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Diagnosing the Reality of Information Technology Adoption Strategies in the Nineveh Education Directorate: A descriptive study

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A B S T R A C T

This study aims to diagnose the availability of information technology (IT) adoption strategies—specifically the parallel use, excessive use, and tolerance strategies—in the Nineveh Education Directorate. A descriptive approach was employed, targeting Educational Management Information System (EMIS) operators in primary schools on the left side of Mosul, with a population of 412 operators. A questionnaire was distributed to 340 operators, and 312 valid responses were analyzed using percentages, arithmetic means, standard deviations, and relative importance. Results reveal that the excessive use strategy is the most prevalent in implementing the EMIS system. This study uniquely contributes to understanding IT adoption in post-conflict educational settings, offering insights into operator-driven perspectives.

1   Introduction

 Information technology (IT) has become a cornerstone of modern educational systems worldwide, driving efficiency, productivity, and adaptability amid rapid global changes. Schools increasingly rely on IT to enhance operational processes and ensure resilience during digital transformation. This study narrows its focus to the Nineveh Education Directorate, a key educational institution in Iraq, examining how it integrates IT through the Educational Management Information System (EMIS) to manage data flow between schools and headquarters. The ability to adopt effective IT strategies is critical for educational success and sustainability in this context. The study is organized into four sections: meth-odology, theoretical framework, applied framework, and conclusions and recommendations. Methodology.

2   Methodology

2.1   Research Problem

The Nineveh Education Directorate's recent implementation of the EMIS system highlights a practical gap in understanding how IT adoption strategies are applied and their effectiveness. Preliminary field visits revealed inconsistent strategy application across schools, prompting this investigation. The study addresses two questions:

1. To what extent are the dimensions of IT adoption strategies (parallel use, excessive use, tolerance) available in the Nineveh Education Directorate?
2. Do IT adoption strategies vary in their presence within the Nineveh Education Directorate?

2.2 Importance of the Research

Many organizations adopt different strategies for adopting information technology, giving each strat-egy its own importance. Here, the importance of research becomes clear according to the following axes:

1. It clarifies to the field under study the strategies that can be adopted within the framework of its operation of the technology systems it uses.
2. It clarifies to the field the optimal strategy for adopting information technology, which enhances the success of this technology through the belief of the individuals working on it in its importance ac-cording to the optimal strategy.

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3. The research contributes to a literature review of the concept of IT adoption strategies in business organizations.

2.3   Research Objectives

Visions are enhanced for organizations through their ability to gather information and within the framework of compatibility between technology and people. This is enhanced by the organization's ability to adopt strategies that enable it to operate technology efficiently and effectively. Hence, the importance of research appears in the following:

1. Identifying the availability of the dimensions of information technology adoption strategies represented by (parallel use strategy, excessive use strategy, tolerance strategy in the Nineveh Education Directorate.
2. Identifying the preference of the research sample among the three strategies in adopting technology, represented by the parallel use strategy, the excessive use strategy, and the tolerance strategy.

2.4   Study Hypotheses

The research hypotheses can be explained according to the following axes:

First Main Hypothesis: The researched individuals are not aware of the strategies adopted by the researched field in adopting information technology.

Second Main Hypothesis: The availability of the dimensions of information technology adoption strategies represented by (parallel use strategy, excessive use strategy, tolerance strategy) in the researched field.

The third main hypothesis: IT adoption strategies do not vary in their presence within the Nineveh Education Directorate.

2.5   Research methodology

Research is based on many methods that are compatible with its nature and what researchers aim to achieve in this research. According to what the researcher aims for in this research, he used the descriptive method, after it was an appropriate method for his research, as this method is based on describing the phenomenon or variables being researched theoretically.

2.6   Research field and sample

The research field represented the schools of the Nineveh Education Directorate, and the study community represented the operators of the EMIS system in the primary schools on the left side of the city of Mosul, numbering (412). (340) sample forms

were distributed from the community at a rate of (76%). (329) forms were retrieved, and (312) were valid for analysis. Thus, the representation is

2.7 Statistical analysis methods:

The research focused on applications including describing the study variables and diagnosing them in light of analyzing the answers of the respondents, represented by a sample of EMIS system operators in primary schools on the left side of the Nineveh Education Directorate, by adopting the statistical program (SPSS V26) to infer percentages, arithmetic means, standard deviations and relative importance.

3 Theoretical framework

3.1 Concepts of Information Technology

before delving into the concepts that writers and researchers have addressed regarding the concept of information and communication technology, it is necessary to analyze the term into its main parts. The technical meaning of the word (Technology), which was Arabized as technology or technique, is a word of Greek origin consisting of two parts, the first of which (Techno) means art or skill, while the second part (Logy) means science or study. Thus, technology means the science of arts or skill to perform a specific function. [1].

The term information technology did not actually appear until the 1990s, when Lo and Venkatraman indicated that the adoption of information technology is a description of the relationship and compatibility between business strategy and information technology, as the adoption of the right information technology can make the management of information technology an easy, sophisticated and integrated work, in addition to defining responsibilities and planning for that technology. Information technology was also considered a critical success factor in order to provide organizational success by the Information Technology Institute, and the goal of that is that the application of technology facilitates and supports the delivery of information to [2].

Information technology is one of the most important facts agreed upon in the literature of information systems, and that it has become the main driver of change. And that adopting a new technology always leads to a new type of operations that are also linked to providing a new product service, oftenwith a high degree of differentiation and heterogeneity, which enables entry into new markets and leads to expanding the market share in a way that leads to achieving high performance. [3].

Its believed that it is a group of interconnected and interconnected technologies that usually focus on computers, and have a tremendous capacity to digitize, process, handle, and transform data in unlimited quantities and in various ways. [4].

The researchers believe that information technology is the basic tool through which organizations achieve speed in accomplishment and organization, and it is the path to achieving efficiency and effectiveness in business organizations. The more an organization has an effective strategy to adopt, the more it will be able to achieve success at the competitive.

3.2   importance of information technology

Information technology plays a major role in modernizing and developing institutions, improving their performance, improving working conditions, and facilitating various transactions within the institution. Therefore, it is of great importance. In light of the use of information technology, it is possible to expand the use of computer networks that would allow direct communication between computers, which allows the exchange of inputs and outputs through that network. Also, any development in information technology came to meet economic and social developments and the expansion of the scope of goals, in service of unit owners, or in service of all segments of society) [5].and the importance of information technology is highlighted through the following [6]:

1. Information technology contributes to achieving the desired balance between the abundant and the scarce, and between creating new businesses and eliminating old ones. Modern and advanced information technology represents the beating heart of organizations.
2. It is characterized by flexibility in designing work in several aspects related to its form and timing, and the ability to redesign it quickly and with higher quality. It can be relied upon in complex calculations, as information technology has the ability to process a very large number of transactions and required work with extreme speed and in a short time.
3. It helps organize and facilitate the transfer of data and information at the organizational level and between business units. It also helps save effort and time for employees in organizations.

3.3   Strategies for adopting information technology

Over the past two decades, information technology has played new business roles, so many organizations have worked to design their strategies in line with these technologies. Strategy is defined as a planned process to achieve specific goals in line with the organization's capabilities by analyzing the internal situation and the external environment of the organization, taking into account the activities of competitors [7].Accordingly, the strategy of adopting information technology was such as enabling new business processes and border-spanning activities, generating new products and services, increasing customer engagement, and facilitating innovation [8].One of the most prominent strategic goals adopted by contemporary organizations is the strategy of adopting information technology in organizations that require the possession of computers (hardware and software), various electronic office equipment, manufacturing equipment, and wired and wireless communications.

This technology is used to process data. Data processing involves obtaining, collecting, storing, and processing it in various ways to produce high-quality information—that is, relevant, accurate, and timely information [9]. Accordingly, these streams of literature have focused either on the use of information technology in organizations to automatically record employee work or on employees' use of infor-

mation technology to report on their own work. Organizations' adoption of information technology as a new strategy depends not only on its function and efficiency but also on users' perceptions of the organization's motives behind its mandatory introduction. Therefore, employees' diverse reactions to imposed technology, or innovation in general, must be taken into account beyond hierarchical logic [10]. Here, a number of information technology adoption strategies can be illustrated.

Overuse strategy

A basic strategy based on the mandatory use of the system used by the organization, which does not allow the organization to transfer information except through it. When looking at Alpha Company's experience in this field, we can notice that some employees at Alpha Company were very enthusiastic about using the new systems approved by the company and used it as they did with any other communication platform The new systems adopted by the company and used them as they did with any other social media platform, such as Facebook and LinkedIn. They shared posts about their weekend activities and managed their profiles to highlight their skills and interests. At this point, Alpha's HR department intervened and tried to influence what was posted. For example, when employees started filling out their profiles by describing their competencies, HR immediately closed this option because these competencies did not align with those specified in employee contracts [11]. As one of the knowledge management coordinators recounted, "The social media approach is complex. The social media space moves faster than the official machine. So it's important to keep all our data consistent and avoid inconsistencies. Therefore, we had to regulate the use of some applications. Thus, under the slogan 'Okay, we've
In fact, the overuse strategy ultimately allowed employees to freely return to the "old way of doing things." In this case, our data showed a case of co-organization, where employees took over tools by "customizing" them according to to their needs, to which Alpha management responded by modifying the control rule, i.e., suppressing the possibility of indicating one's skills.) By preventing employees from adapting the rules to their needs, Alpha management ultimately provoked the complete rejection of the tool by some employees [12].

Tolerance strategy

The strategy is basically based on the company tolerating the use of its own systems or other systems by employees, whether in transferring information or communicating with others [13].

Managers' adoption of a tolerance strategy did not help bridge the gap between the different organizational subcultures (technical and non-technical). In fact, the fact that management imposed, rather than negotiated, IT choices deepened the existing gap. Technical employees continued to use informal IT tools, while non-technical employees followed the formal path, but employed diverse strategies. Consistent with institutional theory, the analysis demonstrated the difficulty of changing organizational practices. The results indicate that the introduction of a central IT tool to promote transparency and collaboration conflicted with the institutional practices, cultures, and

established codes of professional conduct for a significant proportion of users actually [12].

Parallel use strategy

The strategy is essentially based on the company relying on its own systems but giving unconditional freedom to use other systems [14]. In some cases, employees see the implementation of a particular system as a way to enhance control and oversight over their work. Many IT developers, before any system was introduced by the organization, developed their own collaboration tools, which were adapted to the needs of their project teams, often outside the "radar" of the hierarchy and without management approval. As one project manager at Alpha noted, "There are a lot of young developers. We don't know what they do at home in the evening... Maybe they're evolving; so if they need to communicate with each other, they'll develop a chat for that purpose and use it in the future. Between them, there will be a parallel circle. However, these initiatives were not without risks [12]. and that the strategies for adopting information technology in its three dimensions: (the strategy of tolerance, the strategy of excessive use, the strategy of parallel use) facilitate the work of leadership in Achieving success [15]. because it helps in analyzing data and machine learning algorithms and improving logistics operations [16]. and it also helps the organization to perceive changes and identify opportunities in the external environment and take advantage of these opportunities in a timely manner by deploying existing resources and capabilities or acquiring new ones through strategic actions such as alliances, partnerships or acquisitions [17]. which entail reorganizing and adapting the organization's resources internally in response to changing market conditions, reconfiguring the IT infrastructure and operations and maintaining alignment with evolving strategic priorities. [12].

4   Application framework

4.1   Description of the characteristics of the researched individuals

The study sample was characterized according to the data provided by its members through their answers to the first part (general data) of the questionnaire, as shown in the following Table (1):

Table 1. General data

General data	Categories	number	Percentage
Gender	Male	137	44%
	Female	175	56%
the age	Under 25 years old	19	6%
	25-34 years	134	43%
	35-50 years	119	38%
	50 years and older	40	13%
Academic	Higher diploma	25	8%

qualification	Bachelor's	287	92%
	Less than 5 years	90	29%
Duration of service	5-10 years	100	32%
	11-15 years	50	16%
	16-20 years	60	19%
	21 years and older	12	4%

Source: Prepared by the researchers based on the outputs of the SPSS V.26 program, n=312

The table shows that the percentage of females is greater than that of males, reaching (56%) of those working on the EMIS system, while the ages of operators between 25-34 years and 35-50 years had the highest percentages at (43%) and (38%). This indicates that older ages were chosen to work in this system, and most of them, at (92%), hold a bachelor's degree. The percentage of service between 5-10 years reached (32%), which indicates the need for years of service in order to understand the nature of the system's information.

4.2 Description and diagnosis of the study variables

The content of this paragraph refers to a description of the strategies for adopting information technology and diagnosing it in terms of the dimensions expressed in light of the respondents' answers to the paragraphs embodying each of them, as follows:

Parallel Strategy:

It is evident from the instructions in Table (2) that there is a difference between the opinions of the respondents, in addition to the innovative visual paragraphs parallel to the phrases (X1-X5), as the overall agreement rate of the respondents' answers reached (I start, I agree) (57.88%), indicating that there is a medium degree of agreement between the respondents' answers to the visual paragraphs of the parallel strategy , That is, the opinions of the researched individuals tended towards the relative positive based on the five-point Likert scale, while the degree of general disagreement (disagree, strongly disagree) for the researched individuals' answers to the paragraphs of the parallel use strategy dimension reached (18.02%), while the percentage of unsure answers was (24.10%), and the arithmetic mean was (3.52) and the standard deviation (0.97). The relative importance rate of the parallel use strategy dimension was (70.42%), which is a good relative importance, meaning that the respondents agreed on these items according to their personal point of view.

At the partial level, paragraph (X14), which represents the school administration creating a balance in sending the required information between the EMIS system and social networking applications, obtained the highest relative importance of (81.28%) with an arithmetic mean of (4.06) and a standard deviation of (0.93), while paragraph (X11) achieved the lowest relative importance of (56.22%), which represents the school administration applying the EMIS system in addition to social networking applications, with an arithmetic mean of (2.81) and a standard deviation of (1.02).

Table 2. Frequency distributions, arithmetic means, standard deviations, and relative importance of the parallel use strategy dimension

Paragraphs	I strongly agree (5)		I agree (4)		not sure (3)		I don't agree (2)		I strongly disagree (1)		Average calculation	Standard deviation	Relative importance %
	No	%	No	%	No	%	No	%	No	%			
X1	15	4.81	64	20.51	110	35.26	93	29.81	30	9.62	2.81	1.02	56.22
X2	36	11.54	141	45.19	74	23.72	45	14.42	16	5.13	3.44	1.04	68.72
X3	52	16.67	168	53.85	64	20.51	20	6.41	8	2.56	3.76	0.90	75.13
X4	115	36.86	127	40.71	51	16.35	13	4.17	6	1.92	4.06	0.93	81.28
X5	41	13.14	144	46.15	77	24.68	42	13.46	8	2.56	3.54	0.97	70.77
Average		16.60		41.28		24.10		13.65		4.37	3.52	0.97	70.42
The total		57.88				24.10				18.02			

Source: Prepared by the researchers based on the outputs of the SPSS V.26 program, n=312

Overuse strategy

It is clear from the data in Table (3) that there is agreement between the opinions of the researched individuals regarding the paragraphs of the dimension of the strategy of excessive use of phrases (X6-X10), as the general agreement rate for the answers of the researched individuals reached (strongly agree, agree) (%62.76). This indicates that there is a degree of agreement for the answers of the researched individuals on the paragraphs of the dimension of the strategy of excessive use, meaning that the opinions of the researched individuals tend towards the positive based on the (Likert) scale The five-point scale, while the degree of general disagreement (disagree, strongly disagree) for the answers of the individuals surveyed on the paragraphs of the excessive use strategy dimension reached (15.19%), while the percentage of unsure answers was (22.05%), and the arithmetic mean was (3.66) and the standard deviation was (1.00), and the relative importance rate for the excessive use strategy dimension

reached (73.26%), which is a good relative importance, which means that the individuals surveyed agreed on these paragraphs according to their personal point of view.

At the partial level, paragraph (X22), which represents the school administration's view that the EMIS system is the basis for exchanging information via social networks, obtained the highest relative importance of (80.26%) with an arithmetic mean of (4.01) and a standard deviation of (0.98), while paragraph (X24) achieved the lowest relative importance of (60.64%), which represents the school administration's emphasis on the flow of information in the Education Directorate being done via the EMIS system, with an arithmetic mean of (3.03) and a standard deviation of (1.08).

Table 3. Frequency distributions, arithmetic means, standard deviations, and relative importance of the excessive use strategy dimension

Paragraphs	Response scale										Average calculation	Standard deviation	Relative importance %
	I strongly agree (5)		I agree (4)		not sure (3)		I don't agree (2)		I strongly disagree (1)				
	No	%	No	%	No	%	No	%	No	%			
X6	95	30.45	143	45.83	48	15.38	17	5.45	9	2.88	3.96	0.97	79.10
X7	109	34.94	132	42.31	44	14.10	20	6.41	7	2.24	4.01	0.98	80.26
X8	54	17.31	129	41.35	79	25.32	41	13.14	9	2.88	3.57	1.02	71.41
X9	25	8.01	85	27.24	103	33.01	73	23.40	26	8.33	3.03	1.08	60.64
X10	65	20.83	142	45.51	70	22.44	30	9.62	5	1.60	3.74	0.95	74.87
Average		22.31		40.45		22.05		11.60		3.59	3.66	1.00	73.26
The total		62.76				22.5				15.19			

Source: Prepared by the researchers based on the outputs of the SPSS V.26 program, n=312

Tolerance Strategy

The results of Table (4) indicate the existence of agreement among the opinions of the respondents regarding the items of the tolerance strategy dimension (X11-X15), as the general agreement rate for the respondents' answers (strongly agree, agree) reached (55.96%). This indicates that there is a degree of agreement between the respondents' answers on the items of the tolerance strategy dimension, meaning that the respondents' opinions tend towards the positive based on the five-point Likert scale, while the degree of general disagreement (disagree, strongly disagree) for the respondents' answers on the items of the tolerance strategy dimension reached (20.51%). As for the

percentage of unsure answers, it was (23.53%). The arithmetic mean was (3.43) and the standard deviation was (1.04). The relative importance rate for the tolerance strategy dimension reached (68.53%), which is a good relative importance, which means that the respondents agreed on these items according to their personal point of view. At the partial level, paragraph (X35), which represents the follow-up of the implementation of procedures for adopting the EMIS system, obtained the highest relative importance of (73.78%), with an arithmetic mean of (3.69) and a standard deviation of (0.90), while paragraph (X32) achieved the lowest relative importance of (62.12%), which represents the provision of opportunities to use more than one application in its field of work, with an arithmetic mean of (3.11) and a standard deviation of (1.22).

Table 4. Frequency distributions, arithmetic means, standard deviations, and relative importance of the tolerance strategy dimension.

Paragraphs	Response scale										Average calculation	Standard deviation	Relative importance %
	I strongly agree (5)		I agree (4)		not sure (3)		I don't agree (2)		I strongly disagree (1)				
	No	%	No	%	No	%	No	%	No	%			
X11	24	7.69	142	45.51	96	30.77	40	12.82	10	3.21	3.42	0.92	68.33
X12	43	13.78	90	28.85	66	21.15	83	26.60	30	9.62	3.11	1.22	62.12
X13	52	16.67	98	31.41	68	21.79	67	21.47	27	8.65	3.26	1.22	65.19
X14	40	12.82	173	55.45	65	20.83	21	6.73	13	4.17	3.66	0.93	73.21
X15	43	13.78	168	53.85	72	23.08	19	6.09	10	3.21	3.69	0.90	73.78
Average		12.95		43.01		23.53		14.74		5.77	3.43	1.04	68.53
The total	55.96				23.53			20.51					

Source: Prepared by the researchers based on the outputs of the SPSS V.26 program, n=312

4.3 The Summary of the description and diagnosis of the information technology strategies variable

Based on the above, it can be said that all the answers for all dimensions of the information technology strategies variable were higher than the hypothetical arithmetic mean of (3), and that Table (5) shows the relative importance of the dimensions of information technology strategies from the point of view of a sample of EMIS system

operators in some schools of the Nineveh Education Directorate. Through the values of the arithmetic mean, standard deviation and relative importance, it became clear to us that the most important dimension of the information technology strategies variable is the dimension of the excessive use strategy, as indicated by the value of the arithmetic mean of (3.66) and the standard deviation of (1.00) and with a relative importance of (73.26%), followed in terms of relative importance by the dimension of the parallel use strategy. This is indicated by the arithmetic mean value of (3.52) and the standard deviation of (0.97) with a relative importance of (70.42%), while the tolerance strategy dimension was shown to be the least important dimension, indicated by the arithmetic mean value of (3.43) and the standard deviation of (1.04) with a relative importance of (68.53%).

Table 5. Relative importance of the dimensions of information technology strategies

	Dimensions	Arithmetic mean	Standard deviation	Relative importance%	Ranking
1	Parallel use strategy	3.52	0.97	70.42	Second
2	Overuse strategy	3.66	1.00	73.26	First
3	Tolerance strategy	3.43	1.04	68.53	Third

Source: Prepared by the researchers based on the outputs of the SPSS V.26 program, n=312

Thus, it appears to us from the descriptive analysis that we can reject the first main hypothesis, which states "the researched individuals are not aware of the strategies adopted by the researched field in adopting information technology," and accept the alternative hypothesis, which states "the researched individuals are aware of the strategies adopted by the researched field in adopting information technology," and reject the second main hypothesis, which states "the dimensions of information technology adoption strategies represented by are not available." By (parallel use strategy, overuse strategy, tolerance strategy) in the researched field" and accepting the alternative hypothesis of the availability of dimensions of information technology adoption strategies represented by (parallel use strategy, overuse strategy, tolerance strategy) in the researched field.

5 Conclusions and Recommendations.

5.1 Conclusions

These can be explained as follows:

1. The surveyed sample is aware of the existence of a strategy by the Nineveh Education Directorate based on diversity. This directorate's adoption of information technology strategies, including the adoption of the EMIS system, is based on diversity. However, this strategy varies according to the discretion of the school principal and the imposition of an appropriate strategy for adopting the system.

2. There is a high level of agreement among the surveyed sample regarding the strategy of excessive use of the system, which indicates the authorities responsible for the system I worked to employ this system as a basic tool for transferring information between the directorate and the schools studied.

3. The parallel usage strategy was adopted by the principals of these schools to transfer information. This strategy was primarily based on an attempt to avoid operating entirely on the EMIS system due to technical difficulties with the system itself.

4. Some principals also adopted, albeit to a lesser extent, a tolerance strategy to address system disruptions, which negatively impacted the implementation of an appropriate strategy.

5.2   Recommendations

These can be explained as follows:

1. The researchers recommend overcoming the technical problems facing the EMIS system so that the Education Directorate can implement its strategy for adopting information technology.

2. The researchers recommend adopting an update to the EMIS system that would enhance side conversations between the receiver and sender of information to reflect modern social networks, thus enabling the implementation of an appropriate strategy.

3. The researchers recommend strengthening training courses and workshops on the advantages and objectives of the EMIS system, which will enable those in charge to solve the problems they encounter while working with the system.

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