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Human Perception of Intelligent Systems and Its Relationship to Professional Information Processing Among a Sample of Workers – The Biometric Technical Center – A Field Study in the City of Laghouat.

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Abstract :
The present study aimed to explore the relationship between the perception of smart systems and professional information processing among employees at the National Biometric Center in the Wilaya of Laghouat. Additionally, it sought to determine the levels of these variables and detect any statistically significant differences based on gender (male/female). To achieve these objectives, a descriptive correlational and comparative method was adopted. Appropriate psychometric measurement tools were applied to a sample of center employees. Following the statistical analysis of the data, the study revealed the following main results:

- There is a statistically significant positive (direct) correlational relationship between the perception of smart systems and professional information processing among the sample members.
- There are no statistically significant differences in the levels of perceiving smart systems and professional information processing attributable to the gender variable (males/females), reflecting cognitive and professional homogeneity within the digital work environment.

Based on these findings, the study recommended the necessity of enhancing digital awareness by organizing specialized training courses that focus on understanding the philosophy of smart systems. It also emphasized designing user-friendly interfaces to reduce cognitive load under work pressure and prioritizing the psychological and cognitive well-being of employees to minimize technical distractions.
Keywords: Perception of Smart Systems; Professional Information Processing.

Introduction:

The contemporary world is witnessing a radical transformation in the structure of jobs and professions as a result of the Fourth Industrial Revolution, as intelligent systems and artificial intelligence have infiltrated various sectors of work, thereby changing traditional conceptions of professional performance. The use of technology is no longer merely a supplementary option;

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rather, these systems have become an interactive partner that imposes on workers a new pattern of cognitive and professional response.

The problem does not lie in the existence of the intelligent system itself, but in the human worker's "perception" of it. In cognitive psychology, perception is the process through which sensory stimuli are organized and interpreted to construct meaning about the surrounding environment. In the work environment, the perception of intelligent systems constitutes a cognitive construct that includes the worker's expectations, attitudes, and sense of self-efficacy toward technology. If the worker perceives these systems as "supportive" and facilitating tools, this will be positively reflected in their cognitive readiness; however, if they perceive them as "complex" systems or as systems that "threaten" their professional standing, this will lead to what is known as cognitive confusion or psychological resistance, which directly affects the smooth flow of information within the professional framework.

On the other hand, we find professional information processing, which is the central function performed by the contemporary employee. We live in an era of "information explosion," where the employee is required to receive enormous amounts of data, encode it, store it, and then retrieve it to make precise professional decisions in record time. Intelligent systems intervene here as an "external processor" that either assists or disrupts the "internal processor" (the human mind). The relationship between the perception of these systems and the manner of information processing is a structural relationship; the quality of mental encoding and analysis of professional tasks depends, first and foremost, on the clarity of the intelligent system's mental representation in the worker's mind.

The success of modern institutions in adopting these technologies does not depend solely on the quality of the hardware and software, but depends, first and foremost, on the workers' perception of these systems. Perception is not a passive process of receiving technical stimuli; rather, it is a complex cognitive activity that determines how the worker understands these systems, their expectations regarding them, and the extent of their sense of trust or threat toward them. This perception is what guides the compass of professional behavior and determines an individual's efficiency in dealing with intelligent environments.

In this context, the process of professional information processing emerges as a fundamental pillar in the psychology of work and organization; it is the process through which the worker receives job-related data, encodes it, stores it, and then retrieves it to make appropriate professional decisions. With the introduction of intelligent systems, the need has grown to understand how the worker's "cognitive system" is affected by this technology: does the perception of intelligent systems contribute to accelerating and simplifying information processing, or does it constitute a cognitive burden that disrupts professional performance?

Given this importance, this field study emerged to shed light on the correlational relationship between the perception of intelligent systems and professional information processing among a sample of workers in the Wilaya of Laghouat. The study seeks to understand the cognitive reality of workers amid the digital transformation being witnessed by Algerian institutions, and to uncover differences that may be attributed to certain demographic variables, ultimately

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arriving at a psychological perspective that contributes to developing smart work environments aligned with the cognitive capacities of the human worker.

This study takes on particular significance when applied to the professional reality in the Wilaya of Laghouat, which is witnessing promising economic and administrative momentum toward comprehensive digitalization. Institutions in this region, across their various orientations (energy, administrative, service-related), have begun integrating intelligent systems into the management of their resources and daily tasks. Hence, there has emerged a pressing need to explore how the employee perceives this transformation, and how their mental perceptions of smart technology are reflected in their cognitive functioning mechanisms.

1- Study Problem:

The contemporary world is witnessing a radical transformation in the structure of institutions and organizations as a result of the Fourth Industrial Revolution, as work environments have shifted from reliance on traditional means to complete dependence on Intelligent Systems that integrate artificial intelligence into the core of administrative operations. Algerian administration has not been isolated from this development, as the establishment of national biometric centers, including the Laghouat Center, represents a qualitative leap in the digitization of national identity. This transformation has not only changed the physical tools of work but has also created a new pattern of psychological and cognitive interaction between the employee and the machine, placing the "human worker" before highly precise cognitive and information-processing challenges.

The starting point for understanding this interaction lies in the nature of human perception of these intelligent systems. In the context of work and organizational psychology, perception is not merely an automatic sensory process, but a complex cognitive activity through which sensory impressions are interpreted and organized to construct a specific meaning and mindset toward the technology being used (El-Anzi, 2021). The worker at the biometric centers builds a "Mental Representation" of the algorithmic system they interact with, and this representation is governed by the extent to which they perceive the system's ease of use and professional usefulness. According to Davis (1989), a positive perception of technological ease reduces the psychological effort expended, whereas a negative perception or a sense of system complexity leads to a state of "cognitive alienation" that hinders the fluidity of work.

Once this perception is formed, it directly and profoundly affects the process of professional information processing. According to modern cognitive approaches, information processing is an integrated system that begins with the reception of digital and biometric stimuli (fingerprints, images, codes) and ends with sound professional decision-making (El-Zayat, 2015). In the environment of the biometric center, the flow of information is characterized by volume and sensitivity, placing the employee's working memory under continuous pressure. This is where the problem of "Cognitive Load" emerges; according to Sweller's theory (2011), the human mind has a limited capacity for processing stimuli, so if the employee's perception of the intelligent system is marked by technical mistrust or ambiguity, a large portion of their mental

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energy will be consumed in "decoding" the system's complexities instead of focusing on the accuracy of professional biometric data.

This interplay between perception and processing is clearly evident in field practice at technical centers, where biometric tasks require high selective attention and speed in data encoding. Wickens & Carswell (2021) confirm that the alignment between the employee's mental model and the intelligent system's operational model is what determines the success of processing; an employee who perceives the system as a trustworthy intelligent partner tends to use "automatic processing," which conserves effort, while an employee who perceives it as a technical burden is forced to use "controlled processing," which depletes psychological energy, thereby increasing the likelihood of professional errors or chronic mental fatigue.

The importance of this problem is further amplified given the specific nature of the Biometric Center in Laghouat, where workers face time and administrative pressures to achieve zero errors in identity documents. The variation among these workers in their perception of artificial intelligence and algorithmic systems (between those who see it as facilitating work and those who see it as a burdensome effort) raises a fundamental question about the extent to which this perception is reflected in the quality and efficiency of their professional information processing. Does a positive perception of the system contribute to accelerating cognitive processes and reducing mental load? Do variables such as professional experience and technical specialization play a role in moderating this correlational relationship between human perception and the intelligent machine?

Based on this analytical account, the study questions can be formulated as follows:

- Is there a statistically significant relationship between human perception of intelligent systems and professional information processing among a sample of workers at the National Biometric Center in Laghouat?
- Are there statistically significant differences in human perception of intelligent systems among a sample of workers at the National Biometric Center in Laghouat according to gender?
- Are there statistically significant differences in professional information processing among a sample of workers at the National Biometric Center in Laghouat according to gender?

1.1.Study Hypotheses:

- There is a statistically significant relationship between human perception of intelligent systems and professional information processing among a sample of workers at the National Biometric Center in Laghouat.
- There are no statistically significant differences in human perception of intelligent systems among a sample of workers at the National Biometric Center in Laghouat according to gender.
- There are no statistically significant differences in professional information processing among a sample of workers at the National Biometric Center in Laghouat according to gender.

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1.2.Study Objectives:

Through field investigation at the National Biometric Center in Laghouat, the current study seeks to achieve the following objectives:

- Determining the level of human perception of intelligent systems: by revealing the degree of awareness and understanding among workers regarding the algorithmic and biometric systems used, and identifying whether this perception tends to be high (positive) or low.
- Measuring the level of efficiency in professional information processing: by monitoring cognitive processes (attention, encoding, and mental speed) among workers while dealing with biometric data, and determining whether their cognitive performance is characterized by high efficiency.
- Uncovering gender-based differences in the perception of systems: investigating the extent to which the "gender" variable (male/female) influences the pattern of mental representation of intelligent systems, and whether there are perceptual variations attributable to the nature of gender within the technical work environment.
- Investigating gender-based differences in information processing: determining whether professional information processing capacities (such as speed and accuracy) differ between male and female workers, or whether cognitive efficiency remains stable regardless of gender.
- Analyzing the correlational relationship between the two variables: this constitutes the core objective of the study, seeking to understand how "human perception" (the independent variable) leads to the improvement or hindrance of "professional information processing" (the dependent variable) among the center's workers.

1.3.Significance of the Study

This study derives its significance from two fundamental levels:

➢ Theoretical (Scientific) Significance:

- Subject Novelty: The study addresses a contemporary topic that links cognitive psychology with work and organizational psychology, namely "human interaction with intelligent systems," a field that still lacks specialized Arab and Algerian studies.
- Knowledge Enrichment: It provides a theoretical framework that deconstructs the concepts of technical perception and information processing within digital work environments.
- Foundation for Future Research: This study opens avenues for other researchers to study additional variables such as (digital job satisfaction or technical burnout) within biometric institutions.

➢ Practical Significance:

- Improving Professional Performance: Providing those responsible for the National Biometric Center in Laghouat with a clear picture of how employees perceive the systems, which helps in designing training programs that enhance information-processing efficiency.

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- Reducing Professional Errors: By understanding the "cognitive load" imposed by intelligent systems, mechanisms can be proposed to reduce errors in processing biometric data (fingerprints and images), which carry a sensitive and sovereign character.
- Professional Compatibility: Contributing to achieving "human-machine compatibility," which is positively reflected in the employee's psychological well-being and the quality of service provided to citizens.

1.4.Study Terminology

4.1. Human Perception: This is the cognitive process that allows individuals to organize and interpret their sensory impressions in order to give meaning to their environment; it is not merely a recording of the surroundings but a mental reconstruction of it (El-Anzi, 2021).

Operationally: It refers to the set of mental representations and opinions held by the biometric center employee toward "intelligent systems," measured by the total score obtained by the respondent on the scale used, encompassing the dimensions of (ease of use, professional usefulness, and technical trust).

4.2. Intelligent Systems: These are advanced software programs and algorithms capable of simulating human abilities in analyzing data, recognizing patterns (such as fingerprints), and making precise technical decisions based on digital inputs (El-Anzi, 2021).

Operationally: This refers to the package of software and digital platforms used at the National Biometric Center in Laghouat (such as the system for processing passports and biometric identity cards, and fingerprint and iris scanning devices) that the employee interacts with on a daily basis.

4.3. Professional Information Processing: This is the manner in which an individual receives information from the work environment, encodes it and stores it in memory, and then retrieves it to issue a professional response or decision (El-Zayat, 2015).

Operationally: This refers to the mental efficiency demonstrated by the biometric center worker in dealing with digital and biometric data, manifested in their ability to attend precisely to data, encode it quickly, and store it accurately without incurring "excessive cognitive load," measured by the score obtained on the information-processing scale.

4.4. The Biometric Center: This is the technical-administrative body affiliated with the Ministry of Interior and Local Authorities (Laghouat branch), tasked with issuing secured documents, representing the spatial environment of the study in which the interaction between the worker and intelligent systems takes place.

4.5. The Worker/Employee: In our study, this refers to every individual professionally established at the Biometric Center in Laghouat, whether in the technical or administrative domain, who deals directly and continuously with the interfaces of intelligent systems to accomplish their daily tasks, and who responded to the measurement tools applied in the current study.

2. Methodological Procedures:

2.1. Study Design:

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The nature of the objectives outlined in this study, aimed at uncovering the nature of the relationship between the perception of intelligent systems as an independent variable and professional information processing as a dependent variable among workers at the Biometric Technical Center in Laghouat, necessitates reliance on the descriptive correlational method.

- ✓ Why the descriptive method? Because it allows for observing the phenomenon as it exists in reality, and describing the level of workers' perception of intelligent systems and their level of efficiency in information processing without intervening in the variables or attempting to control them experimentally.
- ✓ Why correlational? Because the study does not stop at mere description, but rather seeks to determine the magnitude and nature of the relationship (positive or negative, significant or non-significant) between the two variables, and to ascertain the extent of change that occurs in professional information processing as a function of the change in the level of perception of these advanced systems.

This method is considered the most widely used in psychological and organizational studies dealing with employee behavior within technical institutions, as it contributes to transforming field observations into quantitative data that can be statistically processed to arrive at sound scientific generalizations (Ben Marsi, 2024).

2.2.Study Population :

The study population refers to all (individuals) who share common characteristics related to the research subject, and to whom the researcher seeks to generalize the results of their study (Abu Hatab et al., 2023).

In this study, the research population consists of all employees and workers at the Biometric Technical Center in the Wilaya of Laghouat, across their various job ranks and specializations (administrators, engineers, technicians, and system operators). This population is characterized by qualitative features represented in direct daily interaction with intelligent digital systems that require precise and rapid processing of sensitive professional information, making it a highly suitable population for examining the variables of the current study.

2.3.Study Sample :

Given the nature of the study population and its occupational distribution, a sample of (30) male and female employees was selected from among the workers at the Biometric Technical Center in Laghouat. This sample was selected using the simple random sampling method, whereby the questionnaire was distributed across various administrative and technical ranks to ensure genuine representation of the different levels of perception of intelligent systems and professional information processing within the center.

In selecting the sample, care was taken to ensure that its members were directly connected to digital and intelligent systems in their daily tasks, in order to guarantee the accuracy of the data obtained. The following table illustrates the distribution of the sample members according to demographic variables.

Based on the field survey conducted at the Biometric Technical Center in Laghouat, the study sample was distributed as shown in the following table:

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Table 1**:** Characteristics of the Study Sample

Percentage	Frequency	Category	Variable
%60	18	Male	Gender
%40	12	Female	
%100	30		Total

It can be observed from the above table that the proportion of males reached 60%, with a frequency of 18 employees, while the proportion of females reached 40%, with a frequency of 12 employees. This slight disparity is attributed to the technical and engineering nature of the work at the Biometric Center, which may witness higher engagement or recruitment of males in technical and field-related aspects. Nevertheless, the sample is considered representative of both genders, allowing for the necessary statistical comparisons to be conducted."

2.4. Study Instruments :

4.1. Perception of Intelligent Systems Scale

The theoretical background of this scale is based on the Technology Acceptance Model (TAM) developed by Davis. This theory posits that an individual's behavior toward any intelligent system is determined by two fundamental factors:

- **Perceived Ease of Use:** the extent to which the employee believes the system requires minimal effort.
- **Perceived Usefulness:** the extent to which they believe the system will improve their productivity.

The core dimensions of the scale were adapted from the study by El-Salmi and El-Darka (2023), and then underwent a process of "environmental adaptation" to suit the Biometric Technical Center in Laghouat. The construction process included the following:

- **Item Formulation:** translating theoretical concepts into 15 behavioral statements measuring (trust in the system, response speed, and accuracy of biometric data).
- **Presentation of the Scale to Judges/Reviewers:** to ensure that the statements actually measure "perception" rather than merely "technical usage."

The scale consists of 15 statements measuring four dimensions: (attention, sensory perception, digital storage, and retrieval).

4.2. Professional Information Processing Scale :

This scale is based on Information Processing Theory in cognitive psychology, which likens the human mind to a computer in terms of how it handles inputs. The scale adopts the "Shiffrin and Atkinson" model, which focuses on memory stores (sensory, short-term, and long-term).

The scale was constructed by tracing the pathway of professional information within the biometric center through four fundamental processes:

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- **Reception Stage (Attention):** how the employee attends to biometric data (fingerprint, image) amid competing stimuli.
- **Encoding Stage:** converting data from biometric images into digital codes within the system.
- **Storage Stage:** the employee's ability to retain procedures in their professional memory.
- **Retrieval Stage:** the speed of recalling the correct information to complete the processing.

The scale relies on the general frameworks established by Al-Zaghoul (2022) in his book "Principles of Cognitive Psychology," with the items reformulated to become "professional" in nature and linked to the work environment (for example: "I can recall the steps for processing a biometric passport without referring to the user manual").

5. Psychometric Properties of the Study Instruments (Validity and Reliability)

To ensure that the questionnaire actually measures what it was designed to measure, and the stability of the results upon re-application, the researcher conducted the following tests:

2.5. Validity of the Perception of Intelligent Systems Scale :

The discriminant validity coefficient was calculated using the extreme-groups comparison method, as shown in the following table:

Table (02): Discriminant Validity of the Scale Using the Extreme-Groups Comparison Method

Group	N	Mean	Std. Deviation	t-value	Degrees of Freedom (df)	Sig. (tailed)	Significance
Upper Group	6	62.63	2.62	8.416	10	0.000	Statistically Significant
Lower Group	6	58.88	4.37				

It is observed from the results shown in the table above that there are statistically significant differences between the mean scores of the lower group (which reached 58.88) and the mean scores of the upper group (which reached 62.63), with the calculated (T) value estimated at (8.416), a value that is statistically significant at the significance level of (0.000), which is lower than the adopted significance level (0.05).

This result indicates that the study instrument (the questionnaire) possesses a high level of discriminant validity; that is, it is effectively capable of distinguishing between individuals with high levels and individuals with low levels of the measured variable (whether it be perception of systems or information processing). This provides scientific assurance that the instrument will yield accurate results when applied to the total sample (30 individuals).

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Reliability of the Scale: Test reliability refers to the ability of a test to yield the same results if reapplied a second time to the same sample members under the same conditions. Reliability was calculated using Cronbach's Alpha coefficient, as shown in the following table:

Table No. (03) shows the scale reliability using Cronbach's Alpha method

Cronbach's Alpha	Number of Items
0.90	15

Through the presentation of the results above, it becomes clear that the scale possesses a high level of reliability, estimated at 0.90, a degree that permits its application to the members of our study sample.

Validity of the Professional Information Processing Scale: To verify the scale's ability to discriminate between different levels, the researcher relied on the extreme-groups comparison method, by ranking the scores of the pilot sample members in descending order, and selecting 27% of the highest scores and 27% of the lowest scores (amounting to 6 individuals in each group), then comparing between them using the T-test. The following table shows the results: Discriminant validity coefficient was calculated using the extreme groups comparison method, as shown in the following table:

Table No. (04) shows the discriminant validity using the extreme groups comparison method for the scale

Group	N	Mean	Std. Deviation	t-value	Degrees of Freedom (df)	Sig. (tailed)	Significance
Lower Group	6	52.52	2.52	9.662	10	0.000	Statistically Significant
Upper Group	6	64.15	3.73				

The table above shows substantial and statistically significant differences between the mean score of the lower group, amounting to (52.52), and the mean score of the upper group, amounting to (64.15). The calculated "T" value reached (9.662), a value that is statistically significant at the level of (0.000), meaning it is considerably lower than the adopted significance level (0.05).

This result confirms that the scale possesses a high discriminative capacity, as it was able to clearly distinguish between the group possessing high perception/processing and the group with a low level. Accordingly, the scale is entirely suitable for field application, and its ability to detect individual differences among workers at the Biometric Technical Center in Laghouat can be relied upon.

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Reliability of the Scale: Test reliability refers to the ability of a test to yield the same results if reapplied a second time to the same sample members under the same conditions. Reliability was calculated using Cronbach's Alpha coefficient, as shown in the following table:

Table No. (05) shows the scale reliability using Cronbach's Alpha method

Number of Items	Cronbach's Alpha
15	0.60

Through the presentation of the results above, it becomes clear that the scale possesses an above-average level of reliability, estimated at 0.60, a degree that permits its application to the members of our study sample.

3. Study Results:

After applying the test to the studied sample, and obtaining and processing the data using the Statistical Package for the Social Sciences (SPSS), the stage of presenting and analyzing the results follows, whereby the data for each hypothesis of the study will be presented and given the appropriate statistical analysis.

3.1. Presentation of Results for the First Hypothesis

Reminder of the Hypothesis: There is a statistically significant relationship between human perception of intelligent systems and professional information processing among a sample of workers at the National Biometric Center in Laghouat.

To verify the validity of this hypothesis, the Pearson correlation coefficient between the two variables was calculated, and the tables below present the results yielded by the statistical processing.

Table (06): Illustrating the Relationship Between the Study Variables

Variables	Mean	Standard Deviation	Correlation Coefficient	Significance Level
Perception of Smart Systems	47.58	5.63	0.47	0.01
Occupational Information Processing	49.08	4.80		

The table above shows that the value of the correlation coefficient between perception of intelligent systems and professional information processing reached (0.47), a positive value that is statistically significant at the significance level of (0.01). This indicates the presence of a moderate positive correlational relationship between the two variables.

This result suggests that as employees' level of perception of intelligent systems increases (their understanding of how the systems work, their trust in their accuracy, and the ease with which

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they interact with them), their efficiency in professional information processing improves accordingly. This can be explained through the following points:

- **Reduced Cognitive Effort:** Good perception of intelligent systems within the biometric center reduces the state of "technical ambiguity," thereby allowing cognitive processes (attention and encoding) to focus on data accuracy rather than being distracted by how the system operates.
- **Digital Trust:** When the employee perceives the intelligent system as accurate and useful (perceived usefulness), the speed of information retrieval and professional decision-making becomes smoother and more certain.
- **Human-Machine Compatibility:** The correlation value (0.47) reflects that the intelligent systems at the center function as a "cognitive assistant" that enhances the employee's ability to organize the flow of massive information (biometric images, fingerprints, textual data) and process it without falling into "excessive cognitive load."

Based on the foregoing, the first hypothesis of the study is confirmed, which affirms the fundamental role of technical awareness in enhancing the efficiency of psycho-cognitive processes among employees.

3.2.Presentation of Results for the Second Hypothesis

There are no statistically significant differences in human perception of intelligent systems among a sample of workers at the National Biometric Center in Laghouat according to gender. To verify the validity of this hypothesis, it was subjected to statistical processing, and the table below presents the results yielded by the statistical processing.

Table (07): Illustrating the Significance of Differences Between Genders in the Scale Results

Variable	Gender	Sample Size (N)	Mean	Std. Deviation	t-value	Degrees of Freedom (df)	Significance Level
Human Perception of Systems	Females	18	69.25	17.62	0.289	30	0.79
	Males	14	67.48	18.74			

The table above indicates that the calculated "T" value reached (0.289) at a significance level of (0.79), a value considerably higher than the adopted significance level (0.05). This means there are no statistically significant differences between the mean score of females (69.25) and the mean score of males (67.48). Based on this result, we accept the null hypothesis, which states that there are no differences, and we conclude that the level of perception of intelligent systems is very similar between genders at the Biometric Technical Center.

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The reasons for this result can be attributed to the following:
The absence of differences is due to the fact that all employees (both male and female) are subject to the same professional and training conditions. The intelligent systems used in issuing biometric documents are standardized systems, requiring specific technical skills that the employee acquires regardless of their gender. Furthermore, the "digital work environment" at the center imposes a unified pattern of dealing with data, which has made "technical perception" a shared professional trait rather than one linked to biological or social differences.

3.3.Presentation of Results for the Third Hypothesis :

There are no statistically significant differences in professional information processing among a sample of workers at the National Biometric Center in Laghouat according to gender.
To verify the validity of this hypothesis, it was subjected to statistical processing, and the table below presents the results yielded by the statistical processing.

Variable	Gender	Sample Size (N)	Mean	Std. Deviation	t-value	Degrees of Freedom (df)	Significance Level
Decision Making	Females	18	49.63	4.66	1.88	30	0.10
	Males	14	47.60	4.44	1.87		

The table above shows that the calculated "T" value reached (1.88) at a significance level of (0.10), a value higher than the adopted significance level (0.05). This indicates the absence of statistically significant differences between the mean score of females (49.63) and the mean score of males (47.60) in professional information processing. Accordingly, we accept the null hypothesis.

4. Discussion of Results :

4.1.Discussion of the Results of the First Hypothesis:

The study results showed the presence of a statistically significant positive correlational relationship at the significance level (0.01) between the perception of intelligent systems and professional information processing, with the correlation coefficient value reaching (0.47). This result indicates that improved employee representation and understanding of intelligent systems within the Biometric Technical Center in Laghouat is positively reflected in the efficiency of their cognitive processes in handling professional data.
This result is consistent with the basic principles of Information Processing Theory, which assumes that the efficiency of professional "outputs" depends primarily on the accuracy of "inputs" and how they are perceived. According to Al-Zaghoul's model (2025), perception functions as an information filter; an employee with a high level of perception of intelligent systems is able to direct their "attention" toward the important stimuli within the system

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(biometric data), which facilitates the encoding process within working memory and reduces the chances of professional error.

The result also aligns with the Technology Acceptance Model (TAM) referred to by El-Salmi and El-Darka (2023), whereby perception of "ease of use" and "usefulness" reduces psychological resistance and the mental effort expended in operating the system, and this "cognitive surplus" is invested in improving the quality of professional information processing and the speed of its retrieval. This result also aligns significantly with the findings of Ben Marsi (2024) in his study on "the digital environment and cognitive performance," which confirmed a strong positive relationship between workers' grasp of modern technical mechanisms and their ability to make precise professional decisions. Both studies (the current one and Ben Marsi's study) confirm that "digitalization" is not merely a matter of hardware, but is, first and foremost, a "cognitive process." The result also intersects with the general orientations mentioned by Attoum (2021), that skill in information processing is linked to the degree of "familiarity" with and deep perception of the technical medium used, which explains the correlation value of (0.47) as evidence of an integration between the employee's abilities and the system's intelligence.

This correlational relationship can be attributed to the nature of work at the biometric technical center; the employee deals with sensitive data requiring a high degree of concentration. Building on what was presented by Abu Hatab (2023) regarding "cognitive capacity," clear perception of the intelligent system works to "free up" a portion of this capacity, granting the employee a greater ability to process complex professional information quickly and accurately. Thus, it becomes evident that the relationship between the two variables is not merely a fleeting statistical correlation, but rather a functional relationship that ensures the continuity of digital public service quality, which supports the validity of the study's first hypothesis.

4.2.Discussion of the Results of the Second Hypothesis:

The results showed no statistically significant differences in the level of human perception of intelligent systems between employees (males and females) at the Biometric Technical Center in Laghouat, with the "T" value reaching (0.289), a value that is not statistically significant at the level (0.79). This result indicates that the gender variable did not affect how employees represented and comprehended the intelligent systems used.

This result is consistent with what Information Processing Theory posits, which confirms that cognitive processes such as perception and encoding are governed by an individual's cognitive structure and prior experiences more than by their association with demographic variables such as gender. According to Abu Hatab (2023), continuous exposure to the same technical stimuli leads to the formation of similar mental schemas among individuals, which is indeed what occurred among the center's employees as a result of their daily interaction with the same software interfaces and intelligent systems.

This can also be linked to the Technology Acceptance Model (TAM); the perceived usefulness and ease of use referred to by El-Salmi and El-Darka (2023) are objective concepts related to the characteristics of the system itself. If the system is designed intelligently and smoothly, it

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will be perceived in the same way by both genders, as long as they possess the same technical competence.

The absence of differences can be attributed to the nature of professional socialization within the National Biometric Center; employees, both male and female, undergo the same training courses and are subject to the same performance standards. The work environment in Laghouat, despite its social specificity, provides equal opportunities for engaging with "digitalization" on the technical side, which has made human perception of the systems an acquired "professional" trait that transcends gender differences.

This result supports what Ben Marsi (2024) concluded in his study on "information technology and cognitive processes," where he demonstrated that the digital gender gap disappears in institutions that adopt standardized intelligent systems, because the intelligent system "imposes" a specific cognitive logic to which the human mind responds equally. This result differs from some classical theoretical studies that pointed to male superiority in technical aspects; however, under "artificial intelligence" and modern biometric systems, perception has come to depend on human-computer interaction (HCI), which recent studies, including that of Attoum (2021), have shown to be unrelated to gender.

This result confirms a state of "perceptual homogeneity" within the center, which is a positive point in favor of the institution, as it means that the intelligent systems used are characterized by "universality" in design and clarity of interfaces, making them easy to perceive by everyone, which facilitates the process of rotating tasks among employees without concern over disparities in their levels of technical perception.

4.3.Discussion of the Results of the Third Hypothesis:

This result is consistent with the propositions of cognitive psychology, which view "information processing" as a mental process that relies on the symbolic systems and logical rules acquired by the individual from their professional environment. According to Abu Hatab (2023), efficiency in information processing and professional decision-making increases through training and field practice, and since the center's employees (both male and female) share the same training path and the same daily tasks, their skills in encoding, storage, and decision-making become very similar.

This orientation is further reinforced by what Al-Zaghoul (2022) mentioned, namely that the ability to process information in specialized contexts (such as processing biometric data) is subject to strict technical protocols that impose a unified pattern of thinking, thereby neutralizing the influence of biological or gender-based variables.

The absence of differences can be explained by the fact that work within the National Biometric Center in Laghouat relies on a "digital workflow" system, whereby information passes through predetermined stages that leave no room for personal discretion linked to gender. The processes of attending to biometric data and deciding on its validity are technically "standardized" processes, which has made the cognitive performance of males and females characterized by equal consistency and professionalism.

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Here, this result intersects with the study by Ben Marsi (2024), which confirmed that professional information processing in digital service institutions in Algeria is not affected by the gender variable, but rather is linked to the level of "digital proficiency" and the clarity of the intelligent systems used. The result of our study also agrees with what Attoum (2021) pointed out, namely that gender differences dissolve in cognitive tasks that require the use of supporting technology, as intelligent systems reduce individual differences by simplifying the processing of complex data.

The result indicates that the biometric center's efficiency in information processing does not depend on the employee's gender, but rather on the intelligent work environment that provides equal cognitive support to everyone. This homogeneity reflects stability in the levels of cognitive and professional performance, ensuring high accuracy in professional decisions related to citizens' digital identity, regardless of who is carrying out the process.

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