Kurdish Studies
Jan 2024
Volume: 12, No: 1, pp. 3694-3705
ISSN: 2051-4883 (Print) | ISSN 2051-4891 (Online)
www.KurdishStudies.net

Received: October 2023 Accepted: December 2023
DOI: https://doi.org/10.58262/ks.v12i1.263

Determinants of The Success of Management Information Systems MIS in Smart Cities in Iraq

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Abstract

The research seeks to ascertain the factors that contribute to the effectiveness of management information systems (MIS) in smart cities in Iraq. The study sample reveals that critical determinants of MIS success in smart cities in Iraq are information flow, a high level of information quality and timeliness, the ability to generate innovative and creative work methods, problem-solving skills, and sensitivity.

Keywords: *Management Information Systems - Smart Cities – Iraq.*

Introduction

In the current era, organisations are confronted with an abundance of challenges and an intensification of competition. Hence, it is imperative to consider the significance of information in the context of management. This has led to organisations expediting the advancement of computer-based information systems and management information systems, as well as the implementation of contemporary information technologies, which have significantly transformed the discipline of management through their multifaceted applications. The possession of a management information system is no longer the determining element in an organization's success or attainment of a competitive edge. However, there are numerous other factors that must be considered, the most significant of which are indicators of the system's success, considering its impact on the beneficiary's behaviour and emotions at a time when the beneficiary has assumed the most significant role. With regard to the effective conception and execution of the information system.

In pursuit of this objective, contemporary organisations have integrated effective management information systems (MIS) as a fundamental component, a critical pillar for management, and a source of opportunities that fortify competitive capabilities and generate fresh prospects for organisations seeking to gain market shares and attain competitive advantages.

Research Problem

As a philosophical tenet, the present study activates the processes of development through the implementation of an effective management information system in the smart cities under investigation. The researcher utilised interviews with managers in upper and middle departments in the cities of the research sample to diagnose the problem pertaining to the administrative information in those banks and its impact on development. The interviews revealed that the system is plagued by issues such as restricted availability of essential ingredients required for its success, which further diminished its potential.

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We can summarise the research dilemma in this query in light of the preceding: What factors influence the effectiveness of management information systems in Iraq's smart cities?

Research Objective

• Assessing the efficacy of the management information system in the sample communities and its contribution to the process of development through the establishment of success metrics.
•By presenting the researchers' prior experiences in the field of research variables, this study aims to develop a theoretical framework for understanding contemporary concepts and their potential applicability to the business environment across nations.

In order to ascertain the nature of the correlation between success indicators of management information systems and smart city development,

Study Questions

• Which factors influence the effectiveness of Management Information Systems in Iraq's smart cities?
• What function do management information systems serve in the pursuit of development?
•What is the correlation between the development of smart cities and the success indicators of management information systems?

Literature Review

- As stated by Cruz-Jesus, F., Martins, J., Branco, F., Goncalves, R., Au-Yong-Oliveira, M., Oliveira, T., Naranjo-Zolotov, M. The term "management information system" refers to a collection of interacting or overlapping components that gather, process, store, transmit, and distribute a variety of data and information to the intended recipients in order to facilitate decision-making and maintain authority over the organisation. The information system conducts an analysis of issues and ascertains suitable alternatives for their resolution. In addition, it provides decision makers with a database detailing the organization's activities and the encompassing environment. The implementation of computerization for the information system is not mandatory.
- As it requires time, Koksal, O., and Tekinerdogan, B. (2019) state that all of its operations (input, processing, and output) may be performed manually. The necessity for computerised systems emerged due to the laboriousness and occasional imprecision associated with manual processes. The result is computerised information systems (CBIS), also known as computer-based information systems, which are systems that process data, transmit information, and retrieve data using a combination of hardware and software components. It is characterised as a phrase. Concerning a structured framework and protocols facilitating the acquisition, categorization, arrangement, and manipulation of data, followed by its transformation into actionable information that an individual may consult as necessary to accomplish tasks, arrive at decisions, or execute operations, relying on the understanding gained from the retrieved data from the system. An information system comprises a collection of mechanical and human components that collaborate to gather, process, evaluate, and categorise data in accordance with established protocols and guidelines. Its primary objective is to provide decision makers with the appropriate information (Koksal, O., & Tekinerdogan, B., 2019).

- ***The Concept of Management Information Systems***

According to Al Shobaki and Abu-Naser (2017), an information system comprises a collection of formal

and informal systems within an organisation that function to furnish comprehensive data and information regarding the organisation and its surroundings. This information can pertain to any time period, including the past, present, or future. Decision makers utilise this data to inform their choices with optimal precision and resolution.

Everything is changing in the information revolution and the world of globalisation, where markets are viewed on a global level rather than a local one, because the world has become a single market without borders; various organisations are required to adapt to these global changes.

Also Sharma and Singhal (2021) demonstrate that the influence of nations on international strategies has grown due to the fact that the globalisation of business has enabled organisations to ascertain the physical placement of every activity along the value chain. Such determinations are crucial for optimising performance, minimising expenses and risks, and ensuring optimal performance. The transition towards global organisational structures in business has necessitated the standardisation of business processes and the organisation of information systems so that data can be utilised by various business entities in numerous countries. However, managers operating in a global context must contend with an unpredictable, foreign, and intricate milieu that cannot be disregarded, in contrast to the local context where the organisation navigates through numerous nationalities and cultures that influence the information flow and dissemination between the corporate sponsor and the affiliates within the multinational organisation.

According to Lyu, H. M., Shen, S. L., Yang, J., and Yin, Z. Y. (2019), the facility inevitably necessitated a swift shift in approach, particularly in light of the enormous mergers that gave rise to enormous organisations tasked with navigating numerous environments and cultures and locating suitable information systems. Hence, it is imperative for organisations to formulate a comprehensive strategy that considers the advancements in the information system and emphasises the necessity of implementing this system across business units and external partners. Because electronic data exchange across vast and global networks is facilitated by networks, the implementation of the strategic alliance between domestic and foreign companies is facilitated. The networks establish connections between the branches and their subsidiaries due to the enhanced performance speed and reduced costs.

The databases also furnish senior management with the essential reports pertaining to the operations of the organisation. From a geographical standpoint, it is important to acknowledge that the development of a management information system extends beyond its ultimate stages of design, testing, and implementation. In addition, it is critical that the system is operational and able to communicate with the organisation in order to fulfil its changing information requirements. Furthermore, it is crucial that the management information system is highly adaptable, as this exposes it to numerous external and internal variables. Lastly, the project for the system does not conclude upon the completion of its design and implementation. However, the ongoing procedure of upkeep and periodic evaluation continues in order to implement modifications (Lyu, H. M., Shen, S. L., Yang, J., & Yin, Z. Y., 2019).

A major revolution in the development of new methods and innovative concepts for planning, follow-up, and performance evaluation occurred with the progression of the world and the turn of the millennium. An enormous volcano of information verification emerged as an unavoidable consequence of this revolution, which scrutinises the data that emerges from human reasoning, experience, and expertise. He pursued him in exchange for payment. Addressing the substantial influx of information contained in diverse document formats necessitates the development of suitable systems to assimilate the acquired data via the implementation of information systems on the computer, which incorporate cutting-edge technologies and methodologies capable of resolving the issue while also automating the information circulation storage and processing procedures (programmes). The manner in which the information is presented is suitable for the workplace environment in which it is situated (Al Shobaki, M. J., & Abu-Naser, S. S., 2017).

- ***The Importance of Management Information Systems***

Dewi, I. G. A. A. O., Kustina, K. T., and Prena, G. D. (2018) demonstrate that Included among the significance of management information systems are:

Management information systems (MIS) facilitate the dissemination of pertinent and essential data to all tiers of management, with the intention of aiding in the process of decision-making.

2. The necessary data is gathered subsequent to verifying its efficacy and validity. Subsequently, the data undergoes processing to transform it into insights and conclusions that aid decision makers in selecting policies and procedures that are in the organization's best interest.
3. The accessibility of information has become more comprehensive and suitable for the entire organisation due to advancements in data processing efficiency and accuracy, as well as the simplification and acceleration of data acquisition and retrieval processes.
4. Information systems generate historical, current, and prospective data pertaining to the activities of the organisation, as well as assess the internal and external environments to aid management in making decisions.
5. The implementation of management information systems has enhanced the capacity of institutions and organisations to expand and disseminate information, as well as to compete in the marketplace.
6. Furnishing the organization's various administrative levels with comprehensive information to aid those entrusted with the responsibility of making sound decisions. Management information systems (MIS) serve as a mechanism to provide the accountable individual with accurate and expeditious information.

Management information systems are employed to generate two distinct categories of reports intended for stakeholders:

The initial category comprises periodic reports, which are published at regular intervals (e.g., weekly, monthly, annually) and comprise decision-making-relevant information.

The second category consists of special reports, which are those that the user requests from the system when making a critical emergency decision, or information on any subject that is covered in the periodic report but is required by the user prior to its due date.

- ***The Characteristics of Management Information Systems***

The following are some of the most essential attributes of management information systems (Tan, J., 2019):

1. An organisation processes and generates data as part of its business operations; management information systems furnish a report that details the processes and methodologies utilised to process the data that is generated.
2. Information systems design work sites as opposed to the process of separating employees from the individual who assumes responsibility for work tasks; the design considers the individual's workload and is highly dependent on the administrative structure of the organisation.
3. Developing information that satisfies the requirements of institution-wide decision makers at all hierarchical levels (low, intermediate, and upper).
4. Developing information that is applicable to numerous disciplines, including finance and personnel affairs.
5. Databases and management information systems are interconnected and integrated; this integration must be devoid of redundant data storage and processing in order to eliminate the need for multiple points of data entry; information files are also updated to correspond with computers and data.

- ***Determinants of The Success of Management Information Systems***

A number of determinants contribute to the success of management information systems; they are the components that make up the success of management information system implementation. When these determinants are readily available and abundant, the organisation has a greater chance of attaining the desired outcomes from the implementation of management information systems. To summarise these determinants, consider the following:

§ Availability of a satisfactory quantity of information to fulfil the requirements of all organisational levels and administrative functions. · Availability of specialised knowledge from personnel tasked with the operation and upkeep of information systems. · The potential for allocating the information resource towards the organisation and effectively structuring it. The capacity of an organization's organisational structure to encompass the necessary components for the implementation of information systems. · Support from senior management for the implementation of management information systems. · The economic justification for the implementation of information systems should be demonstrated through returns that are sufficient to offset the associated costs. · The degree of consciousness, comprehension, and general recognition among all officials, system users, and information providers regarding the criticality of implementing information systems.

- ***Management Information System to Achieve Competitive Advantages***

Late in the 1970s, competitive advantages emerged, which are predicated on the Japanese Empire's success in penetrating international markets. Competitive advantages are circumstances that enable an organisation to attain greater financial gains in comparison to its rivals (Laudon, K., 2021).

"Elevating the company's products above those of its competitors."

Concentrate on a particular market segmentation.

- Restricted to channels of production or distribution.

Implementing pricing structures.

According to Laudon (2021), the significance of the management information system in attaining competitive advantages can be succinctly described as follows:

1. Decrease the time required to market the product

The duration of product distribution to the market is a determinant of competitiveness, particularly in the case of introducing a novel product to the market. The period necessary to bring a product to market is determined by three factors: - The duration of time necessary to finish engineering design and manufacturing processes.

- The interval during which duties are completed, such as when production engineers pause the completion of a re-design until it is ready for manufacture.

The duration of rework.

-By ensuring timely access to information and offering assistance with task management, the information system has the potential to decrease product design time by 20% to 30%.
2. Enhance design productivity: The information system facilitates the provision of suitable instruments that augment engineers' productivity. By enabling efficient information access, the system can also reduce the overall duration of the design process.
3. Optimal project control: Since the development of new products entails substantial financial and time investments, as well as the anticipation of failures, the majority of organisations place a premium on optimal control of product development projects. This is because the enormous volume of data

generated by the project is the primary cause of project delays. Hence, the information system assumes a critical function in ensuring that the project maintains accurate oversight of the information that is critical to the project's success. Control can be improved by implementing electronic procedures and automating the flow of data and information; doing so would prevent the scheduling process from being neglected or disregarded.

Research Methodology

The descriptive research method was utilised in the present study; this method describes the phenomenon under investigation as well as the associated concepts and terminology. Furthermore, the research employed an analytical approach, which involved the utilisation of statistical methods and techniques to analyse the data collected via a questionnaire distributed to the study sample. This method was employed to derive conclusions and recommendations that effectively accomplished the research objectives.

Study Population and Sample

The sample population comprises all personnel employed in smart cities located in Iraq. Due to the challenges associated with conducting an exhaustive inventory of every member of the study community, the research employed a sampling method to gather study-related data. This was accomplished by selecting a simple random sample via the questionnaire form, which served as the study instrument. The electronic data will be utilised for data collection in the study as a result of the current precautionary measures in place and the convenience of disseminating the link to the questionnaire on all social media platforms. The total number of individuals who responded to the questionnaire and comprised the study sample was 220.

Study Tool

The electronic questionnaire form was employed as a research instrument for the field study. The questionnaire and its axes and phrases were developed in accordance with the study's theoretical framework and prior studies pertaining to the subject matter. The questionnaire comprised two axes and a total of twenty-eight phrases; a five-point Likert scale was utilised. Respondents were categorised as follows: strongly disagree (1), concur (4), neutral (3), disagree (2), or strongly agree (5) in response to the study's inquiries.

Data Analysis

The data collected from the questionnaire will be analysed using the SPSS22 statistical programme in the following ways:

Alpha coefficient: a metric utilised to assess the questionnaire's stability.

Characterising the study sample with frequencies, percentages, the mean, standard deviation, and relative weight

Utilise the Pearson correlation coefficient to ascertain the study instrument's degree of internal homogeneity.

The Limits of The Study

- **Objective limits:** Study the Determinants of the success of Management Information Systems in smart cities in Iraq
- **Location limits**: Iraq
- **Human limits:** employees in smart cities in Iraq

- **Time limits:** 2023

Applied Framework

Validate the Study Tool.

Table 1: Correlation Between Each Phrase and Axis.

P-value	Correlation coefficient	Phrases
	Up-to-datedness and quality of information	
0.00	0.839**	**Systems are characterized by the possibility of updating to keep pace with continuous changes**
0.000	**0.746	**The programs used meet the requirements and needs of the business**
0.00	0.646**	**The information provided by the system meets the user's need**
0.000	**0.685	**The system provides up-to-date information and keeps pace with changes**
0.00	0.876**	**There are hacking prevention programs available**
0.000	**0.592	**The information provided by the system is characterized by the fact that it includes all the required aspects**
0.000	0.783**	**Information systems provide useful information output to the end user**
0.00	**0.725	**The probability of data and system redundancy is very small or impossible**
0.000	0.832**	**Systems are characterized by the possibility of updating to keep pace with continuous changes**
0.000	**0.640	**The programs used meet the requirements and needs of the business**
0.000	0.803**	**The information provided by the system meets the user's need**
	information flow	
0.000	**0.641	**The programs used enable sharing of available data between more than one user**
0.000	0.761**	**The software used enables the flexible exchange of information between users**
0.000	**0.743	**The information provided by the system is understandable and easy to use**
0.000	0.560**	**Information extraction software is available**
0.000	**0.651	**Information systems have extensive and easily accessible databases**
	Inventing new and creative ways of working	
0.000	**0.883	**Information systems encourage participation in introducing new procedural methods and raising the level of creativity**
0.000	0.726**	**Information systems help to get work done in creative ways**
0.000	**0.862	**Information systems contribute to product development and diversification**
0.000	0.651**	**Information systems contribute to generating new ideas**
0.000	**0.677	**Information systems allow the individual to have the ability to perceive and interpret relationships in things**
0.00	0.839**	**Information systems contribute to the ability to formulate ideas in clear terms**
	Problem solving and sensitivity	
0.000	0.832**	**Information systems contribute to trying new solutions to problems**
0.000	**0.640	**Helps information systems in the ability to develop several alternatives to solve problems**
0.000	0.803**	**Information systems contribute to the effective participation of employees to find solutions to problems**
0.000	**0.743	**Information systems contribute to trying to discover problems before they occur**
0.000	0.560**	**Helps information systems get information about a problem quickly**
0.000	**0.651	**Information systems help an individual analyze problems**

All correlation for questionnaire items was statistically significant in 0.01 and the tool has structural validity.

The Stability of the Study Tool

Table 2: Stability of Questionnaire.

Number of Elements	Alpha Cornbach	Axes
28	0.923	**Total questionnaire**

The value of Cronbach alpha for all study tool is high and the study tool is high stability.

Personal Data

Table 3: Sample According to Personal Data.

	Categories	N	%
Gender	**Male**	**156**	**70.9**
	female	**64**	**29.1**
Age	**Less than 30 years old**	**93**	**42.3**
	From 30 to less than 40 years old	**61**	**27.7**
	From 40 to less than 50 years old	**28**	**12.7**
	From 50 or more	**38**	**17.3**
Academic qualification	**Bachelor**	**135**	**61.4**
	Master	**53**	**24.1**
	PhD	**32**	**14.6**
JOB	**Director**	**53**	**24.1**
	Deputy Director	**12**	**5.5**
	Head of the Department	**24**	**10.9**
	Employee	**131**	**59.5**
work experience	**Less than 5 years**	**89**	**40.5**
	From 5 years to less than 10 years	**46**	**20.9**
	From 10 years to less than 15 years	**20**	**9.1**
	15 years and over	**65**	**29.5**

Dimension of Study

Table 4: Phrases of Dimension.

N.	Phrase	Strongly agree %	Agree %	Neutral %	Disagree %	Strongly disagree %	Mean	S.D	Relative weight	Degree	Arrangement
	Up-to-datedness and quality of information										
1	**Systems are characterized by the possibility of updating to keep pace with continuous changes**	26.36	47.27	17.27	7.73	1.36	3.895	0.928	0.779	High	7
2	**The programs used meet the requirements and needs of the business**	42.73	42.73	10.91	2.27	1.36	4.232	0.836	0.846	High	1
3	**The information provided by the system meets the user's need**	30.00	46.82	16.36	6.36	0.45	3.995	0.873	0.799	High	4

4	**The system provides up-to-date information and keeps pace with changes**	25.91	51.36	15.00	6.82	0.91	3.945	0.874	0.789	High	6
5	**There are hacking prevention programs available**	21.82	55.45	14.55	6.82	1.36	3.895	0.867	0.779	High	7
6	**The information provided by the system is characterized by the fact that it includes all the required aspects**	27.73	49.09	16.82	5.45	0.91	3.973	0.865	0.795	High	5
7	**Information systems provide useful information output to the end user**	31.82	46.82	15.00	4.55	1.82	4.023	0.904	0.805	High	3
8	**The probability of data and system redundancy is very small or impossible**	25.91	36.82	21.36	12.27	3.64	3.691	1.096	0.738	High	10
9	**Systems are characterized by the possibility of updating to keep pace with continuous changes**	24.55	46.82	17.73	8.64	2.27	3.827	0.973	0.765	High	9
10	**The programs used meet the requirements and needs of the business**	28.18	53.18	13.64	3.64	1.36	4.032	0.830	0.806	High	2
11	**The information provided by the system meets the user's need**	26.36	44.55	21.82	6.36	0.91	3.891	0.900	0.778	High	8
	information flow										
12	**The programs used enable sharing of available data between more than one user**	37.73	46.82	10.91	4.55	0.00	4.177	0.800	0.835	High	1
13	**The software used enables the flexible exchange of information between users**	30.00	48.64	14.55	6.82	0.00	4.018	0.849	0.804	High	4
14	**The information provided by the system is understandable and easy to use**	28.18	51.36	16.36	3.64	0.45	4.032	0.796	0.806	High	3
15	**Information extraction software is available**	32.27	49.55	13.64	4.55	0.00	4.095	0.797	0.819	High	2
16	**Information systems have extensive and easily accessible databases**	31.82	45.91	10.45	8.18	3.64	3.941	1.039	0.788	High	5
	Inventing new and creative ways of working										
17	**Information systems encourage participation in introducing new procedural methods and raising the level of creativity**	27.73	50.91	15.00	5.91	0.45	3.995	0.841	0.799	High	2
18	**Information systems help to get work done in creative ways**	27.27	30.45	21.82	14.09	6.36	3.582	1.208	0.716	Medium	6
19	**Information systems contribute to product development and diversification**	26.82	51.36	15.91	4.09	1.82	3.973	0.870	0.795	High	3
20	**Information systems contribute to generating new ideas**	28.64	50.00	15.00	5.45	0.91	4.000	0.860	0.800	High	1
21	**Information systems allow the individual to have the ability to perceive and interpret relationships in things**	25.91	45.00	16.82	8.64	3.64	3.809	1.034	0.762	High	5

22	**Information systems contribute to the ability to formulate ideas in clear terms**	26.36	47.27	17.27	7.73	1.36	3.895	0.928	0.779	High	4
	Problem solving and sensitivity										
23	**Information systems contribute to trying new solutions to problems**	24.55	46.82	17.73	8.64	2.27	3.827	0.973	0.765	High	5
24	**Helps information systems in the ability to develop several alternatives to solve problems**	28.18	53.18	13.64	3.64	1.36	4.032	0.830	0.806	High	2
25	**Information systems contribute to the effective participation of employees to find solutions to problems**	26.36	44.55	21.82	6.36	0.91	3.891	0.900	0.778	High	4
26	**Information systems contribute to trying to discover problems before they occur**	28.18	51.36	16.36	3.64	0.45	4.032	0.796	0.806	High	2
27	**Helps information systems get information about a problem quickly**	32.27	49.55	13.64	4.55	0.00	4.095	0.797	0.819	High	1
28	**Information systems help an individual analyze problems**	31.82	45.91	10.45	8.18	3.64	3.941	1.039	0.788	High	3

It was determined, by arranging the phrases "up-to-dateness" and "quality of information" in that order, that (The programmes utilised satisfy the requirements and needs of the business) appeared first with a score of 0.846, whereas (the likelihood of data and system redundancy being extremely remote or nonexistent) was ranked last. The final phrase received a score of 0.738, and all expressions pertaining to the quality of information and up-to-dateness were at a high level. This was evident from the study sample, where the mean score was 3.945.

Upon organising the information flow terms, it was determined that (The programmes utilised permit sharing of available data among multiple users) appeared first with a value of 0.835, while (Information systems possess comprehensive and readily accessible databases) appeared last with a value of 0.788. Considering the study sample as a whole, all expressions of information flow were deemed to be at a high level, as indicated by the mean of 4.053.

Upon arranging the phrases Inventing new and creative ways of working in terms, it was determined that the first phrase (Information systems contribute to generating new ideas) received a score of 0.800, while the last phrase (Information systems help to get work done in creative ways) received a score of 0.716. Furthermore, among the expressions of Inventing new and creative ways of working, one was classified as medium and five as high. This classification reflected the high level of Inventing new and creative ways of working as perceived by the study sample.

Upon organising the phrases "Problem solving" and "sensitivity" in terms, it was determined that the initial phrase (Assists information systems in rapidly obtaining information about a problem) received the highest score of 0.819, while the final phrase (Information systems contribute to attempting new solutions to problems) received the lowest score of 0.765. Furthermore, all expressions of "Problem solving" and "sensitivity" were at a high level, as evidenced by the study sample's mean score of 3.970.

Conclusion

The study sample exhibited a significant degree of currentness and excellence in information quality, as indicated by a mean score of 3.945;| The study sample demonstrated a high degree of information flow,

as measured by a mean score of 4.053; The study sample demonstrated a high degree of ingenuity and innovation in problem-solving and sensitivity, as measured by a mean score of 3.876; and | The study sample demonstrated a high level of problem-solving capabilities and sensitivity, as indicated by the mean score of 3.970.

Key determinants of the effectiveness of Management Information Systems (MIS) in smart cities in Iraq are as follows: information flow; problem-solving and sensitivity; information quality and timeliness; and the development of innovative and creative work methods.

Recommendations

The imperative to enhance the efficacy of management information system implementation across all smart cities in Iraq

Staff members in smart cities will be acquainted with the efficient and effective implementation of management information systems through the provision of courses and training programmes.

Suggesting that all businesses operating within smart cities in Iraq adopt cutting-edge and contemporary approaches in the domains of information systems and management, with the aim of optimising the attainment of development objectives.

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