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Information Technology Infrastructure and its Impact on the Innovation Performance of Employees: A Survey Study of the Opinions of a Sample of Employees in Iraqi University Libraries

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Abstract. *The research aims to answer the research question (How can information technology infrastructure affect employee innovation performance?). The dimensions (computers and accessories, software and databases, information and communications networks, and human resources) were adopted to measure the variable of information technology infrastructure. The variable of employee innovation performance was calculated based on the dimensions (flexibility, fluency, originality, and sensitivity to problems). A questionnaire was used as a data collection tool. A research sample of 87 individuals from the study community from the libraries of the University of Karbala was selected using a comprehensive enumeration method, representing 93% of the employees. The community as a whole was studied, and to analyze the sample's responses, a set of statistical methods was adopted, including (standard deviation, response intensity, impact factor, and structural equation modeling). The research came up with some conclusions, including that libraries face limited capabilities in the communications and networking system, which is a decisive factor that negatively impacts the investment in technology to obtain the required support on time or to achieve smooth communication with beneficiaries. The researched libraries are also weak in providing their employees with a specialized technical team for technical support and advice, especially since most are not specialized in office or technology.*

Keywords: *Information technology infrastructure, innovation performance, Iraqi university libraries.*

1- Research Methodology

1-1- The Research Problem

Successive technological developments and the increasing quantity and quality of information resources globally represent challenges that cast a shadow over various institutions, particularly knowledge-based ones. This necessitates that those in charge of these institutions reshape their skills and methods of performing their assigned tasks, especially given the limited financial resources allocated to these institutions, which can limit their ability to keep pace with rapid developments in information resources and the accelerating changes in beneficiaries' needs for information resources and services. Accordingly, the innovation performance factor of employees emerges as an effective and key tool in achieving optimal investment in available technology, ensuring the highest levels of performance and service delivery. The main research problem is summarized in the attempt to answer the research question (How can information technology infrastructures affect the innovation performance of employees?) Some sub-questions branch out from this main question, namely:

1- To what extent is the information technology infrastructure sufficient for the work undertaken by the libraries under study?

2- What is the level of innovation performance of the staff in the researched libraries?

3- What is the nature of the relationship between information technology infrastructure and the innovation performance of the staff in the researched libraries at the aggregate level and the level of the dimensions of the information technology infrastructure?

1-2- The importance of the research

The importance of the research emerges from two directions:

The first direction: The scientific significance of the study, which stems from the following points:

1- The importance of the research variables is among the critical variables at the level of knowledge and information institutions, especially university libraries, which are the primary supporters of scientific research in universities and research centers.

2- The research attempts to complement the previous cognitive efforts of researchers to ensure the achievement of new results.

3- At the local level, there is a limited scope for studying research variables within the library environment in general, particularly university libraries. Therefore, this research represents a modest contribution to bridging this knowledge gap.

The second direction: The practical importance of the research stems from the following points:

1. The results obtained can serve as a roadmap for the researched libraries and their counterparts to activate the role of information technology in enhancing the innovation performance of staff, ensuring the highest levels of performance, and improving the quality of services provided to beneficiaries.

2. Drawing the attention of senior management in the researched libraries to the importance of technology and its effectiveness in influencing staff performance.

1-3- Research Objectives

1. Shed light on the information technology infrastructure in the researched libraries.

2. Study the reality and trends of staff innovation performance.

3. Explore the influence of information technology infrastructure on the innovation performance of staff in the researched libraries at the overall level and the dimensions of the information technology infrastructure.

1-4- Hypotheses and Hypothetical Plan of the Research

1-4-1- Research Measures

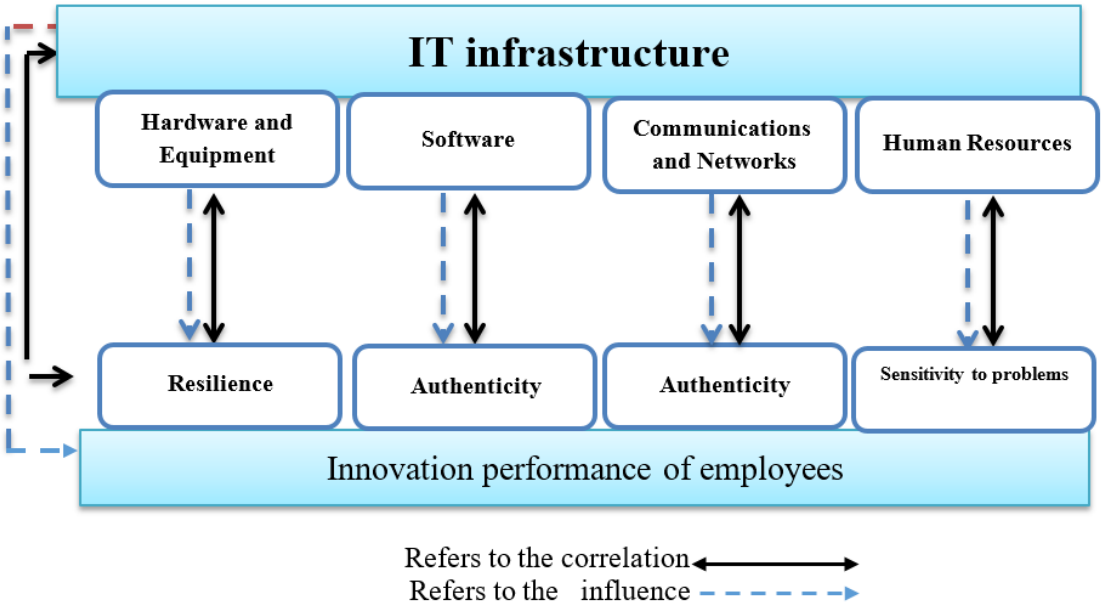
The measures shown in Table (1) were adopted to achieve the research objectives, which indicate the specific measure for each variable and its associated dimensions.

Table 1 illustrates the measures adopted to determine the dimensions of the research variables.

	Variable	Dimensions	Scale
1	IT Infrastructure Variable	**Hardware and Equipment**	Yassin, 2012
		Software	
		Communications and Networks	
		Human Resources	
2	Innovation performance	**Resilience**	Purnomo, 2019
		fluency	
		Authenticity	
		Sensitivity to problems	

"Source prepared by the researcher based on the literature mentioned in the table."

1-4-2- Hypothetical diagram and research hypotheses



"Figure (1) The hypothetical model of the research"

"*Source: Prepared by the researcher based on the mentioned sources".

The research is based on a main hypothesis: "There is a significant influence between the information technology infrastructure variable and its dimensions on the innovation performance variable of employees." From this, four sub-hypotheses branch out as follows:

1. (H1-1): There is a "significant influence between" hardware and equipment and the innovation performance of employees in the libraries studied.
2. (H1-2): There is a "significant influence between" software and the innovation performance of employees in the libraries studied.
3. (H1-3): There is a "significant influence between" communications and networks and the innovation performance of employees in the libraries studied.
4. (H1-4): There is a "significant influence between" human resources and the innovation performance of employees in the libraries studied.

1-5- Research Boundaries

- Spatial Boundaries / University of Karbala.
- Temporal Boundaries / September 1, 2024 - February 1, 2025

1-6- Research Community and Sample

The research community is represented by the employees of the General Secretariat of the Central Library of the University of Karbala and its affiliated branch libraries (college libraries and research centers), which are represented by:

1- The University's Central Library (42 employees).

2- Branch Libraries consist of 20 branch libraries for 17 colleges and three research centers. These branch libraries include 51 employees, meaning the total population was 93 employees, and the research sample was 87 respondents, as the entire population was studied.

1-7- Research Methodology and Data Collection Tools

The survey method was adopted to conduct the research and arrive at the final results. The following data collection tools were also used:

- Literature related to both the topics of information technology infrastructure and employee innovation performance.

- Questionnaire: A three-part questionnaire was prepared, including the following:

Axis One: Description of the research sample.

Axis Two: Paragraphs related to the independent variable of the research (information technology infrastructure) included (20) paragraphs prepared based on the sources mentioned in Table No. (1).

Axis Three: Paragraphs related to the dependent variable (employee innovation performance) included (20) paragraphs prepared based on the criteria in Table No. (1).

(93) questionnaires were distributed to the research population of (93), of which (87) were returned and valid for research purposes, representing a percentage of (94%).

1-8- Previous Studies

Many studies have addressed the research variables, but sometimes separately, linking them to other variables, and sometimes through different fields of application outside the scope of libraries and office work. Some studies that are similar to the current research will be reviewed. The research paper by Asante (2013) aimed to study the impact of technology on organizations in terms of business costs, customer satisfaction, quality, risk management, human resources, management functions, and implementation time. The study by Kimani (2015) aimed to determine the level of information technology use and its relationship to employee performance in the Kenyan Population Services Corporation. The study revealed a positive relationship between information technology use and organizational performance. The study recommended expanding the provision of information technology infrastructure to achieve the highest levels of performance and innovation at work. The study by Attahir (2018) discussed the creative and innovative skills necessary for librarians in the twenty-first century to achieve optimal performance in academic libraries and ensure the best services to beneficiaries, as they face challenges. Libraries face challenges that require fundamental changes in the practice of their daily functions and a review of the nature of their role and objectives. This cannot be achieved without the workers in these libraries investing in technology to support their creative and innovative performance and change the way and method of working with beneficiaries. As for Kahfi (2022), his research studied the impact of digital technology on the adaptation and performance of employees in institutions. To maintain the development of work, it is necessary to understand the impact of information technology on employees. The results indicate that the use of technology positively impacts the productivity, efficiency, and flexibility of employees at work. Thus, the institution can improve its overall performance by relying on technology. However, employees face difficulties in dealing with technology, which requires effective methods for managing change, such as training and support. As for the study (Prasetyamto & et al., 2024) aimed to study how technological progress can support the improvement of knowledge exchange, absorptive capacity, skills, and innovation among employees, thus enhancing efficiency in achieving organizational goals. The research concluded that the integration of artificial intelligence improves the link between innovation and the innovation performance of employees. Still, it does not fundamentally impact the relationship between knowledge exchange and ability, comprehension, skills, and innovation performance. The study offers theoretical and practical contributions to support the decision-making process in technology policies within the creative sector. Given the presentation of previous studies, it should be noted that the current study benefited from reviewing previous studies in selecting the dimensions of the research variables and drawing on these studies to choose appropriate statistical methods for analyzing the sample's responses.

Furthermore, it enriched the theoretical aspect of the study. The current study differs from previous studies in that it combined two variables (information technology infrastructure and employee innovation performance) and studied them in office development. To the researcher's knowledge, this topic has not been previously studied within the field of specialization at the local level.

2- The Theoretical Aspect of the Research

2-1- Information Technology Infrastructure (Concept / Importance / Dimensions / Challenges Facing It)

2-1-1- The Concept of Information Technology Infrastructure

UNESCO defines information technology as "the application of modern technology, including computers, satellites, and other advanced technologies, to produce, store, retrieve, distribute, and transmit analog and digital information from one location to another" (Musa, 2022: 8). It can also be referred to as "a set of methods, production processes, software, and technical means that combine in a technological chain whose application ensures the collection, storage, processing, output, and distribution of information to reduce labor intensity in the use of information resources, as well as increase their efficiency and reliability" (Zhenyi, Zhao, 2024: 925).

Information technology infrastructure can be defined as a set of materials that can be used together and are the basis for enabling technology-based services in organizations" (Serly et al., 2024: 925). 3037).

According to the current research vision, information technology infrastructure can be defined as (the various modern technological resources relied upon to carry out organizational work, consisting of smart devices, computers and their accessories, software, artificial intelligence systems, expert systems, long-range information and communications networks, and qualified human resources to invest and utilize these resources optimally to develop work methods within organizations and communicate with the beneficiaries of each organization's services.

2-1-2- The Importance of Information Technology Infrastructure in Information Institutions

The importance of information and communications technology is reflected in all activities of information institutions, which are represented by the following (Jude & Doris, 2015: 53):

1- Technical Work: Information technology infrastructure can support technical work in information institutions, such as collaborative indexing of information resources with similar institutions or classifying information resources. These infrastructures can also be used to complete the supply chain of traditional or electronic information resources, and they represent an important tool in achieving an annual or monthly inventory of information resources.

2- Supporting Administrative Functions: IT infrastructures can support administrative functions in information institutions, such as planning, implementation, monitoring, and evaluation activities, as well as decision-making processes based on the accurate information they provide about the organization's overall operations and activities.

3- Supporting Information Services Provided to Users: IT infrastructures can be used to support information services provided to users, such as lending, reference services, and selective dissemination of information, as well as translation, abstracting, and indexing.

4- Supporting Organizational Resources: IT infrastructures can be a crucial tool in addressing the severe funding shortages faced by most information institutions and the direct impact this has on acquiring and processing information resources and methods of delivering services to users. It also plays a significant role in bridging the human resource shortage facing most information institutions globally.

5- Controlling global intellectual output as much as possible: Information institutions face a real challenge in acquiring and selecting appropriate information sources for their service users, particularly with the unprecedented increase in intellectual output published globally, both traditionally and electronically. This necessitates that information institutions invest in their information technology infrastructure to find appropriate solutions to this problem.

2-1-3- Dimensions of the IT infrastructure variable

To determine the dimensions of the IT infrastructure variable, the scale (Yassin, 2012) was adopted, which consists of four dimensions (computers and accessories, software and databases, information and communications networks, and human resources). These dimensions can be described as follows:

1- **Computers and accessories:** This refers to the "physical hardware," represented by the various types of computers organizations use in their work, from mainframes to tablets. Smartphones can currently be included, as they can also be used to receive or provide services to beneficiaries. It

consists of primary processing and storage devices, while peripheral devices include all input, output, and secondary storage methods and technologies.

2- **Software and Databases:** This refers to various types of software, including system software, which represents the primary tool for managing computer resources, and application software, which can provide various services, ranging from general software to specialized and utility software. Databases also represent a distinct and unique type of software application, which can be considered an important tool in organizing the assets of knowledge-based information institutions.

3- **Information and Communications Networks:** This refers to all resources used for communicating or exchanging data, from physical communication and networking devices and data transfer protocols to various types of information networks (the Internet, the intranet, the extranet), each of which can be relied upon according to its intended function.

4- **Human Resources:** This dimension may represent a distinct dimension in importance compared to the previous dimensions, as it is the primary tool to optimize the investment of the dimensions, as mentioned earlier. These resources include technical personnel and technicians in computers, software, and networks, who are responsible for creating the organization's projects and computerizing its services. They also play a role in training employees on the projects they adopt, and they play a vital role in monitoring each project's ongoing development and maintenance.

2-1-4- Challenges Facing an Information Technology Infrastructure

Institutions, including information institutions, face challenges in adopting modern technology to carry out their work and provide services to beneficiaries. These challenges are particularly relevant to information technology infrastructure and the determinants of its investment and employment in the workplace. According to the researcher's opinion, these challenges can be divided according to each component of the information technology infrastructure, as follows:

1- **Computers and Accessories:** Computers and their accessories face challenges, particularly the obsolescence of these devices and their associated equipment. The pace of developments in processing speed and storage capacities is accelerating, as well as the varying durability of devices. Institutions face difficulties keeping up with these developments, whether by acquiring the latest or upgrading existing devices, due to the limited financial budgets allocated to these institutions. These institutions also face difficulty controlling the storage of information resources due to the unprecedented amount of intellectual output, which has significantly exceeded traditional intellectual output. This requires renting more virtual storage space or purchasing additional external storage equipment.

2- **Software and Databases:** Organizations face challenges related to the succession of unprecedented developments in the field of software of various types. These developments, especially with artificial intelligence capabilities, pose financial challenges for purchasing software licenses. The greatest challenge is retraining employees to use and employ these software programs each time the organization voluntarily switches to them, or as a mandatory requirement imposed by the external work environment. Furthermore, data security issues have become a real challenge in all areas that utilize information technology.

3- **Information and Communications Networks**: The most prominent challenges facing information organizations in this area are related to the obsolescence of communications and networking equipment and the periodic maintenance of these devices and equipment. Furthermore, there is the issue of the adequacy of data transfer speeds for information organizations' operations. Here, too, financial, administrative, and technical allocations become prominent, directly impacting the quality of the adopted networks.

4- **Human Resources:** The challenges facing human resources in the field of information technology infrastructure include the following:

- There is a significant shortage of specialized technical competencies in hardware maintenance, software, or information and communications networks.

- There is an urgent need to retrain technical specialists, as the capabilities of specialists are rapidly becoming obsolete with the emergence of new technologies.
- In conjunction with each new technology adopted, the need for continuous training for employees in information institutions entails financial obligations for such training.
- Technological illiteracy: (Al-Taie, 2015, 62) This challenge relates to the lack of technological knowledge and expertise among employees and the beneficiaries to whom services are provided. The institution needs to adopt an effective strategy to address this challenge.
- Resistance to change: Resistance to change also represents a major challenge for information institutions, whether this resistance comes from the institution's employees or its beneficiaries.

2-2- Innovation performance (Concept/Importance/Dimensions/Challenges Facing It)

2-2-1- The Concept of Employee Innovation Performance

The concept of performance refers to: an individual's ability to achieve their job objectives within the organization, the output they achieve when carrying out the tasks assigned to them, and how their behavior interacts. Interaction is determined by effort, capabilities, and attention to responsibilities, duties, and activities (Kruger & Stcyn, 2014: 109).

While the concept of innovation refers to the creation of new ideas, the search for modern methods of work, the search for unique value, and the ability to solve problems. It also represents a comprehensive, integrative process that includes an interconnected set of systems and processes within the organization (Al-Ali, 2020: 43). Employee innovation performance refers to the ability of individuals to find and generate new ideas that serve organizations, their procedures, processes, and the workplace (Sharifirad, 2016: 18). It is also an individual-level phenomenon adopted by organizations to produce unique, creative ideas that add value to the work style and service delivery (Yeh & Huan, 2017: 120).

Based on the above, and following the current research perspective, employee innovation performance can be defined as the exceptional ability of employees to produce and generate new, creative, and unconventional ideas to complete the tasks and assignments assigned to them. These ideas contribute to adding value that positively impacts the organization's overall performance. It should be noted that this ability often varies among individual employees, but ultimately, they can be integrated and achieve the desired positive outcome.

2-2-2- The Importance of Employee Innovation Performance

Employee innovation performance is one of the important factors in the development of any organization. The importance of this performance can be summarized as follows: Employee innovation from the researcher's perspective is discussed as follows:

1- The importance of innovation performance for organizations: Innovation helps organizations maintain a proactive competitive advantage through continuous improvement methods based on employee innovation performance. It can also help organizations address work problems in a scientifically studied manner through the creative solutions that are presented and adopted. It also increases organizational flexibility in the face of changes within the work environment and achieves optimal investment of organizational resources.

2- The importance of employee innovation performance: Employee innovation performance contributes to increasing employees' ability to learn and develop from the prevailing creative work methods and culture within the work environment. These methods help improve the conditions for completing the assigned tasks and duties, motivating them always to deliver their best.

3- The Importance of Innovation Performance by Beneficiaries: The innovation performance of employees represents an important tool that contributes to developing and raising the level of services provided to the organization's beneficiaries. This helps ensure that beneficiaries consistently receive the highest quality of service, while diversifying the methods of providing these services and increasing beneficiaries' satisfaction with what they receive.

2-2-3- Dimensions of Employee Innovation Performance

To determine the dimensions of employee innovation performance, the Purnomo (2019) scale was adopted, due to its compatibility with the objectives and community of the current research. This scale includes four dimensions (flexibility, fluency, originality, and sensitivity to problems), which the current research can express according to their use in information institutions as follows:

1- **Flexibility** refers to employees' ability to employ new ideas and combine them with prevailing ideas and work methods to achieve a higher level of work value. This also includes employees' ability to transition from one idea to another and link ideas together at the individual and collective levels, constantly renewing work methods, problem-solving methods, and providing information services to beneficiaries at the highest level.

2- **Fluency:** This refers to employees' ability to generate the greatest possible number of new ideas by studying the business's need for development or improvement methods, then proceeding with the freedom to propose appropriate solutions and possible alternatives for each case, ensuring the transition to an improvement mode and the successful adoption of this improvement.

3- **Originality:** This refers to employees' ability to offer unique and valuable ideas to improve current work methods, find solutions to prevailing problems in the field, or even find unconventional methods to improve the management and use of organizational resources, ensuring optimal investment of these resources.

4- **Sensitivity to Problems**: This refers to employees' ability to deeply understand the current work environment prevailing within and outside the organization, and their ability to link the mutual influences between the two environments and the extent of their impact on work methods and service delivery to beneficiaries. This understanding helps employees anticipate future transformations and problems that represent organizational challenges.

2-2-4- Challenges Facing Employee Innovation Performance

There are several challenges facing employees' adoption of an innovation performance approach, which can be identified as follows:

1- Organizational Challenges: These challenges include:

- Work environment conditions and requirements can sometimes be stressful for employees.
- Lack of financial resources to support the adoption and implementation of new ideas.
- Excessive bureaucracy and routine force employees to adhere to established work methods and refrain from deviating from them for any reason.
- Lack of motivational and encouraging tools adopted by senior management to increase employee innovation performance.

2- Individual Challenges: These include:

- Fear of making mistakes or committing errors: Many creative employees try to avoid making mistakes, which often leads to reluctance to propose new ideas or implement unconventional creative ideas.
- Procrastination and postponement: These personality traits are evident in some creative individuals who often possess creative ideas but fall victim to procrastination and repeated postponement for personal reasons or fear of taking risks.
- Poor training and ongoing qualification of employees, as well as the resulting loss of experience, directly impact their innovation performance.
- Improper time management: Some creative individuals face the problem of allocating and investing their time optimally, which impacts their performance in implementing their proposed ideas.

3- Field-Based Research

Data from the three axes of the questionnaire were analyzed: the first axis (description of the research

sample), the second axis (information technology infrastructure with its dimensions: hardware and associated equipment, software, information and communications networks, and human resources), and finally, the third axis (innovation performance of employees with its dimensions: flexibility, originality, fluency, and sensitivity to problems) was analyzed. The following will be completed:

3-1- Description of the research sample

Table No. (2) shows the description of the research sample.

	Description	Category	repetition	%
1	Gender	Males	25	%29
		Females	62	%71
2	Age Group	35-25	3	%3
		45-36	27	%31
		55-46	30	%34
		+56	27	%32
3	Educational Attainment	Technical Diploma	6	%7
		Bachelor's	54	%62
		Higher Diploma	2	%2
		Master's	23	%27
		Doctorate	2	%2
4	Years of Experience in the Library	5-1	9	%10
		10-6	12	%14
		15-11	35	%40
		+16	31	%36
5	Specialization	Office Worker	11	%13
		IT Specialist (Computers/Networks/Communications/Programming)	7	%8
		Other Specialties	69	%79

"Source: Prepared by the researcher based on field data."

Table No. (2) The description of the research sample shows that the sample, according to gender, represented the highest category of workers (females) at 71% compared to males, which represented a rate of 29%. As for the description of the sample according to age, the age group (46-55) represented the highest percentage (56%), which is a good percentage in the field of benefiting from the accumulation of experiences. The lowest percentage (3%) was represented by the age group (25-35). The reason for the small size of this category may be due to the small number of appointments distributed to the staff of the researched libraries for the last ten years, as the researched libraries face a shortage in the number of human cadres that are supported from time to time, especially with cases of retirement or transfer, which are often not compensated. As for the description of the sample according to educational attainment, the highest percentage (62%) was represented by the category of bachelor's degree holders. This indicates that more than half of the workers in the researched libraries hold high academic qualifications that are appropriate for promoting the development of information services provided to beneficiaries, compared to the lowest percentage (4%) distributed among two categories (high diploma holders It is often a scientific degree granted by limited specializations and universities, and the category of doctorate holders. The small size of this category may be due to the preference of most university graduates for teaching tasks (working in teaching) and trying to stay away from working on administrative tasks. As for describing the research sample according to years of work in libraries, the percentages showed that the highest percentage (40%) was for the category (11-15 years). This indicates that nearly half of the workers in libraries are those who have worked in them for a sufficient period to accumulate experience, which is a positive indication of the ability of this category to be familiar with the nature of the work and functions of the researched libraries, which can contribute to increasing their ability to analyze jobs and collect information, in addition to their ability to present ideas and suggestions that suit the possibility of planning to develop their work method with a high level of performance. As for describing the sample according to specialization, the sample description showed that the highest percentage (69%) of workers were not specialized in

the library or technology, which is a percentage that draws attention to the importance and role of continuous training in library services and functions, in addition to the technological skills that support the functions and work of libraries. As for what is related to the two lowest categories, specialists who hold Library qualifications are often unattainable because this specialization is considered a rare one locally. As for information technology specializations, there is often a scramble to attract this segment from all university departments and formations, which makes it difficult for library management to obtain additional specialists.

3-2- Scale Reliability and Normal Distribution Tests:

Cronbach's alpha test was used second to guarantee the internal consistency of the questionnaire, thereby verifying the dependability of the study instrument. According to Sekaran & Bougie (2016), Cronbach's alpha value was 0.70 or more, which is reasonable. This score guarantees that the questionnaire has strong internal consistency and that, should the instrument be re-administered under the same circumstances, the gathered data will be consistent and repeatable, lowering the likelihood of mistakes and improving the validity of the findings.

Moreover, their distribution was investigated by applying skewness and kurtosis factors to guarantee that the gathered data fairly reflects the research population. Guidelines of Hair et al. (2010) defined acceptable values within the range (+1.96, 1.96). The data followed a normal distribution, according to the findings showing that all skewness and kurtosis coefficients for the research variables were within this range. This sort of statistics demands the assumption of a normal distribution of data. Hence, parametric statistical techniques may be applied in the analysis.

Table [3] Normal distribution of dimensions and objects and reliability coefficient

Variables	Dimensions	Number of paragraphs	stability coefficient	Skewness	Kurtosis
IT Infrastructure	Hardware and Equipment	5	79.5%	1.654	-1.675
	Software	5	86.2%	1.432	-1.430
	Communications and Networks	5	89.3%	1.922	-1.897
	Human Resources	5	88.6%	0.975	-0.899
All paragraphs of the IT infrastructure dimensions		20	83.6%	0.601	-0.575
Innovation performance	Resilience	5	89.9%	1.007	-1.102
	fluency	5	92.8%	1.219	-1.197
	Authenticity	5	91.1%	1.769	-1.654
	Sensitivity to problems	5	86.6%	0.653	-0.569
All paragraphs of the dimensions of the innovation performance of employees		20	83.6%	0.601	-0.575

"Source prepared by the researcher based on the SPSS program".

- Cronbach's alpha test revealed that all research axes attained suitable degrees of dependability at each axis's individual and scale levels. This suggests that the questionnaire is marked by excellent internal consistency and that the questions fairly and consistently measure the intended topics.
- All values of these coefficients lie within the reasonable bounds (+1.96, -1.96), according to data distribution analysis employing skewness and kurtosis coefficients. This suggests that every object and measurement of the research variables has a normal distribution. Consequently, it may be said that the data have a symmetrically distributed nature, which facilitates parametric statistical techniques supposing this kind of distribution.

3-3- Sample Response Descriptive Analysis

The study's results are summarized in this part by analyzing the opinions and preferences of 87 library personnel. It uses descriptive statistical analyses (arithmetic mean, standard deviation, relative importance, level, and direction of response) for each variable under study to determine the level of agreement about the measurement tool's suitability to their attitudes. Therefore, a five-point Likert scale may be tabulated to extract categories to assess the research sample's reaction to the study

items. The categories are determined by finding the range (5-1=4), dividing by the number of categories (5) (4/5=0.80), and adding 0.80 to the minimum. Table 4 indicates the degree of distinction between response level and direction. At the same time, the relative importance is determined by dividing the lowest and highest categories by the highest gradation on the five-point Likert scale (5).

Table (4) Study variable availability standard

Answer scale	Answer direction	weighted average		Weights	
Very Good	Strongly agree	4.21	5	84.2%	100%
Good	Agree	3.41	4.2	68.2%	84%
Average	Neutral	2.61	3.4	%52.2	68%
Weak	Disagree	1.81	2.6	36.2%	52%
Very Weak	Strongly disagree	1	1.8	20%	36%

Akadiri O. P. (2011), Development of Multi-Criteria Approach for Selection: Wolver Hampton, U.K.

The characteristics were ordered and prioritized by relative relevance to analyze the primary dimensions and variables, reflecting the library's highest availability and interest.

3-3-1- Information Technology Infrastructure Variable: -

The following table and graphic provide a high-level overview of the IT infrastructure variables' findings. It attained a relative importance of 60.3%, a mean of 3.02, an average level, and a trend toward neutrality with a standard deviation of 1.58. According to the results, the researched libraries had an average interest in the IT infrastructure. As far as the dimensions were concerned, it was mostly neutral, according to the following:

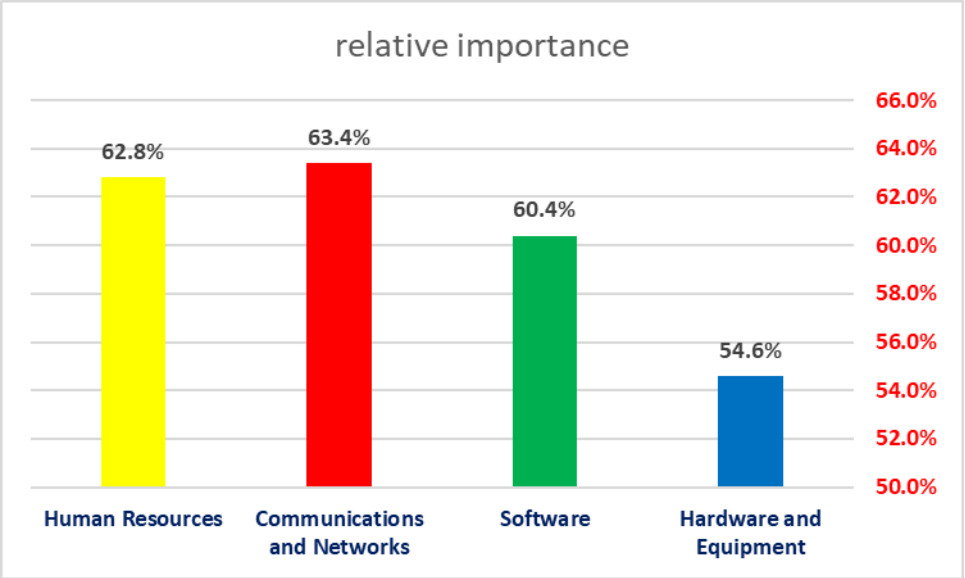
- With an arithmetic mean of 2.73 and a standard deviation of 1.60, it finished in last position regarding the degree of availability and interest of the investigated libraries after computers and accessories. According to the findings, the investigated libraries devote typical attention to computers and accessories. The availability of printers and accessories in enough numbers to satisfy employment demands clearly shows this. It also revealed that libraries are eager to replace these tools and accessories routinely. Furthermore, libraries have an average capacity in terms of the availability of sophisticated computers, enough to control the nature of their operations.
- With a relative relevance of (60.4%), an arithmetic mean of (3.02), and a standard deviation of (1.69), it ranked third in terms of the degree of availability and interest of the investigated libraries following (software and databases). The results demonstrate that the investigated libraries had an average curiosity about the features of databases and software. This is clear from the application's regular communication with clients with the same degree of adaptability and its typical capacity to satisfy consumer wants without waiting.
- With a relative relevance of (63.4%), an arithmetic mean of (3.17), and a standard deviation of (1.50), it came in second in terms of the degree of availability and interest of the investigated libraries after (information and communication networks). The presence of an internal information network (Intranet) to guarantee the execution of job responsibilities in an integrated way indicates that the investigated libraries pay average attention to information and communication networks. Libraries also depend on a standard of efficient communication that ties their many sections and departments.
- With an arithmetic mean of 3.14 and a standard deviation of 1.51, it ranked second regarding the degree of availability and interest of the investigated libraries, behind human resources. The results demonstrate that the investigated libraries exhibit an average human resource interest. This is clear from the library management's eagerness to solve employee obsolescence of technology knowledge and skills, employing ongoing seminars and training. Furthermore, the libraries show an average capacity to draw competent and specialized professionals in information technologies.

Table 5: Descriptive criteria for the dimensions of the information technology infrastructure variable

	Dimensions of IT	MEAN	Answer	S.D	Agreement	Answer	No.

	infrastructure variables		direction		rate	level	
1	Hardware and Equipment	2.73	I disagree	1.60	54.6%	middle	4
2	Software	3.02	Neutral	1.69	60.4%	middle	3
3	Communications and Networks	3.17	Neutral	1.50	63.4%	middle	1
4	Human Resources	3.14	Neutral	1.51	62.8%	middle	2
IT infrastructure variable		3.02	Neutral	1.58	60.3%	middle	

"Source: SPSS V.28 outputs"



"Figure (2) Relative importance of the dimensions of the information technology infrastructure variable"

"SOURCE: SPSS V.28 OUTPUTS"

3-3-2 Variable for Innovation performance

The outcomes of the innovation performance variable are generally summarized in the table and figure that follow. With a standard deviation of 1.22 and a relative importance of 69.8 percent, it is evident that it attained an overall mean of 3.49, which is high, extremely close to the average, and tends toward agreement. According to the findings, the investigated libraries had an interest in and availability of resources that were highly relevant to the innovation performance of their staff, which was near average. In terms of the dimensions, the results demonstrated that there was a wide range of neutrality to high levels:

- With an arithmetic mean of 3.86 and a standard deviation of 1.16, it ranked first regarding the degree of availability and interest of the investigated libraries after flexibility. The findings show that the employees of the examined libraries have a great degree of freedom. Their persistent eagerness to adjust their working techniques to achieve the best ones and examine ideas that contradict their beliefs clearly and impartially shows this. Apart from their capacity to present fresh, more efficient ideas to accomplish the task, they also believe in the value of change and the need to adjust. They are eager to test new positive ideas free from preconceptions.
- Having a relative significance of (73.2%), an arithmetic mean of (3.66), and a standard deviation of (1.18), it came in second place in terms of the degree of availability and interest in the investigated libraries after fluency. The findings show that employees of the investigated libraries have rather high degrees of job security and self-confidence. Their adaptability and optimism in supporting colleagues in completing duties clearly show this, and their capacity to act fast and

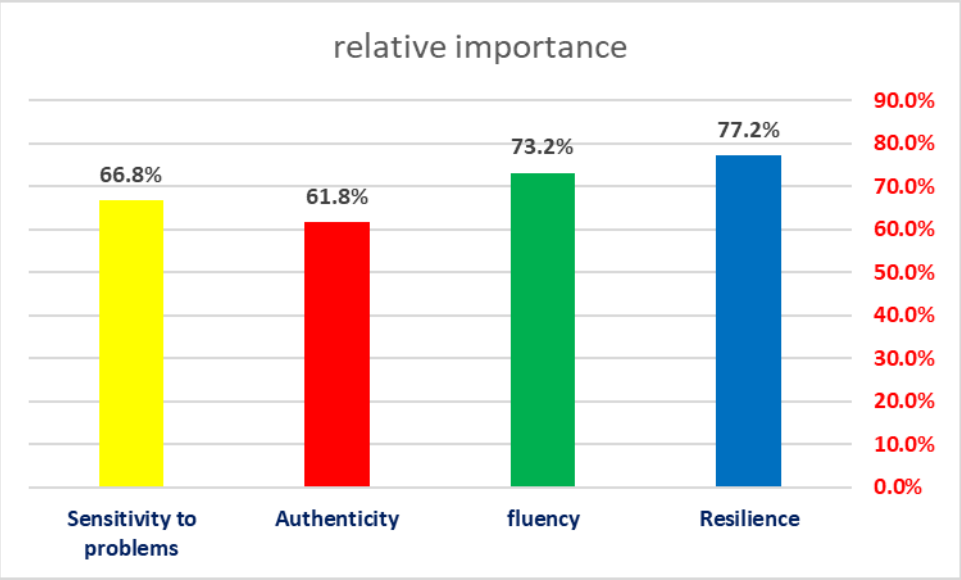
favorably under different working environments and demands. They inspire management to embrace fresh and innovative ideas, as they always seek them. Apart from their capacity to propose the fastest answers to address everyday challenges, they are eager to offer suggestions to satisfy job criteria and identify the required skills to carry out each concept.

- With an arithmetic mean of (3.09) and a standard deviation of (1.38), it ranked last in terms of the amount of availability and interest of the investigated libraries following (authenticity). The findings reveal that the average degree of uniqueness in the performance of the examined libraries defines the employees in them. Their eagerness to provide ideas fit for the capacity of the library to guarantee their quick execution and to create several options to address issues based on their kind of nature clearly shows this. While avoiding duplicating conventional answers to work difficulties, they are also eager to reformulate the work approach and attempt new ideas that have not been used before, striving to achieve the duties entrusted to them fresh way.
- Having a relative relevance of (66.8%), an arithmetic mean of (3.34), and a standard deviation of (1.14), it placed in third place in terms of the degree of availability and interest of the investigated libraries following (sensitivity to difficulties). The findings demonstrate that the average degree of awareness and sensitivity towards problems among the employees in the investigated libraries defines them. Their average eagerness to gather and examine facts for every issue before deciding on a course of action shows this. It enlightens colleagues about the scope of job challenges and their possible influence on the library. Apart from their average keenness to study the topic from several angles, they also exhibit an average degree of approaching work problems constructively and joyfully to solve them and possess the capacity to forecast work problems before they arise.

Table 6: Descriptive criteria for the dimensions of the innovation performance variable of employees

	Dimensions of the innovation performance variable	MEAN	Answer direction	S.D	Agreement rate	Answer level	No.
1	Resilience	3.86	Agreed	1.16	77.2%	High	1
2	fluency	3.66	Agreed	1.18	73.2%	High	2
3	Authenticity	3.09	Neutral	1.38	61.8%	Medium	4
4	Sensitivity to problems	3.34	Neutral	1.14	66.8%	Medium	3
The innovation performance variable		3.49	Agreed	1.22	69.8%	High	

"Source: SPSS V.28 outputs"



"Figure (3) shows the relative importance of the dimensions of the variable of innovation performance of employees".

3-4- Testing research hypotheses

1- The main hypothesis (H1): The sixth main hypothesis states: ("There is no statistically significant effect" of information technology infrastructure on the innovation performance of employees).

Sometimes known as structural equation modeling (SEM), this approach was used as the basis for confirmatory factor analysis (CFA) to ascertain how each item fits the dimension it was designed to measure. Dealing with many variables, confirmatory factor analysis (CFA) seeks to reduce them to a smaller set by evaluating the degree of alignment each item has with the theoretical dimension it was intended to measure. As shown in the following table, which summarizes the goodness-of-fit indicators based on the structural equation modeling approach, these variables need to meet goodness-of-fit criteria to guarantee correct interpretation of the confirmatory factor analysis of the study variables.

Table (7) Structural Modeling Equation Quality of Matching Indicators

Index	Rule
Root Mean Square Error of Approximation (RMSEA)	Less than (0.05) is acceptable, values between (0.05 - 0.08) are good, values between (0.10 - 0.08) are average, values greater than (0.10) are rejected.
Item Saturation Ratio	Greater than (0.40)
Comparative Fit Index (CFI)	The value range is between (0) - (1). Acceptance rule: greater than 0.90 and greater than 0.95 are acceptable.
Tucker Lewis Index (TLI)	
Goodness-of-Fit Index (GFI)	

"Source prepared by the researcher based on Hair et al." (2010)

Table 7 shows that a structural model whose dependability and plausibility were tested exceeded the required indications based on (Hair et al., 2010). The goodness-of-fit indicators for the structural equation model show high congruence, with the GFI reaching (1.00), the chi-square ratio to the degree of freedom reaching (4.087), the root mean square error of approximation (RMSEA) reaching (0.076), and the regression weights exceeding the saturation threshold of (0.40), as shown in the table below.

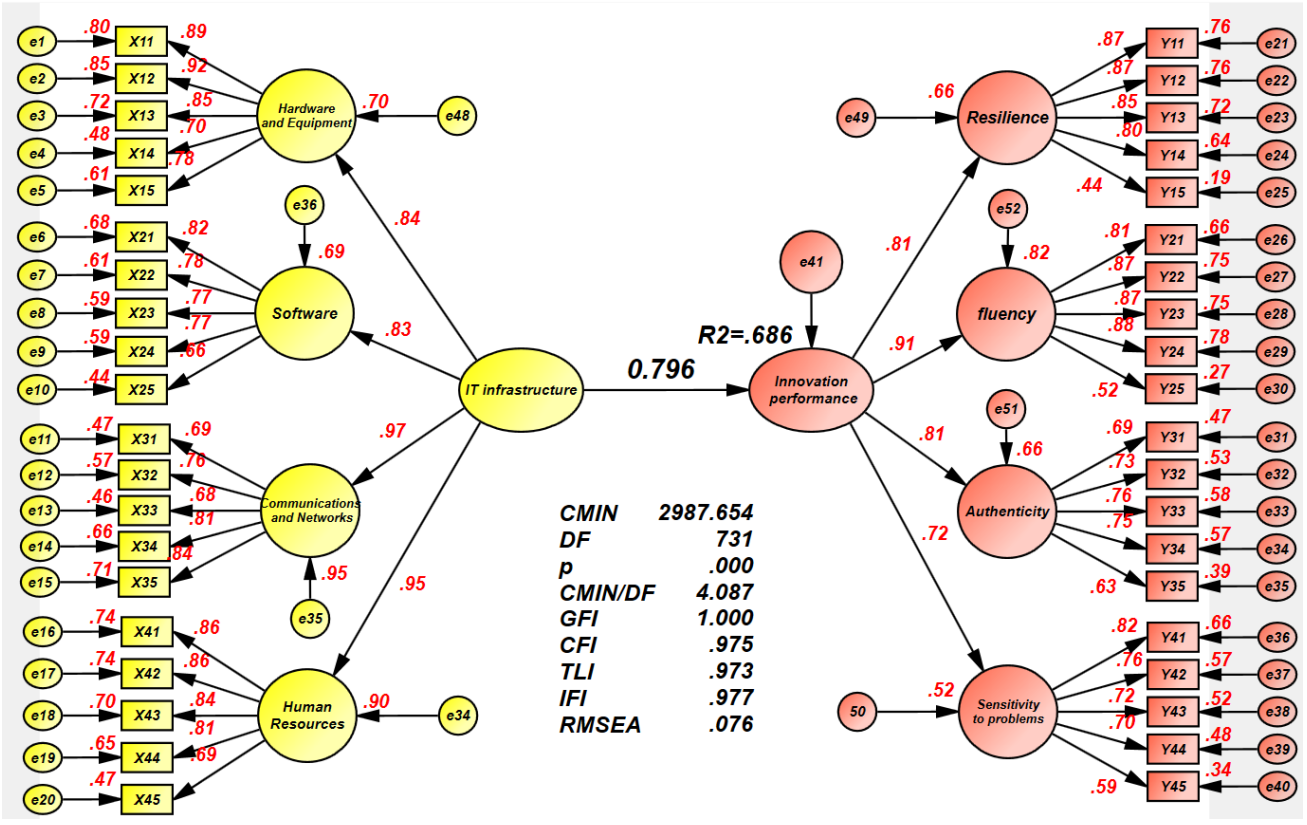
Table 8: Confirmatory factor analysis of research variables

item	path	The dimension	Estimate	S.E.	C.R.	P
X11	<---	**Hardware and Equipment**	.894			
X12	<---		.919	.033	28.315	***
X13	<---		.846	.036	23.612	***
X14	<---		.696	.039	16.756	***
X15	<---		.778	.041	20.142	***
X21	<---	**Software**	.824	.056	17.132	***
X22	<---		.779	.063	16.072	***
X23	<---		.768	.052	15.804	***
X24	<---		.771			
X25	<---		.662	.061	13.346	***
X31	<---	**Communications and Networks**	.687	.047	15.010	***
X32	<---		.758	.051	17.080	***
X33	<---		.681	.049	14.859	***
X34	<---		.813			
X35	<---		.840	.056	19.743	***
X41	<---	**Human Resources**	.857	.050	20.213	***
X42	<---		.859	.051	20.261	***
X43	<---		.839	.051	19.588	***

X44	<---		.807			
X45	<---		.687	.055	14.965	***
Y11	<---	**Resilience**	.872	.292	9.044	***
Y12	<---		.874	.305	9.050	***
Y13	<---		.847	.285	8.968	***
Y14	<---		.801	.273	8.814	***
Y15	<---		.440			
Y21	<---	**fluency**	.810	.214	10.743	***
Y22	<---		.866	.211	11.070	***
Y23	<---		.867	.202	11.074	***
Y24	<---		.881	.215	11.147	***
Y25	<---		.521			
Y31	<---	**Authenticity**	.687	.122	11.268	***
Y32	<---		.728	.106	11.758	***
Y33	<---		.763	.105	12.160	***
Y34	<---		.754	.101	12.063	***
Y35	<---		.628			
Y41	<---	**Sensitivity to problems**	.815	.117	11.689	***
Y42	<---		.756	.105	11.199	***
Y43	<---		.724	.109	10.907	***
Y44	<---		.695	.098	10.623	***
Y45	<---		.586			

"Source: AMOS Program Outputs"

These findings support the presence of a robust, statistically significant, favorable correlation between employee innovation performance and IT infrastructure. The structural model showed the robustness of this relationship: a one-unit increase in IT infrastructure significantly increases employee innovation performance by 0.796 ($p < 0.001$, critical value = 8.654, standard error = 0.065). These findings clearly show that the alternative hypothesis was accepted and the null hypothesis was disproved, based on which more attention to library IT infrastructure is strongly linked to higher employee innovation performance.



"Figure (4) The structural model of information technology infrastructure in the innovation performance of employees"

"Source: The researcher used "AMOS.V.26" statistics package results".

The findings show that IT infrastructure plays a major role in improving employees' innovation performance. However, this factor only accounts for 68.6% of the improvement, leaving room for additional, as-yet-unstudied, variables to influence 31.2% of employees' innovation performance.

Table 9: Final results of the direct impact of information technology infrastructure and employees' innovation performance

PATH			direct impact	standard error	critical value	R^2	Sig.
Information Technology Infrastructure	<--	Employees' innovation performance	0.796	0.065	8.654	68.6%	0.000

"Source: The researcher used "AMOS.V.26" statistics package results".

From the table below for analyzing the sub-hypotheses, the following is clear:

1. (H1-1): Equipment significantly affects library staff innovation.

An evaluation of the analytical results in the table indicates a considerable correlation between the variables. Alpha=1.54 and beta=0.671 were the fixed effect coefficients. The interpretation coefficient was 62.3 percent, and the impact is significant because the computed (F) value was greater than the tabular (F) value. The finding validates the idea. Libraries that pay attention to equipment, provide a specialized technical support department for computer and accessory maintenance, use cloud computing to manage their work, and provide printers and peripherals appropriate to their tasks will increase staff innovation.

2. (H1-2): The innovation performance of staff members in the investigated libraries shows a noteworthy correlation with software.

Reviewing the table's analytical figures helps us deduce a notable correlation between the two variables. With a=1.32, the fixed effect coefficient alpha had a value; b=0.589 was the value of the beta effect level. The interpretation coefficient has a value of 48.6%. The influence is noteworthy as the computed (F) value exceeded the tabular (F) value. This outcome verifies this theory. This shows that the more libraries pay close attention to software, embodied in their keenness to monitor and repair software malfunctioning and provide technical support, their possession of a comprehensive database with backup copies to ensure data integrity, and their dedication to provide and update licenses for protection and data security software, this favorably results in increased innovation performance among their employees.

3. (H1-3): The innovation performance of staff members in the libraries under observation shows a clear link between communications and networks.

Reviewing the table's analytical figures helps us deduce a notable correlation between the two variables. With a=1.56, the fixed effect coefficient alpha had a value; b=0.587 was the value of the beta effect level. The interpretation coefficient has a value of 46.9%. The influence is noteworthy as the computed (F) value exceeded the tabular (F) value. This outcome confirms the validity of this theory. This clarifies the reason libraries give communications and networks more importance. Their eagerness to modernize their systems to guarantee speed and efficiency in communication and work, develop their capacities in using internet applications to support their work and serve their beneficiaries, and supply adequate internet lines to complete tasks and provide services shows this. The rise in their staff members' innovation performance reflects this favorably.

4. (H1-4): There is a significant relationship between human resources and the innovation performance of employees in the libraries studied.

From a review of the analytical values in the table, we conclude that there is a significant relationship between the two variables. The value of the fixed effect coefficient alpha was (a=1.43) and the value of the beta effect level was (b=0.654). The value of the interpretation coefficient was 64.2%. The effect is significant because the calculated (F) value was higher than the tabular (F) value. This result supports this hypothesis. This is explained by the greater attention paid by libraries to human resources. This is evident in their commitment to providing training and technical support to beneficiaries when launching computerization projects for their services, providing a specialized technical team to advise all employees, and the library management's commitment to involving all employees in the technology projects they adopt. This has led to a positive increase in their innovation performance.

Table 10: Results of the influence relationships between the dimensions of information technology infrastructure and the innovation performance of employees

variable	Indicators	Recorded value	variable	Indicators	Recorded value
Hardware and Equipment	*F-Cal*	*54.165*	**Software**	*F-Cal*	*32.454*
	P	*0.000*		*P*	*0.000*
	R^2	*0.623*		R^2	*0.486*
	α	*1.54*		α	*1.32*
	β	*0.671*		β	*0.589*
Communications and Networks	*F-Cal*	*36.309*	**Human Resources**	*F-Cal*	*31.143*
	P	*0.000*		*P*	*0.000*
	R^2	*0.469*		R^2	*0.642*
	α	*1.56*		α	*1.43*
	β	*0.587*		β	*0.654*

F (0.05) =3.84 F (0.01) = 6.63

4- Conclusions and Recommendations

4-1- Conclusions

1- Given that most respondents' answers on most categories were neutral to agreed, interest in the elements of IT infrastructure was modest. This suggests that the libraries under observation should focus more on IT infrastructure.

2- Given majority of the responses of the research sample were neutral to high, there is modest to great interest in the innovation performance of staff. This suggests that the researched library staff's innovation performance has to be improved.

3- Enhancing the IT infrastructure helps to improve the innovation performance of personnel in the libraries under observation by showing a statistically significant correlation between them.

4- Higher innovation performance of personnel in the investigated libraries is favorably correlated with considerable investment in office equipment and technologies.

5- Much attention should be paid to ensuring and maintaining the required software and data security, thereby improving the creative output of the libraries' personnel.

6- The creative output of the libraries examined benefits from an emphasis on modernizing and growing communications and networks, as well as on using online technologies more widely.

7- Utilizing training, assistance, and participation in technological initiatives, a purposeful emphasis on developing human resources results in enhanced innovation performance among the staff members of the investigated libraries.

4- Recommendations

Some ideas and suggestions for libraries under research that will improve staff innovation performance in three different spheres using IT infrastructure:

1- Update hardware regularly to high standards, provide a comfortable workplace, and offer efficient technical support—hardware and accessories.

2- Software and databases: Provide contemporary, specialized tools; create thorough databases, including backup copies and current licenses.

3- Modernize network infrastructure, increase online applications, offer enough internet connections, and create safe networks.

4- Involve staff members in technological initiatives, promote an innovative culture, and give chances for professional growth using tailored training and continuous technical assistance.

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Appendix No. (1) Transcription of the research community's answers

First: Transcribing the answers to the independent variable (information technology infrastructure)

	A. Hardware and Accessories	**I totally agree**	**I agree**	**neutral**	**I disagree**	**I totally disagree**
1	The library possesses advanced computers sufficient for the nature of its work.	**45**	**3**	**2**	**2**	**35**
2	The library regularly updates its computers and accessories.	**13**	**2**	**6**	**20**	**46**
3	The library provides sufficient printers and accessories for the nature of its work.	**30**	**9**	**15**	**33**	**0**
4	The library relies on cloud computing to support its work.	**10**	**6**	**33**	**13**	**25**
5	The library provides a technical support department for the maintenance of computers and accessories.	**18**	**3**	**12**	**15**	**39**
	B. Software	**I totally agree**	**I agree**	**neutral**	**I disagree**	**I totally disagree**
6	The library relies on specialized software for office work.	**40**	**2**	**3**	**40**	**2**
7	The library keeps abreast of updates and developments in various software fields, particularly in its field of work.	**35**	**2**	**17**	**13**	**20**
8	The library is keen to provide software licenses for protection and data security programs and continuously strives to update them.	**6**	**9**	**5**	**29**	**38**
9	The library possesses a comprehensive database for all its work and is keen to provide backup copies of its contents to ensure they are not lost.	**42**	**6**	**0**	**15**	**24**
10	The library is keen to monitor work interruptions resulting from various software malfunctions and provides technical support.	**41**	**2**	**0**	**13**	**31**

	C. Information and Communications Networks	I totally agree	I agree	neutral	I disagree	I totally disagree
11	The library has an effective communications system that connects all its departments and branches.	35	7	8	37	0
12	The library provides an internal information network (intranet) to ensure the integrated completion of work tasks.	38	2	0	32	15
13	The library provides sufficient internet connections to carry out administrative and technical tasks, as well as to provide services to users.	20	15	5	33	14
14	The library is developing its capabilities to expand its use of internet applications to support its work and support the information services provided to users.	39	19	3	25	1
15	The library is committed to updating its communications and networking system to ensure speed, efficiency, and effectiveness in communication and work.	12	6	13	37	19
	D. Human Resources	**I totally agree**	**I agree**	**neutral**	**I disagree**	**I totally disagree**
16	The library attracts qualified and specialized individuals in the field of information technology.	3	6	22	39	17
17	The library administration is committed to addressing the obsolescence of the technological expertise and skills of its staff through ongoing courses and workshops.	38	2	7	18	22
18	The library administration is committed to involving all its employees in the technology projects it adopts.	64	12	6	5	0
19	The library provides a specialized technical support team to provide advice to all library staff.	3	6	15	51	12
20	The library is committed to providing training and technical support to its service users when launching a computerization project for one or more of its services.	41	2	3	34	7

Transcribing the research community's responses to the dependent variable (innovation performance of employees)

	A/ Flexibility	I totally agree	I agree	neutral	I disagree	I totally disagree
1	I possess the ability to propose new, more effective ideas to accomplish work.	49	22	3	13	0
2	I am keen to experiment with new, positive ideas and do not prejudge them.	23	12	33	4	15
3	I believe in the importance of change and the necessity of adapting to it.	32	18	37	0	0

4	I am keen to discuss opinions that differ from my own beliefs in an objective and neutral manner.	**54**	**12**	**19**	**2**	**0**
5	I am constantly keen to implement changes in work methods to ensure optimal ones.	**22**	**19**	**27**	**17**	**2**
	B/ Fluency	**I totally agree**	**I agree**	**neutral**	**I disagree**	**I totally disagree**
6	I possess the ability to suggest the fastest solutions to daily work problems.	**33**	**31**	**12**	**11**	**0**
7	I am keen to present ideas to meet work requirements while identifying the capabilities required to implement each idea.	**18**	**29**	**17**	**12**	**11**
8	I constantly seek new and creative ideas and encourage management to adopt them.	**41**	**26**	**20**	**0**	**0**
9	I possess the ability to think quickly and positively under various work conditions and pressures.	**17**	**22**	**32**	**14**	**2**
10	I am flexible and positive in helping colleagues accomplish their assigned tasks.	**22**	**13**	**27**	**15**	**10**
	C/ Originality	**I totally agree**	**I agree**	**neutral**	**I disagree**	**I totally disagree**
11	I am keen to complete the tasks assigned to me in a fresh approach.	**35**	**12**	**26**	**14**	**0**
12	I avoid re-implementing common solutions to work problems.	**17**	**22**	**2**	**25**	**21**
13	Ensure you reshape your work style and experiment with new, previously untested solutions.	**15**	**22**	**3**	**31**	**16**
14	Ensure you develop multiple alternatives to solve problems based on the nature of each problem.	**12**	**18**	**5**	**33**	**19**
15	Ensure you propose solutions that fit the library's capabilities to ensure immediate implementation.	**19**	**13**	**27**	**28**	**0**
	D/ Sensitivity to Problems	**I totally agree**	**I agree**	**neutral**	**I disagree**	**I totally disagree**
16	Ensure you examine the problem from multiple perspectives.	**12**	**22**	**39**	**12**	**2**
17	Have the ability to anticipate work problems before they occur.	**9**	**21**	**44**	**13**	**0**
18	Confront work problems with positivity and enthusiasm to address them.	**21**	**13**	**11**	**33**	**9**
19	Ensure you inform your colleagues of the dimensions of work problems and their potential impact on the library.	**25**	**28**	**4**	**24**	**6**
20	Ensure you collect and analyze data for each problem before making a decision.	**19**	**21**	**36**	**9**	**2**