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The impact of information technology on improving pension fund services: Constantine state pension fund case study

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Abstract---By embracing information technology, the financial organizations can improve their internal processes, accelerate customers transactions, and minimize human errors. In addition, technology offers advanced security solutions that protect sensitive data from cyber threats. This study aims at identifying information technology impact in improving pension fund services. We have designed a questionnaire and distributed it to a sample of the Pension Fund employees of the state of Constantine. The sample was estimated at 42 employees. Statistical analysis was based on using the statistical package of social science spss26. The study has found a statistically significant impact of human availability on improving the Retirement Fund's services, as well as a statistically significant impact of the presence of the necessary physical components in improving the quality of the Retirement Fund services. In addition to that, the presence of telecommunications stations and networks inside the Fund facilitates many of its operations and enhances its affiliates satisfaction.

Keywords---Information technology, services improvement, Retirement fund of the state of Constantine.

Jel codes: G23, 031

1. Introduction

In modern times, information technology has become an integral part of all sectors including the financial one. The technological advances have greatly improved the financial services which contributed to enhancing efficiency and security and providing a distinctive experience to the customers.

Most organizations no longer rely on the traditional long-term methods in processing information, but they use IT through their programs and instruments to make efficient and timely decisions. This is in line with the demands of the modern times, where the novelty of information and the timing to access it are crucial. And because of the various benefits that IT has demonstrated, these organizations are accelerating to own these technologies and make best use of them to achieve the desired results by improving internal processes and providing advanced security, offering innovative services. IT continues to drive financial organizations towards a more efficient and effective future.

In Algeria, the Pension Fund is one of the prestigious financial organizations and is a public body of special character governed by its own laws and with legal character and financial autonomy. The Fund provides numerous social services to its affiliates including pension supervision and social support.

In line with the necessity to keep pace with the technological development, the Fund has relied on many electronic services. The most prominent of these services are the "Retiree Space" application and the "Pension enhancement" platform, which aim at bringing the fund closer to its affiliates as well as facilitating and simplifying their transactions. Thus, we can ask the following key question:

What is the impact of Information Technology on the improving the Pension Fund services of the state of Constantine ?

- Study hypotheses:

- There is a statistically significant effect of human availability in improving the Pension Fund services.
- There is a statistically significant effect of the availability of the necessary hardware components in improving the Pension Fund services.
- There is a statistically significant effect of telecommunications and the networks in improving the Pension Fund services.

- Significance of the study:

The importance of the study consists in that it highlights the importance of information technology, the reasons and benefits that led the pension Fund to use it, and its contributions in improving the Fund's services.

- Objectives of the study:

The study aims to:

- Clarify the concepts related to the information Technology.
- know the benefits provided by the information Technology to the Pension Fund members.
- Diagnose the reality of the implementation of information technology in the Pension Fund.

- Methodology of the study:

To complete the study, we have used a descriptive analytical approach to explain the concept of information technology, its functions, and components, and a statistical approach to collect data and test the research hypotheses.

- The Study Model:

The study is divided into three independent variables and one dependent variable as follows:

- The Independent Variables:
 - Human Availability.
 - The necessary hardware components.
 - Communication and networks.
- The Dependent Variable:
 - The Pension Fund's Services.

2. Literature Review

2.1. Definition of information technology

We can suggest the following definitions:

"It is the tools and the means used for the collection, compilation, analysis, and storage or distribution of information. And it is classified under a broader and more comprehensive heading (The computer-based techniques) for its direct relationship to the operational activities of an organization. " (Kandalji & Fadil, 2009)

"It is the science of processing various types of information via modern means particularly computers, and using them to help communicate the various human, social and scientific knowledge". (Alami & shakroly Elbayati, 2009)

2.2 Information Technology Functions:

Information technology functions can be limited to the following:

- Processing data into useful information.
- Reprocessing information and using it as data in other processing steps.
- Simplifying information so that it is easier to understand by the user, and to become more appealing and more useful. (C.Laudon & P.Laudon, 2014)
- Converting, analyzing, and calculating all data and information.
- Performing several types of information processing at the same time, whether it is writing, sounds or picture. (P.Raval, 2015)
- Organizing information in a useful way according to its nature, be it a picture, a sound, or any other form.
- Storing and retrieving information and data for additional operation and transmitting it to another beneficiary.
- Sending information and data from one site to another via e-mail, voice messages or others. (Okon & Ogri, 2023)

2.3. Information Technology Importance

- Information Technology provides a set of tools, processes and methodologies that facilitate the workflow and the achievement of the organization objectives such as coding, programming and data transfer, storage, and retrieval, and analyzing, systems analysis, design, and control as well as the associated equipment used in collecting, processing, and presenting information. And that is why information technology is important.
- Information Technology enables organizations to electronically store valuable records ensuring data protection and accessibility when needed. (Kumar, 2021)

- Provides the necessary and important information and communication to decision makers as it helps them make the right decision in relation to their organizations.
- Information technology ensures the protection of electronic information from hacking or damage during technological disasters using advanced safety techniques. (Abuj pandey, 2021)
- Reducing staff members workload by automating routine tasks and by facilitating project tracking and monitoring the financial statements thereby increasing the organization overall efficiency. (Assaj & Shamsi, 2023)
- Remote access to the company's or organization's electronic network so that employees can access the organization network remotely enabling them to work from homes or elsewhere.
- Facilitating communication between workers and the world business quickly and effectively through e-mails and video conferencing, and in-house chat rooms, without necessarily needing in-person communication. This is where the importance of IT in saving time and shortening distances becomes evident. (Altaai, 2013)

2.4. Information Technology Components

2.4.1 The Human Component:

Individuals are the most important building block of the information Technology system. They can be divided into two categories: The first which is the majority, are called end-users such as managers, officials, and section chiefs, who deal with application software as beneficiaries from it and from its applications without delving into the exact details of its programming processes. The second category are the computer specialists who design computers and develop different software whether applications software or system software. (Elija & Amran, 2024)

2.4.2 The Physical Hardware:

This includes all the physical means and tools used to process information. The devices consist of the input means and the central processing unit, the storage and output means, and physical media to connect the parts together. (Hajaj, 2017) The computer is the main base through which information technology is launched and on which it bases its foundations. It has also given various advantages to businesses in all their aspects, and so no organization whatever its characteristics, is devoid of these devices because they have become a necessity for work. This technology includes two types of technologies: processing technology and storage technology.

2.4.3 Telecommunications and networks:

The concept of telecommunications involves the telecommunication networks, terminals, communication processors and some devices connected to each other by multiple communication means and infrastructure. It is known as the structure that includes facilities for technologies and legal procedures that support telecommunications through the use of software, hardware and skilled personnel and means of communication which connect those devices to transmit information between dispersed locations and units. (Valdar, 2017)

3. Data & Methodology

Within this component, we will study the role of information technology in improving the Pension Fund services through the study of the Pension Fund of Constantine based on a questionnaire submitted to a sample of the staff of this Fund.

3.1 Overview of Pension Fund

The National Pension Fund was established on 2 July 1983, by decree 85-223 of 20 August 1985, repealed and replaced by decree 07-92 of 4 January 1992 containing the legal status of Social Security Funds and the administrative and financial management of social security. It is a public body of a special character governed by its own laws having a legal personality and a financial autonomy. (Pension, presentation of the pension fund, 2024)

3.2. The Electronic Services Provided by The Retirement Pension Fund:

(Pension, The electronic services, 2024)

- Personal account application 'Retiree space' is a platform devoted to retirees that brings the Fund's services closer to its members.
- My Retirement is an application for smartphones. It works on Android systems and is intended for Retirees affiliated with the Fund.
- Retirement Pension appraisal platform.
- Retirement file tracking and simulation platform.
- Platform for determining pension payments dates.

4. Research methodology

4.1 The Research Population and Sample

The study population consists in the entire employees of the pension Fund of the state of Constantine. The research sample has been selected according to the simple random sample. The sample consisting of the Fund employees was randomized 50 questionnaires have been distributed, and 42 questionnaires have been collected that is 84 % of the total distributed questionnaires, which is a good percentage to conduct the study.

4.2 The Study Tool

We have used the questionnaire, a scale of measurement which is the 5- point Likert scale, and the used statistical treatment which including the statistical program SPSS, and the descriptive statistical methods and inferential statistics.

The questionnaire has been divided into two sections:

- First section: contains the identifying characteristics of the sample members.
- The second section consists of 4 axes, as follows:
 - The first theme: The Human Component
 - The second theme: The necessary physical components
 - The third theme: telecommunications and networks
 - The fourth theme: the passages about the dependent variable (The Pension Fund services) inactions and networks.

5. The descriptive statistics Results.

5.1 Characteristics of the Study Sample

We will show the identifying characteristics of the study sample members which consists in gender, educational qualifications, professional experience by calculating frequencies and percentages.

Table 1. Characteristics of the study sample

Gender	Frequency	Percentage
Male	31	81
Female	11	19
Educational Qualifications		
B.A	30	72
Master	6	14
Other	6	14
Professional Experience		
5 years and less	6	14
6- 10 years	12	29
10 and more	24	57
Total	42	100

Source: Prepared by the researcher based on the SPSS 26 output

Based on the gender criterion, we find that the males' percentage is higher than that of females in the Fund being studied. Out of total of 42 employees, males represent 81 % of the sample compared to 19% of females.

According to the educational qualification criterion, most of the sample members are bachelor's degree holders representing 72 % of the sample members followed by master's degree holders and other degrees with respectively 14%, which indicates the appropriate level of education required to respond to the questionnaire. According to the professional experience criterion, most of the respondents belong to the category having a high professional experience with 57 %, followed by the category having 6 to 10 years with 29%.

5.2 The Descriptive Statistics Results of the First Independent Variable

In the following table, we show the arithmetic averages and standard deviations for the responses related to the first independent variable:

Table 2. The Arithmetic Mean and Standard Deviation of the First Independent Variable

Items	The arithmetic mean	The standard deviations
The Fund's management is concerned with the highly skilled workers.	3.619	1.188
The Fund's workers have advanced	3.810	0.917

skills.		
The administration of the Pension Fund considers the job specialization for position recruitment.	3.786	1.071
Pension Fund officials have interactive skills with employees.	3.571	1.172

Source: Prepared by the researcher based on the SPSS 26 output

From the results in the table above, we note that the second item ranks first with the arithmetic mean of 3.810 and a standard deviation of 0.917 which shows that the Pension Fund has highly skilled employees. In the second place is the third item with a mean of 3.786 and a standard deviation of 1.071 which reflects the role of the Fund's administration in the distribution of work positions. In the third place is the first item with the mean of 3.619 and the standard deviation of 1.188 which denotes the respondents' agreement on the administration interest in selecting outstanding skills. In the fourth position is the last item with a mean of 3.571 and a standard deviation of 1.172 where the sample members unanimously agree that the Fund's bureaucrats have interactive skills with their employees.

5.3 Descriptive Statistics Results of the Second Independent Variable

In the following table, we show the arithmetic mean and the standard deviation related to the responses to the second independent variable:

Table 3. The Arithmetic Mean and Standard Deviation of the Second Independent Variable

Items	Arithmetic mean	Standard Deviation
The Fund's management activities are carried out using computers.	3.857	1.002
The Fund uses advanced data collection and tabulation devices.	3.548	1.347
The Pension Fun relies on the mobile phone to perform some of its operations.	3.476	1.215
Pension Fund devices are Flexible in use.	4.095	1.008

Source: Prepared by the researcher based on the SPSS 26 output

From the findings shown in the table above, we notice that the last item is in the first place with a mean of 4.095 and a standard deviation of 1.008. This denotes that the sample members agree that the Fund's devices have flexibility to complete its different operations. In the second place is the first item with a mean of 3.857 and a standard deviation of 1.002, this indicates that the sample members agree on the Pension Fund's reliance on computers in performing its activities. In the third place is the second item with a mean of 3.548 and a standard deviation of 1.347 and it denotes the unanimity of the sample members on the existence of sophisticated devices within the Fund. In the fourth place is the third statement with a mean of and 3.476 a standard deviation of 1.215, and

this indicates that the sample individuals acknowledged that the Fund's administration use some applications in mobile phones to deal with its affiliates.

5.4 Descriptive Statistics Results of the Third Independent Variable

In the following table, we show the arithmetic averages and the standard deviations of the responses to the third independent variable:

Table 4. Third Independent Variable Arithmetic Averages and Standard Deviations

Items	Arithmetic mean	Standard Deviation
The Fund's administration has a network with other stakeholders of the sector	3.738	1.211
The Pension Fund has computers that are connected to each other (Intranets)	3.333	1.162
The internet helps develop the services offered to the Fund's affiliates.	3.952	1.058
The Fund's administration is resorting to emails to contact its customers.	3.048	1.396

Source: Prepared by the researcher based on the SPSS 26 output

Form the results in the table above, we note that the third item is ranked first with a mean of 3.952 and a standard deviation of 1.058. This shows the sample members agreement on the importance of the internet in developing and improving the Pension Fund's services. The first item ranks second with a mean of 3.738 and a standard deviation of 1.211. It shows that the sample members agree on the existence of a communication network with the other services of the Fund to improve its services. In the third place is the second item with a mean of 3.333 and a standard deviation of 1.162 which shows the sample individuals consensus on the Intranet existence within the Fund. Ranked fourth the last item with a mean of 3.048 and a standard deviation 3.048 and indicates that the sample members acknowledge the Fund's administration reliance on modern means of communication such as emails.

5.5 Descriptive Statistics Results of the Dependent Variable

Table 5. The arithmetic Averages and the Standard Deviations of the Dependent Variable

Items	Arithmetic Average	Standard Deviation
The Fund's administration seeks to provide advanced models reflecting the current and future needs	4.048	0.936
The Fund aims at innovative services easily accessible by the individuals	3.905	0.821
« The Retiree Space » helps to verify the authenticity of the submitted documents and to eliminate the trouble of commuting to the Fund.	4.238	0.532

The valuation Platform helps identify the amount of grants and pensions and simulates pensions for the Fund's affiliates.	4.105	0.863
The Retiree Space application enables the retirees to drag a ticket remotely without commuting to the Fund	4.143	1.002
The file tracking platform helps track the different Processing stages of the affiliates' retirement application file.	3.524	1.418
The Fund makes use of various communication channels to promote its services.	3.,500	1.174

Source: Prepared by the researcher based on the SPSS 26 output

From the results in the table above, we note that the third item ranked first with a mean of 4.238 and a standard deviation of 0.532. This indicates that the sample agree on the importance of the retiree App in bringing the fund closer to its customers. In the second place, the sample agreed on the Fund's role in facilitating the interaction between individuals and the Fund via the electronic ticket with a mean of 4.143 and a standard deviation of 1.002. In the third place is the appraisal Platform whose role is to determine the amount of the pensions and simulate them with a mean of 4.105 and a standard deviation of 0.863. In the fourth place is the Fund endeavors to provide sophisticated models for the benefit of the retirees with a mean of 4.048 and a standard deviation of 0,936. Fifth is the agreement of the sample members that the Pension Fund provides innovative services for its affiliates with a mean of 3,905 and a standard deviation of 0.821. In the sixth place, is the importance of creating a platform to track the retirees' files with a mean of 3.524 and a standard deviation of 1.418. In the last place, we find the last item with a mean of 3,5 and a standard deviation of 1.174 which shows the importance of using different communications channels to promote the Fund's services.

6. Hypotheses Testing:

We will test the study assumptions to know whether there is a statistical relationship between the independent variables and the dependent one via the simple linear regression model.

We will put forward the null hypotheses that can be accepted or rejected. We will decide to accept the null hypothesis H_0 if the significance value sig is greater than the desired significance level 5 %, and the null hypothesis will be rejected if the significance value is less than the desired significance level.

6.1 Testing the First Hypothesis:

H_0 : there is no statistically significant effect of human element availability in improving the Pension Fund's services.

H_1 : there is a significant impact of the availability of the human element in improving the Pension Fund services.

We verify if the hypothesis is correct through the following table:

Table 6. Analysis of the Simple Regression for testing the First Hypothesis

The variable	R	R ²	Test F	SIG	Coefficient β	Test T	SIG
Hypothesis 1	0.856	0.734	90.236	0.00	0.649	9.499	0.00

Source: Prepared by the researcher based on the SPSS 26 output

From the table, we note that the value of the correlation coefficient between the first independent variable and the dependent variable is $R = 0.856$ and indicates the existence of a strong correlation between both variables.

- The selection value reached $R^2 = 0.734$ which means that the changes occurring in the coefficient of the independent variable represents 73.4 % of the changes occurring in the dependent variable.
- And it is statistically accepted based on the value of the T- test of 9.499 with a significance level of 0.00 which is less than 0.05.
- The degree of effect β reached 0.649 and it means that there is an effect relationship between the two variables.

Thus, the null hypothesis is rejected and the alternative hypothesis “There is a significant impact of the availability of the human element on improving the Pension Fund’s services.” Is accepted.

6.2 Testing the Second Hypothesis:

H_0 : There is no significant effect of having the necessary hardware components in improving the Pension Fund’s services.

H_1 : There is a significant effect of the availability of the necessary physical components in improving the Pension Fund’s services.

We verify the hypothesis is correct through the following table:

Table 7. Simple Regression Analysis for the Second Hypothesis test

The variable	R	R ²	F Test -	SIG	Coefficient β	T- Test	SIG
Hypothesis2	0.719	0.517	11.59	0.00	0.617	3.175	0.00

Source: Prepared by the researcher based on the SPSS 26 output

From the table, we note that the value of the correlation coefficient between the second independent variable and the dependent variable is $R = 0.719$ and it indicates the existence of a strong correlation between both variables.

- The selection value is $R^2 = 0.517$ which means that the changes occurring in the independent coefficient represents a rate of 51% of the changes occurring in the dependent variable.
- It is statistically accepted based on the value of a T- test which of 3.175 with a significance level of 0.00 which is less than 0.05.
- The degree of β effect is 0.617 which means that there is an effect relationship between the two variables.

Thus, the null hypothesis is rejected and the alternative hypothesis “There is a significant impact of the availability of the necessary hardware components on improving the Pension Fund’s services.” Is accepted.

6. 3 Testing the Third Hypothesis:

H₀: There is no statistically significant effect of the telecommunications and networks in improving the Pension Fund's services.

H₁: There is a statistically significant effect of the telecommunications and networks in improving the Pension Fund's services.

We verify whether the hypothesis is correct through the following table:

Table 8. Simple Regression Analysis for the Third Hypothesis Test

The variable	R	R ²	F-Test	SIG	Coefficient β	T- Test	SIG
Hypothesis3	0.518	0.268	26.04	0.00	0.473	7.601	.00

Source: Prepared by the researcher based on the SPSS 26 output

From the table that the value of the correlation coefficient between the second independent variable and the dependent variable is R=0.518 and it indicates the existence of a relationship between both variables.

- The selection value was R² =0.268 that is the changes in the independent variable represents a percentage of 26% of the changes occurring in the dependent variable.
- It is statistically accepted based on the value of the T- test of 7.601 at a significance level of 0.00 which is less than 0.05.
- The degree of β effect is 0.473 which means that there is an effect relationship between the two variables.
- Therefore, the null hypothesis is rejected and the alternative hypothesis "There is a statistically significant effect of the telecommunications and the networks in improving the Pension Fund's services." Is accepted.

7. Conclusion

In our study, we came up with the following findings:

- Information technology includes new highly efficient methods leading to interconnecting computers and networks (Intranet) to be able to process and communicate information electronically.
- Information technology plays a major role in enhancing the efficiency and effectiveness of administrative operations of organizations. These processes are now effectively being done electronically reducing the time taken to complete the work.
- Thanks to technological innovations, the Algerian Pension Fund seeks to improve the quality of its services and to meet the retirees' needs in modern and efficient ways, thereby enhancing the affiliate's satisfaction and enhancing the Fund's financial sustainability.
- There is a statistically significant effect of the human availability in improving the Fund's services which confirms the first hypothesis is true.
- There is a statistically significant effect of the presence of the necessary physical components in improving the Fund's services which confirms the second hypothesis is true.
- There is a statistically significant effect of telecommunications and networks in improving the Fund's services since they facilitate many of its operations and enhance its affiliate's satisfaction. This confirms the third hypothesis is true.

Recommendations

- Conducting training courses on the use of Information Technology for new staff and organizing training courses for senior staff to ensure an efficient and effective use of technology by staff.
- Work to exploit the media space to promote the Pension Fund's electronic products and to contribute to spreading awareness and educating the public on the benefits of electronic transactions, and minimizing the need for paper transactions and making actual visits to the Fund's offices.

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