

**The impact of the application of information and communication technologies on the performance of SMEs**

**-Study of a sample of small and medium-sized enterprises-**

أثر تطبيق تكنولوجيا المعلومات والاتصال على اداء المؤسسة الصغيرة والمتوسطة

- دراسة لعينة من المؤسسات الصغيرة والمتوسطة -

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**Abstract:** the use of Information and Communication Technologies (ICT) in SMEs has become an important element that has a positive impact on the performance of this type of enterprises. In this context and through this study, we have tried to highlight the impact of use (ICT) on the performance of some small and medium-sized enterprises active in the north-western region of Algeria.

The results of the study showed that the application of ICTs in SMEs in an appropriate and effective way could contribute to improving the performance of these companies, particularly in terms of financial, commercial and competitive performance.

**Key words:** Information and Communication Technology, Small and Medium Enterprise, Technological compatibility, Strategic alignment, Organizational compliance.

**JEL classification code:** C20, L53, O32

**ملخص:** أصبح معروفا استخدام تكنولوجيا المعلومات والاتصال داخل المؤسسة الصغيرة والمتوسطة عنصر مهم ينعكس ايجابا على اداء هذا النوع من المؤسسات. لذلك حاولنا في هذه الدراسة تسليط الضوء على بعض متطلبات تطبيق هذه التكنولوجيا مع محاولة تقييم اثر استخدامها على اداء بعض المؤسسات الصغيرة والمتوسطة التي تنشط في المنطقة الغربية الشمالية من الجزائر. حيث ابرزت نتائج الدراسة بان تطبيق تكنولوجيا المعلومات والاتصال في المؤسسة الصغيرة والمتوسطة بالشكل الصحيح والفعال يمكن ان يساهم في تحسن من اداء هاته المؤسسة خاصة فيما يتعلق بالأداء المالي، التجاري و الاداء التنافسي .

**الكلمات المفتاحية:** تكنولوجيا المعلومات و الاتصال ، المؤسسة الصغيرة والمتوسطة ، التوافق التكنولوجي، التوافق الاستراتيجي التوافق التنظيمي للمؤسسة.

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**1. Introduction :**

Information and communication technologies (ICTs) has had great impact in reshaping many of usual restructuring of traditional methods for individuals and organizations, on the establishment of less clear and complex relationships, but without any doubt more efficient and less expensive. Thus, ICTs has become an integral part of the administration of contemporary business and organization, as well as an important resource on which this business depends in all its administrative, productive, marketing and competitive activities, which makes helped to make the appropriate decision and then improve its performance in general.

SMEs are also becoming obligated from the information and communication technology world, which considers it one factors of its success internally and externally. In general, ICT is becoming like a source that participates in promoting the performance of this kind of businesses. The use of various modern technologies in a world known to reduce distances between countries and to conquer new markets now forces these companies to harness this technology by relying on more efficient management methods to maintain the market share and to master production methods at lower cost, as well as to increase creativity and innovation, making the products and services of this type of enterprise the most demanding and competitive in the internal and external markets, that allow these companies to increase their revenues and net profits. Above all, their size makes it possible to follow working methods and strategies respond flexibly and quickly to changes in the environment.

**The problematic of the study:**

Through what we mentioned earlier can highlight the main problem:

How can the use of ICTs affect the performance of SMEs?

In order to answer this question, the following hypotheses can be made as follows:

**The main hypothesis:**

The use of ICT has a positive impact on the performance of SMEs.

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Through this main hypothesis, some of the hypotheses can present, including:

- ✓ The use of ICT positively affects the financial performance of SMEs.
- ✓ The use of ICT positively affects the commercial and marketing performance of SMEs.
- ✓ The use of ICT positively affects the competitiveness of SMEs.

**Previous Studies:**

In order to give a clearer picture of our subject, we will mention some studies that have dealt with this subject and attempted to highlight the status of information and communication technologies and their role in improving the work of 'institution, in particular small and medium-sized enterprises, in particular:

- Samah Mayhoub's study in 2013, is a doctoral thesis at the University of Constantine entitled *“The effect of using information and communication on the commercial and financial performance of French banks”* . A case study of some French banks. The study concludes that French banks are adopting information and communication technologies by offering their remote banking services and by providing electronic payment tools, allowing it to develop its financial performance on the one hand, and improve its commercial performance on the other hand.

- WASFI Kasasbeh's study in 2011 at the University of Jordan titled *“Improving the effectiveness of institutional performance through information technology”*, which is a econometric e study, in which the researcher dealt with the impact of investments in information technology ( hardware, software, databases, number of skilled workers) on business performance in Jordanian free zones, Where it has been found that there is a significant positive relationship between business performance and investment in information technology.

- Among the studies that have dealt with this subject, we can mention the study of Hamzah Bokafa at the University of Al-Arabi Bin Mahidi Um Al-Bouaghi in 2016-2017, which is a doctoral thesis entitled *“The effect of use of the Internet on the performance of small and medium-sized enterprises active in the tourism sector”*, where among the results of this study is the conviction of the owners and managers of these SMEs that the Internet is one of the reasons that

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contributed to increasing the financial and commercial performance and to improving the competitiveness of their companies.

Our studies agreed with previous studies on the impact of adopting information and communication technology on the performance of institutions in general and differed with it because our study focused on the impact of the application of information and communication technology on small and medium enterprises in many sectors, unlike previous studies that focused on certain sectors

**Study Methodology:**

The approach used in this work is the analytical descriptive approach adapted to the nature of the subject of the study, and in the practical aspect, was used the questionnaire tool to know the impact of the use of information technology and communication on performance of small and medium-sized enterprises, and has been processing statistics and data by SPSS tool. (VERSION 20).

**2. General concept on information and communication technologies:**

Many believe that the term information technology is a simple term, but in reality, it is a combination of many different concepts.

**1.2. The concept of technology:** The term "modern technology", which itself has several meanings and connotations that still raise many questions about its concept by researchers in the economy and among the most common concepts, may include the following:

- ✓ It is a process of putting and selecting the methods allowing the effective use of different techniques, and this in order to guarantee the mechanisms of work, production, consumption, information and communication (schoffer, 2007,p16)
- ✓ It is a set of knowledge, innovations and applications focused on the technology of an industry (l'internaute, 2007,p13).

These two definitions of the term technology can be considered as a technical term which represents for some researchers, like JEAN LOUARSTIE, "art of using the natural resources and the equipments to answer the material

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needs of the man, that is to say to say the manufacturing and the application which is based on well organized scientific rules "(JAMAL ABU SHANAB ,1999 ,p08).

The concept of technology is a concept that contains the technology itself, and then comes the integration between them to provide an efficient production and consumption process.

### **1.1.2. Definition of Information and Communication Technologies:**

The definition of information and communication technologies can be treated as follows:

**ROWLEY:** *defines information and communication technologies as follows: "collect, store, process and transmit information and this can't be not only by physical equipment or software, but also by role and by objectives of the 'human being for which he use and apply this technology and the values and principles adopted by him to achieve his expertise"* (HUSSEIN MOHAMED AHMED ABDEL-BASIT ,2005 ,p03).

It is also defined: *"as an information revolution related to information production, marketing, storage, retrieval, visualization and distribution through modern, developed and fast technical mean, and that by the joint use of computers and modern communication systems"*( HADID NOFAL ,2006/2007 p53).

**As for JEAN LANDON AND KENNETH LANDON:** (jean landon, kenneth Landon ,2006 ,p65 ) *they define information and communication technologies in the light of new changes and the digital world as one of the management tools used, which consisting of:*

- *Information material.*
- *Software.*
- *Storage technology, which is represented by the physical medium for storing data and data.*
- *Communication technology represented by the link between different equipment.*
- *Networks to connect computers and exchange data and available resources.*

From the foregoing, we can say that information and communication technologies constitute a set of tools and means necessary to obtain information, process it, store it, transfer it and recover it.

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**2.2. The basic requirements for the optimal use of information and communication technologies within the organization:**

Studies have shown that the success of ICT application in SMEs depends on the availability of a set of necessary conditions, according to most researchers in economics these main requirements are:

**1.2.2. Availability of ICT infrastructure (technology compatibility):**

It is not possible to observe the impact of information and communication technologies on business performance without the availability of an electronic component. The company is subject to severe and permanent competition. In this framework it is obliged to resort to organizing and revising these procedures in a permanent automatic way based on the TIC in order to profit from its productivity and its profitability differently, then to maintain its acquired competitive position.

**Alaoui abdallah** (Alaoui ,abdallah, 2010, p83) also indicated that, in the context of international competition, the company's competitiveness is understood as a continuous adaptation strategy in which governance is not acquired status only depends on the components of the company but also depends on its ability to manage change, which requires the adoption of several applications of information technology. Summarize these tools in computer hardware, networks, software, Internet use, etc.

In general, technological compatibility is the extent to which SMEs adopt a technology that helps them develop their business activities such as controls, software, hardware and equipment, and addition to adopting an advanced information system (yann rival, 2006, p5).

**2.2.2. Provide the skills:**

The success of using information and communication technology in the organization is also dependent on the availability of a competent human element, as it is a technical qualification capable of permanent access to developments in order to use it for the benefit of the institution, in addition to being a pivotal element in the process of innovation and initiative in ideas and bringing information through what is available, in addition to being. An element that is able to interact and communicate with the organization's external environment.

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OLIVIER TORRES(2000) believes that if information and communication technology facilitates access to information, then the translation we can imagine is transforming raw data into appropriate knowledge for strategic action, in other words, information and communication technology facilitates the transfer of information, but this is not sufficient on its own, it is necessary to integrate elements at the heart of the organization This is through its organizational elements, and therefore if the organization benefits from improving the information transfer process and the quality of its reception, this will inevitably lead to increases in skills. The existence of these competencies can be through:

**Develop internal skills through:**

- Adopt special training programs through the use of information and communication technologies through which the worker can master the technology and resist the change.
- Work to establish a database and the knowledge of the company and put it available to the human element or he can resort to use if necessary.
- Respond to the internal needs of ITC users.

**Develop external skills through:**

External recruitment, for example by recruiting(employing) engineers or site designers to meet the requirements of information and communication technologies, where the human element is the nutrient of information and its future, and considers the true capital of any project. Executives specialized in information and communication technologies are very important to ensure an effective launch of enterprises in the digital economy and the human component is at the heart of the various regulatory elements.

**3.2.2. Strategic of Information and Communication Technologies with the Organizational Alignment of the institution:**

The works of JEAN HENDERSON and N.VENKARTRMAN are one of the most famous works in this field through a model called strategic alignment, which suggests that developing the performance of the organization requires coordination between the information technology strategy and communication and the company strategy. (J.henderson and N.venkartman, 1999, p 473-474).

This model seeks to establish a coordination between the information technology and communication and the internal factors of the company (organizational factors) and external (scope of the organization) in order to give a clear vision of the impact of the ICT on the performance of the organization. With this model, it can said that strategic alignment is a continuous and dynamic

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process that provides the organization with solutions and infrastructure to match the specific objectives to the performance with the company's strategy such as putting a relationship of variables like:

- Business strategy.
- Information and Communication Technologies Strategy.
- Organization and management process.
- Information and Communication Technology Infrastructure.

Strategic direction is very important in terms of performance (1990ATKIINSON). In fact, regard less of the strategy chosen by the company, a global strategy or an organizational development strategy both can bring a competitive advantage reflecting an increase in sales, hence an increase in profits and returns. As well as the company's development strategy through diversification, internationalization and partnerships can also generate more profits and enable it to achieve the best organizational performance. VENKARTRMAN also found different dimensions of the strategy linked positively with the organizational performance of the company, where there are two approaches to managing information and communication technology:

**Compatibility Approach:** The Owners of this doctrine believe that the use and consolidation of ICT to support business objectives and the development of business strategies affect the direction of the institution and how plan to operate the information system.

**Impact approach:** Proponents of this doctrine believe that the planning and management of the information system within the enterprise leads to a new vision and the achievement of strategic objectives, and also the information system affects the strategic direction of the company and leads to change in the way the company operates, which explains the existence of a relationship between the ICT operating system and the organizational strategy of the company. However, this strategic alignment between ICT and SME performance remains clearly ambiguous.

**3. ICT use and impact on SME performance: a case study of a sample of SMEs:**

**1.3. Methodological procedures for a field study:**

**1.1.3. Community and study sample:**

The population under study is represented by all the SMEs active in the national economy of the north western region of Algeria, represented in the



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following wilayas: Relizane, Mostaganem, Mascara and Oran, in addition to the wilaya of Chlef. Due to the difficulty of surveying all enterprises active in these wilayas, our samples consisted of 52 enterprises after the distribution of 60 questionnaires, of which 55 were returned, and 03 questionnaires were excluded due to their incomplete nature and 'invalid to statistical analysis. As a result, the percentage of valid questionnaires in the study is estimated at 86.66%.

These enterprises were active in many fields, including 05 agricultural enterprises, 08 companies working in the construction and public works sector, 07 companies active in the commercial sector, 16 industrial companies and 16 companies working in the service sector.

**2.1.3. Method of data collection and statistical analysis:**

**Study tool:** we relied on the questionnaire tool, which is one of the best tools used in this type of study, and on the collection of information, and this questionnaire was presented to a group of teachers before proceeding with its distribution, the questionnaire was addressed to people occupying senior positions within their companies (heads of offices, heads of departments, heads of departments or chief managers of companies).

**Stability of the tool:** in order to check the stability of the evaluation tool, the alpha Cranach coefficient was used, the value of this coefficient (0.930) being higher than the natural value in the human sciences (0.60).

**Analysis of the general characteristics of the sample:**

The general characteristics of the sample consisted of (05) questions to understand some of the elements facilitating the subsequent analysis of the results, and the following table presents general characteristics of the sample.

**Table: 01 General characteristics of the sample:**

<b>Designation</b>	<b>Category</b>	<b>Frequency</b>	<b>%</b>
Nature of the activity	Agriculture	5	9,62%
	industrial	16	30,77%
	BTPH	8	15,38%
	Commercial	7	13,46%
	services	16	30,77%
Number of	01-09	15	28,85%

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workers	10-49	21	40,38%
	50-250	16	30,77%
Legal nature	public	12	23,08%
	Special	40	76,92%
Duration of activity	Less than 5 years	1	1,92%
	5 to 10 years	6	11,54%
	From 11 to 15 years	12	23,08%
	From 16 to 20 years	17	32,69%
	More than 20 years	16	30,77%
Qualification	Secondary	8	15,38%
	University level	29	55,77%
	Graduate Certificate	15	28,85%

**Source:** Prepared by researchers based on SPSS20

According to the table (01), we note that the companies studied and according to the nature of the activity, are industrial and service companies at the peak of 30.77%, followed by companies active in the sector of construction and public works, then commercial enterprises.

With regard to the number of employees, the sample is mainly composed of small and micro-enterprises, the number of workers does not exceed 50, where the proportion of 70%, while the medium enterprises represent only 30%, This explains that enterprises in this region are still far from the aspirations of the Algerian government, which wants to build a national economic fabric, the majority of its enterprises are medium.

According to the legal nature of this sector, the sample is mainly made up of private companies, where the number of SMEs whose capital is privately owned reaches 40 companies, this can be explained by the fact that Algeria is grappling with market economy, by encouraging the private sector to replace the public sector.

With regard to the duration of the activity, we can be said that most of the enterprises questioned went beyond the risk phase (Period of disappearance), often estimated at less than 5 years, where we observed that only one enterprise had less than five years old. This observation can be explained by the state's attempt to support and develop this type of enterprise.

We can also say that most of the decision-makers in these surveyed companies are competent, where the proportion of people who completed the questionnaire is more than 84%.

### **2.3. Descriptive analysis of the sample responses studied:**

Through this component, we will analyze the dimensions of the study in order to answer the questions. Basing on a statistical analysis and relying on the SPSS 20 program, using descriptive statistics to extract the mean and standard deviation of each sentence and classify them according to the degree of approval.

#### **1.2.3. Analysis of the results of the dimension of ICT use:**

We can review the results of the information technology dimension and connect to all the phrases that make up this dimension, as the results showed that the degree of approval of owners of small and medium enterprises from the use of information and communication technology was medium and close to high approval with an average arithmetic 3.38 and a deviation of 0.99 (see **Appendix n° 01**).

#### **2.2.3. Analysis of the performance results of the SME:**

We can review the results of the SME performance axis in its different dimensions (the financial, commercial and marketing dimension and after the competitive advantage), because the small and medium-sized enterprises that are the subject of the study have realized an improvement in the performance index in general, but to varying degrees between the average and near the high. The average arithmetic value of SME performance was estimated at 3.53, which is an average value close to a high approval and a deviation of 0.85( see **Appendix n°02**)

In detail, the financial dimension responses show strong approval for the first sentence and clear dispersion, while the approval of the remaining

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responses was average (almost high), where the arithmetic means ranged from 3.50 to 3, 80. So the use of information and communication technologies has allowed some companies to control their costs, which allows them to feel financially comfortable and thus avoid borrowing.

With regard to trade performance, the paragraph recorded a tendency towards average approval, but to varying degrees, where the arithmetic averages for these paragraphs ranged from 2.94 to 3.65, which explains the uneven use information and communication technologies (where ICT can't be useful just by its use, but the correct way of using them is also important).

We also note that there are two expressions with the same mean and standard deviation, which indicates that demand for the organization's products and services is directly reflected in the organization's business image and that the improvement of the company's commercial image positively affects the increase in demand for the organization's products and services. What can also be observed is that some small and medium-sized enterprises are still far from using the Internet to promote their products and services, especially those active in the agricultural sector, and among the observations also that the use of Information and communication technologies has helped some businesses to adapt to market changes, Through the ease and speed of receiving information, analyzing and adapting to it.

With regard to the expressions concerning the performance of competitive advantage, the responses were directed towards the option of high approval, with the exception of the fourth sentence, which was answered with a medium degree of approval. As the arithmetic average of the first three sentences ranged from 3.78 to 4.13, and the degrees of dispersion were clear, with most firms striving to provide quality products and services, and most SMEs recognizing that information and communication technologies helped them manage time well in various operations and transactions, and also approved the use of technology allowed him to set competitive prices, and this is probably due to his ability to reduce some costs. However, the prospecting process by the companies in the sample did not reach the required level, and this, given the business climate in Algeria, still suffers from ambiguity and gloomy.

**3.3. Test the hypothesis of the study:**

Through this paragraph, we seek to test the relationship between information and communication technologies and the performance of small and medium-

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sized enterprises by studying the relationship between this technology and each dimension of the business. Relying on the analysis of the correlation and regression coefficients, as well as on the significance analysis of the model underlying this relationship. By analyzing the value of Fisher, the degree of meaning and value of student we will also test this relationship at a level of 5%.

**1.3.3. Test the first sub-hypothesis:** in order to test this relationship related to the use of information and communication technologies and to the financial performance of the SME, we have made the following assumptions:

**H1:** There is a statistically significant relationship between ICT and the financial performance of the institution.

**H0:** There is no statistically significant relationship between ICT and financial performance.

The following table summarizes the test results.

**Table 02: Regression model between ICT use and financial performance of the enterprises**  
**Model summary**

Model	R	R <sup>2</sup>	R <sup>2</sup> adjusted	Standard error of estimate
1	,334 <sup>a</sup>	,111	,094	,81435

**Coefficients<sup>a</sup>**

Model	No-standardized coefficients		standardized coefficients	t	Sig.
	A	Standard error	Bêta		
(Constant)	2,208	,577		3,827	,000
Technology	,419	,167	,334	2,503	,016

**Source:** Prepared by researchers based on SPSS20.

In Table 02, the correlation coefficient is  $R = 0.334$  and is positive, but below average, which explains the positive correlation between ICT and financial performance, but it is low, which is confirmed by  $R^2 = 0.11$ , the

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independent variable (information and communication technologies) explains the dependent variable (financial performance) at 11%, while 89% of the explanation of this relationship is due to undiagnosed factors represented by the random variable.

The value of the regression (parameter B) = 0.41, which means that the evolution of information and communication technology in one unit leads to a change in the financial performance of 0.41 and positively, and that the calculated level of significance (0.016) is less than the level of significance (0.05) can be explained. However, this relationship, although low, is significant, and this is confirmed by the calculated student value (2.503) which is lower than the value of the array ( $t_{0.05 / 2-51}$ ) = 2.009, so null hypothesis is rejected and we can write the regression equation as follows:

<b>Financial Performance of SMEs = 0.419 Information and Communication Technologies + 2.808</b>
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**2.3.3. Test the second sub-hypothesis:** This assumption examines the relationship between ICT use and the marketing and business performance of small and medium-sized enterprises.

**H1:** There is a statistically significant relationship between ICT and marketing and business performance of the organization.

**H0:** There is no statistically significant relationship between ICT and marketing and business performance of the organization.

**Table 03: Regression model between ICT use and marketing and business performance of the enterprises**

**Model summary**

Model	R	R <sup>2</sup>	R <sup>2</sup> adjusted	Standard error of estimate
1	,680 <sup>a</sup>	,462	,451	,50202

**Coefficients<sup>a</sup>**

Model	No-standardized coefficients		standardized coefficients	t	Sig.
	A	Standard	Bêta		

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		error			
(Constant)	1,098	,356		3,086	,003
Technology	,676	,103	,680	6,554	,000

**Source:** Prepared by researchers based on SPSS20.

In the table above, we note that there is a strong and positive correlation between the use of information and communication technologies and marketing and commercial performance, where this link has reached 68%, a ranked link in the strongest category, and the change in marketing and business performance of these companies resulting from the element of technology. It is observed that R<sup>2</sup> is 46%, and this result is confirmed by the Fisher value estimated at 42.95 at a significance level 0,000 below the 0.05 significance level, in addition to the calculated Student value of 6.554 which is greater than the table value of 2.009. Therefore, we reject the null hypothesis and accept the alternative hypothesis, which recognizes the existence of a statistically significant link between the use of information technology and commercial performance. The equation model of this relationship can be written as follows:

**Marketing and commercial performance of SMEs = 0.676 Information and Communication Technologies + 1.098**

**3.3-3. Test the third sub- hypothesis:** it concerns the use of ICT and the competitive advantage performance of small and medium-sized enterprises.

**H1:** There is a statistically significant relationship between ICT and the performance and performance of the organization's competitive advantage

**H0:** There is no statistically significant relationship between ICT and the performance of the firm's competitive advantage.

The following table illustrates the test of this hypothesis.

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**Table 04: Regression model between ICT use and the performance of the enterprises competitive advantage:**

**Model summary**

Model	R	R <sup>2</sup>	R <sup>2</sup> adjusted	Standard error of estimate
1	,753 <sup>a</sup>	,566	,558	,41293

**Coefficients<sup>a</sup>**

**Source:** Prepared by researchers based on SPSS20.

Model	No-standardized coefficients		standardized coefficients	t	Sig.
	A	Standard error	Bêta		
(Constant)	1,282	,293		4,381	,000
Technology	,685	,085	,753	8,080	,000

From the results of Table 04, we find that the relationship between information technology and the competitive advantage of the company is a direct and strong relationship, which is explained by the correlation coefficient estimated at 75%. This correlation is also illustrated by the coefficient of determination which exceeds the 56% rate. And so the change in competitive advantage has resulted from the change in information technology and communication. In addition, the Fischer value was 65.25, is greater than the tabular value of 4.03 and the calculated Student value was 8.08 at the significant level of 0.000, which is lower than the adopted level of 0.05. . Therefore, we reject the null hypothesis and accept the alternative hypothesis that there is a statistically significant relationship between the application of information and communication technologies in the institution and the competitiveness of this institution. You can write the equation form as follows:



**Conclusion:**

We have tried through this article to address the impact of the application of information and communication technologies on the performance of SMEs by knowing the impact on financial performance, marketing performance, commercial and competitive performance, especially in light of the intense competition that distinguishes these types of companies in the market. .

We concluded that the use of the technology component in these businesses must meet the following requirements:

- Availability of information and communication technology infrastructures (equipment and machinery, software, databases, various controls).
- Qualified skills and abilities able to control the ICT component.
- Strategic Alignment between Information and Communication Technologies and Business Objectives

Proper application of this technology helps improve business performance. From the field study, it was found that there is an important relationship between the use of information and communication technologies and financial performance, although this is a weak correlation.

We also found that there is a strong link between ICT use and marketing and business performance, which is very strong because it helps to increase the demand for products and services, which helps to increase market share. And thus improve the brand of the company.

It should also be noted that the use of information and communication technologies helps to strengthen the competitiveness of the enterprise, to improve the quality of products and services and to provide them at competitive prices, which contributes to the satisfaction of the customers and the reduction of the duration of the transactions.

Therefore, we can be argued that, alongside capital and labor, which are considered as the main elements of each production and service operation, ICT can be the third element of great importance in this process, especially in small and medium-sized enterprises in order to guarantee its survival and continuity.

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**APPENDICES**

**APPENDICE 01 : Arithmetic averages, standard deviations and degree of approval of sample responses to the ICT dimension:**

Paragraph	average arithmetic	Standard Deviation	Degree Approval	Ranking
The existence of the information and communication technology infrastructure in your company is necessary (office devices, networks, software ,,,, etc.)	4,34	0,51	high	1
Your organization is interested in the application of modern information and communication technologies (Internet, networks, programs and modern applications).	4,28	0,6	high	2
Your organization wants to undertake ICT training	3,15	1,17	Average	8
Your organization has high skills that can control ICT	3,67	1,13	high	4
Your organization relies on ICT for all its functions	3,05	1,1	Average	9
Information and communication technologies have contributed to the change of the working style within your organization (ease of communication between the services of the organization, reinforcement of team work, speed of implementation, resolution of problems, quick decision making, etc.).	3,76	0,75	high	3
Your organization relies on the website to provide information to customers, suppliers and partners	3,48	1,11	Average	5
One of the reasons for creating your organization's website is that its competitors have a website.	2,25	1,13	Low	11
Your organization uses the Internet to promote its products and services and to receive applications.	3,48	1,12	Average	6
Your organization uses the Internet to know the movements of its competitors	2,26	1,2	Low	10

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Your organization deals with its partners through information and communication technologies (exchange of documents and information, price negotiation, communication with proxies, etc.)	3,44	1,03	Average	7
<b>DIMENSION TIC</b>	<b>3,38</b>	<b>0,98</b>		

**APPENDICE 02: arithmetic averages, standard deviations and degree of approval of sample responses to SME performance (financial, commercial and marketing performance, competitive advantage performance)**

Paragraph	average arithmetic	Standard Deviation	Degree Approval	Ranking
Your organization knows an increase in its income	3,8	0,76	high	1
The organization knows how to control costs by reducing all or part of it	3,5	0,93	Average	4
The entreprise knows the financial comfort, viz financial liquidity that helps it to carry out its activities in the best way	3,63	0,95	Average	2
The institution is financially independent, with no external debt	3,55	1,16	Average	3
<b>Financial dimension</b>	<b>3.62</b>	<b>0.95</b>	<b>Average</b>	
Your organization has known an increase in market share domestically and internationally (through access to customers, suppliers)	3,51	0,75	Average	3
The Foundation has witnessed an evolving demand for its products and services	3,65	0,68	Average	1
Your organization's image has improved and its brand has spread	3,65	0,68	Average	1
Increased demand for the products and services of the institution through the promotion of them through the Internet and the website	2,94	1,14	Average	5

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Your organization adapts quickly to changes in the market	3,15	0,89	Average	4
<b>The commercial and marketing dimension</b>	<b>3.38</b>	<b>0.82</b>	<b>Average</b>	
Your products offer quality services	4,13	0,48	high	1
The organization has seen less time in managing transactions and serving customers and suppliers	3,78	0,77	high	3
Your organization offers products and services at competitive prices	4,11	0,8	high	2
Your organization conducts forward-looking operations	2,36	1,18	Average	4
<b>Competitive Advantage Dimension</b>	<b>3.59</b>	<b>0.80</b>	<b>Average</b>	
<b>SME performance (financial, commercial and marketing performance, competitive advantage performance)dimension</b>	<b>3.53</b>	<b>0.85</b>	<b>Average</b>	

**APPENDICE 03: Analysis of variance related to financial performance**

**ANOVA<sup>a</sup>**

Model	Sum of squares	ddl	Average of squares	Ficher value	Sig.
1 Regression	4,154	1	4,154	6,264	,016 <sup>b</sup>
Residue	33,158	50	,663		
Total	37,312	51			

a. Dependent variable: Financial performance

b. Predicted values: (constant), Technology

**APPENDICE 04: Analysis of variance related to Commercial performance**

**ANOVA<sup>a</sup>**

Model	Sum of squares	ddl	Average of squares	Ficher value	Sig.
1 Regression	10,826	1	10,826	42,957	,000 <sup>b</sup>
Residue	12,601	50	,252		
Total	23,428	51			

a. Dependent variable: Commercial performance

b. Predicted values: (constant), Technology

**APPENDICE 05: Analysis of variance related to competitive performance**

**ANOVA<sup>a</sup>**

Model	Sum of squares	ddl	Average of squares	Ficher value	Sig.
1 Regression	11,132	1	11,132	65,288	,000 <sup>b</sup>
Residue	8,525	50	,171		
Total	19,657	51			

a. Dependent variable : Competitive performance

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b. Predicted values: (constant), Technology

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