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Information System and Decision Making
Case study : Some companies from Algeria Telecom

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Abstract:

This research aims to analyze the contribution of information system on the decision-making of some Algerian Telecom group companies using an exploratory study on a sample of 34 managers, thus, the data collection is obtained by questionnaires that were distributed to the selected sample and the answers were processed by SPHINX version 5 software.

The results of the empirical study confirm our hypotheses therefore the information systems of the Algerian Telecom group have a positive impact on their decision-making and they affect favorably on the quality of information at the time of decision, on its effectiveness as well as on the course of the decision-making process.

Keywords: *Information system, decision efficiency, decision-making, the Algerian Telecom group*

Jel Classification Codes: *L1, L10, L20.*

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1. Introduction:

In contemporary times, large enterprises are confronted with numerous challenges. They must respond promptly to the increasing pressure from their environment and the substantial need for information, which has evolved into a strategic resource for decision-making. Indeed, companies are compelled to design an appropriate information system that organizes information and exerts influence across all levels and functional areas of the organization to achieve set objectives and make optimal decisions (Meister, 2004). The concept of the information system now applies universally to all organizations, whether private or public. It coordinates the activities of the organization through information, enabling it to accomplish its goals, with decision-making being a particularly intricate task.

Indeed, decisions of any nature require information to reduce uncertainty and the complexity of choices. This implies that information is considered a dynamic nerve center for all types of decision-making within the enterprise.

The analysis of the relationships between the information system and the enterprise is our guiding thread, as it allows us to determine the contribution of information systems to the improvement of information management and to the effectiveness of decision-making within Algerian enterprises.

Our concern through this research is to address the following problem:

How does the information system influence decision-making within service-oriented enterprises?

The response to the posed problem can be obtained through the verification of the following hypotheses:

H1: Proficient mastery of the information system positively impacts the quality of information at the time of decision-making.

H2: The information system of Algeria Telecom positively affects the effectiveness of decisions made.

H3: The information system positively influences the course of the decision-making process within Algeria Telecom.

2. Literature Review:

The work of **(Saleh Al-Zhrani 2010)** examined the significant role of management information systems in the decision-making process during crises at the General Directorate of Border Guards in Saudi Arabia. The author employed a descriptive research model, and data were collected from a sample comprising all agents of the General Directorate of Border Guards in Saudi Arabia. The results revealed that the management information system was appropriately utilized in decision-making during crises. It was recommended to maintain the information systems units to ensure the free flow of information and the proper use of the information system in decision-making.

Another study conducted by **(Maha Alkhaffaf 2012)** aims to analyze the current state of information systems and their role in decision-making within a Jordanian bank. The study identifies the types of information systems utilized by the bank. However, the research is based on an empirical study employing a questionnaire distributed to 252 employees. The results revealed a strong relationship between information systems and the decision-making process. On the other hand, the findings indicate that Jordan relies extensively on a variety of technologies used by information systems to implement their key activities.

In the same context, **(Mirjana Radovic-Markovic et Milos Vucekovic 2015)** examined the relationship between information systems and decision-making. The aim of this study is to identify the interaction between managers and information systems and how the latter contribute to decision-making in organizations. In this perspective, companies that give high ratings to their management practices will adopt new management tools to a large extent to enhance their business performance.

In their study, **(EWANE, S.C, TSAFACK NANFOSSO. R, and TAKOUDJOU, N. 2021)** analyzed the effect of the accounting information system on the satisfaction of leaders in decision-making within companies in Cameroon. Based on data collected through a questionnaire from 82 small and medium-sized Cameroonian enterprises operating in three sectors (commerce, industry, and services), the results confirm that the quality of accounting information systems plays a statistically significant role in leader satisfaction in decision-making.

3. Empirical Study:

3.1 Presentation of the Research Methodology:

In our research methodology, we will follow the following steps:

3.1.1 Data Collection Method:

Our research focuses on several service-oriented companies within the Algeria Telecom group located in the north-western region of Algeria. Among these companies (operational divisions and subsidiaries), only four agreed to respond, while five others declined our request. Therefore, our target selection encompassed all managers and executives of Algeria Telecom, utilizing a questionnaire administered to a selective sample of forty (40) managers and leaders within specific operational divisions of Algeria Telecom: Ain Témouchent, Sidi Bel Abbes, and Mostaganem, as well as its subsidiary ATM Mobilis in Ain Témouchent. However, we were able to obtain responses from only thirty-four (34) managers.

Regarding the information collection method, we chose a face-to-face administered questionnaire for our survey. This technique offers the advantage of facilitating the understanding of the questionnaire's content, enabling us to obtain more relevant responses.

3.1.2 Statistical Data Analysis:

- After collecting the information in the field, we proceeded to their computerized processing using a descriptive method. To do this, we first coded the responses and then recorded them using SPHINX software 5.
- Subsequently, we analyzed the results by : **the flat sorting method (univariate analysis)** involves a straightforward tally of responses for each question. This type of sorting is used for the exploration of a single criterion. For example, the number of women who responded to the questionnaire.

3.2 Analysis of Data and Interpretation of Results:

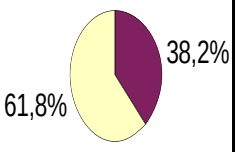
3.2.1 the flat sorting method (univariate analysis) In this section, we will analyze each question individually based on frequencies and percentages.

- **Profile Sheet:** The composition of our sample is illustrated in the tables below:

Table No. (1): Description of respondents based on gender

genre

	Nb	% cit.
feminin	13	38,2%
masculin	21	61,8%
Total	34	100,0%



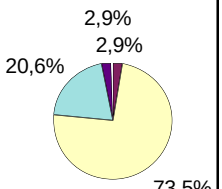
61.8 % of the individuals surveyed are male, and 38.2% are female. We observe that in a significant corporate group like Algeria Telecom, the female gender is represented in leadership positions.

Source: Compiled by ourselves using Sphinx (V5).

Table No. (2): Description of respondents based on age

age

	Nb	% cit.
18-30	1	2,9%
31-40	25	73,5%
41-50	7	20,6%
51-60	1	2,9%
>=61	0	0,0%
Total	34	100,0%



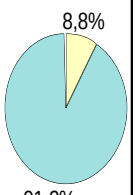
Despite the significance of the company and its contribution to the GDP, we observed that the workforce of the Algeria Telecom group falls within the young age category. Individuals aged under 40 constitute 75% of our sample, confirming that skills have surpassed experience within this group.

Source: Compiled by ourselves using Sphinx (V5).

Table No. (3): Description of respondents based on educational level

niveau intelectuel

	Nb	% cit.
secondaire	0	0,0%
formation professionnelle	3	8,8%
universitaire et plus	31	91,2%
Total	34	100,0%



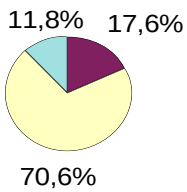
Out of the 34 executives we interviewed, the majority are university-educated, accounting for 91.2%, while 8.8% of the respondents have undergone professional training.

Source: Compiled by ourselves using Sphinx (V5).

Table No. (4): Description of respondents based on family status

situation familiale

	Nb	% cit.
célibataire	6	17,6%
marié	24	70,6%
divorcé	4	11,8%
Total	34	100,0%

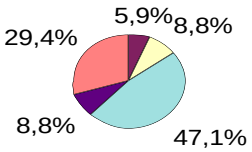


70.6% of the surveyed leaders are married and mature, implying stability in their personal lives, which positively influences the stability of their professional lives.

Source: Compiled by ourselves using Sphinx (V5).

Table No. (5): Description of Respondents Based on Occupied Positions

poste occupé	Nb	% cit.
directeur	2	5,9%
sous directeur	3	8,8%
chef de service	16	47,1%
superviseur	3	8,8%
autre	10	29,4%
Total	34	100,0%

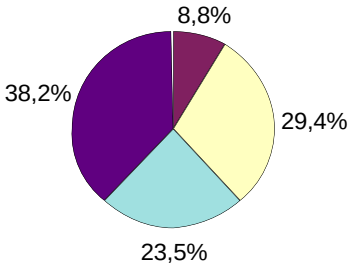


We observe that the majority of respondents are department heads, comprising a rate of 47.1%.

Source: Compiled by ourselves using Sphinx (V5).

Table No. (6): Describe the interviewed managers based on their experience in their roles each time.

experience dans le poste	Nb	% cit.
1-3	3	8,8%
3-8	10	29,4%
8-10	8	23,5%
>10	13	38,2%
Total	34	100,0%



Upon examining the responses, we observe that the experience of Algeria Telecom employees in their positions varies from 1 year to over 10 years, with relative percentages.

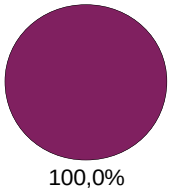
Source: Compiled by ourselves using Sphinx (V5).

- **The information and information system in the company**:

In this context, we will provide an overview of the role of information and information systems in the various activities of the Algeria Telecom group.

Table No. (7): The importance of information in the company

2-1 - l'information occupe elle une place importante dans votre entreprise?	Nb	% cit.
oui	34	100,0%
Non	0	0,0%
Total	34	100,0%

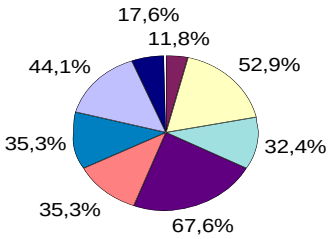


The majority of respondents stated that information holds a significant position in their company. This confirms that the environment at Algeria Telecom Group is built upon the availability and circulation of information.

Source: Compiled by ourselves using Sphinx (V5).

Table No. (8): The main sources of information in the company

2-2 - quelles sont vos prncipales sources d'information dans votre entreprise ?	Nb	% obs.
les manifestations scientifiques	4	11,8%
le journal officiel	18	52,9%
les revues	11	32,4%
les documents établis par le ministère de la poste et TIC	23	67,6%
les sites internet	12	35,3%
la comptabilité interne	12	35,3%
le fichier client	15	44,1%
autre	6	17,6%



Source: Compiled by ourselves using Sphinx (V5).

According to the table above, practically all the mentioned sources of information are utilized by company executives. However, some leaders believe that there are other sources of information that we have not mentioned, such as the supplier file, supervision reports, and emails.

Table No. (9): Information collected

	Very Low	Low	Medium	Good	Very Good	Total
Competitors	3	19	6	5	1	34
ICT	1	3	13	11	6	34
Company Regulations	0	1	9	19	5	34
Customers	0	0	10	10	14	34

P=<0.1% : chi2+72.80 : ddl=12 (significance test)

Source: Compiled by ourselves using Sphinx (V5).

The results indicate that the collected information generally focuses on customers and company regulations. It appears that collecting this type of information is crucial, driven more by mandatory requirements than a genuine willingness to use this data to exploit available opportunities

Table No. (10): The Various Obstacles Encountered in Information Collection

Obstacles	Number	Percentage %
Uncertainty in the environment	19	55.9%
High cost of data collection	6	17.6%
Reliability of data	16	47.1%
Lack of time for information collection	12	35.3%
Other	0	0.0%

Note:

The sum of percentages is not equal to 100 due to multiple responses.

Source: Compiled by ourselves using Sphinx (V5).

The most common challenge is related to the uncertainty of the environment and the reliability of data, which can question the effectiveness of any decision-making process.

Table No. (11): The Channels of Information Flow

	Very Low		Low		Medium		Good		Very Good	
	N	%	N	%	N	%	N	%	N	%
Telephone among colleagues	3	8.8%	5	14.7%	14	41.2%	6	17.6%	6	17.6%
Work meetings	0	0.0%	4	11.8%	13	38.2%	9	26.5%	8	23.5%
Word of mouth	3	8.8%	12	35.3%	4	11.8%	5	14.7%	10	29.4%
Intranet	1	2.9%	5	14.7%	5	14.7%	3	8.8%	20	58.8%
Posters/Notices	6	17.6%	8	23.5%	11	32.4%	8	23.5%	1	2.9%
Targeted dissemination (by department)	2	5.9%	3	8.8%	7	20.6%	16	47.1%	6	17.6%

Source: Compiled by ourselves using Sphinx (V5).

We observe significant use of communication through the intranet and targeted dissemination (by department). However, they rarely employ traditional means of communication, such as posters. This can be attributed to the ease and security offered by the modes they use.

Table No. (12): The concept of information system

	Number	Percentage %
Equipment, computer program	6	17.6%
Management tool	7	20.6%
Communication language	3	8.8%
All at once	26	76.5%

Note:
The sum of percentages is not equal to 100 due to multiple responses.

Source: Compiled by ourselves using Sphinx (V5).

The majority of leaders are familiar with the concept of Information Systems (IS); however, there is a minority of managers with a limited understanding of this concept.

Table No. (13): The rôle of Information Systems in the various activities of the company

	Number	Percentage%
Yes	34	100%
No	0	0.0%

Source: Compiled by ourselves using Sphinx (V5).

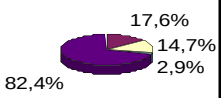
We observe a complete confirmation of the significant role of the information system in the various activities of Algeria Telecom Group.

Table No. (14): The managers most concerned with the Information System

2-8 - d'aprés vous qui sont les plus concernés par le systeme d'information dans votre entreprise ?

Somme des pourcentages différente de 100 du fait des réponses multiples et des suppressions.

	Nb	% obs.
les décideurs	6	17,6%
les administrateurs	5	14,7%
les ingénieurs	1	2,9%
tous le monde	28	82,4%
Total	34	



We observe that 82.4% of the managers in our sample indicate that the entire workforce is concerned with the Information System. This is related to the company's activities, which necessitate the design of the information system to enhance the functioning of all its tasks.

Source: Compiled by ourselves using Sphinx (V5).

Table No. (15): The variables improved by the implementation of the Information System

The variables	Importance
Planning	3.59
Decision-making	3.91
Control and evaluation	2.35
Execution time	2.29
Synergy between departments	2.76

The importance varies from 0 to 5, calculated as the average rank at which the modality was mentioned

Source: Compiled by ourselves using Sphinx (V5).

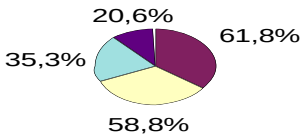
According to the results, the most improved aspect through the company's Information System is decision-making, with an average of 3.91, followed by planning with an average of 3.59. These findings indicate that the Information System enhances decision-making within Algeria Telecom Group.

Table No. (16): The most used type of Information System by Algeria Telecom Group

2-10 - selon vous quel est le type de systeme d'information le plus utilisé par votre entreprise ?

Somme des pourcentages différente de 100 du fait des réponses multiples et des suppressions.

	Nb	% obs.
les systemes de traitement des transactions	21	61,8%
les systemes d'information de gestion	20	58,8%
les systemes d'aide à la décision	12	35,3%
les systemes d'informations pour dirigeants	7	20,6%
Total	34	



Source: Compiled by ourselves using Sphinx (V5).

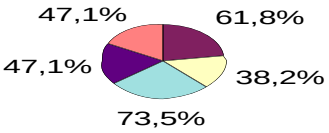
We observe that among the 34 surveyed managers, the majority confirm that the most used information systems in the company are: the management system and the transaction processing system.

Table No. (17): The Operation of Computers within Algeria Telecom Group

2-11 - les ordinateurs dont vous disposez servent à :

Somme des pourcentages différente de 100 du fait des réponses multiples et des suppressions.

	Nb	% obs.
stocker les données	21	61,8%
récupérer les données	13	38,2%
traiter les données	25	73,5%
produire des rapports	16	47,1%
envoyer et recevoir des rapports	16	47,1%
Total	34	



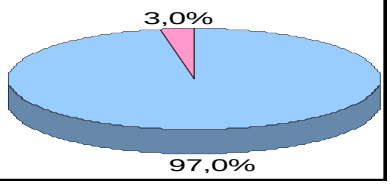
Source: Compiled by ourselves using Sphinx (V5).

The computers available to companies within the Algeria Telecom Group are primarily used for data processing, with a percentage of 73.5%, as well as for data storage, with a percentage of 61.8%

Table No. (18) : Software Provision

2-12 - avez vous des logiciels de gestion relatifs à votre fonction ?

	Nb	% cit.
oui	32	97,0%
non	1	3,0%
Total	33	100,0%



Source: Compiled by ourselves using Sphinx (V5).

Only one manager indicates that his company does not have management software related to his function, and another did not respond. The rest of the managers confirm that their offices are equipped with the necessary software and applications to perform their work comfortably.

- **The Information System and Decision-Making within Algeria Telecom Group :**

Table No. (18): The Nature of Decisions within the Company

	Number	Percentage%
Centralized at the level of the general management	14	41.2%
Distributed across multiple decision centers with coordination from the general management	20	58.8%
Distributed across multiple and autonomous decision centers	0	0.0%
Total	34	100.0%

Source: Compiled by ourselves using Sphinx (V5).

We observe that more than half of the managers, with a percentage of 58.8%, indicate that decisions in their companies are distributed across multiple decision centers with coordination from the general management. The rest of the executives state that decisions are centralized at the level of the general management.

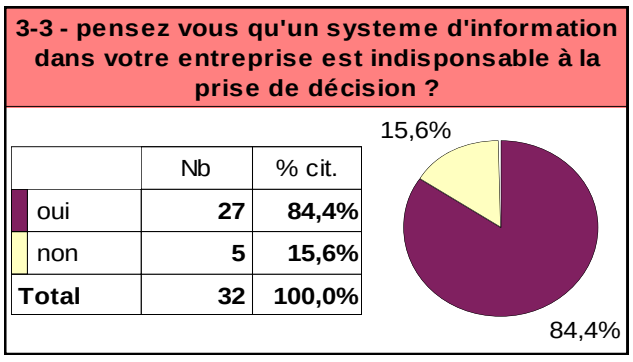
Table No. (19): Decision Sources

Source	Importance
Experience	3.26
Standards and established procedures	3.74
Intuition	1.03
Past data and facts	2.53
Dashboard	4.44

Note: The average varies from 0 to 5, calculated as the average rank at which the modality was mentioned.

Decision models draw inspiration from various sources for some companies in our sample.

Table No. (20): The Indispensability of Information Systems in Decision-Making



The majority of the results suggest that the Information System is indispensable for decision-making

Source: Compiled by ourselves using Sphinx (V5).

A. The Contribution of IS to the Effectiveness of Information Quality at the Moment of Decision

Table No. (21): The Contribution of Information Systems to Information Availability at the Moment of Decision

Frequency	Number	Percentage
Very Low	0	0.0%
Very	0	0.0%
Medium	4	11.8%
Good	15	44.1%
Very Good	15	44.1%
Total	34	100.0%

Average = 4.32 (corresponding to the category « Good »)

Source: Compiled by ourselves using Sphinx (V5).

The information system positively contributes to the availability of information at the moment of decision, with a percentage of 88.2%.

Table No. (22): The Contribution of Information Systems to the Speed of Access to Information at the Moment of Decision

Frequency	Number	Percentage
Very Low	3	8.8%
Very	2	5.9%
Medium	8	23.5%
Good	13	38.2%
Very Good	8	23.5%
Total	34	100.0%

Average = 3.62 (corresponding to the category « Good »)

Source: Compiled by ourselves using Sphinx (V5).

The results confirm that there is a contribution of Information Systems to the speed of accessing information at the moment of decision.

Table No. (23): The Contribution of Information Systems to the Simplicity of Information at the Moment of Decision

Frequency	Number	Percentage
Very Low	2	5.9%
Very	6	17.6%
Medium	14	41.2%
Good	11	32.4%
Very Good	1	2.9%
Total	34	100.0%

Average = 3.09 (corresponding to the category « Average »)

Source: Compiled by ourselves using Sphinx (V5).

The contribution of Information Systems to the simplicity of information at the moment of decision-making is favorable (41.2% of managers believe that the contribution is average, while 32.4% believe it is good).

Table No. (24): The Contribution of Information Systems to Information Sharing at the Moment of Decision

Frequency	Number	Percentage
Very Low	1	2.9%
Very	2	5.9%
Medium	7	20.6%
Good	12	35.3%
Very Good	12	35.3%
Total	34	100.0%

Average = 3.94 (corresponding to the category « Good »)

Source: Compiled by ourselves using Sphinx (V5).

We observe that our key indicator positively contributes to the dissemination of information related to decision-making. This is justified by the two indicators, 'good' and 'very good,' which exceed 70%.

Table No. (25): The Contribution of Information Systems to the Effectiveness of Information Quality at the Moment of Decision

	Very low	Low	Medium	Good	Very Good	Average
The availability of information at the moment of decision	0	0	4	15	15	4.32
The speed of access to information at the moment of decision.	3	2	8	13	8	3.62
The simplicity of information at the moment of decision.	2	6	14	11	1	3.09
The sharing of information at the moment of decision.	1	2	7	12	12	3.94
The effectiveness of information at the moment of decision	/	/	/	/	/	3.74

Source: Compiled by ourselves using Sphinx (V5).

The results of this table confirm our initial hypothesis, which is: *« The information system positively affects the quality of information at the moment of decision ».*

A. La contribution du SI à l'efficacité de la prise de décision

Table No. (26): Level of Satisfaction with Decisions

Frequency	Number	Percentage
Very Low	0	0.0%
Very	2	5.9%
Medium	3	8.8%
Good	12	35.3%
Very Good	17	50%
Total	34	100.0%

Average = 4.29 (corresponding to the category « Good »)

Source: Compiled by ourselves using Sphinx (V5).

According to the survey results, more than 80% of the respondents confirm that Algeria Telecom managers are satisfied with the effectiveness of their decisions

Table No. (27): The Role of Information Systems in Reducing Decision-Making Uncertainty

Frequency	Number	Percentage
Very Low	2	5.9%
Very	1	2.9%
Medium	11	32.4%
Good	15	44.1%
Very Good	5	17.7%
Total	34	100.0%

Average = 3.59 (corresponding to the category « Good »)

Source: Compiled by ourselves using Sphinx (V5).

The results from the two previous tables confirm our second hypothesis: « *The information system of Algeria Telecom positively affects the effectiveness of decisions made* ».

B. The Contribution of Information Systems to the Decision-Making Process

Table No. (28): La contribution du SI à l'identification des problèmes avec précision

Frequency	Number	Percentage
Very Low	0	0.0%
Very	5	14.7%
Medium	14	41.2%
Good	9	26.5%
Very Good	6	17.6%
Total	34	100.0%

Average = 3.47 (corresponding to the category « Average »)

Source: Compiled by ourselves using Sphinx (V5).

The Information System contributes with a percentage of 41.2% to accurately identifying problems.

Table No. (29): The Contribution of Information Systems to Collecting Necessary Information for Problem Identification

Frequency	Number	Percentage
Very Low	0	0.0%
Very	1	2.9%
Medium	10	29.4%
Good	16	47.1%
Very Good	7	20.6%
Total	34	100.0%

Average = 3.85 (corresponding to the category « Good »)

Source: Compiled by ourselves using Sphinx (V5).

The results from the above table confirm that the contribution of the information system to collecting information necessary for problem identification is positive. This is justified by the two response categories 'good' and 'very good,' which exceed 65%.

Table No. (30): The Contribution of Information Systems to Formulating Solutions to the Problems Posed

Frequency	Number	Percentage
Very Low	1	2.9%
Very	4	11.8%
Medium	8	23.5%
Good	14	41.2%
Very Good	7	20.6%
Total	34	100.0%

Average = 3.65 (corresponding to the category « Good »)

Source: Compiled by ourselves using Sphinx (V5).

23.5% of the surveyed managers indicate that there is an average contribution of the Information System to formulating solutions to the problems posed, while 41.2% believe there is a good contribution.

Tableau n° (31) : The Contribution of Information Systems to the Selection of a Possible Solution

Frequency	Number	Percentage
Very Low	1	2.9%
Very	7	20.6%
Medium	11	32.4%
Good	10	29.4%
Very Good	5	14.7%
Total	34	100.0%

Average = 3.32 (corresponding to the category « Average »)

Source: Compiled by ourselves using Sphinx (V5).

The contribution of the Information System to the selection of a possible solution is average with a rate of 32.4%, good at 29.4%, and very good at 14.7%.

Tableau n° (32) : The Contribution of Information Systems to the Execution and Control of Decision

Frequency	Number	Percentage
Very Low	0	0.0%
Very	1	2.9%
Medium	10	29.4%
Good	17	50.0%
Very Good	6	17.6%
Total	34	100.0%

Average = 3.82 (corresponding to the category « Good »)

Source: Compiled by ourselves using Sphinx (V5).

According to the results from the above table, the response categories 'good' and 'very good' exceed 67%, confirming that the information system of Algeria Telecom Group positively affects the effectiveness of decisions made through its influence on the execution and control of the decision.

Results confirm Hypothesis 03: *« The information system positively affects the decision-making process within Algeria Telecom* ».

Table No. (33): Decision Support Systems

Technologies	Number	Percentage %
ERP	19	55.9%
Decision Support System	9	26.5%
No Support	6	17.6%
Total	34	100%

Source: Compiled by ourselves using Sphinx (V5).

Nearly 18% of the companies in our sample do not have supporting technologies for decision-making. More than half, with a percentage close to 60%, have ERP software, and only 26.5% have decision support systems. Regarding the open-ended question we posed and based on the recommendations of Algeria Group officials, we have concluded:

- Improve the quality of the database by facilitating access and maximizing possible operations for data collection.
- Stay up-to-date.
- Have advanced analysis tools to better leverage collected information.
- Develop the information system.
- Enhance user interfaces to easily adapt to different operations.
- Communication and group work.
- Simplify information through reports.
- Share ideas.

3.2.2 Summary of the Contribution of IS to Decision-Making Effectiveness:

- Executives within the Algeria Telecom group utilize various means of communication, with the intranet playing a significant role in information exchange.
- The most improved element after the implementation of the IS is decision-making and planning.
- The majority of surveyed executives believe that the implementation of the IS has had a positive impact on decision-making at Algeria Telecom.
- The Algeria Telecom group uses ERP and SAID as decision support tools.

4. Conclusion:

Organizations, particularly decision-makers, are confronted with an increasingly complex environment characterized by the emergence of innovative technologies and the globalization of exchanges, compelling them to react and make swift decisions. The growing accessibility of information stands as a significant asset for meeting market demands. Given

this scenario, anticipation and environmental monitoring have become major challenges for decision-makers.

To meet the needs of decision-makers affected by these changes, it is crucial to design an information system that will impact decision-making within companies. However, it is essential not to limit the term "information system" to the restrictive computer aspect but to consider it broadly, with the aim of integrating organizational, human, and technological dimensions of business management. Therefore, one must take into account both internal and external sources of information.

Following our empirical study, the key results we have obtained indicate that the Information System (IS) is indispensable for decision-making and positively influences it. This is reflected in the good quality of information used during decision-making (information availability, speed, simplicity, and sharing) and a high level of satisfaction among executives regarding the effectiveness of their decisions. Regarding the contribution of IS to the decision-making process, indicators are favorable for all five stages from problem identification to decision execution and control. This is manifested by the ease of use of decision support tools by Algeria Telecom group executives, such as the ERP (Enterprise Resource Planning).

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