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# Exploratory Study about Information Systems efficiency in "Biocare" Pharmaceutical Industry Company -El Tarf-

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*Abstract*

The research paper aims to know Information Systems efficiency at Biocare Company in the state of Al Tarf, in order to achieve the objectives of study, a questionnaire has been prepared consists of 3 dimensions (Information requirements, Administrative requirements, and Technical and Technological requirements) distributed in its final form to a random sample of (50) individuals, the outputs were analyzed by using the Statistical Program for Social Sciences (SPSS) in its 26 edition. The study found a series of results, the most important of which were significant differences in administrative, technical and technological requirements indicating socio-demographic variables (job position, work experience, and educational level) at the moral level ($\alpha \leq 0.05$).

**Keywords:** Information Systems efficiency; Biocare Company; Information requirements; Administrative requirements; Technical and Technological requirements.

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## 1. INTRODUCTION

Organizations have recently been experiencing a state of progress and sophistication in using information and technological systems also programs that improve performance and achieve goals, but it face many stresses and problems in their different environments that can hinder the achievement of this goal such as economic stagnation and intense competition, so these Institutions are trying to find competitive strategies to ensure their survival and continuity, In the same context **Information Systems** (ISs) are among the most important strategies, it plays a crucial role in the development of modern business organizations by providing with different appropriate information in the most specified time for all levels with the improvement of Functions and Admistrative tasks, in addition to supporting the development of Communications Process, and Information Flow, besides to its reliance on Technical Tools, and Modern Technological Means for enhancing the implementation speed and increasing the mastery skill at work.

**Study Problem:**

Currently, some companies specializing in pharmaceutical industries are applying digital and information systems, such as **Propharmal, Somedial, Evolab, Biopharme,** and **Profam,** Algerian government has decided that pharmaceutical companies must now use an Information System that allows simulations of counting and analysis of application and production plans, to ensure a clear vision of the stock of pharmaceutical materials and the development of annual import estimation programs. Therefore, the problem of the research paper can be posed in the following question:

**- Does Biocare Pharmaceutical Industries have an efficient Information Systems?**

The following sub questions can be formulated:

- Does Biocare Company meets requirements in information systems ?

- Does Demographic and Professional variables affect the level of information systems efficiency in Biocare Company ?

**Study Purpose:**

This research paper aims to determine the effectiveness of the presence of information system requirements through a case study of Biocare Company, which located in the state of Tarf at the country of Algeria.

**Study Methodology:**

In the theoretical aspect, the descriptive methodology was used to examine the literature about information systems, while in the applied aspect; analytical and a case study methodologies were used to determine the effectiveness of information systems at Biocare Company.

**Literature Review:**

There are many studies and researches that address the same variable like our current research studies, but from different angles and perspectives:

- The most recent study is the one conducted by **Veronika Huck-Fries & Others**. (2023), which aimed to demonstrate the impact of job satisfaction on the development of agile information systems from the perspective of stakeholders, the researchers used a mixed methods approach, first identify predictors of SJS in an exploratory case study, Second develop theoretical model that was evaluated with a survey of agile ISD stakeholder, the study concluded that agile ISD practices have a positive effect on job satisfaction.

- The Research of **Ali khalaf GATEA & Others**. (2021) aimed to highlight the impact of information systems on human resource efficiency and their ability to improve performance and decision-making, the field study was based on the examination and sampling of a number of companies in the Iraq environment-governorate of Dhi Qar, the study concluded that human resources in study sample units have the minimum required knowledge about information systems at all levels of management, In order to improve productivity and efficiency.

- Another study by **Agathe Lefèvre Fouache**. (2018), that discussed about the efficiency of the information system in improving the quality of pharmaceutical production in France, the study found that ISs in Pharmaceutical Industries allow in particular to monitor different aspects of the quality process such as document management, changes in staff training or even anomalies, One of the advantages that can bringing these systems saves time by computer agents who realize tasks in parallel with routine system actions.

- Furthermore, **Christophe LEGRENZI**. (2015) agreed that the information systems are a major strategic challenge for organizations in all economic sectors, because the huge amount of spending which ranges between 20% to 100% of the countries' budget, the study concluded that it's important to define; Information, Information technology, Digital and ISs to better understand the issues economic and provide

tangible elements to decision makers, in order to improve their use and management for the benefit of business competitiveness.

- During the same year, **Thomas Pouvreau**. (2015) that tried to find out the nature of work information systems in the pharmaceutical industry, and the most important approaches to detect risks in the health sector, the study found that information system is an integral part of the quality of the organization's system, also organizations must be flexible to adopt technological developments in order to achieve profits, Finally the necessity of effective management information systems in organizations to comply with regulatory requirements in the pharmaceutical industries.

The current study has many differences and similarities with previous studies mentioned above, It attempted to address the importance of Information Systems within economic organizations and to link them to specialized companies in the pharmaceutical industries, But at the practical level the researcher wanted to know the availability of Information, Administrative, Technical and Technological requirements for the effectiveness in Biocare information systems.

## 2. Theoretical Background

### 2.1 ISs Definitions:

Information systems emerged from the big economic and technical transformations, and the need to for the rapid processing and transfer of information, **GLACSI (1986)** dealt with information system as " a set of human and material means and attached methods for processing the various forms of data within the institution" (Habiche, 2021, p. 31), **(Loukis,1994)** sees information systems as " the set of procedures, software, machines, structures, and necessary methodologies for data processing and retrieval that are necessary for the management of the organization" (GATEA, GALI, & DAOOD, 2021, p. 479), also it is defined by **(Laudon, 2002)** as "a set of interrelated elements that work together to collect, retrieve, process, and store information to support decision-making, coordination, control, analysis, and observation in the organization" **(Kessira & Fodil, 2018, p. 52)**.

For **(Al-Salmi, 2005)**, he defined it as "a set of inputs that represent the processed various data to obtain outputs that are essential to satisfying the responses that are needed to be achieved from the system" (GATEA, GALI, & DAOOD, 2021, p. 479)**,** According to the Algerian law **n° 04-09** issued on **05 August 2009** in **Article 02** Information system is "Isolated or linked program or package containing certain

elements for automated data processing" (Journal Officiel Of Algerian Republic, 2009, p. 04), so in short the following definitions can be found:

- ✓ Information systems are interrelated Componants that disseminate information to support decision making, analysis and visualization in an organization (Bouafia & Molnár, 2019, p. 20), also to help managers and workers to solve problems and spur innovation and creativity (C. Laudon & P. Laudon, 2014, p. 45).
- ✓ ISs are the study of complementary networks of hardware and software that people and organizations use to create and distribute useful data (Bouafia & Molnár, 2019, p. 20).

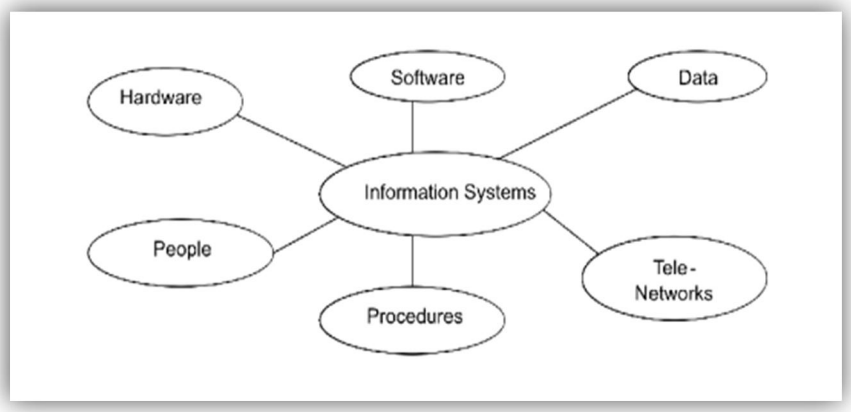
**2.2 Componants of ISs:**

Researchers and specialists have differents point of views about the divisions and componants of information systems, However the basic elements that must be available can be summarized as follows:

- **Hardware and Software:** Hardware is all the physical elements, tools, machinery equipment including means of input and output, used in the aspect of telecommunications network infrastructure, such as light pen, touch-sensitive screen, mouse, printer and plotters, scanners, copiers, projection screens, electrical control devices, keyboard, and wireless two key mouse, 3D capabilities, wireless digital pen, optical character reader, magnetic ink character recognition devices, types of photocopiers and multimedia (boutebia & amriou, 2022, p. 29), while Software is the common term used to describe any operating system or programs used by the computer, Software varies from; temporary freebies, licensed and non-free software, and public software (Mahadi, Tiara, Haslina, & Hafez, 2019, p. 355).
- **Data:** is not only raw materials for information systems, however it is an important resource of the system's recources that should be effectively managed to achieve the needed benefit.
- **Procedures:** are the instructions of individuals who use information systems , they include implementing the practical rules of the system, user responsibilities, and plans to deal with the problems of the system's operations (Hassan Bashier, 2021, p. 59).
- **Human Resoueces:** each organization using information systems needs individuals for operating and managing the systems, Thus training and development are very essential that must be updated for this resource.

- **Communication networks**: it includes all kinds of connections and arrengements of networks and stations used in coordinating data and information flow with the system componants to easily information access, additionally some specialists see them as a part of the hardware and equipments, Internet, web , and the associated work technology also provide an interactive environment that invests the available resources for providing activities to fufil the objectives of organization (AlNajjar, 2010, pp. 57-58).

**Fig. 01: Components of Information systems**




**Source:** (Subudhi, 2013, p. 16)**.**

**2.3 Advantages of ISs for An Organization:**

The aim of using ISs in institutions is to meet the information needs of users in all of the departments,The important features of information systems are as the following:

- This involves analyzing the organization's goals and objectives and determining the required information to support them, any decision or intervention implemented through informatics, has the potential to be extremely low cost and improve the performance of the organization.

- This involves developing reporting and analytics tools that can generate meaningful insights from the data and communicating those insights to decision-makers and other stakeholders to support their decision-making processes (Cantarelli, 2023, pp. 53-54).

- Another area of the information systems usage is the collecting, saving and processing of documentation and information regarding the operation of nuclear power units, Information systems of this type containing databases, are used to support the decommissioning process of power units, Such systems provide for the collection, storage, processing and presentation of data necessary for planning,

project development and decommissioning of the NPP unit (Alyokhina, 2023, pp. 3898-3899).

- ISs often share their knowledge and skills when they interact with their business colleagues, especially when the latter encounter difficult-touse technologies and face task-related conflicts from newly adopted systems, When IS carry out such actions, they affect users' perceptions of an information system, influencing them to use the information system as fully as possible and in novel improvised way (Karimikia, Safari, & Singh, 2020, pp. 429-430).
- ISs can improving communication and interaction in the organization, by providing tools needed for communication, such as chats or forums, and it supports interaction by making required content available to fellow employees, Especially for teams that are geographically dispersed, such a virtual social environment can help to overcome geographical barriers, This environment provides easy to use virtual communication tools and ensures that all group members have the same level of knowledge.

## 3. The Field Study

This part shows the methodological and applied procedures used in the study which will allow obtaining the needed results and discussing them according to the questions and hypotheses.

### 3.1 Study Procedures:

Survey research requires the necessity of describing the study population and its sample, highlighting its characteristics, the statistical treatments and methods adopted in the analysis, also ensuring the validity and reliability of the study tool to reach accurate outputs.

#### 3.1.1. Community and Sample Study:

It consists of all employees working for the parent company Biocare Pharmaceutical Industry located in the State of El Tarf (Algeria), 70 questionnaires were distributed randomly, of which 50 were retrieved for analysis according to statistical custom.

#### 3.1.2. Tools and Methods:

This study relied on a set of statistical methods that can be presented as follows:

-**Frequencies and percentages** to analyze the outputs of the sample's demographic and professional characteristics;

- **Arithmetic means** to find out the level of each dimension and the standard deviation to measure the degree of dispersion of answers from their arithmetic mean**;**

- **Cronbach's Alfa stability coefficient** to measure the stability of the study tool;

- **Pearson correlation coefficient** to ensure the structural validity of the study tool;
- **One sample-test** to find out the dimensions availability of the study variable;
- **One-way Anova-test** to measure the significant differences according to the dimensions of the study variable.

### 3.1.3. Design and construction of the study tool:

The research questionnaire was used to see the efficiency of information system, after reviewing various previous literatures, this questionnaire was formed from two axes, the first represents Demographic and Professional Characteristics information of the study sample, while the second was allocated to dimensions of the study. In the same context, the **5 point Likert scale** was relied upon to see the degree of approval dimensions as follows:

**Table 1. 5 Point Likert scale**

| Rating | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---|---|---|---|---|---|
| **Grade** | 1 | 2 | 3 | 4 | 5 |

**Source:** Literature Review.

### 3.1.4. The validity and reliability of the study tool:

Honesty is one of the basic requirements to be met in the search tool for the purpose to which it was created, and is divided into:

- **Apparent honesty (validity):** The research form was submitted to a group of specialized professors and referees in order to benefit from their proposals on the construction of the questionnaire, taking into account their different views on the integrity of the wording about the phrases, and to modify outlier paragraphs in order to present it in its final form.
- **Constructive honesty:** by calculating the correlation coefficients between the dimensions of the study variable and the tool, the results are shown in the following table:

**Table 2. Measuring the Constructive validity of the study tool**

| Dimensions | Correlation coefficient | significance level |
|---|---|---|
| **Information Requirements** | 0.799** | 0.000 |
| **administrative requirements** | 0.915** | 0.000 |
| **Technical and technological requirements** | 0.940** | 0.000 |

**Source:** prepared by researcher based on Spss/IBM26 results.

**** Statistically significant ($\alpha \leq 0.01$).**

Through the above table we notice that the correlation coefficients for the dimensions of information systems (administrative requirements, technical and technological requirements) were at a high degree, while the value of the information requirements dimension was almost high, which indicates that the questionnaire is characterized by a high degree of validity.

- concerning stability, the **Cronbach's Alpha coefficient** was used and the results were compared with the hypothetical value of 0.70 as follows:

**Table 3. Test stability of the study instrument**

| Statement | Number of Phases | Stability Coefficient |
|---|---|---|
| **Information requirements** | 05 | 0.500 |
| **Administrative requirements** | 05 | 0.785 |
| **Technical and technological requirements** | 05 | 0.865 |
| **Information Systems variable** | **15** | **0.893** |

**Source:** prepared by researcher based on Spss/IBM26 results.

According to Table (3), the results of the Alpha Cronbach coefficient for the dimensions of information systems (administrative requirements and technical and technological requirements) were greater than the comparative value except for the information requirements dimension. Moreover, the value of the variable was also estimated at 0.893, it is greater than 0.70, which confirms the stability of the study tool.

### 3.1.5. Study Sample Characteristics Analysis:

Which the next table refers to:

**Table 4. Demographic and professional Characteristics of Sample**

| Characteristics | Categories | Frequency (Percentage %) |
|---|---|---|
| **Gender** | **male** | 26 (52) |
| | **female** | 24 (48) |
| **Age** | $< 30$ | 12 (24) |
| | $[30-40[$ | 26 (52) |
| | $[40-50[$ | 11 (22) |
| | $\geq 50$ | 01 (02) |
| **job position** | **Department head** | 06 (12) |
| | **Cadre** | 09 (18) |
| | **assigned assistant** | 11 (22) |
| | **administrative assistant** | 11 (22) |
| | **Executive worker** | 13 (26) |
| **Work Experience** | $< 05$ | 13 (26) |
| | $[05-10[$ | 23 (46) |
| | $[10-15[$ | 14 (28) |
| **Educational level** | **Secondary Education** | 05 (10) |
| | **Vocational Education** | 08 (16) |
| | **University Education** | 37 (74) |

**Source:** Prepared by researcher based on Excel outputs.

We see in the table that most of the study sample are males with a percentage of 52%, ages of 30 to less than 40 years old with a percentage of 52%, occupying the position of assigned assistant or administrative assistant with a total percentage of 44%, the work experience ranged between 5 to less than 10 years old at a rate of 46%, and those with a university level at a rate of 74%.

### 3.2. Approval of study dimensions:

The results of the study sample's attitudes about all dimensions are shown in the following table:

**Table 5. Attitudes of the Sample about Study Dimensions**

| Dimensions | Arithmetic mean | Standard deviation | arrangement | Approval degree |
|---|---|---|---|---|
| **Information requirements** | 4.32 | 0.51 | **3** | High |
| **administrative requirements** | 4.44 | 0.54 | **1** | High |
| **technical and technological requirements** | 4.43 | 0.53 | **2** | High |

**Source:** prepared by researcher based on Spss/IBM26 results.

According to Table (5), the degree of agreement on information requirements dimension was high, with an arithmetic mean of 4.32 and a standard deviation of 0.51, also about of the administrative requirements, the approval degree of this dimension was high, with an arithmetic mean of 4.44 and a standard deviation of 0.54, finally technical and technological requirements dimension was with a high degree of approval also, with an arithmetic mean of 4.43 and a standard deviation of 0.53.

### 3.3. Study Hypotheses Test:

Two main hypotheses have been put in the research which are:

#### 3.3.1. The First main hypothesis:

It states: "There is no efficient requirement of information systems in the institution under study according to view point of sample individuals at a significant level ($\alpha \leq 0.05$)", and these hypothesis are divided into the following sub-hypotheses:

$\boldsymbol{H_0}$: "there are no Information requirements in the institution under study according to view point of sample individuals at a significant level ($\alpha \leq 0.05$)".

$\boldsymbol{H_0'}$**:** "there no administrative requirements in the institution under study according to view point of sample individuals at a significant level ($\alpha \leq 0.05$)."

$H_0^{"}$**:** "there are no technical and technological requirements in the institution under study according to view point of sample individuals at a significant level ($\alpha \leq 0.05$)."

- In order to test these hypotheses, a **(One-sample t-test)** was used and the results are clear in the following table:

**Table 6. Study Dimensions Availability**

| Dimension | T Value | Degree of Freedom ddl | Significance Level (Sig) | Mean | Standard Error |
|---|---|---|---|---|---|
| **Information requirements** | 31.607 | 49 | 0.000 | 4.32 | 0.041 |
| **administrative requirements** | 25.456 | 49 | 0.000 | 4.444 | 0.056 |
| **Technical and technological requirements** | 24.427 | 49 | 0.000 | 4.47 | 0.060 |

**Source:** prepared by researcher based on Spss/IBM26 results.

According to the table (6):

- for information requirements dimension the mean 4.32 is greater than the comparative value of 3, and the calculated T is greater than tabulated, therefore it is statistically significant (0.000) less than 0.05, So we reject the null hypothesis and accept the alternative hypothesis of information requirements availability.

- about administrative requirements dimensions the mean is 4.44 greater than the comparative value of 3, and the calculated t is greater than tabulated, also it is statistically significant (0.000) less than 0.05, So we accept the alternative hypothesis of administrative requirements availability in institution under study.

- the mean in technical and technological requirements was 4.47 greater than the comparative value of 3, and the calculated t is greater than tabulated, also it is statistically significant (0.000) less than 0.05, Therefore we reject the null hypothesis and accept of the availability of this dimension in institution under study.

➊ Generally, depending on all the above-mentioned results Based on the previous sub-tests, **we accept the alternative hypothesis** in which there is efficiency for the information systems variable according to point view of sample individuals in institution under study.

**3.3.2. The Second main hypothesis:**

Indicates that: "There are no significant differences between the attitudes of study sample about information systems efficiency due demographic and professional

variables **(job position, work experience, and educational level)** at a significant level ($\alpha \leq 0.05$)", these hypotheses are divided into the following sub-hypotheses:

$H_0$**:**"There are no statistically significant differences between the attitudes of the study sample on information requirements due demographic and professional variables at a significant level ($\alpha \leq 0.05$)."

$H_0^{'}$**:**"There are no statistically significant differences in the attitudes of the study sample about administrative requirements due demographic and professional variables at a significant level ($\alpha \leq 0.05$)."

$H_0^{''}$**:**"There are no statistically significant differences between the attitudes of the study sample regarding the technical and technological requirements due demographic and professional variables at a significant level ($\alpha \leq 0.05$)."

We will use a **One-way Anova** In order to test these hypotheses:

**Table 7. Outputs of One-way Anova about Information Requirements**

| variable | Source of Variance | Sum of squares | Degree of Freedom | Mean squares | Fisher coefficient F | Significance Level (Sig) |
|---|---|---|---|---|---|---|
| **Job position** | **between groups** | 0.472 | 4 | 0.118 | 1.406 | 0.247 |
| | **within groups** | 3.775 | 45 | 0.084 | | |
| | **Total** | 4.247 | 49 | | | |
| **Work Experience** | **between groups** | 0.027 | 2 | 0.013 | 0.150 | 0.862 |
| | **within groups** | 4.220 | 47 | 0.090 | | |
| | **Total** | 4.247 | 49 | | | 0.042 |
| **Educational Level** | **between groups** | 0.535 | 2 | 0.267 | 3.386 | 0.042 |
| | **within groups** | 3.712 | 47 | 0.079 | | |
| | **Total** | 4.247 | 49 | | | |

**Source:** prepared by researcher based on Spss/IBM26 results.

Results of the previous table indicate that there is no effect of the statistically significant differences about information requirements, According to the variables (job position and work experience), values of the significance level were greater than 0.05 meaning that there are no statistical significance, except for the educational level, so the null hypothesis can be partially accepted with no significant differences for the study sample's attitudes about information requirements.

**Table 8. Outputs of One-way Anova about Administrative Requirements**

| variable | Source of Variance | Sum of squares | Degree of Freedom | Mean squares | Fisher coefficient F | Significance Level (Sig) |
|---|---|---|---|---|---|---|
| **Job position** | **between groups** | 2.433 | 4 | 0.608 | 5.061 | 0.002 |
| | **within groups** | 5.407 | 45 | 0.120 | | |
| | **Total** | 7.840 | 49 | | | |
| **Work Experience** | **between groups** | 0.204 | 2 | 0.102 | 0.628 | 0.538 |
| | **within groups** | 7.636 | 47 | 0.162 | | |
| | **Total** | 7.840 | 49 | | | |
| **Educational Level** | **between groups** | 1.969 | 2 | 0.984 | 7.881 | 0.001 |
| | **within groups** | 5.871 | 47 | 0.125 | | |
| | **Total** | 7.840 | 49 | | | |

**Source:** prepared by researcher based on Spss/IBM26 results.

According to the above table we see that there are significant differences about administrative requirements, with regard to the variables of job position and educational level whose values were less than 0.05, While work experience variable had a significant value of greater than 5%, which means that there is no statistically significant effect, in general the alternative hypothesis can be partially accepted with significant differences in the attitudes of the study sample about administrative requirements.

**Table 9. Outputs of One-way Anova about Technical and Technological Requirements**

| variable | Source of Variance | Sum of squares | Degree of Freedom | Mean squares | Fisher coefficient F | Significance Level (Sig) |
|---|---|---|---|---|---|---|
| **Job position** | **between groups** | 3.098 | 4 | 0.775 | 6.061 | 0.001 |
| | **within groups** | 5.751 | 45 | 0.128 | | |
| | **Total** | 8.849 | 49 | | | |
| **Work Experience** | **between groups** | 0.113 | 2 | 0.056 | 303 | 0.740 |
| | **within groups** | 8.736 | 47 | 0.186 | | |
| | **Total** | 8.849 | 49 | | | |
| **Educational Level** | **between groups** | 2.949 | 2 | 1.474 | 11.745 | 0.000 |
| | **within groups** | 5.900 | 47 | 0.126 | | |
| | **Total** | 8.849 | 49 | | | |

**Source:** prepared by researcher based on Spss/IBM26 results.

In table (10), we see that there are significant differences about technical and technogical requirements, with regard to the variables of job position and educational level whose values were less than 0.05, while the variable of work experience had a significant value of greater than 5%, Generally, the alternative hypothesis can be partially accepted with significant differences in the attitudes of the study sample about technical and technological requirements.

➋ Based on the previous sub-tests, **we partially accept the alternative hypothesis** with significant differences in the attitudes of study sample individuals due personal and professional variables (job position, work experience, and educational level) about information systems efficiency.

## 4. CONCLUSION

The study dealt with the information systems issue and the extent to which its basic requirements are applied according the employees point of view of under study, by measuring their attitudes and their agreement about dimensions, In order to obtain an effective and development information system, The research paper concluded a set of results, the most important of which are the following:

- ✓ Organizations use information systems to facilitate decision-making processes and put effective plans and strategies, also information systems provide security in conducting tasks and transactions within institutions;
- ✓ The study sample individuals agreement about the information requirements dimension with an arithmetic mean of 4.32 and a standard deviation of 0.51;
- ✓ The study sample individuals agreement about the administrative requirements dimension, with an arithmetic mean of 4.44 and a standard deviation of 0.54;
- ✓ The study sample individuals agreement about the technical and technological requirements dimension with an arithmetic mean of 4.43 and a standard deviation of 0.53;
- ✓ Availability of information requirements according to view point of the sample individuals in the institution under study at a significant level ($\alpha \leq 0.05$);
- ✓ Availability of administrative requirements according to view point of the sample individuals in the institution under study at a significant level ($\alpha \leq 0.05$);
- ✓ Availability of technical and technological requirements according to view point of the sample individuals in the institution under study at a significant level ($\alpha \leq 0.05$);

- ✓ No significant differences between the attitudes of the study sample about information requirements due demographic and professional variables (job position, work experience, and educational level) at a significant level ($\alpha \leq 0.05$).
- ✓ There are significant differences between the attitudes of the study sample about administrative and technical/technological requirements due demographic and professional variables (job position, work experience, and educational level) at a significant level ($\alpha \leq 0.05$).

**Suggestions and Recommendation:**

According to the results, some of the following proposals can be recommended:

- Putting information systems based on the use of modern technologies that provide data automatically at the lowest costs, and trying to get rid of paper files and documents gradually;
- Providing specialized and trained human resources - financial resources in terms of computers, communication networks and media, which are necessary for using information systems safely and effectively;
- urging employees and making them aware of the importance of means, devices, and software by which knowledge base systems are used for making various administrative and strategic decisions;
- The need to involve workers in institutions and business organizations in developing the management information system, and submitting proposals through a periodic survey of their opinions as one of the most effective bases for evaluating the effectiveness of information systems;
- Integration of universities and scientific institutes with the management administrative information systems in institutions within their specializations and academic courses.

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