy, and enhancement). **Table 5** is illustrative.

Table 5. "Arithmetic means and standard deviations results for cybersecurity" (the independent variable).

Rank	Item	A.M	S.D	Relative importance
1	Confidentiality	3.75	0.570	High
2	Privacy	3.67	0.630	Medium
2	Enhancement	3.62	0.762	Medium
Total		3.69	0.586	High

Table 5 shows that cybersecurity received a high score, as the arithmetic mean mounted to (3.69), and ranked first place after "confidentiality," with an arithmetic average (3.75). "Privacy" ranked second, with an arithmetic average (3.67). "Enhancement," came in the third place with an arithmetic mean of (3.62).

Q2:" What is the level of SME entrepreneurship strategies in SMEs in Balqa Governorate"?

The arithmetic means, standard deviations, and relative importance were analyzed to answer the first question, indicating the level of entrepreneurship of SMEs. This is illustrated in **Table 6**.

Table 6. Arithmetic means and standard deviations results for SME entrepreneurship (the dependent variable).

Item	Arithmetic mean	Standard deviation	Relative importance
SME Entrepreneurship	3.75	0.516	High
Total	3.75	0.516	High

Table 6 shows that when the arithmetic mean 3.75, the dependent variable became increasingly important.

Q3: What is the level of technological infrastructure from the perspective of the sample of the study in Jordan?

Arithmetic means, standard deviations, and relative importance were analyzed to answer this question. What is the level of technological infrastructure? **Table 7** shows this.

Table 7. Arithmetic means and standard deviations for technological infrastructure items.

Item	Arithmetic mean	Standard deviation	Relative importance
SME Entrepreneurship	3.69	0.566	High
Total	3.69	0.566	High

Table 7 shows that that the mediator variable (technological infrastructure) attained significance importance, with an arithmetic average of 3.69, which is in the lower limits of the increase.

Q4: What is the impact of cybersecurity and its dimensions (confidentiality, privacy, and enhancement) on the entrepreneurship strategies of SMEs in Balqa Governorate?

The standard multiple linear regression test was used for hypothesis (HO.1), to answer this question. **Table 8** is illustrative.

Table 8. Standard multiple regression analysis to identify the impact of cybersecurity represented by its dimensions (confidentiality, privacy, and enhancement) on SME entrepreneurship in Jordan.

Dependent variable	summary		Variance [b]				Variable	Regression coefficients [a]		
	RRR	***R*²**	**D.F**		**(*F*) Value**	**Sig *F* statistical significance**		**(*B*) Value**	**(*T*) Value**	**Sig *t* statistical significance**
Independent variable	0.886	0.784	Regression	3	431.566	0.000	Constant	0.950	10.981	0.000
			Residuals	236			Confedinciality	0.255	7.074	0.000
							Privacy	0.236	6.555	0.000
			Total	271			Enhancement	0.271	9.764	0.000

Table 8 shows that the value of the correlation coefficient for the relationship between "cybersecurity and its dimensions" and "entrepreneurship in small and medium enterprises" was (R = 0.886), and the coefficient of determination was (R^2 = 0.784). This indicates that (78.4%) of the variance in the dependent variable can be explained by cybersecurity as an independent variable with its dimensions, which is "entrepreneurship" in "small and medium-sized companies." The calculated F value was (F = 431.566), which is a significant value at the level of significance ($\alpha < 0.05$). To demonstrate the importance of each independent variable individually, a stepwise multiple regression analysis was performed.

Table 9. Results of stepwise multiple regression analysis to predict the Level of SME entrepreneurship through cybersecurity dimensions".

Model No.	summary		Variance		
	R	***R*²**	**D.F**	**(*F*) Value**	**Sig (*F*) Statistical significance**
1	0.824	0.679	1	758.300	0.000
2	0.871	0.758	2	560.031	0.000
3	0.886	0.784	3	431.566	0.000

Model number
1: Enhancement
2: Enhancement, confidentiality
3: Enhancement, confidentiality, privacy

As **Table 9** conclude that the "cybersecurity" dimensions as the independent variable are: Enhancement ranked first and explained (67.9%) of the variance of the "small and medium entrepreneurship" as dependent variable, while "confidentiality" came in second place. It explained with "enhancement" an amount of (75.8%) of the variance in "entrepreneurship among small and medium enterprises." "Privacy" came in third place, along with promotion and confidentiality, and explained (78.4%) of the

variance in "small and medium entrepreneurship." Therefore, the null hypothesis is refuted and the alternative hypothesis is accepted.

Table 10 shows that all "values of (B)" at the different calculated levels of (T) in the four models were statistically significant at (0.000). They were all less than (0.05). It is significant at the level ($\alpha \geq 0.05$). This emphasizes the importance of transactions. Hence, the null hypothesis was rejected; and the alternative hypothesis was accepted, which states: "There is a statistically significant effect at a significant level ($\alpha \geq 0.05$) of cybersecurity represented by the dimensions (confidentiality, privacy, and enhancement) on small and medium entrepreneurship."

Table 10. Results of stepwise multiple linear regression coefficients to reveal the impact of cybersecurity and its dimensions on in SME entrepreneurship.

Model	Regression coefficients			
		(*B*) Value	**(*T*) Value**	**Sig *t* Statistical significance**
1	Enhancement	0.559	27.537	0.000
2	Enhancement	0.363	14.376	0.000
	Confidentiality	0.365	10.803	0.000
3	Enhancement	0.271	9.764	0.000
	Confidentiality	0.255	7.074	0.000
	Privacy	0.236	6.555	0.000

Q5: What is the impact of cybersecurity and its dimensions (confidentiality, privacy, and enhancement) on the technological infrastructure in Balqa Governorate?

In order to respond to the fifth question, test hypothesis (HO.2) used the standard multiple linear regression test, it shows in **Table 11**.

Table 11. Standard multiple regression analysis" to identify the impact of "cybersecurity represented by its dimensions (confidentiality, privacy, enhancement) on the technological infrastructure" in Jordan.

Dependent variable	Model summary			Variance [b]				Variable	Regression coefficients [a]		
	RR	***R***	***R*²**	**D.F**		**(*F*) Value**	**Sig *F* statistical significance**		**(*B*) Value**	**(*T*) Value**	**Sig *t* statistical significance**
Independent variable	0.853		0.727	Regression	3	316.757	0.000	Constant	0.858	8.045	0.000
				Residuals	356			Confedinciality	0.223	5.019	0.000
				Total	359			Privacy	0.163	3.680	0.000
								Enhancement	0.385	11.277	0.000

Table 11 shows that "sub-variables of cybersecurity, its dimensions (confidentiality, privacy, and enhancement)," have a statistically significant impact on the level of technological infrastructure. The correlation coefficient (R = 0.853) between "cybersecurity in its dimensions and technological infrastructure" was found to be significant, and the coefficient of determination was (R^2 = 0.727). This means that cybersecurity, as an independent variable with its dimensions, explains (72.7%) of the variance in the intermediate variable, which is "technological infrastructure."

Table 12 view a "cybersecurity" that the dimensions of the independent variable were: "enhancement" had first and explained an amount of (67.3%) of the variance in the dependent variable "technological infrastructure," while secrecy came in second place, as it was explained with Improving the amount (71.7%) of the variation in

technological infrastructure. "Privacy" came in third place, along with "enhancement" and "confidentiality," and explained 72.7% of the variance in technological infrastructure. As a result, we accept the alternative hypothesis and reject the null hypothesis; this appear that cybersecurity, as represented by the technical infrastructure's characteristics of confidentiality, privacy, and enhancement, has a statistically significant impact at the significance level ($\alpha \geq 0.05$).

Table 12. Results of stepwise multiple regression analysis to predict the level of technological infrastructure through cybersecurity dimensions.

Model No.	Model summary		Variance		
	***R* Correlation coefficient**	**R^2 Coefficient of determination**	**Degree of freedom**	**(*F*) Value**	**Sig (*F*) Statistical significance**
1	0.820	0.673	1	736.659	0.000
2	0.847	0.717	2	452.031	0.000
3	0.853	0.727	3	316.757	0.000

Model number
1: Enhancement
2: Enhancement, confidentiality
3: Enhancement, confidentiality, privacy

Q6: What is the impact of technological infrastructure on entrepreneurship strategies for SMEs in Balqa Governorate?

To answer the sixth question, simple regression was tested for hypothesis (HO.3) to identify the relationship between technological infrastructures in entrepreneurship of SMEs from the perspective of the sample of the study. **Table 13** shows this.

HO.3 "The third main hypothesis: There is no statistically significant effect at a significant level ($\alpha \leq 0.05$) of the technological infrastructure on entrepreneurship of SMEs from the point of view of the study sample".

It appears that the "value of the correlation coefficient (R)" between the two variables "(technological infrastructure and small and medium entrepreneurship)" (**Table 13**). Amounted to (0.899), and there was a clear correlation between the two factors, this illustrates how the dependent variable, "small and medium entrepreneurship," is favorably impacted by the mediating variable, technical infrastructure, and the value of the "coefficient of determination (R^2) was (0.809)," meaning (80.9%) of the change in technological infrastructure and small and medium enterprises.

Table 13. A simple linear regression test results to reveal the impact of technological infrastructure on SMEs entrepreneurship.

Dependent variable	Model summary		Variance [b]				Variable	Regression coefficients [a]		
	RR*R* Correlation Coefficient	**R^2 Coefficient of determination**	**Degree of Freedom**		**(*F*) Value**	**Sig *F* statistical significance**		**(*B*) Value**	**(*T*) Value**	**Sig *t* statistical significance**
Independent variable	0.899	0.809	Regression	1	1514.651	0.000	Constant	0.727	9.235	0.000
			Residuals	358			Technological infrastructure	0.821	38.919	0.000
			Total	359						

Q7: "What is the impact of "cybersecurity and its dimensions (confidentiality, privacy, enhancement) on small and medium-sized entrepreneurship strategies through technological infrastructure" in Balqa Governorate"?

To answer the seventh question, (HO.4.1) was tested. **Table 14** is illustrative.

The study tested (HO.4.1), and this is shown in **Table 14**.

HO.4.1 The first sub-hypothesis: "There is no statistically significant effect at a significant level ($\alpha \geq 0.05$) of confidentiality in small and medium entrepreneurship through technological infrastructure as a mediating variable" from the point of view of the study individuals.

Table 14. Multiple regression test results to reveal the effect of confidentiality on SME entrepreneurship through technological infrastructure as a mediator variable.

Dependent variable	Model summary		Variance [b]				Variable	Regression coefficients [a]		
	***RRR* Correlation Coefficient**	**R^2 Coefficient of determination**	**Degree of Freedom**		**(*F*) Value**	**Sig F statistical significance**		**(*B*) Value**	**(*T*) Value**	**Sig t statistical significance**
Independent variable	0.918	0.843	Regression	2	961.040	0.000	Constant	0.474	6.162	0.000
							Confedentiality	0.248	8.871	0.000
			Residuals	357			Technological infrastructure	0.637	22.644	0.000
			Total	359						

Table 14 displays the value of the correlation coefficient (*R*) found between the two variables "(confidentiality with technological infrastructure as a mediating variable and small and medium entrepreneurship)" and it amounted to 0.918, and was a direct relationship between the two variables. This explains that the confidentiality dimension positively affects the dependent variable "small and medium entrepreneurship" with technological infrastructure as a mediating variable, and the value of the "coefficient of determination (R^2) was (0.843), i.e., (84.3%)" of the change in "cybersecurity and entrepreneurship." Small and medium." In light of these results, the researcher rejected the null hypothesis and accepted the alternative hypothesis. The researcher tested (HO.4.2), and a simple regression test (Multi Regression) was tested show the link between confidentially in SME entrepreneurship through technological infrastructure as a mediator variable from the perspective of the study sample. This is illustrated in **Table 15**.

Table 15 multiple regression test results to reveal the effect of privacy on SME entrepreneurship through technological infrastructure as a mediator variable.

Dependent variable	Model summary		Variance [b]				Variable	Regression coefficients [a]		
	***RR R* Correlation Coefficient**	**R^2 Coefficient of determination**	**Degree of Freedom**		**(*F*) Value**	**Sig *F* statistical significance**		**(*B*) Value**	**(*T*) Value**	**Sig *t* statistical significance**
Independent variable	0.922	0.850	Regression	2	1010.519	0.000	Constant	0.582	8.152	0.000
							Privacy	0.253	8.880	0.000
			Residuals	357			Technological infrastructure	0.609	21.357	0.000
			Total	359						

Table 15 showed that the value of "(*R*) between the two variables (privacy with the presence of technological infrastructure as a mediating variable and small and medium entrepreneurship)" amounted to 0.922, and was direct relationship between the two variables. This shows that the privacy dimension positively affects the dependent variable "small and medium entrepreneurship" with the presence of technological infrastructure as a mediating variable, and the value of (R^2) reached (0.850). This means that (85%) of the change is in "Cybersecurity and Small and Medium Entrepreneurship". Accordingly, the study rejected the null hypothesis and accepted the alternative hypothesis.

The researcher tested (HO.4.3), and "simple regression (multiple regression)" was tested to clarify the relationship between promoting "small and medium-sized entrepreneurship through technological infrastructure as an intermediary variable" from the perspective of the research. This can be explained in **Table 16**.

Table 16. Multiple regression test results to reveal the effect of strengthening the SME entrepreneurship of through technological infrastructure as a mediator variable.

Dependent variable	Model summary		Variance [b]				Regression coefficients [a]		
	***RRR* Correlation Coefficient**	**R^2 Coefficient of determination**	**Degree of Freedom**		**(*F*) Value**	**Sig *F* statistical significance**	**Variable**	**(*B*) Value**	**(*T*) Value**	**Sig *t* statistical significance**
Independent variable	0.912	0.832	Regression	2	881.889	0.000	Constant	0.808	10.787	0.000
							Enhancement	0.179	6.960	0.000
			Residuals	357			Technological infrastructure	0.623	17.976	0.000
			Total	359						

Table 16, it appears that the "value of the correlation coefficient (*R*)" between the two variables "(enhancing the presence of technological infrastructure as a mediating variable and small and medium entrepreneurship in small and medium companies)" amounted to 0.912. The two variables showed a direct relationship. This shows that the enhancement dimension positively affects the dependent variable "small and medium entrepreneurship" with "technological infrastructure as a mediating variable," and the value of (R^2) was (0.832), meaning (83.2%) of the change in cybersecurity and small and medium entrepreneurship. The "calculated F value was 881.889" with a statistical significance level of 0.000, which is less than $\alpha < 0.05$. This underscores the significance of the regression analysis. Consequently, the study rejected the null hypothesis and accepted the alternative hypothesis.

7. Discussions

The statistical analysis results indicated that cybersecurity holds a high level of importance, with an arithmetic mean of 3.69. The study population (SMEs) does not realize the importance of cybersecurity to a sufficient degree, and it was rank number one after "confidentiality," with an arithmetic mean (3.75). "Privacy" was rank number two, with an arithmetic average of (3.67), and it rank number three after "enhancement," with an arithmetic average of (3.62). This indicates that the study community realizes the importance of confidentiality to a sufficient degree, but it does not realize the importance of privacy and its enhancement enough to influence

entrepreneurship through technological infrastructure. This appears in the fact that the study community does not store customer data in more than one place and simultaneously, and does not follow the privacy policy of affiliated websites is sufficiently. They also do not involve their employees in external courses related to cybersecurity policies. These results are consistent with a study (Nygard et al., 2021), which concluded that travel agencies interested in cybersecurity can enhance the digital trust of their customers. It differs from the study (Stouffer et al., 2023), which recommended the necessity of training Estonian library employees on awareness of information security, and after that their awareness must be re-evaluated. This difference is due to the difference in the study populations and the study tool, as the combination of the study population and the study tool affects the results that can be obtained from analyzing study data.

Statistical analysis results of the data indicated that the dependent variable (SME entrepreneurship strategies) acquired a great deal of significance, as the arithmetic average amounted to (3.75). This indicates the availability of entrepreneurship strategies among the study community, and this is demonstrated by the study community's support for individual successes that is based on the personal efforts of the work crew, while providing an environment that supports excellence and achievement for the working individuals, as well as meeting the requirements of customers for its products. This is consistent with the study (Raji et al., 2024), which concluded that the study population possesses a high degree of entrepreneurship, and differs with the study (Zhang et al., 2023), which recommended the need to delve deeper into the field of digital transformation strategy for technological infrastructure and the mechanisms of differentiation between types of strategy.

The results of the statistical analysis showed that the study data showed that the technological infrastructure obtained a high degree of importance, but it is at the minimum level of increase, as the arithmetic mean reached (3.69). This indicates that the study population does not have a sufficient degree of technological infrastructure, and this is shown by the lack the websites of SMEs that contain everything that customers need, and also that many projects do not have their websites available on the Internet. This is consistent with the study of (Raji et al., 2024), which recommended using the geometric mean for the dimensions of the infrastructure of knowledge management, as well as with the study of (Emon and Nipa, 2024), which recommended the need to strengthen the company's knowledge management infrastructure, which is made up of information technology. The results of hypothesis testing showed that there is a statistically significant effect of cybersecurity on SME entrepreneurship, as (R^2 = 0.784). This means that cybersecurity as the dimensions of the independent variable explains (78.4%) of the dependent variable variance, which is SME entrepreneurship. The results of hypothesis testing showed that there is a statistically significant impact of cybersecurity on the technological infrastructure of SMEs. The correlation coefficient (R = 0.853) between the technical infrastructure and cybersecurity in its many dimensions is attained, and the coefficient of determination reached (R^2 = 0.727). That is cybersecurity as an independent variable with its dimensions explains (72.7%) of the variance in the mediator variable.

The results of hypothesis testing showed that there is a statistically significant effect of the technological infrastructure on SME entrepreneurship. The correlation

coefficient (*R*) between the technical infrastructure and SME entrepreneurship was found to be 0.899, and there was a clear correlation between the two factors. This explains that the mediator variable, technological infrastructure, positively affects the dependent variable, "SME entrepreneurship," and the value of the coefficient of determination (R^2) was (0.809), this expresses that (80.9%) of the change in technological infrastructure and SME entrepreneurship. They conclude of hypothesis testing showed that there is a statistically significant effect of cybersecurity in its dimensions (confidentiality, privacy, and enhancement) on the strategies of SME entrepreneurship through the technological infrastructure in Balqa Governorate. The correlation coefficient (*R*) between confidentiality, with infrastructure technology as a mediator variable, and SME entrepreneurship reached 0.918, and the relationship between the two variables was positive. This explains that the confidentiality dimension positively affects the dependent variable "SME entrepreneurship" with the technological infrastructure as a mediator variable, and the value of (R^2) was (0.843), meaning (84.3%) of the change in cybersecurity and SME entrepreneurship.

8. Conclusions

The study arrived at a series of findings that Management of SMEs is committed to continuous supervision and control of customer information, to deal with documented authorities to ensure the confidentiality of the information, to follow strict standards for disclosing and circulating customer data and information based on legal texts, and to maintain the privacy of customers' financial data.in additional SMEs support individual successes based on the personal efforts of the staff, provide an environment for employees, sustain discrimination and achievement, work to increase awareness among their employees of the importance of innovation and creativity at work, and also adopt a culture of leadership and work to support and develop it. Moreover, SMEs prepare independence and individual initiative in the work of employees, seek to exploit the opportunities available in the work environment, to be interested in new ideas and project distinction in the labor market, by building on modern perceptions and constantly new products. Finally, SMEs provide electronic linking systems between project departments, through modern technologies to continuously know the needs and desires of customers, and also provide modern and integrated software to enable working individuals to carry out project tasks. And SME enterprises use communication programs via the website to provide practical means that encourage customers to communicate with them, and they also work to raise the performance achieved through the use of modern devices and equipment, and electronic programs that lead to controlling the content of advertising messages and producing attractive services for customers, and working on promotion to customers.

9. Recommendations

The study recommended the need to work on considering the confidentiality of customer data as one of the most important priorities for SMEs, and that their data be stored in more than one place and simultaneously. The projects' websites follow the privacy policy, and that the customer's identity is verify before handing over his data and documents, by making SME workers participate in SME in specialized courses

and workshops to demonstrate the importance of confidentiality of data and information.

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