

## The impact of information and communication technology on the re-engineering process of Small and Medium Enterprises -Algeria case study-

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### **Abstract**

*The current study aimed to learn about the impact of the use of ICT on SME reengineering. The rapid development of the latter in its field of work and the diversity of its objectives and programs have made the process of reengineering of great importance to the growth and development of the enterprise and its acquisition of flexibility to cope with changes in the environment in which it operates. To learn about the impact of ICT on the success of this process, the researchers prepared an electronic questionnaire that included (70) individualized. Using The SPSS social science statistical calendar to analyze the data obtained, thus interpreting the results economically.*

*The study found several findings, the most important of which was a positive correlation between the four dimensions of ICT, i.e., hardware and equipment, Software, communication networks, databases, and reengineering, in addition to the fact that the institutions studied attach great importance to formal communication for its positive advantages in reducing time, effort and costs when doing business. Furthermore, ICT contributes to formulating objectives related to the reengineering strategy.*

**Keywords:** ICT, reengineering, SMEs.

**Jel Classification Codes:** D8, L26.

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## 1. INTRODUCTION

The SME sector is one of the critical sectors whose presence within an economy is an urgent necessity because of its benefit to various economic and social variables and economic indicators, such as an increase in gross income, Positive outcomes in the foreign trade balance, and added value in addition to raising social hands, it contributes to increased employment, Eliminate unemployment, reduce poverty in society and reduce the burden on the public sector.

However, given that these institutions operate in an open environment to the outside world, they are vulnerable to various changes that may occur, including the introduction of ICT into the organization's multiple operations and their heavy reliance on them for the performance of the business to achieve the various advantages that derive from there, SMEs have therefore used ICT to help them facilitate decision-making and improve their efficiency in business performance.

These institutions have also been affected by changes caused by the outbreak of the coronavirus pandemic, the effects of which have not only been on the health or social side but also on the economic side and have affected their work. Some institutions experienced higher operating costs and lower revenues during the quarantine period. On the other hand, financial indicators and their returns have increased.

To cope with these changes, SMEs have resorted to reengineering their operations as an essential strategy for these changes. In addition, on the other hand, it develops its current functions, improves its competitiveness, and increases its flexibility to be able to operate in the current environment, as ICT is the effective tool on which SMEs rely to line their various operations; used to assist them in carrying out various reengineering operations.

**Problematic:** To identify the impact of the use of ICT on SME reengineering, we have presented the following problems:

Does the adoption of ICT by SMEs affect the reengineering process within them?

Sub-questions:

To answer the study's main problem, we can ask the following sub-questions:

- What are the most critical dimensions of ICT?
- What are the main reasons for re-engineering?
- Is there a relationship between ICT and SME re-engineering?

**Hypotheses:** Based on the sub-questions provided, the following hypotheses may be included:

- 1- There is a statistically significant moral impact relationship between ICT and SME re-engineering.

This hypothesis has the following sub-hypotheses:

- The first sub-hypothesis: there is a statistically significant moral impact relationship between the hardware and equipment dimension and the re-engineering of SMEs;
- Second sub-hypothesis: there is a statistically significant moral impact relationship between the software dimension and SME re-engineering;
- Third Sub-hypothesis: A statistically significant moral impact relationship exists between the telecommunication network dimension and the reengineering of SMEs;

- Fourth Sub-hypothesis: There is a statistically significant moral impact relationship between the database dimension and SME re-engineering.

**The importance of the study:** The importance of the present study stems from the fact that it seeks to:

- Addressing the compulsory application by SMEs of various ICT dimensions to keep pace with technological development;
- The reengineering of SMEs during the period of the coronavirus pandemic is of great importance to prepare SMEs to cope with this crisis and to work towards ensuring that they are exited with minimal losses;
- The need for SMEs to adopt different ICT dimensions to facilitate the enterprise's reengineering process.

**Objectives of the study:** The current study seeks to achieve a range of objectives, including:

- Knowledge of the impact of the independent variable (ICT) on the dependent variable (SME re-engineering process) in its four dimensions;
- Identifying more than one dimension of ICT has a greater capacity to facilitate the implementation of the re-engineering process and which dimensions are more widely used in the work of the institutions studied;
- To highlight the re-engineering process as a new orientation that enables SMEs to achieve their goals, improve their performance, and increase their competitiveness.

## **2. ICT conceptual framework and SME re-engineering**

In its various dimensions, ICT is an essential tool to facilitate and improve small enterprises' performance and implement multiple related tasks. Most importantly, implementing different processes related to the return of small and medium-sized enterprises (SMEs) to improve the latter is efficiency, performance, and flexibility to keep pace with the various changes in the business and management environment s development in multiple fields and activities.

### **2.1. What is ICT?**

Information and communication technology (ICT) is critical in various fields. At different levels, with multiple researchers paying considerable attention to it in their studies and theoretical research, on the one hand, and the other hand, its presence within institutions

#### **2.1.1 Definition of ICT:**

Many definitions of ICT have been received, the most important being:

First definition: "Economic activities that contribute to making information visible and then processed, stored and transmitted by electronic means." (Kouche, 2017, p21)

Second definition: "Integrate computers into related hardware from software and systems, to facilitate the user's creation, storage, retrieval, deployment, exchange, management and transmission of information in digital format." (LADJEL, 2020,p650)

Third definition: "Acquisition, processing, storage, and dissemination of audio, graphic, text and digital information through a set based on microelectronics from computers and communications devices." (Kwadwo Kyeremeh, 2019, p02)

Through the definitions provided, ICT can be said to be:

"The process of integrating computer devices with software and systems between them, to assist in the acquisition, processing, storage, and dissemination of information of various

kinds through electronic computer and communications-based methods."

### 2.1.2 Reasons for SMEs' reliance on ICT:

There are many reasons why SMEs are motivated to adopt the ICT concept, perhaps the most important of which are: (Sahanin, 2017, p37-38)

– **Complex and volatile business environments:** The environment in which SMEs operate is becoming more complex and volatile. Progress in communication and technology has created many changes as well as other changes resulting from political and economic factors; what has made these institutions carry out activities aimed at improving their operations, such as re-engineering to improve the forecasting process and build strategic alliances with other institutions by building on ICT as a supportive tool for all these activities to ensure their survival and sustainability in a complex and unstable environment.

– **Strong competition and the global economy:** pressures by international organizations as well as advanced technology have intensified global competition, which has become focused not only on prices but also on quality. Information and communication technology (ICT) helps SMEs to obtain multiple advantages such as improved productivity, higher service level, and higher quality.

– **Social responsibility:** There is no doubt that the interaction between SMEs and society is not interrupted. In recent times, these institutions have become more aware of this interaction and its importance; by contributing to social services such as environmental control s rights, information and communication technology supports social responsibility activities through decision support systems to monitor equal opportunities programs and expert techniques to improve environmental management.

– **Changing resource structure:** The information factor increases the importance of ICT. In the industrial era, it was believed that there were four primary resources of the enterprise (physical, human, financial, and raw materials), while now, a fifth key factor is an information from here the importance of ICT for the processing and utilization of information, especially in the current information explosion.

### 2.1.3 ICT dimensions:

The ICT dimensions are the core of ICT's sound performance, the most important being: (Saad Ibrahim Hamad, 2018, p30-31)

**Hardware and equipment:** This dimension reflects computers and accessories, both the hardware and equipment consisting of the CPU, the primary panel, and the screen, as well as the equipment and supplies used for data entry, processing, retrieval, transportation, and handling, to make a good investment among all beneficiaries to be restocked after utilization and updated to be ready for recovery whenever needed.

**Software:** Software is central to the implementation of supporting systems that incorporate different techniques, whether decision support systems or equipped systems, as well as management information systems and other systems that are central to the success of ICT functions, being a serious, effective, and efficient contributor to data collection, entry, classification, restoration, generation, storage, updating and retrieval for various activities. This software contains the final operating systems of the word processor and application software for each task and specialized work.

**Communication networks:** Communication is the link that provides information and communication technology services to beneficiaries. It is the most critical dimension in receiving and transmitting information through various relevant devices such as Fix, Fibre Optic, and the International Information Network (Internet) to multiple entities simultaneously to anticipate the time and achieve the targets of the beneficiaries of this

information.

**Databases:** an integrated set of data that is organized and stored in a way that is easy to retrieve and must incorporate database infrastructure in a manner consistent with organizations' needs and that they are easily accessible and must be in a way that can apply more than one program to them, This is through a series of programs that help to perform these functions, called database management systems, where the latter allows the end user to complete the process. (Abdawi, 2016, p88)

### **3. What is re-engineering**

Enterprise re-engineering is an essential product in the world of management. After several leading institutions have achieved impressive outcomes in this area, most institutions in different parts of the world have been quick to embrace and employ this concept within the organization as a tool for development, improvement, and development of excellence.

#### **3.1. Definition of re-engineering:**

Many definitions of reengineering have been provided, the most important of which are:

The first definition: "Reengineering is a systematic administrative instrument based on organizational reconstruction at its root and based on the restructuring and design of the administrative process to achieve a fundamental and ambitious development in the performance of institutions." (Mohamed Ahmed Basnawi, 2013,p48)

Second definition: "Fundamentally rethinking, a radical redesign of the main enterprise process, to achieve the results of tremendous improvement in modern performance measures: service, quality, cost and speed of work." (Bin Attallah Alamy, 2020,p293).

Third definition: "A method that includes a radical redesign of the enterprise's work, its management techniques and the organization of work, by abandoning the long-adopted methods and taking a fresh look at the work necessary to deliver a product and satisfy the customer based on a process-focused approach." (Rahab Oakel, 2019, p68)

Through the definitions provided, we can say that the reengineering is:

"A management tool based on the rethinking and radical design of the enterprise process to achieve remarkable development, improve performance standards and organizational efficiency, and increase its ability to respond to and adapt to surrounding changes."

Implementation of the reengineering program requires several necessary dimensions, the most important of which are: (Sinai Jarallah Ahmed, 2017, p472-473)

– Enterprise strategy and employee empowerment: Many studies have demonstrated the importance of strategizing when leading the reengineering process. The reengineering program must be linked to the Foundation's strategic vision and objectives.cannot ignore The importance of empowerment and human resources management in successfully applying the reengineering. Many studies have demonstrated the importance of the humanitarian component as a critical element for successfully implementing the reengineering philosophy of the Secretary-General ' This by nature means abandoning the prevailing bureaucratic pattern and enabling workers to raise their functional satisfaction and develop them into multi-skilled individuals.

– Commitment and conviction of senior management: The success of the reengineering depends on the commitment and trust of senior management in the enterprise that a reengineering program is needed to improve the enterprise's competitive position. It must translate This mask into support and support.

– Information technology: The use of information technology as a tool for building a new process is considered rather than relying on the process based on the old system of information technology.

This can be achieved using the labor registry model, whereby the enterprise cancels old operations and starts from scratch by constructing its best ideal model. The conviction of employees in the initial stages of the reengineering process is a prerequisite.

– Readiness for change: A key challenge for enterprises in applying reengineering is linked to the process of readiness for change that is seen as critical to the successful application of reengineering, unavailability of the current situation, and changes in values, practices, and organizational structure.

#### **4. SME re-engineering relationship with ICT:**

The role of ICT for SME reengineering differs from that of other institutions and management systems in that their use is linked to an attempt to shift from traditional manual work to electronic work by converting different data and information into their electronic form. To facilitate the transfer process and reduce the costs of achieving this process from automated media, telephone, or fax where information and communication technology is used in the reengineering process to facilitate activities by enabling senior management to better design the process by linking it to its problematic tasks and streamlining its performance procedures. More clearly, it can argue that ICT's relationship with SME reengineering is through two aspects:

– Making organizational change and preparing for it by abandoning old working methods and adopting a re-engineering model.

– Facilitate the performance of all activities and tasks that maximize the value produced within the organization by innovating a process and contributing to disseminating information that helps make the right decisions.

ICT also contributes to the creation of effective communication channels that ensure the transfer of data and information between the various administrative units, raise the levels of control over all operational activities and facilitate their practice, facilitate simplification procedures to ensure that they perform efficiently, and effectively.

More explicitly, we can say that the re-engineering process imposes the need to redesign all the exercises so that the activities and tasks they pose are combined using ICT in a way that reduces the time and space required to perform them, accelerates their implementation, and makes them consume the least economic resources that are positively reflected in the value produced by the enterprise. (Hicham Mezhoud, 2018, p207)

#### **5. Impact of ICT on the re-engineering of Algeria's SMEs**

The applied part was based on the method used to complete the study. It also dealt with all the tools used to collect data and statistical methods used to analyze such data, as well as to present and analyze the study's variables to determine the impact of ICT on re-engineering the institutions studied.

##### **5.1 Sample Study:**

The sample study consists of all employees in the SME sector. A questionnaire was prepared as a tool for data collection. This study was divided into 03 main axes. The first axis addresses the respondent's subjective data and includes 06 questions. The second theme concerns the ICT dimensions, with each dimension encompassing 05 questions relating to its main aspects. The third relates to the four dimensions of SME re-engineering, so each dimension also includes 05 questions.

The questionnaire was distributed electronically immediately after what was supposed to be distributed at the level of a sample of SMEs due to the spread of the virus pandemic -19-Covid all countries of the world, including Algeria. which has led to the suspension of these institutions' activities for a certain period and the prohibition of conducting interviews and questionnaires as precautionary measures. In the light of this data, the e-broker was used to distribute the questionnaire, where both e-mails were relied upon. Facebook, in addition to analyzing this questionnaire according to the five-degree Likert quinquennial scale as shown in the following table:

**Table No. (01):** Degree of approval according to the Likart quinquennial scale

Appreciation	Strongly disagreed	Disagreed	Neutral	OK	Strongly Agreed
degree	<b>01</b>	<b>02</b>	<b>03</b>	<b>04</b>	<b>05</b>

**Source:** Prepared by the researchers.

### 5.1.1 Study variables and research indicators:

Study variables and research indicators: The study model consists of the independent variable and the dependent variable:

ICT (autonomous variable): includes the four dimensions of ICT mainly: hardware and equipment, software, communication networks as well as databases;

Reengineering SMEs (subordinate variable): encompasses the four dimensions of SME re-engineering, mainly: enterprise strategy and employee empowerment, senior management commitment and conviction, information technology, and readiness for change.

### 5.1.2 Statistical methods used in the study:

- We have emptied, coded, and entered data into the computer using the SPSS (Sciences Social for package statistical) program, where we have used some statistical tools, including:
- The alpha Cronbach's persistence factor (Cronbach's Alpha) to measure the degree of credibility of answers to the questionnaire paragraphs;
- Computational average, standard deviation, and degree of approval for each ICT dimension and the re-engineering of SMEs in order to detect the orientation of sample personnel towards the studied dimensions;
- Simple linear regression to study the impact of ICT on SME re-engineering.

**Table No. (02):** Levels appropriate for computational medium according to the Likartalmetric scale

Level	Very low	Low	Average	High	Very high
computational medium	<b>1.8-1</b>	<b>2.60-1.81</b>	<b>3.40-2.61</b>	<b>4.20-3.41</b>	<b>5-4.21</b>

**Source:** Rakda Bint Atiq Khan al-Atawi, Talent Management of State High Schools, Tabuk Mouda, Al-Jinan Publishing and Distribution House, Oman, 01 edition, Jordan, 2020, p. 179.

### 5.1.3 Persistence of study tool:

In order to test the degree of stability of the study tool, we calculated the "Cronbach's Alpha" coefficient, which indicates the stability of the scale and measures the degree of stability of the sample for each axis of the questionnaire and for the questionnaire as a whole, where the test results were as shown in Table 03.

**Table No. (03):** Variable Stability Test Results

Questionnaire axes		Number of paragraphs	Cronbach's Alfa
First axis	Hardware and Equipment	05	0.892
	Software	05	0.948
	Networking	05	0.964
	Databases	05	0.966
	Information and communication technology	20	0.985
Second axis	Enterprise Strategy and Employee Empowerment	05	0.775
	Commitment and conviction of senior management	05	0.807
	Information Technology	05	0.916
	Ready for Change	05	0.856
	Reengineering Institutions	20	0.949
All questionnaire phrases		40	0.974

**Source:** Prepared by the two researchers based on the questionnaire's findings

Note from the table above that the Alpha Cronbach's coefficient value for the first axis (information and communication technology) was 0.985, while the constant factors for the dimensions of this axis recorded high values ranging from 0.892 to 0.966.

The value of Alpha Cronbach's for the second axis (SME re-engineering) was estimated at 0.949, and its four dimensions recorded constant factors between 0.775 and 0.949.

The determination factor as a whole has been estimated at 0.974, reflecting a high determination factor that emphasizes ensuring that the same results are obtained if the instrument is reapplied to the same group of individuals, as well as a low impact of chance and random factors on the instrument's results, exceeding the 60.0 (60.0) alpha factor, the recommended minimum constant.

#### 5.1.4 Analysis of the results of the field study:

This section describes and analyses the study's variables, but before that, the study sample must be described through its demographic data.

Description of demographic variables of study sample individuals:

**Table No. (04):** Sample Description Research According to Demographic Variables

Basic variables for sample personnel	Repetition	Percentage%	
Sex	Male	44	62.9
	Female	26	37.1
Age	From 23 to 33 years	33	47.1



	old		
	34 to 44 years old	<b>28</b>	<b>40</b>
	Older than 44 years	<b>09</b>	<b>12.9</b>
<b>Educational Level</b>	Baccalaureate Certificate	<b>13</b>	<b>18.6</b>
	Bachelor's degree	<b>12</b>	<b>17.1</b>
	Master's Certificate	<b>16</b>	<b>22.9</b>
	Technical Certificate	<b>15</b>	<b>21.4</b>
	Other than what was mentioned	<b>14</b>	<b>20</b>
<b>enterprise Type</b>	Micro-Enterprise	<b>12</b>	<b>17.1</b>
	Small Enterprise	<b>24</b>	<b>34.3</b>
	Medium Enterprise	<b>34</b>	<b>48.6</b>
<b>Years of experience</b>	Less than 03 years	<b>22</b>	<b>31.4</b>
	From 03 to 07 years	<b>20</b>	<b>28.6</b>
	Older than 07 years	<b>28</b>	<b>40</b>
<b>Enterprise Classification</b>	Business	<b>19</b>	<b>27.1</b>
	Service Institution	<b>23</b>	<b>32.9</b>
	Industrial Enterprise	<b>28</b>	<b>40</b>

**Source:** Prepared by Researchers based on SPSS.23's outputs

After analyzing the statistical data in the table above, it is clear that:

- **Sex:** About this variable, it is clear that males make up the highest proportion of the sample studied at 62.9%. Females in the sample studied at 37.1%. This can be traced back to the nature of the institution's work and its need for muscle abilities and considerable effort to perform the work, in addition to the fact that the work of females is primarily in management from other interests;
- **Age:** Categories 23 to 33 and 34 to 44 dominated most of the study sample. Moreover, this is due to the work of the sample institutions studied to employ the youth group more to fit them into the enterprise's activity, on the one hand, On the other hand, it is more familiar with modern technologies, as well as the ability of young people at this stage to give more to serve and promote the institution.
- **Educational level:** Most employees in the sample's institutions have a high level of education. The holders of bachelor's, master's, and high technical certificates make up 61.4% of the study sample. This is due to the keenness of the owners and officials of the institutions to employ competencies and people of high level in their field on the one hand and, on the other hand, the institutions studied are also keen to diversify at these levels in order to adapt to the institution's work and the different positions held by these employees. It is also well known that the institutions studied employ persons other than those listed in the above table in order to assign them simple tasks to complement essential work;
- **Type of institution:** From our reading of the table above, the sample study was distributed among the three types mentioned by the Algerian legislature in Law 17-02 when defining SMEs. Despite the presence of the three species in the sample, medium enterprises controlled about half of the sample studied. This is due to the enjoyment of an organizational structure

with more sections and staff than other types, especially micro-enterprises, whose organization and functions are characterized.

– **Years of experience:** The individuals of the specimen studied have significant experience in their field of work, perhaps mainly because of the work of the institutions studied to attract individuals with experience in their field of work, as well as the efforts of the institutions studied to take advantage of the human capacities they work with and make up more to keep pace with technological developments and innovations.

– **Enterprise classification:** The sample institutions studied were distinguished by the variety of areas in which they operate. The sample study varied between industrial, commercial, and service enterprises, despite a slight increase in the proportion of industrial enterprises to most individuals' orientation for this type of enterprise due to their possession of industrial qualifications and the presence of human and material resources.

### 5.1.5 Analysis of study questions:

This section concerns the study and analysis of the results of the questionnaire's second and third axis questions, the results of which are as follows:

#### 5.1.5.1 ICT dimensions:

**Table No. 05:** Averages and standard deviations of the study sample's views on ICT dimensions

Thoughtful dimensions	Arithmetic Average Standard	Degree of deviation	approval
Hardware and Equipment	3.09	1.098	Medium
Software	3.30	1.311	Medium
Networking	3.45	1.351	High
Databases	3.41	1.310	High
Information and communication technology	3.31	1.232	Medium

**Source:** Prepared by Researchers based on SPSS.23 's outputs

Table No. (05) Shows the responses of the sample examined on the dimensions of ICT, with the average responses of the study sample members averaging 3.31 degrees of intermediate approval; that is, workers are of the view that the degree of application of ICT by SMEs is moderate.

It is noted that the dimensions of communication networks and databases have received a high degree of approval in the sense that most of the study institutions seek to ensure the efficiency of the communication devices within them and work to provide a sufficient number of communication devices that cover their needs by entering data or documenting information and communicating it to their applicants with the necessary characteristics. In addition to being able to reduce personal contacts that would reduce workers' efforts and lose their focus and increase the time needed to perform business, Furthermore, thoughtful institutions provide a database within them to ensure rapid data processing and prevent duplication on the one hand and assist them in decision-making on the other.

However, thoughtful institutions do not have adequate training programs for workers using ICT tools. Because most workers are graduates of universities and formative schools,

they must have tribal gains on how to deal with them. Moreover, just like it is not upgrading hardware and equipment. Moreover, follow up on the new software for use because it is not available on the complex process that needs to be processed from sophisticated software, Owing to their employees' accustomed to a particular type of software in the performance of the business provided by the enterprises.

### 5.1.5.2 Dimensions of SME re-engineering:

**Table No. 06:** Averages and Standard Deviations of Sample Opinions of the Study on Dimensions of the Re-engineering of Studied Institutions

Thoughtful dimensions	Arithmetic Average Standard	Deviation Degree of	approval
Enterprise Strategy and Employee Empowerment	<b>3.24</b>	<b>1.006</b>	Medium
Commitment and conviction of senior management	<b>3.16</b>	<b>1.015</b>	Medium
Information Technology	<b>3.45</b>	<b>1.144</b>	High
Ready for Change	<b>3.20</b>	<b>1.118</b>	Medium
Reengineering SMEs	<b>3.26</b>	<b>0.972</b>	Medium

**Source:** Prepared by Researchers based on SPSS.23 's outputs

From the findings in Table No. 06, it is clear that the degree of approval of employees in institutions studied about the latter's application of the reengineering dimensions was average, recording an average calculation of 3.26.

The researchers point out that the institutions studied believe in the need to reengineer their operations to cope with the evolution of the business environment. They also can accept and embrace change to meet the various challenges they face, including solid competition, regardless of whether this change in values, practices, or organizational construction. Although thoughtful institutions face difficulties in integrating, reengineering programs when building their objectives. Nevertheless, it works to create and generate the best methods that will facilitate and facilitate this process, Reduce workers' resistance to changes in the reengineering process. However, thoughtful institutions limit decisions on the implementation of the reengineering process to the level of senior management only without involving lower-level workers in the process,

In other words, thoughtful institutions do not empower their employees to raise their job satisfaction, believing that those working at this level must carry out only their mandated tasks.

What is also noted in the table above is that the sample institutions considered attaching great importance to ICT in implementing the reengineering process. This dimension received a high average calculation of 3.45 to a high degree of approval; Thoughtful sample enterprises consider this technology to be the tool that would facilitate an enterprise's achievement of its objectives and appropriate decision-making. In addition, help it successfully implement modern management entry points, including by eliminating the bureaucratic pattern prevailing in business.

## 6. Hypothesis Test:

Through this section, the two researchers seek to test the study model using a simple linear regression method that measures the impact of the independent variable on the dependent variable, i.e.,. To study the extent to which ICT can explain the change in SME re-engineering.

### a. Test the first main hypothesis:

Information and communication technology (ICT) and the re-engineering of SMEs.

They also give rise to the following sub-hypotheses:

- A statistically significant moral impact relationship exists between the hardware and equipment dimension and the re-engineering of SMEs;
- A statistically significant moral impact relationship exists between the software dimension and SME re-engineering;
- A statistically significant moral impact relationship exists between the telecommunication network dimension and the reengineering of SMEs;
- A statistically significant moral impact relationship exists between the dimension of databases and the re-engineering of small enterprises

**Table No. (07):** Variance analysis table

Source of variation	Total boxes	Degree of freedom	Average boxes	F
Regression	<b>19.119</b>	<b>1</b>	<b>19.119</b>	<b>28.170</b>
The rests	<b>46.153</b>	<b>68</b>	<b>0.679</b>	<b>Indicative level</b>
Total	<b>65.272</b>	<b>69</b>		<b>0.000</b>

**Source:** Prepared by Researchers based on SPSS.23 's outputs

The results of the F test show a statistically significant moral impact relationship between ICT and SME re-engineering. From the table above, it is clear that F's calculated value was (28.170) at a moral level of 0 .05, where the calculated level of indication was 0.000 below 0 0.05, which means rejection of the nowhere hypothesis and acceptance of the alternative hypothesis.

**Table No. (08):** The impact of ICT on thoughtful enterprise re-engineering Variables

Variables	Estimated Parameters		T	Bêta	R <sup>2</sup>	Indicative level
	Parameter Value	Standard error				
Fixed	<b>1.851</b>	<b>0.284</b>	<b>6.515</b>			<b>0.000</b>
Information and communication technology	<b>0.427</b>	<b>0.080</b>	<b>5.308</b>	<b>0.541</b>	<b>0.293</b>	<b>0.000</b>

**Source:** Prepared by Researchers based on SPSS.23 's outputs

The statistical results in the table above indicate that the R-value was 0.541, meaning that ICT explained 54.1% of changes in the re-engineering of the institutions studied. Any discrepancy in this process can be predicted by ICT at 29.3%, and the results of the t-test indicate the

morale of the thoughtful model because the calculated level of morale was 0.000, below the approved indicator level of 0.05.

The following table shows whether the sub-hypotheses are valid or not.

**Table No. 09:** Results of the simple regression formula between ICT dimensions

Affiliate Variable Independent variable	Reengineering SMEs					
	R-deux	Statistical standards			Estimated Parameters	
		F	R	Indicative level	Fixed	b1
Hardware and Equipment	0.293	23.978	0.510	0.000	1.871	0.452
Software	0.263	28.438	0.543	0.000	1.935	0.403
Networking	0.295	25.767	0.524	0.000	1.961	0.377
Databases	0.275	25.976	0.526	0.000	1.936	0.390

**Source:** Prepared by Researchers based on SPSS.23 's outputs

– Sub-hypothesis I:

Does a statistically significant moral impact relationship exist between the hardware and equipment dimension and the re-engineering of SMEs?

Through the statistical results shown in the table above, we see the morale of the model where the calculated indicator level is 0.000, which is below the approved indicator level of 0.05, which indicates a correlation between the two variables mentioned, i.e., that the devices and equipment affect the process of re-engineering the institutions studied, The results also indicate an average correlation between them, with the Pearson coefficient valued at 51.2%, a statistical function at the indicator level  $0.01\alpha \leq$  And we note that 29.3% of the variability in the dependent variable of any enterprise re-engineering is explained by the independent variable of devices and equipment, The value of the B1 parameter, estimated at 0.452, shows the strength of the impact of the independent variable on the dependent variable. Whenever SMEs rely on state-of-the-art and sophisticated equipment, they reduce the effort and time required to perform the business, which is positively reflected in the re-engineering process by 45.2%.

Thus, we can accept the first sub-hypothesis, i.e., there is a statistically significant moral impact relationship between the hardware and equipment dimension and the SME re-engineering process, and the equation reads as follows:  $1.871 + 0.452$  (SME re-engineering process).

– Sub-hypothesis II:

Does a statistically significant moral impact relationship exist between the software dimension and reengineering

Having reviewed the results described in the table above, we have reached the model's morale after recording the calculated indicator level below the approved indicator level of 0.000, leading us to say that there is a relationship between the software dimension and the reengineering process in the institutions studied, With an average correlation score of 54.3%, which is a statistical function at the  $0.01\alpha \leq$  indicator level, that is 26.3% of the variability in

the dependent variable. Moreover, the value of the  $b_1$  parameter estimated at 0.403 shows us the strength of the independent variable's impact on the dependent variable, since whenever modern software is used, SMEs studied reflect the engineering process at 40.3%.

Therefore, in the second sub-hypothesis, i.e., a statistically significant moral impact relationship between the software dimension and the reengineering process, the equation reads as follows:  $1.935 + 0.403$  (reengineering process).

– Sub-hypothesis III:

Does a statistically significant moral impact relationship exist between the aftermath of communication networks and the re-engineering of SMEs?

After reviewing the statistical results recorded in Table No, (09) and obtained using the SPSS software, we can indicate the morale of the model studied in the sense that communication networks influence the re-engineering of the institutions of the sample studied in order to record the calculated level of indication of the value of 0.000 below the 0.05 approved level.

We can also say that there is a positive correlation between the communication networks and the re-engineering process of 52.4%, and the communication networks can interpret an estimated 29.5% variation in the re-engineering process. The latter can influence the re-engineering process by 37.7%, meaning that any development or change of the communication networks will show results in the re-engineering process.

These statistical results prompt us to accept the third sub-hypothesis, enabling us to write the model equation as follows:  $1.961 + 0.377$  (SME re-engineering process).

– Sub-hypothesis IV:

Does a statistically significant moral impact relationship exist between databases' dimension and SMEs' re-engineering?

After analyzing the statistical results in Table No, (09), we can say that the model studied has morale, that is, the model for reconciliation to predict changes that may occur between the two variables in order to record the level of indicator calculated by the value of the 0.000 below the level 0.05 adopted.

There is a positive correlation between databases and SME re-engineering at 52.6%, so that databases can explain the amount of 27.5% of the variance in the dependent variable; it affects it by 39%, in the sense that proper handling of the data and the ability to retrieve and process it at any time the enterprise needs will have an impact on the re-engineering of the sample is studied institutions.

Results from Table No. (09) prompt us to accept the fourth sub-hypothesis, enabling us to write the model equation as follows:  $1.961 + 0.39$  (SME re-engineering process).

## **7. Conclusion:**

The application of re-engineering within any institution is a positive and essential step in its development and response to the surrounding circumstances. In particular, if this process is accompanied by the use of information and communication technology, which has recently broken into the business world and witnessed significant changes in its methods and areas of use, Because of the importance of this topic, we have tried in this paper to expose the impact of the use of information and communication technology (ICT) in its four dimensions on the process of re-engineering within SMEs.

- The study presented revealed that SMEs studied attach great importance to ICT in their four dimensions, namely, networks, communication, and databases when formulating re-engineering objectives;
- A positive correlation between the four dimensions of information technology, namely, hardware and equipment, software, communication networks and databases, and the re-engineering process, which prompts us to accept and validate the sub-hypotheses raised in the study;
- The process of formulating various objectives and making decisions on re-engineering is limited to the level of senior management, without enabling and involving workers at the lower levels, considering that the worker only implements what has been requested;
- Thoughtful institutions attach great importance to formal communication for its positive advantages in reducing time, effort, and costs when doing business.

#### Recommendations:

After research on ICT and SME re-engineering, the latter affected by ICT used to improve this process, we can make the following recommendations:

- SMEs should strengthen the role of the ICT dimensions of the hardware, hardware, and software dimensions of their operations, as they help improve performance and reduce the time and effort needed to perform their work;
- Increase the number of ICT training programs undertaken by enterprises, which would facilitate the use of ICT and its dimensions by enterprise workers at various levels in the process of re-engineering to achieve the goals set by the enterprises for the adoption of this strategy;
- The need to apply the re-engineering process at gradual intervals and explain it to workers to facilitate their absorption of new changes and contribute significantly to raising economic indicators and maximizing

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