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The Impact of Data Analysis On Improving Services in Municipalities in Northern of Jordan

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Abstract :

Abstract: This study aims to know the contribution of data analysis on improving services in Municipalities. The study adopted the descriptive survey method, and data was collected from 134 employees in a Municipalities in Jordan using a questionnaire. The data were analyzed using SPSS. The results indicate that all the hypotheses were statistically significant, and therefore, the null hypotheses were rejected, and the alternative hypotheses were accepted. This means that data analysis, along with its components (data volume, data speed, data reliability), contributes to the development of improving services in Municipalities and showed a positive impact of all dimensions on improving municipal services. The analysis also showed that the volume of data directly contributes to improving Municipalities services. The study gives several recommendations, as the need to strengthen digital infrastructure and develop database management systems in Municipalities, the importance of investing in data analysis programs and developing employee skills in all fields and integrating decision support system into daily administrative processes by promoting the use of

data analytics applications that provide intelligent models and reports to assist decision-makers in Municipalities.

Keywords:

data analysis , improving performance, data volume, data speed, data reliability, Municipalities, Jordan.

Introduction :

Today, Municipalities strive to adopt the latest tools and technologies that ensure continuous improvement of services provided to citizens. Among these tools is data analysis, which contributes to developing more effective strategies. Municipalities are currently living in the age of information technology, where the volume of available data is growing rapidly every day, and become as big data. Big data represents a significant opportunity to enhance strategic decision-making across various sectors, including the Municipalities sector [1].

Data analysis involves using advanced analytical techniques to extract valuable indicators that guide better decision-making for providing the required services. It is not limited to collecting data but extends to transforming it into meaningful information that supports strategic decisions. Thus, data analysis is considered a central tool for achieving excellence and success, as it contributes to identifying trends and factors that influence performance towards improved outcomes [2].

In the current digital age, data has become one of the most critical assets relied upon by institutions in their pursuit of better decision-making. With the increasing volume and variety of data, leading institutions resort to analytical techniques to understand citizens' expectations and needs more accurately, enabling them to design customized services that efficiently meet these needs. The ability to analyze data and extract

precise patterns is among the most important factors contributing to higher levels of satisfaction [3].

Important of the Study:

The important of study as the following

1.The theoretical significance of this study lies in providing an academic contribution to the literature on data analysis in the Municipalities sector by addressing a topic that has not received sufficient attention in the Jordanian context.

2. The study contributes to improving performance by providing Municipalities administrations with a clear practical framework for implementing data analysis projects.

3. Through this study, Municipalities will be able to identify strengths and weaknesses in service improvement and take appropriate actions to address shortcomings and enhance areas of excellence.

4. The study results will allow Municipalities administrations to improve the quality of services provided and achieve sustainable excellence.

Objectives of the Study

1.To identify the impact of data analysis on improving services in Municipalities in Northern Jordan.

2. To examine the effect of data volume on improving services in Municipalities in Northern Jordan.

3. To examine the effect of data speed on improving services in Municipalities in Northern Jordan.

4. To examine the effect of data reliability on improving services in Municipalities in Northern Jordan.

Problem Statement:

The research problem lies in how to effectively use big data in the Municipalities sector in Jordan and transform it into valuable information that contributes to improving strategic decision-making. Despite the enormous potential of big data, service institutions face numerous challenges in utilizing it due to complexities associated with its volume, variety, velocity, and reliability. This highlights the need for advanced methods and techniques that can effectively integrate big data into Municipalities [4].

As a result, it has become necessary to examine the current state of data analysis applications in Municipalities, identifying strengths and weaknesses as well as the opportunities and challenges involved. This will help reach innovative solutions and effective decisions that support the sustainability of service improvement in Municipalities. Accordingly, the problem of the study can be formulated in a question :

What is the role of data analysis, with its dimensions (data volume, data velocity, data reliability), in improving services in Municipalities in Northern Jordan?

Hypotheses of the Study:

To answer the research questions, the following main hypothesis was formulated:

H01: There is no statistically significant impact at the significance level ($\alpha \leq 0.05$) of data analysis, with its dimensions (data volume, data speed, data reliability), on improving Municipalities services in Northern Jordan.

From this main hypothesis, the following sub-hypotheses are derived:

H01-1: There is no statistically significant impact at the significance level ($\alpha \leq 0.05$) of data volume on improving Municipalities services in Northern Jordan.

H01-2: There is no statistically significant impact at the significance level ($\alpha \leq 0.05$) of data speed on improving Municipalities services in Northern Jordan.

H01-3: There is no statistically significant impact at the significance level ($\alpha \leq 0.05$) of data reliability on improving Municipalities services in Northern Jordan.

Theoretical framework and previous studies:

The digital age is rapidly evolving, and data analysis has become an important process for transforming large amounts of information into actionable insights. By examining and analyzing this data, organizations, whether public or private, can gain insights into improving entire services. This analysis enables organizations to identify strengths and weaknesses in improving existing services [5] , Data analysis is the cornerstone of building a successful service delivery strategy and it provides the foundation for making informed decisions aimed to improving services. Data analysis is a pivotal concept in the era of digital transformation, as it represents the tool that enables Municipalities to invest the vast amount of data available to them and transform it into added value [6] .

Al [7] defined data as a form of advanced analysis using specialized tools and programs to deal with big data in its various forms, whether structured or unstructured, and in accordance with its great speed of generation and flow. Data analysis can be defined as "the process necessary to understand a data set in order to extract and generate useful information and knowledge, which through interpretation and classification will lead to more effective management" [8] .

Data size "indicates that there are larger amounts of data than in traditional methods, and therefore processors and devices capable of handling that data are needed" [9]. Data speed "means the speed of data flow, as big data is produced and flows more quickly than data produced by traditional methods"[10] and data reliability "refers to the reliability of data. When data is collected at high speed, it is worthless if the data is flawed and inaccurate" [11] .

Improving services in Municipalities means that the services provided by Municipalities have become in demand, with their differences and diversity This is due to the high increase in population numbers. Municipalities services are considered essential matters in the lives of citizens. The urgent need has emerged to develop these services and make them faster and easier. Here, the use of information technology in developing and advancing Municipalities services has become necessary, as the Jordanian government has shifted to electronic services and modern applications Municipalities provide a number of direct basic services to citizens, nonprofit-making services, which are infrastructure such as opening streets and other Services [12] .

A study by[13] "Impact of Information Technology According to the Technology Acceptance Model in Improving the Performance of Staff in the Municipality of the Northern Region in Jordan," aims to examine the effect of information technology on staff performance in the municipality based on the Technology Acceptance Model. In order to achieve its objective, the study employed a descriptive and analytical research design using a simple random sample of 200 individuals. The study findings made several important recommendations, including the strengthening and enhancement of the information technology infrastructure to meet the needs of the day. In addition, it demanded the use of information and communication technology universally in all the local administration institutions. In addition, the research highlighted the significance of fully embedding the information technology model in all aspects of operations and services in all Municipalities across Jordan.

A study by [4] entitled "Using Big Data Analysis in Management Accounting to Improve Financial Forecasts and Strategic Decision Making: A Field Study on Commercial Banks" This study aimed to explore the impact of big data analysis on management accounting, in order to improve financial forecasts and enhance strategic decision making. The study relied on the descriptive and analytical approach, as primary data was collected through a questionnaire that was designed and distributed

to a sample of workers in the banking sector Which includes 390 individuals. To analyze the data, descriptive statistical methods such as the arithmetic mean and standard deviation were used, in addition to inferential statistical methods such as validity measures, correlation coefficient, and regression coefficient to test the study hypotheses. Among the results of the study: There is a statistically significant positive effect of integrating big data with management accounting systems on the accuracy of financial forecasts. It was also found that there is a statistically significant positive impact of the integration of big data with management accounting systems on the quality of strategic decision-making, in addition to a statistically significant positive impact of the integration of big data with management accounting systems on the quality of risk management.

A study by [14] "The role of information and communication technology (ICT) on the transformation of Municipalities into smart cities for improved service deliver" The research aims was to improve the delivery of services, Municipalities in South Africa are implementing information and communication technology (ICT) initiatives and to advance their status as smart cities, The article is qualitative in nature and the data collected is analyzed descriptively. The findings explore the challenges related to leadership in the municipality that requires a willingness to adopt, adapt and implement ICT initiatives for smart governance.

A study by [15], studed the "Evaluating the impact of digital governance in improving service delivery in Eastern Cape Municipality. the aim was to know the impact of digital governance on service delivery within Eastern Cape Municipalities. With the increasing integration of digital technologies in governance structures worldwide , the method was a document analysis, this research evaluates the implementation of digital governance initiatives and their influence on service delivery outcomes the result was reveal both opportunities and challenges associated with digital governance adoption,

highlighting the importance of context-specific strategies and stakeholder engagement.

A study by [16] study "Improving public services performance measurement systems: applying data envelopment analysis in the big and open data context", the Purpose to contributes to the field of public services' performance measurement systems by proposing a benchmarking-based methodology that improves the effective use of big and open data in analyzing and evaluating efficiency, an empirical implementation of the proposed methodology was conducted on waste management services provided in Italy. The result addresses the problem of misleading targets for entities that are erroneously deemed inefficient when applying data envelopment analysis to real-life datasets containing outliers. The paper fills this research gap by proposing a methodology that allows for exploiting the opportunities offered by big and open data for supporting internal decision-making

Methodology:

A descriptive-analytical approach was employed to meet the requirements of the current study. Descriptive analytical approach has been defined as a research approach that is involved with events, phenomena, and practices that are available to be observed and measured without intervention by a researcher. The researcher has access to it, and thus

the researcher can analyze and describe it. The use of data analysis and its contribution towards improving services in Municipalities in Northern Jordan.

Study population: The study population was a sample of employees working in Municipalities in Northern Jordan and the sample included (150) employees working in in Municipalities in Northern Jordan and from whom (134) fillable questionnaires were received to be processed statistically.

Study instruments: The researchers have borrowed theoretical literature and sources that addressed the use of data analysis and their role improving services in

Municipalities in Northern Jordan, and the design of the questionnaire is borrowed from previous research, using a five-point Likert scale, 5= "strongly agree" and 1= strongly disagree"

Results:

The result of hypotheses as the following:

1. There is no statistically significant impact at level ($\alpha \leq 0.05$) of data analysis, with its dimensions (data volume, data speed, data reliability), on improving Municipalities services in Northern Jordan.

Table 1: Presentation of Results of multiple regression a whole.

independent variable is the role of ICT	Value of T	Sig	Value of R	Value of R^2	Value of F	sig
data volume	1.683	.002*	0.365	0.1332	3.245	0.029
data speed	0.873	.001*				
data reliability	2.408	.012*				

It is observed from table (1) that the value of (R) was (0.365) which provides the overall correlation coefficient, the value of (R2) was (0.1332) which provides the percent of influence or interpretation by all independent variables to the dependent variable, and the value of (F) was (3.245), with statistical significance (0.029). The data analysis, with its dimensions (data volume, data speed, data reliability) in improving Municipalities services in Northern Jordan, the hypothesis is rejected according to a statistically significant level at the significance level ($\alpha \leq 0.05$) of data analysis, with its dimensions (data volume, data speed, data reliability) in improving

Municipalities services in Northern Jordan, and accepting the alternative hypothesis that there is a role for improving Municipalities services in Northern Jordan to a statistically significant level ($\alpha \leq 0.05$) of data analysis in improving Municipalities services in Northern Jordan.

2. There is no statistically significant impact at the significance level ($\alpha \leq 0.05$) of data volume on improving municipal services in Northern Jordan.

Table2: Presentation of Results of multiple regression a whole.

independent variable is the role of ICT	Value of T	Sig	Value of R	Value of R^2	Value of F	sig
data volume	8.896	.000	0.438	0.192	*79.146*	0.000

It is observed from table (2) that the value of (R) was (0.438) which provides the overall correlation coefficient, the value of (R2) was (0.192) which provides the percent of influence or interpretation by all independent variables to the dependent variable, and the value of (F) was (79.146), with statistical significance (0.000). The data volume in improving Municipalities services in Northern Jordan, the hypothesis is rejected according to a statistically significant level at the significance level ($\alpha \leq 0.05$) of data volume, data volume in improving Municipalities services in Northern Jordan, and accepting the alternative hypothesis that there is a role for improving Municipalities

services in Northern Jordan to a statistically significant level ($\alpha \leq 0.05$) of data volume in improving municipal services in Northern Jordan

3. There is no statistically significant impact at the significance level ($\alpha \leq 0.05$) of data speed on improving Municipalities services in Northern Jordan.

Table 3: Presentation of Results of multiple regression a whole.

independent variable	Value of T	Value of R	Value of R^2	Value of F	sig
data velocity	13.022	0.046	.0021	1.918	0.04

It is clear from the data in Table (3) that the value of (R) was (0.046) which provides the overall correlation coefficient, the value of (R2) was (.0021) which provides the percent of influence or interpretation by all independent variables to the dependent variable, and the value of (F) was (1.981), with statistical significance (0.021). The data velocity in improving Municipalities services in Northern Jordan, the hypothesis is rejected according to a statistically significant level at the significance level ($\alpha \leq 0.05$) of data speed, data in improving Municipalities services in Northern Jordan, and accepting the alternative hypothesis that there is a role for improving Municipalities services in Northern Jordan to a statistically significant level ($\alpha \leq 0.05$) of data velocity in improving municipal services in Northern Jordan.

4. There is no statistically significant impact at the significance level ($\alpha \leq 0.05$) of data reliability on improving municipal services in Northern Jordan .

Table 4: Presentation of Results of multiple regression a whole.

independent variable	Value of T	Value of R	Value of R^2	Value of F	sig
data reliability	0.098	0.422	0.178	0.007	0.002

It is clear from the data in Table (3) that the value of (R) was (0.422) which provides the overall correlation coefficient, the value of (R2) was (0.178) which provides the percent

of influence or interpretation by all independent variables to the dependent variable, and the value of (F) was (0.007), with statistical significance (0.002). The data reliability in improving Municipalities services in Northern Jordan, the hypothesis is rejected according to a statistically significant level at the significance level ($\alpha \leq 0.05$) of data reliability, data in improving Municipalities services in Northern Jordan, and accepting the alternative hypothesis that there is a role for improving Municipalities services in Northern Jordan to a statistically significant level ($\alpha \leq 0.05$) of data reliability in improving Municipalities services in Northern Jordan.

Conclusions and Recommendations:

This study highlights the growing importance of data analysis in enhancing the efficiency and effectiveness of Municipalities services in Northern Jordan. In an era where data has become one of the most valuable assets, Municipalities face both opportunities and challenges in utilizing big data to guide strategic decision-making. The study emphasizes that the effective use of data analysis dimensions (volume, speed, and reliability)is essential for Municipalities seeking to improve service delivery, optimize resources, and increase citizen satisfaction. Data analysis involves using advanced analytical techniques to extract valuable indicators that guide better decision-making for providing the required services. In this study, the role of data analysis in Municipalities are investigated according to the study model analysis, The results of the research reveal that through the arithmetic mean, showed that the level of data volume in Municipalities reached a total arithmetic mean of (2.46), which indicates an average low. It demonstrates the ability of traditional frameworks to handle the increasing volume of big data, which can affect the effectiveness of analysis. The data speed, it showed a total arithmetic average of (2.67), which is an average medium. This indicates

an opportunity for improvement in Municipalities' work on immediate data processing and analysis, and finally, the overall arithmetic mean of the data reliability dimension was (2.74), which is also an average level. This suggests that Municipalities may need to strengthen mechanisms to ensure the quality and reliability of the data used.The results showed that the overall arithmetic mean of the municipal services improvement variable was (2.72), which is an average medium level. This suggests that Municipalities are not making sufficient use of data analysis. The results showed a positive impact of all dimensions on improving municipal services. The analysis also showed that the volume of data directly contributes to improving municipal services, as it allows the administration to identify citizens' needs. The study showed that the

speed of data collection and analysis in a timely manner leads to faster and more flexible decision-making, and the reliability and quality of data are important in improving municipal services, when management relies on accurate and unbiased data, it can make strategic decisions that reflect the actual situation in improving municipal services. The study have many recommended, as the need to strengthen digital infrastructure and develop database management systems in Municipalities, the importance of investing in data analysis programs and developing employee skills in all fields, Integrating decision support system into daily administrative processes by promoting the use of data analytics applications that provide intelligent models and reports to assist decision-makers in Municipalities and Developing an organizational culture based on innovation and continuous learning within Municipalities, by empowering and encouraging employees to adopt data analytics practices that will support the improvement of municipal services.

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