Walden University

College of Management and Technology

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Walden University
2018

Abstract

Educational Manager Perceptions Towards Integrated Management Information System

Implementation in Yemen

by

Mahfood Hussain Alkaabi

MA, Riga, Latvia, 1994

BA, Riga, Latvia, 1992

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

The government of Yemen has been developing government offered services designed to improve the quality of education management. Yemen's managers of education and managers of higher education in the Ministry of Education (MOE) and the Ministry of Higher Education (MOHE) have sought to improve quality of education, reduce costs, and provide timely information for decision-making processes by implementing an integrated management information system (IMIS). The problem was the lack of understanding the barriers that hinder successful IMIS implementation by the MOE and MOHE, and the role that lack of collaboration has played in prior unsuccessful attempts. The purpose of this case study was to identify barriers and success factors related to previous attempts to implement an IMIS in Yemen's MOE and MOHE. Diffusion of innovation (DOI) theory and the technology acceptance model (TAM) provided the conceptual framework. A purposeful sampling was used to select participants for semistructured interviews. The interviews were conducted with 3 ministry personnel, 8 managers, and 4 administrators from various governorates who are currently working or have worked in the Yemen MOE or MOHE. Open coding was used to identify themes and patterns. Themes were related to insufficient human and material resources, lack of understanding and acceptance of IMIS, inadequate IMIS education and training, incompetent program managers, and fear of change. These findings may contribute to positive social change by improving the management of education, thereby the overall quality of education in Yemen. Improving management in education could increase the quality of life by contributing to increase of prosperity through a better-educated society, an active citizenry, and a reduction in the level of societal violence.

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Dedication

My sincere thanks go to my family, and especially my daughter Saada Mahfood Alkaabi, whose encouragement provided me with an opportunity to complete this incredible journey. Without their precious support, it would not have been possible to achieve this dissertation. I would like to give an additional thanks to my wonderful friend and mentor, Warren Henderson for his support in my dissertation journey. It would have been challenging for me to accomplish my goals without the encouragement from my committee, family, friends, and colleagues. In memoriam, I would like to acknowledge my dad, Hussain Hasson Alkaabi. His dream for me became mine, and it has come true.

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Table of Contents

i

iii

iv

List of Tables

Chapter 1: Introduction to the Study

An integrated management information system (IMIS) converts data into information that management can use as inputs for planning and decision-making processes across an organization (Wahdain, Ahmad, & Zakaria, 2014). IMIS and related procedures enable collection, processing, retrieving, storing, and communicating of actionable financial and operational information critical to efficient management. Effective decision making and operational management rely on timely, accurate, and relevant information. IMIS delivers information in easily accessible, readable, and summarized prespecified report formats. The format enables information users to grasp the meaning and apply it to the governance and operation of the organization (Hasan, Shamsuddin, & Aziati, 2013).

Integrated information systems are among the most innovative and useful developments in modern society. They have proved to be valuable in supporting the success and the reputation of modern businesses. IMIS technology has also facilitated timely and effective communication among key players in an organization (Abu-Khadra, Barqawi, & Alramahi, 2014). The support management team has created one system that can help to deliver the organization's objectives. The strategy has a reputation for supporting employees' needs, monitoring risks and hazards, reducing inefficiencies, and maximizing resources. Furthermore, the integrated management system supports teamwork with each function aligned with a single goal toward the organization's objectives. Such development also facilitates performance improvement in the entire

organization and ensures that managers and organizational leaders can coordinate an effort that is greater than its parts (Basir & Davies, 2016).

The government of Yemen has been working continuously to improve government offered services designed to increase the quality of education management. Yemen managers of education and managers of higher education have sought to improve education quality, reduce costs, and provide timely information for decision-making processes by implementing an IMIS. Leaders of Yemen's public and private organizations initiated projects directed at leveraging technological tools to improve work processes. The process focused on ensuring that many citizens have access to essential services in the public sector. The country has yet to realize the benefits of IMIS operational benefits (Al-Mamary, Shamsuddin, & Aziat, 2014a; Ministry of Education [MOE], 2013). Failure to reap fruits from IMIS adoption is common in Yemen, as with other developing countries. Many such programs in the developed world as well have failed to produce the anticipated benefits.

Scholars have associated the inability of most modern development plans with some challenges. Lack of teamwork among key players has played an unfortunate role in undermining the success of modern projects (Wee, Baskaran, Woon, Chow, & Mangalam, 2016). Limited information and understanding on strategies to use modern technology is a major setback that undermines its success. Many companies and business entities lack necessary human and capital resources. This shortage undermines the success and reputation of modern projects and innovations (Basir & Davies, 2016).

This study includes an evaluation of the managers' perceptions of IMIS implementation in the education sector in Yemen (see Friedman, 2015). Exploration addressed how business people and educators understand the benefits and setbacks of current integrated management systems. An understanding of their existing perceptions could help to identify some setbacks that undermine the use of technology in Yemen and other developing countries. The present study could help reveal strategies to support the intensive use of modern technology in the country. Additionally, I evaluated the factors that hinder the adoption of these modern systems in the education sector (see Fatemi, Wei, & Moayeryfard, 2016). Chapter 1 includes the background of the study; the problem and purpose statements; the research questions; the conceptual framework; the nature of the study; definitions; assumptions, scope, and delimitations; limitations; significance of the study; and a summary of the chapter.

Background of the Study

Globalization has necessitated communicating factual and timely information (Burinskiene & Pipiriene, 2013). Such a need has forced administrations within the global market to adopt IMIS to join their major functional areas within organizational departments (Al-Mamary, Shamsuddin, & Aziati, 2015). Information technology has become the driving force within the current economy. Today, even developing nations realize the fruits of such relationships. Countries with free trade practices benefit from lower costs and prices, higher employment rates, and a better standard of living (Al-Mamary et al., 2015). The enhancing of civil liberties leads to increased usage of resources.

The misgivings are pointless because globalization is a positive-sum concept in which skills and technologies enable everyone to increase living standards throughout the world. Industrialists look to globalization as an efficient tool to eliminate penury and allow the underprivileged a firm foothold in the global economy (Al-Mamary et al., 2015). Though inflation may have played a role, the number of people in the world surviving on $1 or less per day decreased from 1.5 billion to 1.1 billion as the world population increased (Burinskiene & Pipiriene, 2013). The percentage of such population categories decreased from 40% to 20% in developing countries (Al-Mamary et al., 2015).

Many traditional information systems have been unsuccessful in providing information to decision makers due to a lack of timely pertinent information (McCollin & Disney, 2014). There is an urgent need for new, adequate technology systems that can communicate high-quality information at the right time. Such systems can also contribute to the rationalization of decisions in several fields, including security, education, politics, commercial interests, medicine, and sociology. Analysis of the existing theories, integration models, and experiences provides a systematic framework. The framework helps to determine the needs of companies to ensure an integration model that best suits different demands. The analysis of existing experiences, such as incentives and benefits of IMIS (Al-Mamary et al., 2015) is a significant step towards a productive IMIS. Incentives and benefits classify the levels of integration that should reduce complications (Burinskiene & Pipiriene, 2013).

Effective decision making also plays a significant role in reducing unnecessary management and operational challenges. Company administrators integrate their

management systems to sustain or improve their coordinated operating levels (Al-Mamary et al., 2015). Factors impacting the levels of integration are size, functioning, competition, institutional setting, and system. The identified factors depend on the needs of the companies that revolve around all these factors (Al-Mamary et al., 2015). The integration of IMIS ensures effective and efficient information flow that enhances faster and better decision-making processes. The acknowledged strategy often results in improved quality of the entity's output (Burinskiene & Pipiriene, 2013).

Companies with effective decision-making approaches have been recording notable development in their operations and management activities. Effective use of modern technology has been supporting the formulation of effective and productive strategies and policies (Burinskiene & Pipiriene, 2013). IMIS systems are helping organizations to decrease operational costs through the integration and reorganization of multiple tasks and branches (Al-Mamary et al., 2015). Due to the continuous increase in expenditures among ministries and departments, governments are adopting intensive IMIS applications. Governments boost accountability and transparency due to efficient information flow (Al-Mamary et al., 2015).

IMIS have several features that include a planning process to ensure the consistency of all objectives defined across various fields and at various levels. The technology entails individual and sound management of the processes. MOE and MOHE implemented the system to fulfill its missions, meet legal requirements, and process other requirements. Some of MOE and MOHE requirements include developing and drafting adequate policies and procedures. MOE and MOHE requirements facilitate effective

competence, functioning, control, and process traceability (Elsmuai & McCollin, 2014). The development involves the management of the agency's business risks and the management of adequate resources in line with their objectives, justified accordingly and with the possibility of adaptation in subsequent reviews.

Yemen's learning institutions' leaders could use such progress to enhance system checks and measurements, including key performance indicators and data analysis. Effective use of the technology can also support a system of good follow up of IMIS related actions. The technology also helps to review IMIS at planned intervals by directors. The review of IMIS ensures its continuing suitability, adequacy, and effectiveness. The technology also enhances a system to manage changes, especially of regulations (Ohtsubo, 2017). Wahdain et al. (2014) identified various barriers to successful IMIS adoption, including context-driven factors such as leadership and organizational culture. The considerations consist of content-driven factors, which include business processes and technology and process driven factors, such as change management and strategic designs.

Additional audits have indicated that other factors have contributed to the lack of success. Some of these factors include lack of success of top management to execute IMIS plans, project management breakdown, poor processes, and complexity of system designs (Ilies, Salagean, & Bâlc, 2015). Project acceptability becomes a significant determinant of the success, or lack of success, for the IMIS Project. Projects and programs with poor user involvement deliver poor results. Though not always productive,

such ventures often require further enhancements that may exceed budget, time, or specification constraints.

Although there is literature on user acceptance and adoption of technology, few researchers have explored implementing technology in the public sector. Furthermore, few have involved the Gulf countries, which have distinct social and cultural characteristics (Sierra, 2013). Such is the case in the Yemen management education sectors. With the MOE and MOHE managing the segments, there are many issues regarding the adoption of an education management information system (EMIS). I discovered the perceived factors that hinder the application of an IMIS in Yemen's MOE and MOHE. While IMIS implementations have consistently delivered gains in efficiency and productivity, many IMIS implementations had been less than successful. Table 1 illustrates factors that negatively affect IMIS implementations.

In the development of the current system in Yemen's MOE and MOHE, managers could implement and manage their own IMIS. However, untimely, inaccurate, and inconsistent data resulting from current practices has led to castigation among various stakeholders. Al-Mamary et al. (2015) stressed that consequences from previous implementations of multiple IMIS have resulted in poor managerial performance due to a flawed application process. The criticism among the stakeholders arose from the lack of coordination in the passing of information among various institutions in the government (Yuki & Kameyama, 2013).

Table 1

Factors Negatively Affecting IMIS Implementation

Factor	Percentage
1. Lack of user input	12.8%
2. Incomplete requirements & specifications	12.3%
3. Changing requirements & specifications	11.8%
4. Lack of executive support	7.5%
5. Technological incompetence	7.0%
6. Lack of resources	6.4%
7. Unrealistic expectations	5.9%
8. Unclear objectives	5.3%
9. Unrealistic time-frames	4.3%
10. New technology	3.7%
11. Others	23.0%

Note. Adapted from "Using TAM to Study the User Acceptance of IT in the Yemeni Public Sector" by E. A. Wahdain et al., 2014. Retrieved from http://www.ijcce.org/papers/312-A003.pdf

Diffusion theory indicates that the spread of ideas and technology innovation may well facilitate the sharing of information among various institutions during the policy-making process (Ghazal, Aldowah, & Umar, 2017). Coordination of agency managers could reduce resistance to the adoption of new technology and lead to the formulation of structures that are more formidable and efficient (Ghazal et al., 2017). The multitenant environment requires an IMIS that centralizes data collection and dissemination points to guarantee the accuracy, consistency, and timely processing of data. Stakeholders and managers use IMIS to monitor data in their repertoire and to assist managers in making accurate decisions.

Many issues may arise during the implementation process of IMIS. Both Burinskiene and Pipiriene (2013) and Géczy, Izumi, and Hasida (2014) found that each

organization has the potential to compound existing issues. Before implementing IMIS, management first identifies obstacles that could hinder successful employment and develop strategies to overcome these possible barriers. With an operational and coordinated plan, the organizational leaders could be able to provide oversight to identify, coordinate, involve, and sensitize users. The operational and coordinated plan should also help to mobilize the necessary resources to ensure successful project delivery (Basaleem & Amin, 2014).

Problem Statement

Despite Yemen's MOE and MOHE effort to implement IMIS to improve operating performance, progress toward improving student enrollment metrics have been disappointing. Scholars have associated current challenges with some regrettable factors. Poor management, limited resources, and the lack of adequate research undermine the use of the modern technology in the Yemen education sector (Abdulsalam & Al-Hadabi, 2016; Al-Mamary et al., 2014a; MOE, 2013; World Bank, 2015). Estimates indicate that between 15% and 50% of the students enrolled drop out each year (Abdulsalam & Al-Hadabi, 2016; MOE, 2013; World Bank, 2015). There are significant differences in the use of information and communications technology (ICT) in the Middle East and North Africa regions. Members of the Gulf Cooperation Council countries have adopted plans to acquire ICT and have begun to benefit from its relative advantages. North Africa countries and the Eastern countries (Levantine nations) still suffer from significant weaknesses that hinder their capability to spread the use of ICT. The identified

weaknesses undermine competition for business and accelerate the positive social

impacts associated with technology (Abdulsalam & Al-Hadabi, 2016).

The general problem was to understand how the educational managers can

overcome factors that have contributed to the unsuccessful implementation of IMIS in the

Yemen education sector (Al-Mamary et al., 2014b). Yuki and Kameyama (2013)

recommended implementing IMIS to centralize data collection and dissemination. The

specific problem was the lack of understanding factors inhibiting the success of IMIS

implementation by the MOE and MOHE. IMIS implementation is difficult because

managers in Yemen's MOE criticize each other for inaccurate and inconsistent

information (Al-Mamary et al., 2014b). Managers blame the lack of communication and

cooperation on the insufficient flow of timely and accurate information among the

officials managing educational affairs. The disagreements between the administrations

make it challenging to enforce the implementation process as well as monitor its progress

(Aldowah, Ghazal, & Muniandy, 2015). There is sporadic follow-up of the

implementation process after the rollout of the technology caused by the lack of

cooperation between the two ministries (Al-Mamary et al., 2014b).

There is minimal inclusion of IMIS in both private and public sectors, which also

undermines the success of modernizing businesses via implementing contemporary

technology. The Yemen government focuses on attaining sustainable development by

relying on available means and information technology capabilities (Al-Mamary et al.,

2014b). The information technology sector is a backbone for comprehensive national

development. It is necessary to identify scientific and strategic planning to develop the

informational sector. Scientific and strategic planning fulfill comprehensive development needs, which also contribute to developing informational work performance for state institutions. Scientific and strategic planning provides information services to the decision maker (Akber Pradhan, Rizvi, Sami, & Gul, 2013).

Purpose of the Study

The purpose of this qualitative case study was to explore barriers and success factors that support future attempts to enforce the implementation of IMIS successfully in Yemen's MOE and MOHE. The MOE and MOHE have expressed frustration with multiple nonintegrated financial and operational IMIS. Unsuccessful IMIS implementation was a significant cause of the lack of success in meeting MOE and MOHE operating goals. Identifying and overcoming the barriers by MOE and MOHE by working together can lead to improved operating performance as well as enhance the school environment for administrators and students (Aldowah et al., 2015).

Enforcing IMIS technology in education system is a priority. Exploring and understanding the challenges and the roles of the principals are important. I focused on the determination of the perceived roles of senior managers in implementing IMIS. There is a significant need to evaluate education managers' perceptions regarding changes required to design and enforce successful IMIS for MOE and MOHE department.

Research Questions

The following research questions for managers and stakeholders guided the research process, goals, and framework:

Research Question (RQ)1: What factors contributed to the unsuccessful

implementation of IMIS in the MOE and MOHE?

RQ2: What are the managers' perceptions of factors for successful IMIS

implementation?

RQ3: How can the managers overcome factors that led to unsuccessful IMIS

implementation?

Conceptual Framework

Rapidly changing technology is forcing organizations to upgrade the quality and

quantity of their outputs (Poba-Nzaou, Uwizeyemungu, Raymond, & Paré, 2015).

Diffusion of innovation (DOI) theory formed the conceptual framework to facilitate the

undertaking of this study in a systematic and orderly manner. The DOI theory includes

the process of technology adoption within and between organizations and social systems.

Top management should enhance communication throughout the organization. During

the adoption process, some stakeholders may choose to embrace the new idea; others may

resist the innovation of the adapted idea (Sutherland, 2013). Top management must be

able to anticipate and respond to such possible resistance in the change management

process.

The ICT is an important technological development that has a significant impact

on the reduction of operational inefficiency. It can improve decision making in many

spheres of governance; IMIS is a concept that can empower education administrators to

enhance the progress of education in Yemen. Al-Mamary et al. (2014a) stressed that

communication and information technologies offer various possibilities and facilities for educational leaders to fulfill their tasks.

In many organizations, information and communication systems have brought about a change in education management. They facilitate the transfer, storage, retrieval, and processing of information by those who work or interact with institutions of higher learning. Al-Mamary et al. (2014a) observed that IMIS enhances operating effectiveness. It enhances the planning and decision-making processes for academic affairs, administration, and financial management improvements. Al-Mamary et al. observed that IMIS enables the dissemination of knowledge and information by separating content from physical locations. Information flow is impervious to boundaries and can create global networks of knowledge, information, and culture.

Adoption of IMIS does not necessarily determine use by all employees, for some may continue using the old system. The implementation process is critical to obtaining expected benefits. Successful implementation involves integration with existing processes (diffusion approach) without creating parallel processes, with one inside the IMIS and the other using the legacy process. Studies have indicated that after the excitement of implementing a new technology fades, many organizations fail to use the full potential of the innovative new technology (Al-Mamary et al., 2015).

The usage gap consequently leads to poor diffusion of IMIS in the organization. It also undermines the capability of the implemented technology to enhance efficiency or generate the anticipated reduction in time and cost. The unsuccessful delivery of the expected performance promptly reduces usage and often leads managers back to

redundant legacy systems; nonintegrated MIS is a result. Although there are researchers who have investigated the connection among organizations' cultures, little exists on the role the subcultures play in implementing and diffusing innovation technology (see Géczy et al., 2014).

Rogers (2003) is the most widely recognized source for DOI and who has continued to refine the theory through ongoing research. Since the 1950s, other researchers have joined in developing concepts for the model. DOI is useful in many disciplines, including sociology, anthropology, public health, advertising, marketing, education, and nursing. Rogers developed five components of the DOI model as follows:

1. Diffusion revolves around the process of communicating an innovation through specific channels over a period by participants in a social system.

2. An innovation is a novel practice, object, or idea according to individuals or groups.

3. Innovations emerge through communication channels, where participants share and develop information so that all may understand it mutually.

4. Businesses adopt *time*—an innovation over a period.

5. The social system is a group of connected units that solve problems collaboratively in a common goal. DOI takes place in the social system. The social structure of the social system determines the adoption of the concept.

A look at a subculture may produce an insight into the role organizational culture plays in the adoption of new technology. A study of the subculture reveals that subgroups often have values, practices, and behavior that may be different from that of the

organization. These subcultures may influence the success or lack thereof of diffusion and appropriate adoption of the new technology.

Géczy et al. (2014) argued that because IMIS involves complex applications, which by design support different interpretations, interpretations edifying practices of various subcultures in an organization influence its understandings. Organizations are not likely to implement the information management system and start reaping benefits of efficiency and reduced operational cost immediately. Organizational managers need to ensure that functionality of the new technology is like the organization's strategies and operational procedures. Top management and the end users of the technology must also have the power to understand fully and accept the application of the system. Diffusion leads to the realization of IMIS benefits.

Akça and Özer (2014) viewed the diffusion of technology as a process, delivering innovation and ideas through a specific channel that exists between members of a group or social system. The authors acknowledged that diffusion theory helps in explaining several exogenous factors that often affect the making of decisions on implementing and applying innovative technology in many organizations. Akça and Özer saw diffusion of technology as the uptake of subscribers and an importation determiner of the successful adoption of the technology and future success of the organization.

End-user attitudes affect behavioral intent to use new technology (Akça & Özer, 2014). User attitudes are a function of the following four factors: performance expectancy, effort expectancy, social influence, and facilitating conditions (Al-Mamary et al., 2014a). Performance expectancy refers to the degree to which an individual believes

that using the technology will improve his or her job performance. Effort expectancy refers to the effort needed to use the new technology. Social influence refers to the degree to which an individual perceives that managers believe that new technology is useful and important. Facilitating conditions refer to organizational and technical infrastructure availability to support the use of the new technology. The integration of four factors predicts actual use of new technology and is critical to successful IMIS implementation (Al-Mamary et al., 2014a).

Nature of the Study

A qualitative case study for this research was appropriate to address the research questions. Qualitative case studies involve the collection of rich, textured data drawn from interviews, observations, and discussions (Poba-Nzaou et al., 2015). Researchers use the interview as a typical data collection method. Before a conversation can start with individuals who have had a direct encounter with the research variables, it is essential for researchers to explore their own experiences. Direct encounter helps to evaluate the dimensions and to discover prejudices, bias, viewpoints, and general assumptions (Patton, 2014). Revisiting the situation helps in understanding and judgments. Bracketing of assumptions and prejudices allows the evaluation of consciousness. The result of the case study is a description that shows the essence of the invariant structure (Patton, 2014).

A case study research design was essential for the study. Research experts have indicated that adopting a case study can be crucial because of its incorporation of diverse arrays of techniques. It also helps identify measuring instruments that facilitate the collection of in-depth insights into a situation (Poba-Nzaou et al., 2015). The qualitative

research methodology enables broad and textured data collection as an input to a comprehensive understanding of senior managers' perceptions. Furthermore, the methodology has flexibility, especially regarding data collection methods and techniques (Tuckman, 2013). Semistructured interviews of a 45-minute duration were the primary data collection method.

Definitions

Compatibility: Compatibility refers to how much an innovation is in harmony with legacy needs, experiences, and values of those who might adopt (Rogers, 2003). When compatibility is lacking, it negatively affects adoption. The naming of the innovation is important and should be meaningful (and compatible) with its purpose and needs of the adopter, and its meaning should be clear.

Complexity: Complexity refers to the relative difficulty involved in understanding and using an innovation (Rogers, 2003). Different from other characteristics, complexity has a negative correlation to adoption rate. Thus, innovation's extreme innovation complexity can be a barrier to adoption.

Integrated management information system (IMIS): The integrated system refers to integrated software systems and procedures for the efficient collection, processing, analysis, storage, and distribution consumers. IMIS in a university setting includes principals, curriculum planners, financial managers, university chancellors, administrators, policy advisers, and political leaders (Khan & Ally, 2015).

Management information system (MIS): The management system refers to software systems and procedures that enable the collection, processing, analysis, storage,

and distribution of information. It applies to specific business functions, such as accounting, operations, supply chain management, or human resources (Khan & Ally, 2015).

Relative advantage: Relative advantage is how much an innovation surpasses the idea that went before it (Rogers, 2003). Elements of relative advantage include motivation aspects of innovation and cost. To increase the rate of the use of innovations and to make relative advantage more effective, direct, or indirect, incentives help to support or motivate individuals in adopting an innovation. The most consistent way to predict innovation adoption is relative advantage (Rogers, 2003).

Trial: Trial refers to the degree to which an innovation positively correlates with adoption rates. Innovations with higher testing rates result in faster adoption. Reinvention may occur during the trial, with the formulation of modifications to improve the fit or acceptance of the innovation. The vicarious trial is another significant concept, a period that includes the observation of innovation during a trial (Rogers, 2003).

Assumptions, Scope, and Delimitations

The primary assumption in this study was that information derived from the participants would be honest and true. The second assumption was that participants would give information based on their best knowledge and ability. The third assumption was that participants represented adequate views of the population and had enough knowledge regarding IMIS as well as understanding the questions included in the questionnaire. Participants were individuals involved both in policy development and

system application to glean the factors responsible for the unsuccessful implementation of IMIS.

The focus of this study was on investigating the perception of senior managers or officials of the MOE and MOHE. Specifically, territorial managers and tertiary institutional heads on the implementation of an IMIS would provide adequate information. I focused on the senior managers or government officials who support policy formulation and decision making processes as well as the physical implementation of the system.

<div align="center">

Limitations

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This study depended on the integrity of the researcher because it was a qualitative study. Many participants were required to ensure the gathering of adequate information and obtaining qualified participants was challenging. I accessed the participants by phone, emails, or other platforms such as Skype, where travel to the contact's physical location would have been difficult. Obtaining this information was demanding because most respondents who were interviewed included IMIS users who were leaders of tertiary institutions, and higher learning institutions as well as regional educational officials and education ministry officials who might have been reluctant to participate in the interviews. Flexibility of setting the interview dates introduced an alleviation of the limitations (see Savin-Baden & Major, 2013). This study also entailed finding participants from multiple governorates of Yemen to obtain a representative understanding of the problems facing the implementation of the IMIS technology. The goal was to understand the perceptions of the end users throughout the country. There

was no way to verify the data gathered, for it depended on the responses given by the participants.

Significance

The information derived could provide advanced knowledge on the development of IMIS in Yemen's management of education. The results could generate information for practical and professional applications in the adoption of the technology in multiple environments. Policy makers and top managers in Yemen's management of education, as well as other sectors, could use the findings to overcome obstacles in the development of IMIS. The application of innovating diffusion theory in the implementation of MIS could contribute to the managerial analysis of an integrated system. Burinskiene and Pipiriene (2013) and Géczy et al. (2014) noted that every layer of an IMIS process faces some unique obstacles. Top managers play a critical role in addressing the challenges. In general, there is a gap in the literature regarding education managers' perceptions of success factors and obstacles in the implementation of an IMIS process. The gap is particularly common in underdeveloped countries, especially in the Middle East (Poba-Nzaou et al., 2015).

A successful IMIS implementation in Yemen facilitates managerial decision-making processes at all levels of the country's management of the educational system, thus ensuring adequate planning, monitoring, and evaluation of the country's educational assets. The system could also assist MOE, MOHE, and stakeholders in diagnosing the problems in the management of education to introduce the applicable changes necessary to improve day-to-day operations (see Al-Mamary et al., 2014a). Successful IMIS

implementation could increase transparency and shared accountability for MOE and MOHE and their stakeholders.

Enhancing accountability and transparency could reduce the overall cost of education that burdens many parents. All interested parties could monitor funds granted or paid to any institution. Specifically, increasing the accountability of educational institutions could contribute to increased enrollment rates while reducing the dropout rates (Luena, 2012). Before the implementation of an IMIS in an organization, the identification of obstacles that could hinder successful employment and development of strategies to overcome these possible barriers is essential. With an effective and coordinated plan, the organizational leaders could be able to provide oversight to identify, coordinate, involve, and sensitize users.

Significance to Theory

Study findings may advance diffusion theory by applying the concepts, constructs, and propositions to a new population, managers in Yemen's MOE and MOHE. The ability to generalize the diffusion theory to the Yemeni culture is unknown. Ideally, scholarly research using diffusion theory for information technology implementation does not presently exist in an educational setting in Yemen.

Significance to Practice

Integrated management could offer a distinct set of information resources often organized for the collection, analysis, processing, use, and dissemination of required information at workplaces. Géczy et al. (2014) stated that technological innovation and information modification could transform the role of information to increase the

performance, while enhancing the satisfaction and motivation of system users. Luena (2012) observed that finding the issues that have inhibited the successful adoption of innovative technologies is central to the adoption and acceptance of the innovations. There are many attempts to implement an IMIS, but few have succeeded despite the organizations' leaders buying into the importance of the system.

Significance to Social Change

Information systems facilitate and support human social processes that contribute toward a productive and meaningful working life for users in any given organization. Information systems experts have observed that technological innovation emerges from people for use by the people. Consequently, innovative technology has its roots within human nature, which is the social context. Successful IMIS implementation occurs in such a context. An array of nontechnical practices and decisions influence implementation (Olumoye, 2013). Information technology (IT) does not exist in technical or social isolation. Instead, people and their innovative technologies make up the social networks. Adoption of technology often affects the social relationships that result from the organization adopting the technology (Olumoye, 2013).

An information system is an arrangement of people who recognize the human element in the application of IT, data, process, and system interfaces that interact to enhance the operations of an organization. The information system also supports the decision-making, problem-solving needs of organizational management and the users (Olumoye, 2013). Increased application of IMIS and its subsequent growth has changed many aspects of society. Olumoye (2013) indicated that the use of the Internet, for

example, has significant consequences about how IT has changed the face of human interactions, most significantly regarding culture or behavioral approaches. Behavioral researchers have argued that information systems can change the processes and hierarchy of decision-making (Olumoye, 2013). IT affects the cost of information acquisition positively and consequently broadens the dispersion and distribution of information.

A successful implementation of IMIS technology has a significant impact on human socialization and relations within an organization. The accrued benefits in social change are enhanced working relations among users and management. The benefits include improved dissemination of information and improved interaction with both people and technology. Although IMIS has its limitations and disadvantages, it has several advantages that make it crucial. Interaction and protocol of passing information is a key pillar on how people interact, from junior staff through the top leadership. Good internal relationships generate an environment conducive to working, resulting in good productivity for the company.

Effective implementation of IMIS in managing Yemen's education system could enhance the way students access education. The quality of school management has an influence on student productivity. Proper management helps alleviate challenges facing the effective scheduling of classes and even distribution of resources across the country. The technology would facilitate equity in the education system throughout the country, following the provision of resources according to need. A successful education system is a recipe for the growth of the country's economy through innovation, better management of corporate resources, and effective prioritization of development projects in the

country. Students from MOE and MOHE will be the primary beneficiaries of the efficacious implementation of IMIS in the education system of Yemen. The results would help the government of Yemen to initiate many projects intended to leverage emerging IMIS tools and applications to improve work processes in both the public and private sectors, and for MOE and MOHE.

Summary

The purpose of this qualitative case study was to identify barriers and success factors related to previous attempts to implement IMIS in Yemen's MOE and MOHE. Technology diffusion theory was the conceptual framework used for understanding how to frame the research questions and the research design (see Akça & Özer, 2014). Projects involving IMIS represent a diffusion of technology, which is a process that delivers innovation to members of a group or social system. Diffusion theory was essential for understanding and explaining factors that affect design and implementation decision making. User attitudes affect behavioral intent to use new technology and are critical to successful IMIS implementation.

Four factors comprise the basis of user attitudes: performance expectancy, effort expectancy, social influence, and facilitating conditions (Olumoye, 2013). Although all of these user attitudes are important in successful IMIS implementations, social influence remains the most significant and malleable impact factor. The four factors predict the use of a new technology and are important to successful IMIS implementation (Olumoye, 2013). Chapter 1 also included the nature of the research along with highlighting the limitations, assumptions, and the significance of this study. The chapter aids in

comprehending the data management, treatment, and methodology applied in the research.

Chapter 2 includes a review and synthesis of the literature regarding technology adoption and use. In Chapter 2, I also summarize extant research on technology adoption in Yemen. Chapter 3 includes a review of the research design methodology, data collection and analysis plans, sampling, and procedures for contacting and interviewing participants. Chapter 4 reveals the findings of the study, and Chapter 5 presents conclusions, implications, and recommendations for future research and practice.

Chapter 2: Literature Review

Despite continuing efforts to develop a capable IMIS solution, Yemen's MOE and MOHE IMIS were unsuccessful in producing a sufficient and timely flow of accurate information. The IMIS solution also lacks communication and collaboration tools. It is also inadequate for managing both day-to-day operation and strategic decision-making (Al-Mamary et al., 2014a). The purpose of this qualitative case study was to identify barriers and success factors related to previous attempts to implement IMIS in Yemen's MOE and MOHE. I further sought to evaluate in this study the factors that hindered MOE and MOHE from implementing IMIS within the existing educational institutions in Yemen. Chapter 2 includes a discussion and synthesis of existing literature regarding the theory and practice of successful development, implementation, and operation of IMIS.

Literature Search Strategy

The literature search strategy involved a systematic search, selection, and analysis of relevant articles for the current literature review. The search strategy required a broad approach that led to identifying adequate and relevant literature. The literature further enhances the collection of formidable data on the perception of users in the adoption of IMIS and the possible factors that inhibit adoption. Keywords played a critical role in searching the scholarly databases: Elton Bryson Stephens Company (EBSCO), Springer Link, Emerald Insight, Science Direct, JSTOR, Wiley Online Library, and SAGE Journals. To attain the requisite comprehensive level, a search through Google Scholar supplemented the existing literature. The following keywords helped in identifying relevant material: *IMIS adoption, Yemen information technology, IMIS in education,*

technology adoption, and *diffusion theory*. I searched especially for professional and peer-reviewed articles written in English and published between 2000 and 2017.

The second step in the search strategy was to review titles, abstracts, and texts to determine the relevance of the articles to the scope of this study. The consideration of the articles relied on the provision of adoption or implementation of IMIS in a systematic approach. The articles also provide information on the factors that inhibit the implementation of IMIS. Limited research was available regarding IMIS implementation in education.

Conceptual Framework

Rogers' (2003) DOI theory served as the conceptual framework for this study. IMIS systems have a diverse array of components. The innovation-decision process is for both information processing and information seeking (Roger, 2003). Individuals try to reduce ambiguity about the impact of innovation acceptance. The five steps in this process are as follows: (a) knowledge, (b) persuasion, (c) decision, (d) implementation, and (e) confirmation (Rogers, 2003). These stages typically follow each other satisfactorily. At the knowledge state of the innovation-decision process, people learn that innovation exists. Then, they decide on the nature of the innovation and how it works. The three types of knowledge that guide these questions are awareness-knowledge, how-to-knowledge, and principles-knowledge (Rogers, 2003).

Awareness-knowledge is a type of innovation knowledge that makes a person want to know more about why and how the innovation works. They eventually want to adopt the innovation (Poba-Nzaou et al., 2015). In learning the *how,* people learn how to

use the innovation appropriately, which is most important in the process of innovation-decision (Poba-Nzaou et al., 2015). Chances increase for adoption when people know enough *how-to* information before the innovation trial period. The knowledge is more critical for complex innovations. Principles-knowledge describes how and why innovation works (Poba-Nzaou et al., 2015).

At the decision stage, one can decide to reject the innovation or adopt it. A partial trial basis enhances the timely adoption of innovation. The individual looks for confirmation support for the decision (Rogers, 2003). A reversal of the decision can occur if the individual encounters conflicting messages about the innovation. Discontinuance may occur in the following circumstances: A person can adopt another innovation rather than the original one because he or she sees the former as better, which is known as replacement discontinuance. Second, the individual rejects the innovation because of dissatisfaction with its performance, or it does not meet the individual's needs—known as disenchantment discontinuance (Rogers, 2003).

Formulation of policies that facilitate the effective coordination of the element is also essential towards the timely achievement of the set objectives. The MOE, in coordination with relevant stakeholders, should continuously formulate techniques that enhance the coordination of the diverse and distinct elements (Olumoye, 2013). These stages play a critical role in the achievement of the set objectives such as the successful integration of the systems into the management of diverse education operations in Yemen.

S-Shaped Curve

Diffusion of innovation theory indicates that all innovations result in an S-shaped curve, which indicates the rate/pattern of adoption of an innovation over time and also illustrates *critical mass* or the *acceleration point* for innovation. Once a critical mass of people decides to adopt an innovation, further adoption by others takes off more rapidly (Al-Mamary et al., 2014a; Winder, 2016). The slope of the curve reflects the speed of adoption: The slope will be more gradual and flat when the adoption of innovation takes a longer duration. Peaked slopes indicate rapid adoption.

Innovativeness is a social construct. It is also a relatively stable innovation-dependent characteristic, and it demonstrates how far people will go to change their familiar routines, which means that a person may be an early adopter of innovation and a later adopter for another. Innovativeness is not a personality trait. Innovators are willing to experience new ideas and cope with the uncertainty and consequences of innovations (Venkatesh, Morris, Morris, & Davis, 2003). Innovators are gatekeepers who bring innovations in from outside the system. Early adopters become leaders in the system, from whom others seek information and advice (Winder, 2016). They are at the center of every stage in deploying the resources needed for implementation. Initial adopters' attitudes toward innovations are important. Their opinions reach others and influence their decisions (Sutherland, 2013). Early adopters reduce uncertainty and indicate their full approval of an innovation through their timely adoption.

While the early majority may have interacted well with the social system, they are unlikely to attain the same leadership positions as the early adopters (Waheed, Kruzik,

Knels, & Zaheer, 2015). Networking interpersonally is still vital to the innovation-diffusion process. The early majority takes more care in innovation adoption and though they are not the last to adopt, they are not the first. Laggards have a more traditional view about change and are more skeptical about innovations (Wee et al., 2016). They are a more localized group and are not in leadership roles—their relationships are from within a small peer group. They are conservative and will not adopt an innovation before they are certain it works (Waheed et al., 2015). Laggards are useful after seeing others use the innovation.

The adapter attributes are useful in acknowledging the different ways in which individuals respond to change. Efforts to pigeonhole individuals into adopter categories are not helpful (Ohtsubo, 2017; Patton, 2002). There can be variability in the extent to which a person may be more favorable to change or to a new idea or practice depending on the change. Prior experience, values, beliefs, and view of the helpfulness of the new idea or practice may be influential. A wait and see attitude is not always negative or an indication of resistance or laggard-type behavior but is a thoughtful approach to weighing risks/losses and benefits (Udmale et al., 2016; Wee et al., 2016).

These cautionary perspectives can provide some balance to the development and implementation of new ideas and care practices. The strategy applies to providing pressure for a more comprehensive evaluation and determination of barriers or negative consequences. The wait and see strategy could lead to discovering better ways to use the idea or implement the new care practice. Individuals who consistently convey dispositions characterized as innovators or laggards, and attention to these ends of the

spectrum can prevent overzealous implementation of new ideas (Sutherland, 2013). Such overzealous implementation may not have a good fit, and, alternatively, the stalling or undermining of needed new ideas or care practices as manifested by laggards.

Diffusion of Innovation in Education

The fundamental idea of DOI centers on the conditions that increase or decrease the likelihood that members of a given social system will adopt a new idea, product, or practice. DOI theory predicts that media, as well as interpersonal contacts, provide information and influence opinion and judgment. In summarizing studies of diffusion, Rogers (2003) proposed four components: the innovation or invention, diffusion (or communication) through the social system, time, and consequences. Information flows through networks. The nature of the social relationships and communication patterns within and between networks are influential as are the roles of opinion leaders, change agents, and champions (Monzavi, Zarei, & Ghapanchi, 2013).

Opinion leaders can determine the likelihood of the adoption of innovation or new care practice through endorsement and promotion. Opinion leaders, change agents, and champions exert influence on others in the social system and their behavior through their contact. The five adopter categories include those who innovate, those who adopt early, those who form the early majority, those who form the late majority, and those who lag behind everyone else (Udmale et al., 2016). In the DOI model, these adopter *types* are normally widespread. There are few innovators, laggards, and early or late adopters who need persuasion if the innovation attributes are favorable.

The DOI model provides a framework for evaluating innovations and planning diffusion strategies that facilitate the adoption of new ideas, practices, and technologies/objects. Strengths of the model include the ability to determine potential barriers and facilitators to the evaluation, perception, and adoption of new ideas or care practices (Winder, 2016). The ability to view a planned change effort through a holistic perspective takes into consideration the importance and influence of the individual, system and communication patterns within the system, and the characteristics of the innovation (Song, Zhao, Zhang, Li, & Cao, 2015). The framework is similar to other conceptual models of change, social science and behavior theories, and the presence of a coherent model. In that case, it is easy to use effectively in practice for developing empirical and theoretical strategic initiatives. Successful widespread use is present across different disciplines and a simple set of core ideas, thus making the model practical, relevant, and useful in clinical practice.

Attributes of Innovation

A favorable attitude about the use of IMIS is vital to have a positive perception of implementing an information system. Presumptions indicate that positive attitudes toward usage may not exist if the user does not know of the existence of the system (Géczy et al., 2014). The quality of the system, ease of use, and time to retrieve data may influence perception and attitude formation (Manaseh, 2016). Beliefs are only one factor contributing to the users' attitude toward the system. Other beliefs that may come into play include related objects, computers, and training programs.

Situational Constraints

Situational constraints may play a role in the development of attitude and perceptions. The constraints may emanate from an individual's belief system, including the perception that data are unreliable, or the top management does not offer the required support. Some scholars have claimed that greater attitude-behavior consistency occurs when the attitude and perceptions components focus on behavior associated with the attitude object (Géczy et al., 2014). Many governments have traditionally accorded education a high premium, as acknowledged in many international charters, and the constitutions through legislation (Luena, 2012; Macfarlane, 2015). Yemen's management of education has directed major efforts toward promoting educational opportunities, relevance, and quality for the growing population (Al-Mamary, 2014b). Still, the management of education in Yemen suffers from a dearth of quality information, due to the lack of a management support system (Al-Mammary et al., 2015). Attention is on the quality of information and data, due to reported errors and inconsistent or misinterpreted information as postulated through inaccuracies of the data.

Yemen government's inability to provide the essential support structures has only exacerbated the problem. Khan and Ally (2015) observed that frequent changes of educational management concepts, poor survey structures, shortages of both software and hardware, and lack of skilled staff are some of the obvious factors that require mitigation measures. It is unsettling to note that development of education management in Yemen is still a low priority regarding resource allocation (Abdulsalam & Al-Hadabi, 2016). The situation is particularly worrying, especially in countries that have not envisioned

investing in IMIS of education. In these countries, a collection of information is in
manuals, which are inaccurate and disorganized. Yemen schools lack a centralized record
keeping system (Aldowah et al., 2015). The lack of accuracy and unavailability of data
leads to errors in enrollment trends. It is important to not only implement educational
IMIS but also to integrate actively the generation and consumption of the data availed by
the IMIS as well.

Various factors influence the implementation of an integrated education IMIS. In
Yemen, many senior government officials have acknowledged that several problems exist
that restrict education officials from fully implementing and using an integrated
education information system (Basaleem & Amin, 2014). Often cited is the lack of
adequate human and material resources to meet the needed requirements to implement
the system (Özturan, Bozanta, Basarir-Ozel, Akar, & Coşkun, 2015; Poba-Nzaou et al.,
2015; Rogers, 2003). The current data collection system does not operate on a standard
with which all managers and stakeholders can work, especially many government
agencies that collect data. The system is not running on an integrated data collection
policy that could manage collection, submission, data processing, and exploitation.
Managers of education officials may also lack an understanding of the application of
IMIS (Özturan et al., 2015). The lack of appreciation of the usefulness and application of
the system leads to undefined and sporadically collected data.

The EMIS acronym stands for Education Management Information System. The
definition refers to a technology service that organizes groups of information from
collection, storage, processing, and dissemination to educational management and

planners (Khan & Ally, 2015; Nedeva & Nedev, 2014). Various components of EMIS include input and output processes, integrated to deliver a specific goal, as well as feedback. EMIS is an integrated system that manages large groups of easily retrievable, analyzable, and easily delivered information to the consumers of the data.

EMIS is a tool that applies to computer systems technology, which delivers a comprehensive approach to the gathering of vast data on the country's education management system (Nedeva & Nedev, 2014). Managers of education officials and administrators are the consumers of EMIS information (Nedeva & Nedev, 2014; Ng Foo Seong, 2013). The system should deliver timely and accurate data that can aid in planning, decision-making, and policy development (Khan & Ally, 2015). Fundamentally, the information users must be able to work with and manage their information system through computers if they are to reap the benefits of the integrated system.

The implementation of a new IMIS by an organization for adopting the new technology may not be adequate to deliver a positive effect on its processes. Organizations must fully integrate the new technology with the existing processes (diffusion approach) to enhance managerial and operational activities. After the excitement of implementing a new technology, many organizations often fail to utilize the full potential of the innovation (Nedeva & Nedev, 2014). Thus, an adoption gap is created that is the difference in widespread exploitation and adoption of the system (Al-Mamary et al., 2015). The assimilation gap can lead to poor diffusion of IMIS in the organization. It also leads to the undermining of the capability and capacity of the

implemented technology to enhance efficiency, or to generate the anticipated reduction in time and cost (Keczer, 2014). The failure to deliver the expected performance because of lack of acceptance and conflict within the adopting organization is among the significant challenges.

Main Features of an Integrated Management Information System

The main features of IMIS implementation enhance the collection, processing, analysis, storage, and distribution of information to administrators and curriculum planners in a timely and reliable manner. The purpose of implementing IMIS is to collect and collate information that involves the management and administration of related educational activities (Monzavi et al., 2013). The information then undergoes processing, which is made available in an easily readable, comprehensive format that can be understood by various users. Consumers of information derived from IMIS in the management of education sectors are principals, curriculum planners, financial managers, university chancellors, and education administrators (Manaseh, 2016). Other consumers of the information are policy advisers, political leaders, and nongovernmental organization managers.

The information has a collection of interested parties, given that education is a top government priority. IMIS enables the collection, processing, distribution, analysis, and dissemination of the information to get to the targeted consumers (Ng Foo Seong, 2013). IMIS also enhances the flow of information and data for decision-making purposes. The research could eliminate duplication, making it possible to access processed data for easy

application in policy development, and other administrative activities (Khan & Ally, 2015).

System integration. The rapid development of technologies has seen increased use and diffusion of many IT essentials, including mobile devices such as notebooks and smartphones. These advancements have changed the way many people communicate or corroborate. Khan and Ally (2015) raised the issue of the ambiguity of information. New business rules, means, and manner of corroboration emerge because of the pervasiveness of the emerging technologies (Ohtsubo, 2017). The technological revolution has changed the dynamics and systems of many workplace environments.

Previously, organizations used information systems to help solve internal organizational problems. Small clusters of information systems were common features in many organizations (McCollin & Disney, 2014). Along with the development of new information management technologies, many organizations and governments have found it necessary to integrate old forms of information management with emerging technologies. The literature has indicated that the cardinal purpose of system integration was to enhance organizational performance and productivity, which then promotes organizational effectiveness and attains a competitive edge (Khan & Ally, 2015). In other organizations, including government agencies, the goal of implementing IMIS is to achieve improved service delivery to the people.

The Yemen government has made several purposeful measures to improve education, such as offering compulsory free education for low-income families. Other issues affect the education management sector such as poor and inadequate

infrastructures (Aldowah et al., 2015). The lack of proper classrooms, transportation to and from school, and few human resources are among issues that hinder the implementation of effective learning and management experiences (Al-Mamary et al., 2014a). After completing secondary education, students can apply to attend any of the seven universities, an apparent opportunity that is problematic because many students do not make it through postsecondary education (Al-Mamary et al., 2014b). Education management officials may not have the information to explain the reasons for dropping out of universities.

Many systems analysts have opined that the common need for systems integration is data integration. Data integration needs arose from end users' problems with accessing databases, which often had similar data (Khan & Ally, 2015). The distribution of the data was nonexistent. One problem with IMIS implementation was the implementation of independent databases (Al-Mamary et al., 2014a). The immediate effect is a lack of information exchange among officials and departments of the various sectors. Nevertheless, they all require processing and time-bound information from each other.

An individual view of information involves integration through prisms of functions and processes in a larger organization. Other analysts have described integration as a stage in the journey towards setting up strategic alignment between technology and organizations (Baines & Lightfoot, 2013; Basir & Davies, 2016). Integration is the recognition of the value of interconnecting an organization's various operational plans and processes with information systems. Géczy et al. (2014) indicated that system integration in the IT industry was the process of bringing together computing

systems and application functionality through computer networking to act as one coordinated information system (Keczer, 2014). Successful implementation involves accurate data, systems, and procedures that meet the needs of users and have procedures for organizing information. Such implementation involves appropriate data analysis applications, adequate storage, information retrieval, and communication across IMIS centers (Géczy et al., 2014).

IMIS is a subsystem that operates within an inter-ministerial arrangement. MOE and MOHE with other government agencies that have interests in the higher education sectors (Leedy & Ormrod, 2015; Manaseh, 2016). IMIS coordinates information resources and integrates the various sources into one harmonized system that serves the MOE and MOHE's handling of upper-level education matters.

Organizational integration. Organizational integration is the linkages among different departments in an organization. It is the extent to which independent units or components integrate to make a unified whole (Al-Mamary et al., 2014a). The components include people, technology, and processes, and may include departments, units, and corroborating agencies (Goodman, Hurwitz, & Smith, 2017). Organization integration is both internal and external incorporation. Internal integration addresses the organization's internal processes and external deals with the interlinkages within corroborating agencies.

Information system integration. The information system integration emerges into approaches. In technical terms, integration is a mechanism that depicts the inter-connectedness of technologies, and the extent of a conceptual representation of

information and data spread (Hall, 2013). Integration is the degree to which various subsystems of an organization link and can communicate with each other (Al-Mamary et al., 2014a). The second approach is the linkage of two or more independent organizations that standardize their business processes to ease communication and sharing of information and data.

The goal of information system integration is to facilitate the exchange of, and sharing of, information within the established networks in an organization. Scholars have opined that integration encompasses three areas: domain, direction, and reach (Idrus, 2013; Janicak, 2014). The direction can either be vertical or horizontal. Inter-organization and intra-organization are components of reach, while the domain exists either as function, data, or program. Al-Mamary et al. (2014a) aptly observed information systems literature and emphasized that system alone cannot sustain efficient performance. Alignment with the organizational resources, culture, and the social context principally harnesses workflow and operations management.

Layers of an IMIS

In many IMIS application areas, the information and data spread through a multitude of heterogeneous, as well as autonomous, data systems. The exchange of data among these systems is not easy and involves vertical distribution of organization units that can be within four architectural layers including the business, application, technological, and inter-organizational layers (Nedeva & Nedev, 2014).

The business architecture layer. The business architecture layer typically defines the organizational structure, including the established workflow for processes and

rules. Al-Mamary et al. (2014a) viewed the business architecture layer as the conceptual level often expressed regarding how meaningful it is to the end-users of the application systems.

The application architecture layer. The application architecture layer is the actual diffusion and implementation of the organization's concepts as defined regarding the enterprise application. The layer offers connectivity between the application domain and the technical solutions discussed in the technology architecture (Keczer, 2014). Maintaining the interdisciplinary relationship between both the domain and communication technology is essential.

The technology architecture layer. The technology layer is the definition of communication infrastructure within the entire system. In technology architecture, IT meets challenges in attaining organizational requirements (Nedeva & Nedev, 2014). To systems designers, the different organizational units or centers cannot work alone. They must exist in cooperation and interrelatedness.

Inter-organizational process layer. The inter-organizational objective is to cut across the traditional horizontal organizational structure. Heterogeneous information systems require support in situations in which the involved information systems are autonomous (Idrus, 2013). The integration process, at the inter-organizational process layer, is a challenging task.

In summary, there are many layers to an IMIS application with information distributed among many systems. These units involve the business, application, technology, and inter-organizational layers. The business layer includes workflows for

processes, and the application layer addresses implementation of organizational processes. It also entails the technology layer, which addresses the system's communication infrastructure, and in the inter-organizational process, a layer refers to processes that cut across organizational structures (Poba-Nzaou et al., 2015). Together, these layers allow for the dispersal of information.

Poba-Nzaou et al. (2015) noted that adoption of an IMIS requires implementing change management in organizational processes to align with innovation. Al-Mamary et al. (2015) highlighted that change should not suit innovation functionality. More accurately, new technology architecture needs to align with the organization. Problems are certain to arise regarding adoption of a new technology. Should management force the organization to align with new technology, users and consumers of the information generated using the system are often likely to resist change (Poba-Nzaou et al., 2015). IMIS leads to supporting existing organizational processes while preserving and justifying investment in the system.

Linkages of IMIS Users

Implementing an IMIS that creates and manages the flow of information among college admissions, finance, employee salaries, curriculum development, and administration requires linkages. There are linkages between IMIS and various departments and organizations. These varied organizations and departments have a link through IMIS allowing for the flow of information (Özturan et al., 2015). Some organizations take advantage of different IMIS at different times to explore various types of information (Poba-Nzaou et al., 2015). Working between two IMIS can allow for the

exchange of information between differing IMIS, and allow more robust information access from organizations as well as departments primarily associated with one IMIS rather than another.

There are some organizations that rely on IMIS for information and information exchange. Within a university, those who depend on an IMIS for information access can range from the student body to university leaders (administrators and instructors; Hasan et al., 2013). Higher-level organizations require information from IMIS and contribute information to that IMIS as well (e.g., Ministry of Finance, Ministry of Labor; Ghazal et al., 2017). Many organizations rely on IMIS to provide critical information, used by high-level government agencies. The effectiveness of IMIS could maximize its capability to guarantee that stakeholders can properly access information.

IMIS is dependent upon the creation of information centers that generate and distribute information to the various consumers concerned with education in Yemen. Beneficiaries include MOE, MOHE, tertiary education, finance, and labor (Al-Mamary et al., 2015). There may be other subsystems addressing specialized functions and activities such as research, policy, and curriculum development that link to the management of education sectors IMIS (Hasan et al., 2013). All subsystems and centers perform various information activities including collection of data and information relevant to education, processing, and storage of information for easy retrieval (Sarazin, Burstyn, Kincl, & Lavoue, 2016a). A one to two page analysis of data extracted, specific information would produce reports to be used to disseminate the information to various consumers, decision makers, and policy developers (Poba-Nzaou et al. 2015).

IMIS Centers

IMIS centers function in several ways. They can manage information coming out of a regional location, function to facilitate special research, and address information that is specific to education. The IMIS centers involve the following three types:

1. Area IMIS centers may be in district or provincial centers and could be responsible for managing the information emanating from that district or province. With the devolved method of managing education in Yemen, these centers provide essential support to the administration of education at the local as well as the highest levels (Cheng, Ko, & Lee, 2016).

2. The second group of centers addresses specialized functions such as research or preparing information for publication (Sarazin, Kincl, Burstyn, & Lavoue, 2016b). For example, the Ministry of Education and Ministry of Higher Education periodically produces and publishes many reports regarding their activities such as performance assessments.

3. The third group of centers involves those addressing the collection and storage of data. They honor specific aspects of education, such as the higher education population, vocational training, gender distribution, and student population with special needs (Song et al., 2015). All IMIS centers require enough resources to enable them to meet their own constituency information needs. Sufficient resources help in processing, storage, and retrieval of large quantities of information and data that may need sophisticated analysis and dissemination

(Cheng, 2015). Personnel with skills who can operate the systems, databases, and databanks are critical to success.

Literature Related to Key Concepts of IMIS

There are several concepts associated with IMIS. These ideologies influence how IMIS is adopted and implemented in various fields, especially learning institutions in developing countries. IMIS integration is laden with challenging encounters due to individual, communal, and technological aspects. Some of the key concepts relating to the adoption of IMIS technology in Yemen's learning institutions include the challenge of perception, attitudes of the leader of the implementation team, and attitude of the users.

IMIS Adoption

Some organizations struggle to integrate MIS successfully into their management processes (Poba-Nzaou et al., 2015). IMIS allows establishments to access the correct and appropriate information, and get it delivered to the right users promptly. Such distribution of information and data emerge through enhancing interaction among generators of information and users of processed information in an association (Sutherland, 2013). Research indicated that IMIS is an integral operational performance tool and plays a meaningful function in organizational outcomes (Poba-Nzaou et al., 2015). The system, when correctly used, delivers appropriate information promptly and supports decision making and management activities. One of the expected benefits is that the IMIS system has the potential to deliver information instantly without the need for face-to-face interaction between the producer of information and the end-users

(Venkatesh, 2003). Within institutions, IMIS is an important asset with the ability to deliver reliable, accessible, comprehensive, and understandable information.

Researchers acknowledge the performance of any system or process occurs through constant assessments. Researchers and industry activists have continued to engage in debate regarding the variables best suited to determine the user's perception of adoption and usefulness of IMIS technology. Poba-Nzaou et al. (2015) noted that successful adoption and implementation of innovations in many organizations is dependent on the characteristics of the technology. Other essential factors include the project, the association's characteristics, task characteristics, and most significantly the users' attitude and behavior (Wee et al., 2016). These factors do not exist when organizations decide to change their business processes and strategies. In their pioneering work on adoption of innovation in the Yemen telecommunication sector, Al-Mamary et al. (2014a) identified several factors that hinder implementation of IMIS. Some of them include the technical quality of the information service, end-user training, senior management support, technology self-efficacy, and finally, end-user experience.

In the technological dimension, Al-Mamary et al. (2014b) identified variables that influence successful implementation of IMIS, including system configuration, information, and service qualities. The key variables in the acceptance of new technology based on technological dimension are the quality of the system and the information it generates (Khan & Ally, 2015). System quality is the desirable characteristics of the envisioned IMIS. Such a system has reliability, flexibility, eases of learning, and timely responsiveness. Also, included in the list of desired system characteristics are system

sophistication and user-friendly features. Al-Mamary et al. (2014a) found that system quality has a direct association with perceived usefulness of the technology including user satisfaction. Poba-Nzaou et al. (2015) also identify a positive relationship between user satisfaction and quality of the system. Researchers have claimed that quality of a system has a significant and positive influence on end-user satisfaction levels, easier adoption, and diffusion of organizational processes.

Scholars have additionally observed that an increase of information quality increases the perception of the usefulness of new technology. When users perceive that information delivered by a new technology meets their expectations, it is more likely acceptable without much resistance (Al-Mamary et al., 2014a). Quality of service from the IT department has contributed to the perceived usefulness of a system and user satisfaction (Poba-Nzaou et al., 2015). Valuable features include prompt responsiveness, reliability, accuracy, and technical competencies.

Perceived management support during the implementation phase of IMIS projects is a function of input during the design phase. Senior management support involves the provision of the necessary resources essential to the utilization of the system and encouragement to end-users (Aldowah et al., 2015). Management must ensure that the necessary hardware and software are available when needed by users. Senior managers have significant input and influence on adoption of the new technological system (Poba-Nzaou et al., 2015). Insufficient support from senior managers could negatively influence the perception of the users and contribute to resistance to system adoption.

Perception challenges. Perception is the power to understand or the ability to respond to some stimulus. Taken further, it is the acceptance that an individual is familiar with a given topic. Information experts view perception as a process that involves prior knowledge in obtaining and interpreting some situation (Winder, 2016). Perception is a cognitive process experienced by individuals as they try to understand information delivered by the information system. Poba-Nzaou et al. (2015) viewed perception as the understanding of how individuals interpret objects, events, and people around them. The scholars further observed that people often act on their perceptions, regardless of factual reality (Basaleem, 2014; Burstyn et al., 2014; Cochrane, 2016). One's perception is the process interpreted through and organized by sensory impressions to give meaning to one's surroundings or the world. Through these interpretations, IMIS is perceived by the MOE and MOHE.

Leaders' attitudes. Researchers have observed that attitude exhibited by leaders plays a critical role in the implementation of technology, which, according to researchers, reflects their motivation and interest in the system. Accordingly, attitude impacts adoption of technology (Poba-Nzaou et al., 2015). Stakeholders are also aware of the importance of adopting technology. Workers are likely to take a pragmatic view regarding technology as either favorable or unfavorable. Senior managers in technology need to display enthusiastic behavior while taking into consideration how their attitudes influence employees and other stakeholders (Yuki & Kameyana, 2013). Leadership support of IMIS often involves acknowledgment of innovation. Employees and the managerial processes determine the course implementation will take (Zhou & Li, 2016).

Adoption of IMIS gets less effective when faced with opposing attitudes regarding the usefulness of the system and how it might work.

In a study investigating concerned school principals, Poba-Nzaouet al. (2015) noted several observations on principals' attitudes towards new technology including factors as aversion, self-efficacy, avoidance, anxiety, confidence, and enthusiasm. If the principals display enthusiasm, confidence, and commitment towards innovation adoption, employees are likely to respond positively and can navigate the challenges presented by the innovation (Aldowah et al., 2015; Al-Mamary et al., 2014b; Al-Mamary et al., 2015). Thus, employees are likely to become actively involved with innovation initiatives once identified by school managers as positive toward the management process.

User perception and attitude. A significant factor that influences success or lack of success of the implementation of IMIS is user perception and related attitudes. Monzavi et al. (2013) argued that many organizations have not yet gained the benefits associated with adoption of innovative information technologies. The researchers observed that bureaucracies seeking the services of innovation had focused more on the technological aspects of the system adoption. Observed as well was the failure to recognize the psychological aspects of innovation and the role played by the end-users in the outcome of the information system. The adoption of a new IMIS involves several changes in the normal operation of the enterprise. Users often view changes as risky and ambiguous (Hasan et al., 2013). The end-users are likely to resist full implementation of the IMIS if effects of the system and benefits to the users are not established before the project starts.

Users` perceptions and beliefs are significant determinants of the behavior of the users as stated by the Technology Acceptance Model (TAM) presented by Poba-Nzaou et al. (2015). The model posits there could be several external influences that impact end-users' attitudes and perceptions toward the adoption of a new IMIS (Wahdain et al., 2014). Song et al. (2015) viewed that some researchers have indicated there are several external factors likely to influence the perception of the internal players. Several researchers have explored such factors as situational involvement, prior use, intrinsic involvement, and effect of the change. Another group of researchers has interrogated the developer responsiveness, and the effects of compatibility, visibility, trainability, and output demonstrability (Song et al., 2015).

Theory of reasoned action (TRA) indicated that users' attitudes and perceptions towards a new technology are critical to usage (Ajzen & Fishbein, 1980). In TRA, it is posited that an individual's behavior is predicated on user intent, and social norms influence behavioral intent (Sierra, 2013). TRA is further beyond the theory of planned behavior that includes behavioral intention as an important element influencing end user's behavior (Ajzen & Fishbein, 1980). Diffusion theory is a significant authority in IMIS literature. Researchers have observed that end user's perceptions of the system are the initial introduction of innovation acceptance (Monzavi et al., 2013). The role of the communications channel is as a conduit in the facilitation of innovation diffusion. Innovation diffusion theory argues that people decide to accept an innovation depending on whether the system has a relative advantage, complexity, trialability, and compatibility.

Another model often used to explain what factors influence individuals in accepting innovations is the technology acceptance model (TAM). This model refers to an individual's beliefs influencing personal attitudes, shaping ones' behavior, and actually using the system (Patton, 2014). An individual's usefulness is a function of personal perception of innovation effectiveness in enhancing task performance (Poba-Nzaou et al., 2015). The use of the technology could be devoid of many difficulties when recognizing the ease of use and the degree to which the individual thinks.

Technology is a tool for enhancing the delivery of efficiency or improving task performance. Evaluation of the adoption of a new technology without involving the end-users is a recipe for failure (Hall, 2013). Other influences on user behavior are technology characteristics such as a network hardware and software. The coordination of these elements plays a supportive role in the adoption of new technology by aligning the technology and the users' accomplishment of their tasks (Ozturan et al., 2015). The developers of all these models and theories agree that users' beliefs and perceptions are important in the successful adoption of IT.

The TAM has indicated there are two factors determining system use: perceived ease of use and actual usefulness of the system. Hall (2013) described the TAM approach to perceived usefulness as the users' subjective probability that use of new technology could enhance task performance within their directorial environment. The perceived ease of use is the users' assessment that using the system requires little effort. User attitude toward the perceived usefulness of new technology influences behavioral intention

(Ohtsubo, 2017). Previous studies on the adoption of IMIS understate the role of attitude in offering innovation acceptance behavior (Monzavi et al., 2013).

Measuring the Success of Implementation of IMIS

Several models can be used to facilitate and measure the success of implementing IMIS in the education sector. The models include TAM, the computer usage model (CUM), the information system success model (ISSM), Delone and McLean's IS success mode, the technology organization and environment framework (TOF), and computing acceptance, to state a few (Al-Mamary et al., 2014b). The four aforementioned models have been employed in the advancement of alternative methods for implementing IMIS. The distinguished ease of use and perceived convenience constitute the two determinants in TAM (Al-Mamary et al., 2014a). The Delone and Mclean's IS model comprises a nomenclature of the success of information systems, which includes system quality, purpose, net benefits, quality of information, service quality, and the satisfaction of the user. Among all other characteristics, the emphasis has been put on system quality, its user-friendly service offered by the technical support team, and the quality of information presented by the system. All are considered as primary influences on the success of IMIS (Ahmadi, Papageorgiou, Yeh, & Martin, 2015).

TAM's perceived usefulness factor looks at comprehending the performance extent of an IS while the effort assigned to the system is measured using the perception of ease of using the system (Al-Hadi & Al-Shaibany, 2017). The two TAM determinants correspond to external variables or attributes to adapt the acceptance of technology in an organization. The external attributes involved comprise political, cultural, and social

factors. Al-Hadi and Al-Shaibany (2017) went on to posit that TAM could be an excellent model in higher education to understand how users accept e-learning. The adoption of mobile banking can be better understood through the TAM model. TAM has also proved itself on social media. A study conducted by Al-Hadi and Al-Shaibany revealed a set of critical success factors that influenced the implementation of the integrated management information system in institutions of higher learning. The critical success factors included the following:

1. Education program

2. Support of the top administration to implement IMIS

3. Structure of the education system

4. Budget size

5. Vision and goals

6. Training and education of staff

Support of the Top Administrations to Implement IMIS

Top management can constructively influence the vision and goals of a program. The way top management motivates the lower ranks in a process influences their perception of IMIS. The opposite results in a low acceptance of the technology being initiated, which in our case is IMIS. Top management is responsible for making policies that will ensure the smooth implementation of IMIS in the education system (Shao, Feng, & Hu, 2016). The top management also explains the goals of a program such that they align with those of institutions as well as sustaining the organizational constitution of the learning institutions. The top management is also obligated to interpret how the policies

designed by the institutions' boards adapt to the objects, vision, and objectives of the institution (Al-Hadi, 2017).

Organizational Structure of the Education System

The organizational structure of MOE and MOHE is a critical success factor that addresses how tasks are categorized and assigned within the organization. Implementing IMIS is a process that requires adequate planning and properly defined guidelines for coordinating the procedure (Altamony, Tarhini, Al-Salti, Gharaibeh, & Elyas, 2016). The body in charge of executing the application of IMIS in learning institutions needs to consolidate efficiently to construct integrated departments to embody their organizational structures. Rosenblatt (2013) explained that re-planning the organization can affect it positively if it aligns with the application of IMIS. The management of an IMIS program is affected by the structure of the organization, whereby it motivates technology's execution in education management (Karfaa et al., 2016). The configuration of the education curriculum was not altered adequately to accommodate the standards of IMIS. MOE and MOHE did not consider the attitude of the users before starting the IMIS project; neither did they ask how they could appreciate the technology. Therefore, they lacked the proper systems and resources to influence end users to welcome it.

The Business Process of the Learning Institution

The direction of the business process is a critical success factor of TAM that could reveal the degree of implementation of IMIS in Yemen's learning institutions. Chang (2016) argued that the future direction of integrated institutional management is the most suitable way to ensure the presence of a positive perception about IMIS within

the country's education process. Being able to manage institutions is required to lead them to embrace technology. Comprehensive understanding of a learning institution's business process could make the implementation of IMIS technology easier if people are introduced to different, less complicated technologies before they move to the more complicated ones (Ahmadi et al., 2015). The end users could find the new technology friendly because of prior interaction with other technologies. MOE and MOHE have stressed the need for schools to start changing their services to digital platforms gradually, and while some started the process, others delayed the process. An institution's business process could render the initially recommended IMIS worthless because it clashes with structured activities of numerous other institutions.

The teams responsible for implementing IMIS in developing countries have failed to issue early remarks and guidelines that the management of the institution can alter in the business process to match with the technology (Al-Mamary et al., 2015). Inadequate preparation of the business staff results in loss of quality of the institutions' products and services. The prerequisites of the determinate system are not established in time, causing the determinant essentials and functional elements of the institution to be re-planned after the implementation of the technology (Al-Hadi, 2017). A business process that is ready for the technology facilitates a positive effect on the users' perceptions of easily applying, and the effectiveness of the technology.

Training and Education of End Users of IMIS

The appropriate knowledge of technology is fundamental to understanding how it works. IMIS users need to understand how the technology functions and the changes it is

expected to bring. Jinno, Abe, and Iizuka (2017) argued that implementation of technology is bound to fail at the conception stage if the users have not been provided with suitable training on the system. Enlightening users and recipients of the technology ensures that they are contented with the system and contribute to enhancing its implementation process. End-users need to comprehend not only the working procedure of the firm, but also understand the activities within the system, and the expertise required for each process (Escobar-Rodriguez & Bartual-Sopoena, 2015). Human resource management could have illustrated its preparedness by scheduling training programs before MOE and MOHE rolled out the technology. The training of staff positively affects the business process by adequately preparing employees for prevalent transformations in the processes of the system in use (Grant, 2016). The training and education of employees instill a positive perception in the end users according to TAM.

The Visions and Objectives of the Corporation

The visions and objectives of an institution play an important role in measuring the need for, and expectations of implementing the integrated departments in learning institutions in Yemen. Adopting IMIS may cause changes in timing in attaining certain short-term objectives, which may lead to a delay in implementing the technology. Changing existing policies may lead to additional costs in running the system or achieving institutional objectives (Ram, Corkindale, & Wu, 2013). Culture-oriented institutions may find it hard to accommodate the integrated management information system, because technology goes against some of the ideal objectives of such institutions (Escobar-Rodriguez & Bartual-Sopoena, 2015). The institutions need to change their

business plan as soon as the Yemen's MOE and MOHE announce their intentions to introduce IMIS technology in the education sector. The vision and objectives may positively affect the business process if it is aligned with technological goals (Kerzner, 2013). TAM can adjust the vision of the learning institutions to influence an affirmative perception of the value of IMIS technology, which may lead to its successful implementation in these institutions.

The Size of the Budget

The use of IMIS may depend on the aspect of costs incurred during the implementation process. Planning, training of staff, and customization of visions and subjects may be a costly affair for the institutions on the current system (Drury, 2013). The low budget size influenced the slow implementation of IMIS in the Yemen school system (Al-Hadi, 2017). Executing the technology requires a budget size that ensures the functional fitness of the set procedure (Razi & Tarn, 2015). The management of the institutions is expected to outline the most cost-effective criteria to accelerate the implementation of IMIS technology. Budget size inspires managers who have investigated implementing IMIS technology. TAM indicates that an adequate budget size shows the significance of executing the procedure. Such a procedure inspires a different view of the technology's effectiveness, on top of the opinion of easiness in applying IMIS technology (Tenhiälä & Helkiö, 2015).

The unified theory of acceptance and use of technology (UTAUT), developed by Hall (2013), was consolidated from TAM. UTAUT posited four constructs that influence user perception, attitudes, and use: performance expectancy, effort expectancy, social

influence, and facilitating conditions. The strongest of these four predictors was performance expectancy, which means "the degree to which an individual believes that using the system will help to attain gains in job performance" (Venkatesh et al., 2003, p. 447). Performance expectancy was the single strongest predictor of intention and actual use of new technology. Effort expectancy is "the degree of ease associated with the use of the system" (Hall, 2013, p. 265).

Effort expectancy reflects the combined amount of management and user effort necessary to adopt and use a new IMIS. Effort-oriented constructs are most important during early stages of adoption, and they had greater accuracy for predicting use in women than for men. As noted earlier, researchers have suggested that gender role identity is a factor explaining those differences. Social influence is the degree to which an individual perceives that important others believe he or she should use the new system (Idrus, 2013). Social influence is the extent to which the influential MOE and MOHE perceive that use of the new IMIS is important to them.

Integrated Management Information System in Developing Countries

Researchers have linked the development of IMIS with efforts at improving association systems by modernizing data management, enhancing the flow of information, and harnessing technology potential. Baines and Lightfoot (2013) reported that a review of researchers in developing countries showed some successful experiences with IMIS, which met their expectations of policy and decision makers.

Hall (2013) sought to investigate the use of information generated and delivered by IMIS. There were problems and challenges during the integration of information

practices in the Bahamas West Frontier Province. The assumption was that information derived from the system enhanced the speed and working capacity of the decision-making process. Assumptions line up with the mantra and rationale that adoption of IMIS should provide relevant, reliable, and timely information to support decision making.

IMIS had a significant role in planning and decision making, and the adoption of the innovation challenged the decision-making process. For example, the process of collecting and integrating the processed data resulted in an increased workload for data entry employees (Hall, 2013). Data handling by decision-makers was a challenge when it came to sharing IMIS generated information; and when produced on request, resulted in inadequacy to other users.

Hall (2013) contradicted the assumption that IMIS generated administrative functions that provided timely, accurate, and reliable information to support decision makers in achieving their tasks efficiently. Although the technical infrastructure was important, leadership for its implementation and maintenance was still a necessity (McCollin & Disney, 2014). The leaders faced the problem of coordinating the necessary information and ensuring it reached appropriate users. IMIS lacked alignment with prior processes, and due to the slow bureaucracy, the adoption of the information system created a challenge in handling data in the decision-making process.

Uses of Integrated Management of Information System

The IMIS system has relied on a wide variety of industries to facilitate data and information sharing. Industries include the education field (Nedeva & Nedev, 2014); healthcare (Waheed et al., 2015); government (de Sousa, Giardino, & Trezza, 2014;

Sarazin et al., 2016b; Song et al., 2015); and private logistics management (Macfarlane, 2015). These systems help to increase the effectiveness of data sharing and allow for the generation of reports for future action and decision support among various agencies.

University context. The main goal of IMIS integration at Trakia University was to improve the educational process and to improve the system of quality management at the University (Nedeva & Nedev, 2014). The university used a systematic evaluation of management for research and to manage the organization. The main goal of IMIS integration of this system was to perform multiple related tasks, including the collection and analysis of data in real time and maintaining data for 5 years. A system proposal was in the Todo Kableshkov University of Transport in Sofia, Bulgaria (Dimitrov, 2013). One required goal of the developers was to create a system allowing for effective information management within the university. Work in this area necessitated the development of a commonly used database accessible to all users, the ability to share work in real time through the system, and interchangeable system modules.

An IMIS solution was proposed for the university system in Turkey. The researchers said it could help to enhance the effectiveness of business affairs conducted by the university administration (Manaseh, 2016; Özturan et al., 2015). Implementation issues included strategic, physical, logistical, and organizational attributes. The researchers noted the platform consisted of several web service connected subsystems integrating a central portal that could help to coordinate information and satisfy the four requirements identified in their needs analysis.

Medical context. IMIS in the healthcare field, known as a Health Management Information System (HMIS) allowed for the collection of management information related to the health sector (Waheed et al., 2015). Waheed et al. noted that the system used for blood transfusions in Pakistan was ineffective for information management. It was due to a lack of adherence to standards, including a critical assessment of daily operations (Winder, 2016). Waheed et al. (2015) proposed solutions including stronger support for routines in the transfusion processes, and management information systems that supported the decision-making process.

Government context. The Brazilian Nuclear and Energy Research Institute required IMIS and outlined a course toward that goal (de Sousa et al., 2014). The system developed was the planning and managerial information system known as the Planning and Managerial Information System of IPEN (SIGEPI), which required a 10-year development time. Planning began with the creation of a director's plan elaborating on needed changes. Development included software that linked at least one computer in each research center to the main database. de Sousa et al. (2014) specifically concluded that one cannot always purchase IMIS off the shelf. For organizations and critical modules, it is better to develop systems in-house (not outsourced). Employing individuals with specific experience in IMIS is necessary. Identifying needs and developing a plan is the earliest step, as need-analysis forms a basic function before developing such a system (Song et al., 2015). From the development of needs, designers can then begin to assess potential solutions to those needs and create systems around those solutions. Final software creation is a last step in the overall design process.

An IMIS for China focused specific development of its dynamic monitoring management system platform (Zhou & Li, 2016). Such focus integrated dynamic monitoring of a region, decision-making through data visualization, administrative management overseeing several stakeholder divisions, and auxiliary support that integrated system maintenance (Wahdain et al., 2015). The system helped to manage the temporal, spatial distribution of marine resources, and allowed data sharing among states, provinces, cities, and counties.

China has also taken steps toward developing an IMIS that could facilitate effective management for parking cars (Zhou & Li, 2016). Via system integrated radio frequency identification, a three-dimensional ultrasonic detection system allows rapid access to parking a car. The transmission and central storage enabled vehicle-based control of access to parking while optimizing space. Central storage had the effective result of more quickly issuing permission for entrance, reducing times to register with a parking system (Udmale et al., 2016). Removing congestion from the parking lot itself cut the labor costs associated with allowing entry and eliminated long parking times. Udmale et al. (2016) concluded that IMIS was superior to human-based management of these parking facilities.

Data from IMIS used by the Occupational Safety and Health Administration (OSHA) indicates the system is more likely to underreport non-detected chemical exposure samples than in a specific system (Sarazin et al., 2016b). Research into this situation compared the two systems and data recording in both systems for both detected and non-detected chemical samples alongside data. Ilies et al. (2015) found recordings of

only 38% of the IMIS measurements taken by the Chemical Exposure Health Data System. Only 50% of detected and 29% of undetected measurements were found in IMIS. The results indicated the presence of bias due to selective recordings, but the researchers could not identify what specific characteristics of the IMIS led to underreporting of these data (Ilies et al., 2015).

Additional studies have revealed reasons for the poor performance of OSHA. IMIS was in large part due to criteria used by OSHA, which determined standards for selecting worksites for testing (Sarazin et al., 2016a). Follow up inspections revealed higher exposure than planned inspections. The error, in this case, was not within IMIS, but the data collection conducted by OSHA indicated human error. Data in the IMIS remained reliable but only as valid as the degree to which OSHA criteria were rigorous in inspections of sites (Winder, 2016). OSHA results acted as a reminder that IMIS assessment determines if lack of success in the data collection is because of poor knowledge sharing or human based error.

Despite the poor findings by Sarazin et al. (2016b), OSHA has found that IMIS has been helpful in identifying asbestos exposure among workers (Janicak, 2014). Data from inspections identifying asbestos violations across 847 inspections have led to effective and widespread enforcement activities, and categorization of the most common violations. Similarly, IMIS helps to coordinate information about work-related asthma (Lefkowitz et al., 2015). IMIS, as a data system, was used to store information between 1993 and 2008. Integrated data from four states using air sampling was an example of an IMIS being able to coordinate information from diverse regions to identify trends

(Macfarlane, 2015). Macfarlane (2015) concluded that isocyanates, for example, widely continue to contribute to work-related asthma. Specific industries where these trends were most common were also identifiable from the data.

IMIS automated coding of occupations and exposure to hazards in general was equal to manual coding, demonstrating acceptable levels of accuracy in its automated procedures (Burstyn et al., 2014). When the collected data were accurate, the findings indicated successful abilities to congregate data, demonstrate acceptable accuracy, allow sharing of data, and produce accurate reports (Burstyn et al., 2014; Lefkowitz et al., 2015). Burstyn et al. (2014) and Lefkowitz et al. (2015) warned that successful automated coding was dependent on the exposure, which was consistent with the work of Sarazin et al. (2016b).

In India, the Department of Drinking Water Supply (DDWS) used IMIS to assemble tested water supply sources and generate accurate reports regarding both chemical and bacteriological contamination within drought-prone districts (Udmale et al., 2016). The DDWS study allowed the government to best assess how districts were responding to drought and water contamination. Local governments and users were overlooking these contaminations and neglected the treatment of the water (Luena, 2012). Udmale et al. (2016) concluded that a more in-depth investigation of drinking water sources had to design appropriate relief measures in the affected areas. They based their conclusions on the ability of IMIS to assess data from multiple districts and the resulting levels of demonstrated contamination.

Logistics context. IMIS has its value in the coordination of mining operations, which requires precision mass balancing, weight indicators, fleet tracking, and fleet management. All these operations are conducted through a central system (Macfarlane, 2015). IMIS is originating at the Finsch Mine for mining operations, which helped to organize transport fleets in real time, arrange dispatches, and coordinate effectively with mine planning (Khan & Ally, 2015). The implementation via a system that coordinates all data through a central database is essential. It helped to operate mining services, which required real-time data on ore flow to coordinate with the rest of the organization's operations (Khan & Ally, 2015).

Summary and Conclusions

IMIS enables the collection, storage, processing, and dissemination of information critical to management and decision-making (Khan & Ally, 2015). Successful IMIS implementations create and distribute actionable information to decision makers in a distributed environment across fixed and mobile platforms, with embedded business rules and processes that promote collaboration across organizations. Successful adoption and use of IMIS have required change management and alignment with existing organizational processes (Poba-Nzaou et al., 2015).

TAM indicated that two central factors determined system use: perceived system usefulness and perceived ease of use. These two factors influenced attitude and behavior intent toward IMIS (Hall, 2013). UTAUT was developed by Hall (2013) through TAM. UTAUT posited four constructs that influence user perception and attitudes: performance

expectancy, effort expectancy, social influence, and facilitating conditions. The strongest

of these four predictors has been performance expectancy.

Chapter 3 includes a qualitative case study research approach to address the

experiences of Yemen managers who have facilitated IMIS implementations in the past.

Chapter 3: Research Method

The purpose of this qualitative case study was to identify barriers and success factors related to previous attempts to implement an IMIS in Yemen's MOE and MOHE. DOI theory provided the conceptual framework. The following communication and collaboration research questions for managers and stakeholders guided the research process, goals, and framework:

RQ1: What factors contributed to the unsuccessful implementation of IMIS in the MOE and MOHE?

RQ2: What are the managers' perceptions of factors for successful IMIS implementation?

RQ3: How can the managers overcome factors that led to unsuccessful IMIS implementation?

Hall (2013) viewed research as the process used to arrive at a dependable solution to an identified problem. This process involved a well-designed systematic collection, analysis, and appropriate interpretation of data. Chapter 3 contains the research methodology, rationale for design choice, population, sample, and data collection and analysis. The qualitative research method involves the collection of in-depth insights on a research situation. The adoption of a diverse array of approaches such as ethnography and grounded theory were the indicated solutions. Understanding the intricate behavior of humans helps in the collection of reliable raw data (Basaleem & Amin, 2014).

A qualitative study also helps in the formation of suitable collaborations between the researcher and the study's population, thus facilitating the collection of in-depth

insights on a situation (Marshall & Rossman, 2015). The method helps a researcher to determine the underlying factors towards a behavior among human beings. It also encompasses various techniques like semistructured and unstructured interviews, focus group discussions, case studies, observations that facilitate the generation of important findings, and rationale towards a behavior (Marshall & Rossman, 2015).

A qualitative case study approach was useful in exploring the Yemen education ministry managers' experiences regarding communication and collaboration during the development of IMIS that resulted in a nonintegrated solution. The intention of those who conduct qualitative studies is to understand situations through an exploration of various behaviors and perspectives of the individual players in situations and context (Savin-Baden & Major, 2014). Qualitative research takes place in natural settings. In a qualitative study, words play a critical role instead of numbers.

Observations, document reviews, emails, and interviews help in the collection of qualitative data (Patton, 2014). The data analysis revolves around interdisciplinary fields of engineering, and engineering management focuses on the design of complex management systems. Qualitative research methods are inductive, meaning that hypotheses are a product of the effort rather than the starting point (Patten & Newhart, 2017). This research aspect helps in the formulation of recommendations to address the challenges in a case study. The combination of the research methods also helps in addressing preexisting assumptions, biases, and prejudice towards the study's population (Marshall & Rossman, 2015).

Research Design and Rationale

Given the focus of this study on individuals' experiences and perceptions, a qualitative case study was the most appropriate research design. Qualitative research involves deriving meanings that individuals ascribe to a social or human experience. Qualitative research is appropriate when a complex, detailed understanding of a situation is accessible. The situation can only involve speaking directly with the people experiencing what has occurred (Patton, 2014). Qualitative methods are useful to the study of issues that cannot undergo compartmentalization into discrete entities, which involves the evaluation of the dynamics of a process, not its static form (Patten & Newhart, 2017).

Qualitative methods provide the researcher with the ability to infer meaning and understanding of a certain situation. These contextual issues include the cultural, social, and political association concerns, processes of development of the system, adoption, and usage (Basaleem & Amin, 2014). They also affect the perception of the user or participants. Qualitative methods are useful in determining the importance of measuring results, and why the measured results appear as they do. Conversely, methods can help to establish why the subject may not be easy to measure. The methods also help the researcher to understand what happened or why people perceive a situation (Savin-Baden & Major, 2013).

Quantitative methodologies require articulated research questions with known, measurable study variables (Leedy & Ormrod, 2015). A considerable amount of knowledge is necessary regarding a situation if researchers use quantitative methods.

Quantitative studies help in creating generalized findings for well-defined variables using large samples and validated instruments. This study involved the personal experiences and perspectives of a small group of individuals. The goal was rich textured information, which is not consistent with quantitative research designs.

Role of the Researcher

Researchers are the main players in the research process. Usually, researchers have the role of designing the research question and identifying the research topic. Researchers facilitate the identification of all the required resources to support the research process (Patten & Newhart, 2017). Researchers also mobilize resources that support the data collection and analysis process. In qualitative research, a researcher is a tool or an instrument. The researcher's identity in comparison with the research participants is important. Such an identity helps to include various markers such as ethnicity, gender, and social economic status. Identifying the degree of outsider or insider status helps in detailing the experience, or lack of experience, with the study population (Patton, 2014). Such identification is useful in revealing the degree of sensitivity of the researcher in collecting, analyzing, and reporting data. For research conducted with a participant of a different racial, cultural, or linguistically different background, the information communicates to the reader that the qualitative study revolves around adequate care. The researcher acknowledges the distance between participant and researcher. The researcher uses bracketing, intuition, and reflexivity to set aside any preconceptions regarding the subject or study situation (Basaleem & Amin, 2014).

In the case study method, the researcher seeks to comprehend and learn about participants' perceptions (Patton, 2014). Such understanding helps to prepare a comprehensive description of the subject under study. I achieved saturation once there was no addition of new data. The next step was to analyze the data. Data synthesis involved the sorting and piecing together of raw data, which enabled me to arrive at a general understanding of the situation and the study participants.

<div align="center">

Methodology

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Research Design

The research method for this study was qualitative, with a case study design. The case study method is the most appropriate to investigate natural, single, or multiple contemporary bounded systems over time according to Manaseh (2016). The description of the situation uses a detailed and exhaustive collection of data from multiple sources of information. The sources of information included extensive reading of print media, interviews, emails, and observations.The research methodology assisted me in comprehending and describing the situation surrounding the implementation of IMIS technology in the management of learning institutions in Yemen. I conducted interviews via phone, email, and documents with people in the MOE and MOHE. The interview questions were crafted to focus on the reasons, impacts, benefits, and lack of success of IMIS technology to deduce the varying perceptions of the end users about the technology. Their perceptions included the ease of use of the technology and the effectiveness of the technology in the management of institutions. Taking notes on body language, pauses, tone, and facial expressions via Skype calls added an extra dimension of analysis to the

data collection. I also examined public documents regarding IMIS in the education sector in Yemen to explore a more public perspective of IMIS implementation.

Justification of Research Methodology

The qualitative method was optimal for the study. Qualitative studies allow for flexibility during the research, as well as more comprehensive and rich data in the form of visual evidence or written reports. Researchers who conduct qualitative studies look into the context (Starman, 2013). Moreover, qualitative studies can work with a small sample whereas quantitative requires a large sample size. First-hand involvement with the participants helps the researcher to conduct the analysis (Starman, 2013). The researcher can also record nonverbal cues by noting them down during the interview, which may assist during analysis of the data. The nonverbal cues could include voice tones, sighs, loudness, anxiety, and mood, among other means of human communication.

Qualitative studies help in explaining the research that may have been gathered in quantities, thus adding more value to the existing research, which may be helpful both to the researcher and the subject (Starman, 2013). Computer programs can be used to refine data analysis through systemic ways of recognizing links and patterns that facilitate the accuracy of the findings. Interviews in qualitative studies need to be recorded and transcribed for analysis. Qualitative studies give researchers the potential to realize high conceptual validity and measure the indicators that appropriately present the theoretical concepts they want to measure.

Qualitative case studies are appropriate for serving the intention of inductively identifying additional variables as well as new hypotheses (Savin-Baden & Major, 2013).

The case study design helped me to explore other variables of the end user's present perceptions in activating the causal mechanism in implementing IMIS technology. Finally, the case study approach allowed for accommodation to complex contributing relations such as path dependency, effects of complex interactions, and equifinality. Equifinality in this context refers to a situation in which the same result can be obtained using different methods (Starman, 2013). Marshall and Rossman (2015) stated that data in qualitative research were more convincing and potent than data collected through quantitative methodologies. Qualitative research involves human experience. The outcomes of the study can be moved to another setting and involve collecting data from few people. It would be easier to redirect or guide the questions meant for interviews in real time.

Sampling and Sampling Procedures

The sample for conducting the research was in the form of purposive samples. The advantage of employing the purposive sample methodology is that I could gather information from a small population and generalize the findings to the entire population of Yemen (Omair, 2014). The method also gave me the opportunity to compute statistical data and analyze the information for precision. The sample in the study comprised 15 individuals who have worked as managers and administrators in the Yemen Ministries of Education and Higher Education from the different governorates.

I interviewed the participants via telephone and emails and transcribed for analysis. I conducted the interviews on various dates for at least 30 minutes each. The participants must have had substantial knowledge about technology in education

management, especially in IMIS. It would be important for the participants to have worked in the MOE or MOHE. The period of work ensured that the information provided encompassed issues surrounding IMIS technology in Yemen before and after its implementation.

I investigated the chosen participants with the intention of determining their experience with IMIS technology. Questions included what it has enhanced, challenges concerned with enacting the IMIS, the indecisiveness to implement it in various higher learning institutions, and the effect of the technology on the administration. The sample included 15 participants; three board members of the implementation team were included in the study to determine their perceptions of IMIS technology. The TAM model was employed to determine how the end users perceived the usefulness and the ease of employing the technology and how it has affected the implementation process of IMIS in education management.

Participant Inclusion Criteria

A case study approach involves a small sample consistent with an in-depth and comprehensive examination of each participant's personal experience of the situation (Savin-Baden & Major, 2013). The sample must also be sufficiently large to collect data from the perspectives of as many stakeholders as possible in the concerned industry. I recruited a group sample of 15 managers from the following groups of MOE and MOHE, district education governors, and college and university department supervisors (see Savin-Baden & Major, 2013).

A recruitment email sent via LinkedIn targeted the MOE, MOHE, deputy minister, district education governors, and college and university department supervisors. The primary method of data collection for this study was through semistructured interviews with the participants. The interview was planned to take up to one hour during which time I would be taking notes and recording the audio. I later transcribed it for analysis. I focused on the perceptions of the participants concerning the usefulness of IMIS technology, and how they affect the implementation of the IMIS technology in the management of Yemen's education system. I was able to analyze how the end users' perceptions may have affected the implementation of the technology from the findings. I also searched for materials on the subject of implementing IMIS in school management in Yemen through publicly available online and print materials using such keywords as *IMIS*, *Yemen education system*, *management*, *technology*, *implementation*, *perception*. *ease of use*, and *end-user*. The materials provided a variety of information required for the validity and reliability of the study.

Using semistructured interviews enables participants' stories to emerge through a guided interview protocol, which encourages participants to describe their reality using their own words. The participants' responses and experiences provided opportunities to ask follow-up questions (Savin-Baden & Major, 2013). The interview questions provided a point of entry into a conversation. I recorded some background information to characterize the sample and encourage participant's responses around their experiences of current and prior IMIS implementations (Idrus, 2013).

I began the conversation by setting an inviting atmosphere, allowing participants to be comfortable during the interview process (Hall, 2013). Participants in a qualitative study need to trust the researcher and the interview process. Establishing a rapport encourages participants to elaborate on descriptions of their experiences to include memories, feelings, and insights. The case study approach relies on the interviewer soliciting rich, vital, substantive descriptions of the subject (Hall, 2013).

Field Test

Adoption of a field test was essential towards assessing the suitability of the interview questions. Results of the field test were useful to create and structure interview questions in a clear and understandable fashion. I was able to identify the challenges hindering data collection. The field test assisted me to fine-tune interviews, samples, scope of people, and the scheduling of the major study. I acquired efficient study and additional insights, which may have contributed to more comprehensive inquiries and feedback.

This study helped with determining the feasibility of the implementation of the IMIS technology in the Yemen education management sector. It could involve gathering statistical information about how much the state has invested in promoting technology providing its rigorous use in Islamic countries (Becker, Kugeler, & Rosemann, 2013). The field test entailed the finding of specific information based on the geographical locations and their different education standards. The information could provide a platform to understand the general perception of technology among the Yemen population, and the various organizations in the country. Conducting a field test helped to

explore the different aspects of Yemen such as religion, culture, and other aspects that may affect the popularity and application of technology in the country. It made me conversant with the relevant offices and authorities to send letters for the selection of participants for the actual study.

I found valuable information in investigating the use of IMIS technology in other organizations, particularly government institutions. The information obtained from the field test assisted me to understand better the barriers to implementation of IMIS in the education sector (Chang, 2016). I compared the implementation with other government divisions that had already adopted the technology and executed it successfully. I established types of technological appliances and other supporting features during the field test, which helped in understanding the essential components of IMIS technology. I was motivated to modify the alignment of the project to enhance its feasibility when discovering existing barriers that could have convoluted the initial research. The field test was crucial in the structuring of questions intended for the main interview. It helped to guarantee that the participants offered information about the users and their perceptions of using IMIS technology. I was able to use the information obtained during the information to ask questions that were not included in the listed questions but were relevant to the study.

An advantage associated with conducting a field test could be that the researcher can establish milestones for the project (Jeston & Nelis, 2014). It would involve analysis of the achievements that the field test might produce, and the future expected returns of the project. Determining the milestone of the research helped to forecast the future

performance of the project. The field test influenced a change to the scope of the efforts

to obtain new estimates. In forecasting, changing the scope of activities and questions

helped achieve a new project estimate to align the study. I accomplished changes by

removing the inefficiencies that may be detected and embracing efficient procedures. I

was able to estimate the total time required to complete the essential works concerning

the study (Grant, 2016). My strategy constituted forecasting the scope of the research

involved, the approximation of the total time needed to handle every phase, and the

activity outlined in the research. The field test, in addition to historical data about similar

research, was utilized to estimate the total time the study might consume.

The field test was resourceful in managing the project to ensure the study results

in set objectives (Rice, 2013). Project management practices such as planning and proper

allocation and organization of resources are very critical. These practices ensure the

project follows a set of objectives, which could be made more accessible through

conducting a field test. Project management could aid in guaranteeing that resources for

the project are safeguarded and used stringently for the intended purpose. A field test, to

a very great extent, helped me in laying down procedures in executing the investigation.

It further acted as the guiding principle for the study to ensure that the qualitative study

was implemented successfully. Study management requires that researchers undertake

projects rightfully, and that they know what the project entails. It could be achieved

through field testing when the project needs to be accomplished. Finally, conducting a

field test pointed out potential weak points that were susceptible to various risks

including ethics-related ones (Kerzner, 2013). By identifying these risks, I was able to

mitigate and root out the risk-prone areas or processes.

Journaling

A researcher's role in a case study analysis is to identify how the data fit together.

A journal acted as an ongoing source of data. The journal provides an opportunity to

record nonverbal communication from interviews, reflections in the moment, and an

audit trail to identify potential researcher bias (Savin-Baden & Major, 2013). These

reflective expressions provided a conduit to elucidate ideas or perspectives that could

otherwise not surface into conscious awareness and, therefore, go unnoticed.

Implementation of a peer review process helped in coding the documents. The interview

transcripts, as previously described in the section of the coding, could confirm

plausibility of the findings (Ng Foo Seong, 2013). Coding of interview transcripts and

journaling ambiguous or contrary interpretations enhanced the attention of an advisor to

resolve any conflicts in coding of data. Patton (2014) underscored the importance of

researchers' obligations to monitor their analytical processes and procedures as fully and

truthfully as possible.

Data Collection

The primary source of collecting data for this qualitative study was through

interviews. The secondary sources included a review of the existing literature on factors

influencing the implementation of IMIS technology in different avenues. Secondary

sources took account of the level of technology appreciation in Yemen and the effect of

the perception of end users on different types of technology. Based on the data, I chose a

suitable direction for the study as well as guidance on what questions to ask the interviewees. I took notes while interviewing in addition to tape recording and emails for future reference. I transcribed the audio recordings word for word before commencing analysis of the gathered data. I retained a folder of field notes to accompany the audio recordings of the interview. The notes assisted in establishing and commenting on the environmental contexts, nonverbal cues, and intuitions that may not be sufficiently depicted by the audio recording.

Data Analysis Plan

The data analysis plan began with verifying the accuracy of the interview transcriptions by providing participants with an editable copy for their review. They might have wished to revise the transcriptions to ensure accuracy. Thematic coding of the interview transcripts is necessary, as recommended by Hall (2013). Thematic coding is a systematic procedure to organize the data collected into recurring patterns or words, phrases, ideas, or categories (Cochrane, 2016). Ideally, the coding process supports the identification of useful data that can support the research outcome. Coding is also useful in enhancing the classification of the research data. Therefore, the peer review process has a notable effect in supporting the success of the data collection process. Opposing interpretations of interview transcripts and journaling enhanced the attention of the advisor to determine and solve any conflicts in coding or misinterpretations of data. Savin-Baden and Major (2013) underscored the importance of researchers' obligations to monitor and report their analytical processes and procedures as fully and truthfully as possible.

A spreadsheet and NVivo served to organize, categorize, classify, and label primary patterns or themes derived from repeated readings of the transcript (Hall, 2013). My role in data collection, analysis, and observation was to interview participants objectively and to categorize themes without preexisting notions or biases. Development of categories, or descriptors, occurred through an iterative process to reflect the accumulated data properly (John-Matthews, 2016). It is critical to review data that do not fit together or diverge from existing categories. The analysis of the divergent data determines whether it represents an extension of an existing theme or identified as *deviant cases* in that they do not fit the existing schema (Hall, 2013).

Research data analysis involves a multi-step and multi-level process (Savin-Baden & Major, 2013). The objective of the iterative process is to develop, deepen, and crystallize an understanding of the situation. The first step in horizontalizing is the researcher's conscious acknowledgment to provide equal attention and significance to participant responses (Savin-Baden & Major, 2013). The second step is transcript coding (Savin-Baden & Major, 2013). After organizing the relevant statements, the next task is to eliminate redundancies, or overlapping statements, within each participant's response (Keczer, 2014).

The remaining clustered themes helped to relate participants' experiences textually and then delve into the structure of the how these experiences came to be. The goal was to establish an accurate interpretation of the underlying dynamics of the experience, themes, and qualities that account for how feelings and thoughts are related to experience (Savin-Baden & Major, 2013). Finally, themes, patterns, and ideas

enhanced the understanding of their meanings and the experiences of the participants. Educational managers and officials from the MOE and MOHE participated in the study. Descriptive statistics (means, frequencies) characterized this study's sample demographics. Emergent patterns and themes helped in analyzing, organizing, and reporting to summarize recurring themes.

Finally, a journaling technique was useful to address potential bias and to improve the accuracy of the data collected. The journal acted as an ongoing source of data that provided an opportunity to record communication from interview reflections to create an audit trail to identify potential researcher bias (Savin-Baden & Major, 2013). These reflective expressions provided a channel to illuminate ideas or perspectives that could otherwise not surface into conscious awareness (Savin-Baden & Major, 2013).

Limitations

Limitations are challenges that undermine effective collection of reliable data. Numerous challenges may emerge that threaten to undermine the credibility and efficiency of the data collection process. First, financial resources are useful in supporting the timely collection of data from different sources. Therefore, the lack of adequate financial resources can limit the ability to easily accessible, reliable information. The process also requires the recruitment of numerous research assistants. The main duties of the research assistant were to ensure timely and effective gathering of credible data. Therefore, the lack of adequate human capital is the main setback to the research progress.

The identification and the formulation of the case study can also face various limitations and ethical challenges. I could find minimal literature existence on IMIS in Yemen. Therefore, I was likely to witness some setbacks in gathering credible and adequate data. Most of the participants might have been unwilling to take part in the research (Cheng et al., 2016). Identifying individuals who were willing to provide credible and reliable information was relatively challenging for me. I can find out that existing literature had numerous biases and prejudice that can undermine the reliability of the research findings. Many participants might not disclose the actual information on their strategies for implementing IMIS in Yemen. The emerging challenge might hinder me from gathering credible information on the research of the situation.

Time was also a major challenge for participants in this study. Ideally, time constraints among the participants is a major limitation towards the collection of reliable and comprehensive data (Goodman et al., 2017). Participants sacrificed part their daily activities and operations, thus reducing the time to gather reliable information. The experts are formidable reference points for the research (Stetson, 2013), and respondents may have behaved differently while under scrutiny.

Leaders who can take part in the study could also behave differently; thus, they might have hindered the collection of reliable data. I also over relied on qualitative data. Ideally, quantitative data enables the researcher to determine the main cause of a behavior and activities in an organization. The qualitative method enables the researcher to identify the continuous evolution of a problem. Therefore,

the dependence on qualitative data could have undermined me from undertaking a comprehensive comparative analysis.

<div align="center">**Issues of Trustworthiness**</div>

A qualitative study is trustworthy when it accurately reflects a participant's experiences, ideas, and reality. Trustworthiness involves putting aside preconceived ideas or biases regarding the situation. Trustworthiness is achievable when researchers ascertain the following elements: credibility, confirmability, dependability, and transferability (Savin-Baden & Major, 2013).

Credibility

Credibility refers to the confidence in the data and can compare to the internal validity used in the quantitative research. Credibility is attainable when the research results accurately reflect participants' perceptions regarding IMIS implementation. Supervisors can check the research data and conclusions (Fox, 2015). The inquiry audit comprises the scrutiny and analysis of the data and the supporting documents by an external examiner (Fox, 2015). Research project supervisors perform scrutiny of data and relevant supporting documents of the present study.

Transferability

Transferability means that research findings apply to similar situations (Savin-Baden & Major, 2013), and knowledge gained in one context is applicable in another. Researchers can apply certain concepts that may have evolved from this study. Transferability is comparable to generalization in quantitative research. This study may

be transferable to other Middle Eastern countries because they have similar cultures and practices.

Dependability

Dependability refers to the consistency or stability of the research process. To ensure the dependability of the research findings, the adoption of a consistently applied process is necessary. Data collection takes the form of semistructured interview questions, journaling, and use of the constant comparison method (Savin-Baden & Major, 2015). Dependable research should be consistent and accurate (Savin-Baden & Major, 2013). There are two ways of evaluating the dependability of data: the inquiry audit and stepwise replication. Stepwise replication often involves several researchers dividable into groups who have separate inquiries to compare data and the conclusions they derived.

Confirmability

Confirmability refers to the neutrality and objectivity of the data. Confirmability ascertains that any of the study findings are solely the product of the study and not the researcher's preconceptions and assumptions. By using the inquiry audit, it is possible to trace the sources of the data (Savin-Baden & Major, 2013). The path through which the researcher arrived at the themes, constructs, and the interpretation is carried out during the audit under the supervision of a study supervisor. The supervisors provide a reliable guideline to identify the research themes and constructs. The supervisor also ensures that gathered information complies with the research questions. Including the supervisor in the process can prove to be useful in the entire analysis (Savin-Baden & Major, 2013).

Ethical Procedures

Data collection began after approval from the Institutional Review Board. In addition, participants signed an informed consent form, which stated the study's purpose as well as ensuring participant confidentiality. The consent form also stated that no remuneration would occur for this study's participation. The provision of an executive summary was essential. I informed the participants that they could withdraw from this study at any time without consequences. Data will be stored for 5 years in a locked drawer in my office and then destroyed along with any notes or other data files.

Institutional Permissions

I presented the proposal to the Institutional Review Board for a go-ahead in conducting the study (IRB Approval #03-29-18-0316819). The draft included the study goals and the population intended for the investigation. Also contained in the proposal were the ethical considerations I made in advance, during, and after the study. I welcomed recommendations to ensure the study would be conducted in the safest and most respectable manner to the participants, and their identities would be confidential.

Relevant Information Collected About the Participants

The details of the participants included names, gender, age, and education levels. I informed the participants fully about the goals, methods, and projected possible uses of the study as the basis of their participation. I followed appropriate protocols when notifying the participants. Letters of request to the participants were sent first. The request letter contained the specifications of the preferred participants of the study after which I revealed the particular details of their expected contribution. For instance, the

objectives of this study required them to explain their understanding of IMIS technology.

I did not use their views as a measure of their intelligence, but rather the approval of their

perceptions and the various aspects related to the technology. I also notified the

participants about any legitimacy issues that may have arisen before commencing the

research.

Ethical Concerns Related to Recruitment Materials

Any alterations made to the computed information could only be made in case a

new data set would be presented, and not change my thoughts. I recorded and stored

documentation of the entire research process including the conditions of their discovery.

The research procedure could have comprised planning of the investigation, requesting

and obtaining permissions, and discovering specifications. These processes included the

management of the data and computed findings. All of the published data in figures and

tables would require that I had the raw data thoroughly documented and the storage

system clearly stated. The documentation would guarantee that every questionable piece

of data shown in the table was readily available as well as the calculations resulting in the

figures of findings. I also identified the effects of the study to enhance adequate

management of the consequences and to ensure a swift process. It was imperative that I

create a list of the effects posed by ethical misconduct.

Anonymity

The researcher is required to have high regard for the discretion of the

information provided by the participants as well as to maintain their anonymity (Healy,

2013). The data were presented such that they could not be associated with a particular

individual, but rather expressed their thoughts. I used codenames to represent the different participants to protect their actual identity. It is common to find participants withdrawing their contribution in the early stages or midway into the research once they feel potential exposure on publication. Some participants have even refused to participate just before the process begins despite their desire to volunteer earlier on (Healy, 2013). I notified the participants about the confidentiality of the data and the protection of their identity to alleviate the chances of withdrawal.

Some institutions might not have implemented the gender equality thresholds set by the government's objectives, which could reveal their status if the data were to be accessed by other individuals. The anonymity also kept the participants from being discriminated against by their employers. They would be unable to determine the particular individuals who revealed specific sentiments about their execution of IMIS technology. The information provided will also be published to protect the participants from discrimination by the readers of the study. Some readers may hold participants responsible for the lack of success in implementing a significant technology such as IMIS. I tried to ensure that I presented the information obtained anonymously to avoid having any participants experience prejudice due to their contributions to the study.

Confidentiality

I ensured the information provided by the respondents is in safe storage. The responses to the questionnaire need protection in the best way manageable. I stored the information collected in my personal computer. The action assisted in alleviating any incidences of identifying a specific person. The information will be accessible to the

participants and me for the next 5 years. I will destroy the files after the end of that period.

Summary

The purpose of this qualitative case study was to identify barriers and success factors related to previous attempts to implement IMIS in Yemen's Ministries of Education and Higher Education. In the case study method, the researcher seeks to understand the participants' experiences. The government of Yemen has been working continuously to improve the quality of government offered services designed to improve the quality of education management. Yemen Managers of Education and Managers of Higher of Education have sought to improve education quality, reduce costs, and provide timely information for decision-making processes by implementing IMIS.

The problem addressed in this study was how educational managers can overcome those factors that resulted in unsuccessful IMIS implementation. The problem entailed the development of a managerial process that could result in successful IMIS implementation by the MOE and MOHE (Winder, 2016). DOI theory provided the conceptual framework. Data obtained from this study may contribute towards improving the management of education. In the process, it could also improve education, and impact the quality of life of the average citizen, not only in Yemen but also in other countries. A better-educated society and an active citizenry could lead to increased social prosperity and perhaps a reduction in societal violence, including crime rates.

A qualitative research approach was consistent with a desire to understand the participants' unique experiences with prior IMIS implementation in Yemen's

management educational system. The primary method of data collection for this study

required 30 to 60-minute semistructured interviews. Each interview was audio recorded

and transcribed. A qualitative study is trustworthy when it accurately reflects

participant's experiences, ideas, and reality. The constant comparison method and

journaling enhanced the trustworthiness of the study's findings (Winder, 2016).

Data analysis involved using content analysis, journaling, and a constant

comparison method. I coded interview transcripts, which involved a systematic procedure

to organize the data collected into recurring patterns or words, phrases, ideas, or

categories. An Excel spreadsheet and NVivo helped to organize, categorize, classify, and

label primary patterns or themes derived from repeated readings of the transcript (Patton,

2002). Data collection did not occur, nor did recruitment begin, without the approval of

the Institutional Review Board.

Chapter 4: Results

This qualitative case study was aimed at discovering the barriers and success factors associated with previous attempts to implement an IMIS in Yemen's MOE and MOHE. To identify the underlying factors influencing the success or lack of success of IMIS implementation attempts, several research questions were used to investigate the managers' and stakeholders' experiences with the implementation process. They include the following:

RQ1: What factors contributed to the unsuccessful implementation of IMIS in the MOE and MOHE?

RQ2: What are the managers' perceptions of factors for successful IMIS implementation?

RQ3: How can the managers overcome factors that led to unsuccessful IMIS implementation?

In this chapter, the results of the research are presented as set out in the methodology chapter. The results are presented on perceptions toward implementing IMIS in Yemen's MOE and MOHE (see Jamshed, 2014). Thereafter, I present the personal and organizational conditions that influenced the experiences of participants during the time of study as well as the demographics of the participants relevant to the study. Further described are the data collection and analysis as well the evidence of trustworthiness. The results of this research are organized into essential themes and patterns under the three primary research questions.

Research Setting

The data were gathered through semistructured interviews with 15 individuals who have worked as managers and administrators in Yemen's MOE and MOHE. All of them had experience in the implementation of IMIS, and they offered credible insights into the challenges of implementing an IMIS in MOE and MOHE. I designed the interviews in accordance with the research questions and study objectives and explained the aim of the study to each respondent before the interview process. It was important to obtain the consent of respondents before the interview process and assure them of confidential responses (see Cleary, Horsfall, & Hayter, 2014). I encouraged the respondents to express themselves freely, and I asked follow-up questions based on some of the responses. All responses were either audio recorded or emailed by me for later transcription and analysis. Each interview lasted between 30 and 60 minutes.

Data analysis was done alongside data collection to allow questions to be refined and explored as well as to develop new avenues for inquiries. The transcription of the interviews took place 48 hours after interviews (see Cleary et al., 2014). I interpreted the findings using content analysis, which involved reading the transcripts repeatedly and categorizing words and phrases to find themes that eventually emerged from the responses. I present various extracts from the responses in the findings.

Although qualitative research requires standardization of procedures, a study could be influenced by an external variable that could influence the interpretation of results (Sargeant, 2012). In this study, the ongoing civil war that has devastated families, communities and hampered efficient functioning of government significantly affected

participants. Because of the importance of professional perspectives on the lack of success of IMIS implementation in Yemen's MOE and MOHE, I selected participants who were representative of education managers and IMIS administrators. However, it was quite challenging to access most of them due to insecurity fears. Hence, I developed email interviews to collect data (see Sargeant, 2012). This situation hindered me from gathering critical contextual details through follow-up questions. Some of the participants also feared for their safety. Hence, they failed to provide adequate information that could inform the facets and perspectives related to the issues under investigation (see Sargeant, 2012). Moreover, some interviews were shorter than anticipated because of interruptions. These challenges were addressed by collecting quality data in the shortest time possible as well as sending follow-up questions for clarification where there was a need to do so.

Demographics

The participants' demographics that I collected from this study included four essential data sets, including age, gender, and job position.

Gender

I interviewed 11 men and four women for the study.

Age

All the participants' ages were above 18 years as set in the criteria for inclusion. Although most participants provided their ages in terms of range, three of the participants were above 55 years, six were in their mid-40s, and the rest were in their mid-30s.

Job Position

I gave all participants the opportunity to include their job details as well as the setting of the locations where they worked. This information provided a perfect opportunity to evaluate any potential challenges or experiences that would have influenced their jobs or positions (see Cleary et al., 2014). There were 10 education managers and five IMIS administrators interviewed in the study. The information collected from this study was meant to answer the primary research question: What factors contributed to the unsuccessful implementation of IMIS in the MOE and MOHE? The participants were probed on incidences in the roles as education managers and administrators who influenced the success or lack thereof of IMIS implementation in Yemen's MOE and MOHE. The research respondents were referred to as participant P1, P2, P3, P4, P5, et cetera, as highlighted in Table 2.

Data Collection

To ascertain the accuracy of the transcriptions, I compared the transcribed interview to the audio recording to check the accuracy of the collected information (see Cleary et al., 2014). After confirming that the transcribed information was in line with the recorded interviews, I sent the transcriptions to participants to verify if their thoughts and experiences were captured as they wanted (see Cleary et al., 2014). All participants indicated that their experiences and opinions on the success and failure factors associated with IMIS implementation attempts were captured accurately.

Table 2

Participants and Their Job Positions

Participant	Job position
Participant 1	Ministry personnel
Participant 2	Education manager
Participant 3	Education administrator
Participant 4	Ministry personnel
Participant 5	Education manager
Participant 6	Ministry personnel
Participant 7	Education manager
Participant 8	Education administrator
Participant 9	Education manager
Participant 10	Education manager
Participant 11	Education administrator
Participant 12	Education manager
Participant 13	Education manager
Participant 14	Education manager
Participant 15	Education administrator

For the participants who were unable to find time for the interview, I sent emails to gather important data. The interview questions were used to create a data collection form in the Microsoft Access database and then emailed to the respondents. The returned forms were automatically received, and emerging themes were identified for further coding. The email form was customized to ensure that the data gathered were safe and accurate (see Alshenqeeti, 2014). I transcribed email interview transcripts immediately when they were received from the participants.

The analysis of data was anchored on three critical questions that were essential in understanding the experiences of the participants (Elo et al., 2014). All participants interviewed were asked to describe their experiences whether negative or positive

regarding what they perceived to be the critical success or failure factors in the implementation of IMIS in Yemen's MOE and MOHE. The first question posed to the participants during the interview was to discuss what they believed to be the primary contributors to the unsuccessful implementation of IMIS in the MOE and MOHE in Yemen.

Table 3 includes the issues participants identified as barriers to the implementation of IMIS in Yemen. Participant 1 opined that lack of leadership support was a major contributor to lack of success during implementation of IMIS. This participant noted that "some leaders do understand the importance of these systems. In most cases, they fail to provide the resources and leadership required to make these systems successful." Lack of skilled staff capable of efficiently implementing the systems was also identified by several participants as one of the leading contributors to lack of success during IMIS implementation. Participant 4, for instance, stated that "the Ministry of Education has failed to train or hire highly skilled staff at the installation of various software and hardware integral in the functionality of the systems." Participant 4 continued by noting, "We are often left to figure how these systems are implemented. Hence, we have often adopted a trial and error that has failed severally."

Table 3

Participant Summaries of Factors Contributing to Unsuccessful IMIS Implementation

Participant	Factors
Participant 1	Mismanagement of available resources
Participant 2	Inadequate human and material resources
Participant 3	Minimal acceptance of information management systems
Participant 4	Lack of understanding of the steps and functionality of IMIS
Participant 5	Inadequate education and training
Participant 6	Lack of management discipline
Participant 7	Poor project composition during implementation
Participant 8	Lack of sufficient communication of IMIS benefits
Participant 9	Lack of essential infrastructure within the organizations
Participant 10	Poor project composition during implementation
Participant 11	Minimal acceptance of information management systems
Participant 12	Lack of sufficient communication of IMIS benefits
Participant 13	Fear of the unknown
Participant 14	Poor project composition during implementation
Participant 15	Lack of essential infrastructure within the organizations

The other IMIS implementation barriers identified by the participants included disorganization and lack of the appropriate resources to implement information management systems. All participants provided some information that related to this issue with Participant 9 asserting that "the task that we have been challenged with is immense and requires several staff to implement. However, the ministry has not hired additional staff since initiating the IMIS implementation process." Participant 7 also reiterated this position, noting that "IMIS implementation has failed in the past because of inadequate human resources who are vital to the evaluation, data processing, and assessment of the success of every implementation stage."

Another theme that emerged from the data analysis was the delay in providing appropriate information when needed. Participant 8 was categorical that "very little

progress has been achieved because it takes a lot of time to get the required information to the right user." Because of these delays, "many users have developed negative attitudes towards the use of IMIS" according to Participant 12. As a result, the implementation has experienced significant hiccups.

The participants were then asked to describe what they believed to be the success factors associated with the successful IMIS implementation. Through the email delivered within 24 hours after receipt, Participant 3 stated, "I believe that adequate support of the staff and all stakeholders involved in the process help overcome potential barriers." All participants reiterated the importance of support from the ministry leadership and the provision of necessary materials and resources. Of crucial significance was Participant 9's view on the significance and training for staff. Participant 9 thought that "training and education will help education managers and administrators to learn how to use different software to improve the experiences of users." Also, another participant thought that sufficient financial resources are critical to the success of implementation. While explaining why sufficient finances and material resources are important, Participant 10 asserted, "I do not see IMIS succeeding without enough money and technical resources. They are crucial since planning, training of employees, and implementation requires money."

Some participants opined that the existence of a clear implementation goal helps in measuring outcomes and evaluating success. Therefore, the vision and goals of an organization should be aligned with the technological goals that implementers aim to achieve. Participant 15 was more categorical: "I believe that every organization should

have a goal they seek to attain. Without a clear vision of what is required, they may to achieve appropriate and desirable outcome." There were variations to this question posed to the respondents. For instance, Participant 14 was asked to name "factors that influence the success of IMIS implementation at the MOHE and MOE." This change had the potential of changing how the participant responded to the questions asked. For this reason, a more general analysis was adopted to factor in the variations among participants. Many participants, however, had similar responses to the question asked despite the little variation introduced.

The participants were finally asked to identify how relevant stakeholders could overcome factors that led to the previous unsuccessful IMIS implementation. Participant 4 looked at the issue comprehensively, stating, "I believe successful implementation of IMIS requires collaboration. All relevant stakeholders should be involved in creating strategies to improve the outcome." By examining the response of this participant, it was possible to identify that collaboration was the overriding factor in improving IMIS implementation success. Most participants had learned from the negative experiences occasioned by the lack of success. Participant 11, for example, stated that "enough resources and skilled staff are required for the implementation of an IMIS to be successful." These ideas led to the exploration of participants' ideas on the nature of training and number of financial and technical resources needed to enhance chances of success. Participant 5 explained that "he could not quantify the exact amount, but obviously sufficient finances were critical. How could you train employees on the appropriate implementation of IMIS if there are no resources?"

Table 3 indicated the factors involved in an unsuccessful IMIS implementation according to each of the 15 participants. These and other pieces of information gathered during the phone and email interviews led to several themes. A total of five themes emerged from the manual coding and analysis of the data on the factors contributing to unsuccessful IMIS implementation in Yemen's MOE and MOHE. They included insufficient human and material resources, lack of understanding and acceptance of IMIS, inadequate IMIS education and training, incompetent program managers, and fear of change.

Evidence of Trustworthiness

Credibility

Credibility refers to confidence in the validity of the original data, along with the internal validity used in quantitative research (Elo et al., 2014). Credibility was attainable when the questions were presented in a clear-cut fashion to help participants respond with answers that accurately reflected their perceptions regarding IMIS implementation. I checked the research data and conclusions. Interviews were carried out offline (via email) or online, followed-up by phone calls. The inquiry audit comprised the scrutiny and analysis of the data and the supporting documents by an external examiner (Fox, 2015). I did scrutinize the data and relevant supporting documents of this study.

Due to the participants' requests, I did not audio record the offline interviews. E-mailed questionnaires were sent to participants. After the participants received each of their emails, I phoned them to confirm credibility and the understanding of their responses. The answer to each query was assessed and coupled with my review notes.

Additionally, I transcribed these calls and supplemented the data with the newly gathered information. I sent the transcripts along with appended valuations to the contributors for the purpose of logging their corroboration. I used standardized member-checking techniques in reviewing the contributions with participants to ensure trustworthiness.

Transferability

Transferability is the measure of application of a particular research finding or group of findings that may pertain to similar situations (Savin-Baden & Major, 2013), and knowledge gained in one context is applicable in another. Researchers can apply certain concepts that may have evolved from this study to other similar areas. In this case, conclusions may be relevant to other Middle Eastern countries because they have similar cultures and practices. To facilitate the transferability of findings in this study, I provided thorough explanations that can enable readers to identify situations usable in their own environment.

Dependability

Dependable research should be consistent and accurate (Savin-Baden & Major, 2013). I adopted a consistently applied process for the stability and dependability of the research findings, and I revised and added data during the research *process.* I collected data in the form of semistructured interview questions and journaling, and I also used the constant comparison method (Savin-Baden & Major, 2015). Inquiry auditing was used to evaluate the dependability of data and gathering information throughout the process from participants.

Confirmability

I wrote down my thoughts as notes and avoided any assumptions to achieve neutrality and objectivity of the data. Data reports included detailed descriptions of the study findings that were solely the product of the research, and not my preconceptions and assumptions. By using the inquiry audit, it is possible to trace the sources of the data (Savin-Baden & Major, 2013). I followed through with the themes, constructs, and the interpretation as I audited the interviews. The report provides a reliable guideline to identify the research themes and constructs. I ensured that gathered information complied with the research questions, and I made sure that the process was useful and transparent in the entire analysis (Savin-Baden & Major, 2013). I ensured that the data were supported by the conclusions and a comprehensive review of literature to avoid personal bias; hence, I attained confirmability.

<div align="center">

Study Results

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Analysis of the collected data revealed various themes. The aim of this study was to present the perceptions of the major policy and education stakeholders regarding the challenges and obstacles involving the implementation of IMIS. The results from the analysis of each group are presented separately as five fundamental themes regarding participant perceptions toward implementing IMIS in MOE and MOHE. I posed the following primary questions, followed by the subsequent questions as listed in Appendix C, to the participants leading to the identification of various themes.

RQ1. What factors contributed to the unsuccessful implementation of IMIS in the MOE and MOHE?

RQ2: What are the managers' perceptions of factors for successful IMIS implementation?

RQ3: How can the managers overcome factors that led to unsuccessful IMIS implementation?

Research Question 1: Factors Contributing to Unsuccessful IMIS Implementation

Personnel in the MOE and MOHE recognized the challenges of implementing IMIS by education managers. They noted that understanding of success factors is critical in mitigating inherent challenges during implementation. They observed that "most managers have minimal acceptance of information management systems," making the implementation quite challenging. They noted that "adequate planning, monitoring, and evaluation" are crucial if IMIS implementation is to be successful. Every element of the IMIS system ought to be evaluated to determine levels of conformity with the organizational processes and goals. Alignment of the implementation stages and institutional processes is paramount for successful implementation of a system capable of achieving the desired outcomes. Inadequate human and material resources were also perceived as a major contributor to unsuccessful IMIS implementation. Low acceptance of innovations such as IMIS is a critical consideration during implementation, for the ministry personnel observed that "very few managers understand the importance of new technologies and their impact in enhancing their roles to a whole new level."

Fear of the impact of IMIS on social change is a leading cause of resistance to IMIS implementation both in government and education institutions. One participant discussed "fear of the unknown" as another contributor to IMIS implementation failure.

Fear results from conformity to the status quo and negative attitudes towards new inventions. His concern was that the majority of crucial stakeholders' lack understanding of the steps in proper implementation and functionality. This instability was a huge hindrance to the integration of the system in colleges, universities, and the MOE. Implementation processes were unclear, ambiguous, and confusing, and they needed to be comprehensive and clear for all the policymakers and educational stakeholders on what their input would be to ensure successful implementation of IMIS in MOE and MOHE.

All the participants had positive views on the significance of IMIS within organizations. Interviews with the college and university department supervisors yielded insightful information. University supervisors believed in "lack of sufficient communication of IMIS benefits" as the most significant contributor to the lack of success of IMIS implementation within schools and colleges. There is the need for sufficient and comprehensive education on its benefits and better training on how IMIS should be implemented to support educational goals and objectives. In addition, supervisors believed that education was not the problem regarding unsuccessful implementation of IMIS systems. Managers recognized, poor project composition during implementation and the mismanagement of available resources significantly contributed to lack of success during IMIS implementation. This perception points to the concerns of some stakeholders overriding lack of integrity of the people tasked with implementing the system.

All the education managers and end users in my sample thought that "poor requirement management was another major contributor to lack of success during IMIS implementation." When the policy makers and critical decision makers are unaware of how to manage available resources effectively, they contended that failure of IMIS implementation is inevitable. Changes in organizational processes and goals were major contributors to the lack of success during IMIS implementation in the MOE and MOHE. The departmental supervisors agreed that support of major stakeholders was critical during implementation. Without aligning organizational objectives with integrated information management systems, the ensuing confusion could result in unsuccessful implementation.

An agreement was present among university department supervisors on the role played by adequate human and material resources, and acceptance of innovations (Pierre & Jackson, 2014). They all stated that "inadequate human and material resources needed to implement the system" contributed significantly to the failure in implementing IMIS. In the view of the departmental supervisors, unsuccessful implementation of IMIS could be attributed to inadequate education and training of the people involved in the process. Lack of essential infrastructure within the organizations as well as lack of management discipline was capable of not bringing IMIS implementation to fruition.

Table 4

Emerging Themes on Factors Contributing to Unsuccessful IMIS Implementation

No.	Factors contributing to unsuccessful IMIS implementation
1	Insufficient human and material resources
2	Lack of understanding and acceptance of IMIS
3	Inadequate IMIS education and training
4	Incompetent program managers
5	Fear of change

Research Question 2: Manager Perceived Factors for Successful IMIS Implementation

The ministry personnel believed that a management information system is a crucial tool in learning and collaboration between private and public education departments. Its successful implementation within MOE in Yemen had been affected by certain barriers. Participants identified "user attitudes" during implementation as significant factors in IMIS implementation. These attitudes are based on four fundamental factors: "Performance expectancy, effort expectancy, social influence and facilitating conditions." The ministry personnel claimed that people's acceptance of technology depends on how they believe the technology can influence their lives, improve their work, and require efforts to use the technology. They believed that to implement IMIS successfully, "favorable attitude, the ease of use of the system and availability of the human and material resources necessary to implement the IMIS" are needed. The ministry personnel concurred that lack of sufficient support by the MOE and MOHE in Yemen is a significant factor in the failure of IMIS implementation. Some of the other barriers they perceived as the most critical contributors to unsuccessful

implementation included "lack of management support systems, low priority of resource allocation to the implementation of the system, and lack of implementation standards by the stakeholders and policymakers."

The implementation of IMIS revolutionizes many aspects of education such as improved learning and better collaboration of education stakeholders according to the MOE and MOHE. As a stakeholder with very vital experience in the implementation stages, the minister was critical of the alignment of IMIS and the goals of the institutions of higher learning. When asked about some of the system implementation challenges, he noted "ineffective integration strategies" during implementation as another barrier. Participants thought that system implementation ought to be integrated with the old system to allow for an easier transition by users. Many organizations continue to use the old systems because they lack understanding of how the new system can impact their roles. For this reason, they contended that lack of adequate and comprehensive training significantly impacts the level of success during training. They also noted that integration of new systems requires significant reforms in the available models, which have been "lacking and insufficient where it is carried out."

Another challenge identified by the ministry personnel was "organizational bottlenecks," which they claimed can be alleviated through shared accountability during implementation. Lack of coordination and sufficient plans on how to implement the system significantly contributes to the failures of IMIS implementation. On some of the critical success factors during IMIS implementation, the ministry personnel perceived

integration of the new systems with the old ones without creating parallel processes was a crucial factor in whether the systems are successful.

When managers were asked about some of the factors they perceived as barriers to IMIS implementation, all the education managers recognized "insufficient resources and lack of effective leadership" fundamental obstacles during system implementation. Mobilization of resource requirements and sufficient training of critical stakeholders also featured prominently as some of the factors essential to the success of system implementation. Integrated MIS holds significant potential in influencing the achievement of educational goals and objectives. The managers thought that "cultural changes, acceptance of innovation, supportive regulation, and adequate human and material resources" are major contributors to successful IMIS implementation.

All the managers and end users concurred that the failures witnessed during several attempts of implementation have been due to challenges that can be grouped into environmental, organizational, and technical obstacles. Some environmental constraints identified included misalignment of organizational goals and the aims of system implementation. One of the managers thought that implementation of a successful IMIS technology "requires sufficient planning, organization, and execution of system elements." Without proper planning on how the implementation strategies are to be enacted and the goals they aim to achieve, there could be high chances of failure. For this reason, comprehensive training and education are crucial both for IMIS technology executors and end users on their roles in ensuring successful implementation.

Table 5

Manager Perceived Factors for Successful IMIS Implementation

No	Manager perceived factors for successful IMIS implementation
1	Comprehensive training and education
2	Adequate human and material resources
3	Acceptance of information management systems
4	Sufficient planning, organization, and execution of system elements
5	Collaborating between private and public education departments
6	Management discipline
7	Ease of use of systems

Research Question 3: How Managers Can Overcome Unsuccessful IMIS

Implementation

The ministry personnel believed in the allocation of sufficient resources as the one

critical strategy of ensuring successful system implementation. In their response, they

stated, "The IMIS system ought to be compatible with the organizational goals and

stakeholder expectations to ensure a complete and successful implementation."

Acceptance of the system and positive attitudes by the stakeholders was also identified as

a vital element in the implementation of IMIS. Technology of education is crucial in

appreciating the role innovations play in achieving the objectives of education and

integrating processes within MOE and MOHE. Assembling of the appropriate

communication and collaboration tools ensures successful implementation of IMIS.

As part of the stakeholders critical in IMIS implementation in the learning

institutions, all the school and university managers were cognizant of their roles and of

some of the challenges hindering successful IMIS implementation. One of the

stakeholders argued that overcoming barriers to project implementation requires "the

identification of the challenges contributing to the unsuccessful implementation of the systems." While responding to how the problems identified could be overcome, they noted that "collaboration and effective communication is critical in enhancing understanding and achieving the goals and objectives." One supervisor thought that "organizational support is necessary" for system executors involved in the implementation through the provision of prerequisite human and material resources. Without the required resources such as relevant technologies and system infrastructure, the implementation of IMIS is likely to fail. Another supervisor believed in making the necessary materials available and adequate, commenting on "education and training of the stakeholders on how the systems should be implemented and on dealing with challenges during implementation."

All the university managers agreed with the criticality of "accepting system changes and adoption of favorable attitudes" as the greatest strategy to address implementation challenges. When concerned stakeholders acknowledge the importance of their roles, chances increase to support the whole process and to facilitate compliance with required procedures. One of the university managers purported that "building lasting relationships will help in dealing with collaboration issues." The managers were asked to respond further on how they thought a close relationship could be achieved among the critical stakeholders. One stated that "top leadership has the role of designing working environments which encourage close interaction and collaboration in roles and responsibilities."

Efficient communication and clear organizational policies on system implementation reduce change resistance. Most of those who are involved would be aware of the impacts of the changes to their roles and how they can be mitigated. Another interview participant also recognized the "identification of the barriers as the first step towards finding solutions to implementation challenges." When the issues raising concerns have been identified, it is easier to find solutions to them by evaluating the existing strategies and procedures. Leadership and management support are vital components of successful implementation of IMIS systems in MOE and MOHE.

Table 6

How Managers Can Overcome an Unsuccessful IMIS Implementation

No.	How managers can overcome an unsuccessful IMIS implementation
1	Allocation of sufficient resources
2	Compatibility of IMIs systems with organizational goals and stakeholder vision
3	Efficient communication and collaboration
4	Organizational support
5	Education and training of staff and stakeholders
6	Identification of barriers

Summary

The findings of the study regarding the participants' perceptions on fundamental IMIS themes have been presented in this chapter. Most IMIS systems created by the government have failed to fulfill the expectations of end users. The lived experiences of some of the important stakeholders have been explored through various themes such as the factors contributing to unsuccessful IMIS implementation and the role of communication and collaboration in these attempts. Also explored were the managers'

perceptions of the barriers and critical success factors for successful IMIS implementation, and how managers can overcome factors that led to this implementation. The most prominent factors were acceptance of IMIS technology, lack of management and user support, and inadequate human and material resources. These obstacles have made the implementation of the systems both challenging and disappointing.

This chapter also included an examination of how the managers can address the challenges bedeviling the system's implementation process. At the center of implementation, success is the consistent and invaluable management support that provided and enabled the right environment and some of the resources needed for implementation. Effective communication and collaboration are crucial in enhancing the relationship among the stakeholders and clarifying the procedures and methodologies essential to IMIS implementation. A feedback information system is critical to reducing inherent system complexities. Identification of the stakeholders and definition of their roles enhance understanding of the specified roles each should perform. The system executors should be supported by management because such coordination facilitates acceptance among the players on implementation goals, objectives, and procedures.

Chapter 5 presents the conclusions and recommendations on how to address the challenges identified as plaguing the implementation process for IMIS systems. The chapter also summarizes the study objectives, research methodology, and results of the investigation.

Chapter 5: Discussion, Conclusions, and Recommendations

The need for accurate, consistent, and credible information in today's organizations has shaped the business and education landscapes significantly. The MOE and MOHE are confronted with rapid changes and need for information critical to the decision-making process. Researchers in higher education have been challenged to engage in uncovering and disseminating new knowledge. Such strategies could facilitate successful implementation of IMIS systems within the MOE and MOHE. To effectively understand the barriers to successful IMIS implementation, it is essential to study the perspectives of some of the critical stakeholders in IMIS implementation. Due to the rapid changes in management information systems, system executors should consistently upgrade their skills. Despite the availability of numerous studies on IMIS, a paucity of research exists on the perspectives of critical stakeholders on the implementation of IMIS and their perceptions of factors for successful IMIS implementation.

Research on the experiences and points of view of education managers was critical. These experiences help in expanding the knowledge base and determining how the various stakeholders view the challenges, suggestions, and reasons during the implementation of IMIS. Computer-based information systems have become prominent for improving efficiency during the process of making decisions. However, few systems have been implemented successfully in MOE and MOHE. In the ensuing pages of this study, I discuss the findings of this research in three crucial parts, including a summary of the findings, implications and recommendations for stakeholders and policymakers, and recommendations for further studies.

In this study, the goal was to explore education managers' perspectives on MOE and MOHE regarding success factors during IMIS implementation. Timely and accurate information needed by the MOE and MOHE on IMIS implementation was obtained through a current nonintegrated system to help in making informed decisions. Because implementing an IMIS was a new venture, the exploration and understanding of the role and challenges of the stakeholders such as university managers and ministry personnel assumed crucial importance during the literature review in this dissertation. Due to the importance of the perspectives of MOE and MOHE, it became necessary to evaluate the managers' opinions on the changes required in the successful design and implementation of an IMIS. It was important to explore the prerequisite knowledge necessary for improving the processes of IMIS selection, development, and implementation of MOE and MOHE critical to IMIS implementation. In this chapter, I present the conclusions and recommendations emanating from the study.

I employed a qualitative case study to address the research questions. Emails and semistructured interviews of approximately 30 minutes were developed and administered to collect primary data from education managers and stakeholders. I asked all of the respondents to highlight critical issues contributing to the lack of success of IMIS implementation and to enumerate the roles played by those who used communication and collaboration in unsuccessful attempts to implement IMIS. I also asked them to identify factors they perceived would lead to successful IMIS implementation. Finally, I asked them to highlight the roles and the strategies the stakeholders can use to overcome factors that led to unsuccessful IMIS implementation. The results of this investigation can be

used to answer three crucial questions: (a) What factors contributed to the unsuccessful IMIS implementation in the MOE and MOHE? (b) What are the managers' perceptions of factors for successful IMIS implementation? and (c) How can the managers overcome factors that led to unsuccessful IMIS implementation? Qualitative data were used to explicate the preceding research questions.

The responses from the interviews of the ministry personnel, education managers, and university supervisors provided great depth, clarification, and insights into barriers and obstacles to successful implementation of IMIS. I used the responses of the participants to draw conclusions, describe the implications, and explore some of the areas needing further research, especially for countries that seek to employ IMIS within their institutions of higher learning.

Conclusions

The results of this investigation led me to draw a number of conclusions relating to the research questions posed to the participants. Attitudes, situational constraints, and level of innovation were considered fundamental to the success or failure of IMIS implementation in all participants' responses. Among the challenges identified by managers were lack of adequate human and material resources, lack of adequate management support, inadequate resources for implementations, lack of training and education, poor communication and collaboration activities, and lack of consulting teams. The open-ended nature of the interviews allowed the interviewees to give insightful responses relating to obstacles to implementation of IMIS.

Another consideration critical in the implementation according to the managers was the nonstandardized data collection system the managers and other stakeholders had failed to identify. Lack of understanding in implementing IMIS by managers of education was also a significant factor in the failure to implement it in MOE and MOHE. Data collection procedures and methodologies should be standardized to enhance accuracy and relevance. The information obtained from this process significantly impacts decision making processes.

I also found that implementation of IMIS relies on managerial support and efficient use of communication tools and practices. Adequate resources and application of appropriate communication tools during the IMIS implementation are critical to success. Both MOE and MOHE have minimal access to the information systems field. The failures witnessed during implementation suggest that new approaches, which have been evaluated for relevance, are used to address the obstacles to implementation. There has been an increasing body of research on IMIS implementation; many reviews have been conducted on the implementation literature. In this study, I have revealed critical elements of a sound IMIS solution. Usability, flexibility, expandability, cost, and correctness of technical specifications are some of the components that comprise good solutions to some of the problems hindering IMIS implementation.

Success of IMIS depends on its deployment and adaptability to information needs and demands in making decisions. In this study, I have revealed the factors hindering successful implementation and their relationship to institutional goals and objectives. Knowledge management and provision of appropriate tools to the specialized team of the

system executors are factors that have been identified as vital to successful implementation. Implementation of management of IMIS during the implementation process requires considerable knowledge and appropriate infrastructure. The education managers' perceptions of the process of implementation requirements have been instrumental in comparing the literature and outcomes of the analysis of their perspectives and experiences.

Implementation of IMIS requires a deep understanding of the systems as well as the critical responsibilities of each stakeholder. Before IMIS implementation could begin, a pool of knowledgeable and skilled personnel is needed to undertake system design, selection, and implementation. Most attempts to implement IMIS within the MOE and MOHE have not been successful. Hence, it can be concluded that a lack of a comprehensive and integrated approach towards design and implementation is a leading contributor to unsuccessful IMIS implementation. The information needed to recognize the knowledge gaps adequately and address the concerns raised during implementation are sometimes costly and unavailable. Having people who are knowledgeable is crucial because they reduce time wastages and help cut implementation costs. Promotion of knowledge management concerning information and performance is vital to enhance efficient performance of the executors and to reduce process distortions that could lead to nonconformity with organizational goals.

Research Question and Themes

Qualitative data analysis was used to explicate the participants' responses to the three research questions and their related interview questions. The responses from the

qualitative interviews of the ministry personnel, education managers, and university supervisors provided great depth, clarification, and insights into barriers and obstacles to successful implementation of IMIS. I used the responses of the participants to draw conclusions, describe implications, and explore some of the areas needing further research, especially for countries that seek IMIS within their institutions of higher learning.

Despite the differences in sample populations, there is a correlation within the results. Ranjan, Jha, and Pal (2016) described some of the challenges of integrating IMIS into organizational processes. These findings indicate that the users' perceptions of the usefulness of the systems are critical to the success of its implementation. Characteristics of technology, the project being undertaken, association characteristics, task characteristics, and most significantly the users' attitude and behavior remain the leading contributors to the successful implementation of IMIS.

From these findings, some conclusions are possible regarding the factors contributing to the unsuccessful implementation of IMIS, and there was no significant difference between the findings of this case study and findings of reviewed literature on the factors contributing to the unsuccessful implementation of IMIS in MOE and MOHE. In this study, I identified several fundamental elements critical to successful IMIS implementation. Lack of user input, incomplete requirements and specifications, and technological incompetence featured prominently (see Ranjan et al., 2016). The other factors I identified include inadequate or lack of resources to support IMIS

implementation, unrealistic expectations, unclear objectives, and new technologies leading to higher expectations.

The managers' experiences considered in the study included the incentives, disadvantages, and benefits of IMIS within the MOE and MOHE setup. To reduce the difficulties of implementing IMIS, integration of the incentives and benefits is critical. Integration levels during implementation are determined by numerous factors including size, competition, and the institutional setting. IMIS within the MOE and MOHE setup optimizes management solutions (Ranjan et al., 2016). The MOE and MOHE have not achieved comprehensive organizational standardization procedures and systems. Management uncertainty and characteristics of learning institutions are some of the hindrances toward standardization.

The respondents highlighted organizational culture and management support as significant in creating a united management information system team capable of delivering the expected outcomes. While there were some differences on how the culture should be developed, there was agreement that adequate support for a culture of innovation would help in confronting resistance of leaders, and other end users of the system. Appropriate and supportive organizational culture supports changes meant to improve system efficiency and their implementation (Ranjan et al., 2016). Integration of information management processes requires concerted efforts from the management of design and implementation processes.

The tendency of respondents to value collaboration and effective communication during the implementation of IMIS was established in response to the managers'

perceptions of factors for successful IMIS implementation. While there was no significant difference in selected respondents, the responses demonstrated the value of effective communication and collaboration. The respondents recognized the importance of effective communication practices in seeking management support during implementation and building strong bonds among the teams tasked with IMIS implementation. The participants believed that effective communication should be targeted at clarifying issues such as the goals of the project, the budget, the scope, implementation schedule, and the risk and mitigation measures, among many others (Ranjan et al., 2016). Effective communication helps stakeholders in eliminating the barriers to implementation such as confusion and misunderstanding, which significantly lead to time wastage as observed by most of the participants. The role of communication in articulation of implementation goals, formulation of the processes of implementation, and building of a strong working relationship among the stakeholders is critical.

Due to the changing world of information communication technologies, the role of communication and collaboration in IMIS implementation will continue to change considerably. There were favorable perceptions on communication's role in IMIS implementation. The findings here would suggest appreciation and complete understanding of the roles of effective communication practices by the participants, which also indicates that the perspectives and experiences were grounded in interactions with implementation processes where barriers and success factors could be identified.

It was regrettable, as identified in the study, that lack of teamwork among the players is a major hindrance in IMIS implementation (Gaus, 2017). Effective

communication enhanced the level of available information necessary for understanding the use of technology and understanding limited human and material resources in accomplishing successful IMIS implementation in MOHE. Rationalization of decisions in various fields such as IMIS significantly depends on the availability of adequate information and integration of technological systems capable of providing high-quality information at the right time (Roulston & Shelton, 2015). Collaboration of learning managers is critical in the facilitation of a system of checks during IMIS implementation to reduce chances of unsuccessful implementation. Similar collaboration among the education managers is also necessary for data analysis and efficient use of technologies to enhance the implementation of IMIS.

Analysis of the elements of effective communication and collaboration revealed crucial aspects of the educators' roles in the processes of information systems. Specifically, the failure of top managers to executive the MIS plans, management breakdowns, and complexity of the system design were identified as the most critical aspects improved by effective collaboration and communication among education managers. Inadequate involvement of stakeholders such as of the MOE and MOHE during the implementation of IMIS is a recipe for failure. Ineffective collaboration practices stem from inaccurate and inconsistent data, leading to castigation of various stakeholders in IMIS implementation. The managers considered the insufficient flow of accurate information and lack of appropriate communication and collaboration tools as the leading contributors to the breakdown in communication and minimal collaboration.

The perception of the managers of the barriers and critical factors to success were determined to respond to Question 3. The emphasis was placed on the fundamental barriers hindering implementation such as user acceptability and technology adoption. The most significant factors identified by the results of this investigation included inadequate resources, poor management, poor levels of teamwork among the crucial stakeholders, and low acceptability of the technology, which significantly undermined its implementation. One recognizable barrier from the responses of the managers is a lack of understanding of the obstacles themselves. The implementation of IMIS is hindered by inadequate integration of the information and data generated by the students and other stakeholders.

Owing to the critical nature of the implementation success, the primary implementation goals should be identified to reduce the risks inherent in the system. Some of the identified challenges could be categorized into humanistic, environmental, and organizational challenges. Humanistic barriers to implementation identified included lack of information on the users' expectations, poorly defined goals, and management's lack of participation and understanding on how the system should be implemented. Challenges were also classified into environmental challenges that relate to how the organization is set up and the characteristics of its operations. Participants identified lack of appropriate procedures and methodology for implementing the system as significant implementation barriers. An inappropriate computer-use culture also negatively affects the implementation process.

Participants thought that training and education of the stakeholders tasked with IMIS implementation were very important. Analysis of these factors demonstrates the need to facilitate adequate communication between stakeholders and system executors. While it is conceivable that the participants who have massive IMIS implementation experience valued effective communication and collaboration, the criticality of communication and cooperation is well documented and supported in the reviewed literature. Perhaps the perception of some of the university supervisors that "without collaboration, the project implementation is likely to fail," accurately reflects the nature of cooperation in IMIS implementation. If we consider the relevance of cooperation from participants' perspectives, where the teams comprise different individuals with specialized skills, then the impact of team collaboration during IMIS implementation is critical.

To answer Research Question 3, it was necessary to evaluate the critical stakeholders involved in IMIS implementation and how they can overcome the barriers that result in unsuccessful IMIS implementation. Even though there were three groups of participants interviewed in this study with different levels of experiences on implementation of information systems, there was little difference in perspectives on how they could handle the barriers. The level of understanding between the strategies that can be used was evident from the responses given by the participants. Some of the strategies for overcoming the barriers included management support of system implementation endeavors. Adoption of open and inclusive communication helps in building strong teams; and support for work environments, which enhances stronger relationships among

the stakeholders, end users, and policymakers. Given that the validity of the data provided through the participants' responses to this problem could be suspect, there was a major similarity between the findings of this study and reviewed literature. This similarity pointed to the essential nature of the participants' ideas on how to address the challenges of implementation. Because the instrument used did not limit the participants on the themes to refer to when making the suggestions, there were several perspectives on overcoming barriers to unsuccessful IMIS implementation.

Because of a high number of responses to this question, there were challenges in aligning the suggestions to specific factors interpreted by some of the respondents as barriers because of the lack of specific responses to individual obstacles. An available list of the identified barriers from reviewed literature was used to check against the responses for relevance and validity. The fact that all participants had prioritized what they considered was the major obstacle could be the reason for the differences in the issues they thought should be addressed and prioritized. From the participants' perspectives, this research identified several issues during implementation and how they could be addressed. The factors identified include improvement of management support during implementation as well as alignment of organizational goals with the objectives of the organizations.

Acceptability of the technology among its users remains one of the most significant findings of this study. The experience and IT user skills, the previous experience on use of IT systems, and functionality of the new systems are some of the factors that contribute to the adoption and implementation of IMIS. Other factors

identified in the study include the perceived ease of use and its impact on the roles and responsibilities of the end users. Change management is a fundamental problem for many institutions and how it is handled influences the success of some of the programs initiated in the organization. Implementing IMIS in learning institutions in Yemen has failed due to inappropriate change management strategies that lead to resistance rather than acceptance of innovations. Still, innovations such as IMIS are vital within many organizations and institutions such as the MOE and institutions of higher learning.

Interpretation of Findings

This study employed a qualitative case study in addressing the research questions. E-mails and semistructured interviews of approximately 30 minutes were developed and administered to collect primary data from education managers and stakeholders. All respondents were asked to highlight some of the factors contributing to the lack of success of IMIS implementation. They were asked to enumerate the roles played by communication and collaboration in unsuccessful attempts to implement IMIS. They were also asked to identify factors they would perceive would result in successful IMIS implementation. Finally, they were asked to highlight the roles and the strategies stakeholders can use to overcome factors that led to unsuccessful IMIS implementation.

Factors Contributing to Unsuccessful IMIS Implementation

Ferreira and Kuniyoshi (2015) indicated that successful IMIS implementation ensures the sustainability, development, and implementation of enterprise administrative systems that can serve both students and faculty members within learning institutions. In IMIS implementations, critical elements exist within every institution because they

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revolutionize the provision of critical services and effective collaboration (Lambooij & Koster, 2015). Ifinedo (2011) observed that MIS plays a crucial role in college and university administration because these learning institutions are created to satisfy the fundamental needs of many people within a society. Sustained management support, appropriate organizational structure, and competent managers are crucial in IMIS implementation (Ferreira & Kuniyoshi, 2015). All participants acknowledged that MIS involved the integration of different databases within an organization.

Hidalgo, Albors, and Gómez (2011) argued that IMIS produces the organized information needed for decision-making. Implementation efforts of the system should be centered on the architecture and identification of the data required in the strategic administrative process (Hizmetli, 2014). The inadequacy of the data structures and trained personnel significantly influences the outcome of the implementation process (Ifinedo, 2011). Recognizing the contributing factors to lack of success is crucial. Successful implementation has immense benefits for the institutions (Enninga & van der Lugt, 2016).

Based on the responses of the participants, IMIS could fail if the resources necessary during implementation have not been pooled together. For example, information on users, material resources needed, and critical stakeholders make it easier for collaboration within the academic community. These items enable streamlining both academic and administrative procedures. All participants mentioned the lack of adequate structures within institutions as a significant contributor to unsuccessful IMIS implementation. I considered the participants' responses on this theme regarding

contrasting attitudes and lack of top management support using Vaughan's (2017) argument. In consideration of the obstacles and barriers towards implementation, I categorized the barriers into lack of adequate top management commitment towards the implementation process and insufficient education and training. Other categories included resistance of the employees towards the change process and inadequate human and material resources needed during the implantation process. Absence of sufficient consulting of stakeholders with the capabilities of addressing the challenges of implementation played a vital role in the change process.

These perceptions of factors leading to unsuccessful implementation were supported by Omidinia, Masrom, and Selamat (2011). Omidinia et al. noted that lack of top management support is a significant contributor to the failure during implementation of the systems due to low prioritization along with conflicting goals and objectives. Lack of organizational support was also identified by Hidalgo et al. (2011); Ferreira and Kuniyoshi (2015); and Ifinedo (2011). Vaughan (2017) observed that there are many reasons for inadequate top management support relating to IMIS implementation. Some of the factors were identified by the authors as contributors to this low support, which include high leadership turnover, low dedication to innovation and inadequate education of the implantation processes, and top management roles. Another critical contributor to unsuccessful IMIS implementation was resistance to the change process and innovation at all levels. Murphy and de Jongh (2011) had a similar finding. They observed that resistance could come from employee fear based on lack of sufficient knowledge on how IMIS could impact their roles, and the requirements to sustain successful implementation.

The study also identified inadequate education and lack of training of the system executors during implementation.

A similar finding was also concluded by Abrahamsson, Hansson, and Isaksson (2017); Al-Najjar and Jawad (2011); and Rebelo, Santos, and Silva (2015) when the authors observed the criticality of comprehensive education on the roles and skills needed in the implementation process. With the requisite skills, the policymakers and decision-makers can identify and address the challenges of IMIS implementation. All the participants identified inadequate human and material resources as significant obstacles during implementation. Material resources such as finances were identified by Ferreira and Kuniyoshi (2015) as hindrances during IMIS implementation. Funds are needed to institute training programs and provide the necessary resources during the implementation process. Concerning the availability of human resources, about 84% of the participants thought that lack of human resources was a vital factor acting against IMIS implementation (Ambrósio de Oliveira, de Vasconcelos, Queiroz, & Hékis, 2011). Inadequate resources could be comprised of several issues including low employee morale, high staff turnover, and insufficient education, among others.

As noted by Babaei and Beikzad (2013), IMIS is a tool that provides managers with the information needed to prepare them for making critical decisions. Nordin and Adegoke (2015) claimed that IMIS provides an excellent platform for decision-making. The authors have categorized obstacles to IMIS implementation into humanistic factors, organizational factors, and environmental factors. Humanistic challenges are the issues relating to individuals in the company. These issues contribute to lack of success to

satisfy users' expectations during implementation. Environmental challenges are issues that relate to the organizational setup and operations. These issues arise from aspects of organizational culture, change, behavior, poor coordination, or inadequate capabilities. With regards to participant responses, there is a greater similarity among the factors suggested, and some of the factors identified by Babaei and Beikzad (2013). These authors identified numerous issues relating to these categories as contributing factors towards unsuccessful implementation of the management information systems, as outlined in Table 7.

From the perspectives of the deputy education minister, the school, college, and university supervisors, the three categories identified by Babaei and Beikzad (2013) are critical ones that could lead to lack of success during implementation of IMIS systems. All the participants perceived the organizational, environmental, and humanistic factors as hindrances during system implementation. It should be noted that successful implementation can reap vast rewards both for the organization and the users (Barska, 2014). Unsuccessful implementation significantly drains the organization of people, finances, and vitality (Vaughan, 2017). Recognizing factors that contribute to unsuccessful implementation is critical in mitigation measures before the collapse of IMIS implementation. Vaughan (2017) grouped the fundamental elements essential to the lack of success of system implementation into the interaction of the technology and the organization. Other elements included user participation and involvement, management of project resistance, level of commitment of the system executors, planning, and anticipation and management of the project's associated risks.

Transparent communication and collaboration are necessary within organizations involving stakeholders (Ferreira & Kuniyoshi, 2015). Implementation of management information systems includes many methodologies and tools that could be complex and require effective communication and collaboration among the stakeholders (Rezvani, Dong, & Khosravi, 2017). Due to the complexities that could be inherent in these systems, Ferreira and Kuniyoshi (2015) suggested a need for adequate information and communication.

Feedback information significantly controls MIS. Ferreira and Kuniyoshi (2015) argued that without effective communication involving anticipative information and feedback, system functioning and development would be impossible. Communication ensures the provision and availability of right information needed by the stakeholders. Hidalgo et al. (2011) observed that information alone is not sufficient to aid in decision making. The cooperation among different departmental heads in the organization and adequate assistance of the system providers and end users are crucial success factors during implementation.

Mamary, Shamsuddin, and Aziati (2015) argued that lack of communication regarding system benefits and implementation procedures along with poor coordination and sharing of responsibilities significantly hinder the implementation process. Communication is critical during implementation because it helps clarify the goals of the process and addresses the challenges of implementation and the user priorities (Ülker & Yılmaz, 2016). The most important role of IMIS is to provide timely and adequate information needed for decision making (Farzandipur, Jeddi, & Azimi, 2016).

Table 7

Obstacles to IMIS Implementation

	Humanistic factors	Environmental factors	Organizational factors
1.	Inadequate information on the needs of the users and managers	Lack of quality criterion of the existing information systems	Inadequate conditions for participation and collaboration of the managers, users and system directors
2.	Lack of effectively defined goals.	Lack of suitable consultants for designing and implementing the system and software	Complexity of the existing manual for implementing the systems
3.	Inadequate or lack of lack of participation of the managers and users during system design and implementation	Lack of procedures and methodology to guide successful implementation.	Lack of existing systems and methods analysis before the system design
4.	Management's lack of understanding of the system and how it should be implemented.	Lack of evaluation of environmental aspects in management information systems	Inadequate resources such as Lack of human-computer fields and other required specializations
5.	Lack of acceptance those implementing the system and resistance against the change.	Inappropriate culture of using computer and information systems.	Inadequate user education
6.	Inconsistencies and lacking accuracy in the data collected	Inadequate training opportunities for system implementation within colleges and universities	Unsuitable implementation of the system

Note. Adapted from "Management Information System, Challenges and Solutions" by M. Babaei and J. Beikzad, 2013. Retrieved from European.Science.com

Without effective communication and the application of the appropriate communication tools, it would be impossible for learners and education managers to receive much-needed information. Emergence of information and communication technologies has played a significant role in IMIS implementation (Wahdain et al., 2014), which is accomplished by facilitating the provision of the information needed for decision-making. IMIS is primarily concerned with the processing of data, which must be communicated to various individuals in the organization to support decision-making processes (Kadam & Sutar, 2017). IMIS implementation could be unsuccessful in the presence of inadequate or inappropriate strategies.

Participants in this research have all recognized the importance of collaboration and communication in IMIS implementation because of goal clarification and sharing of common purpose. The education minister perceived that the lack of communication and effective collaboration during implementation are crucial factors undermining successful IMIS implementation. The minister's position is supported by Ghazal, Aldowah, and Umar (2017), who observed the critical role that communication and collaboration play in IMIS implementation. They stated that "effective communication and collaboration among the stakeholders are essential success factors during IMIS implementation and application." The primary principle inherent in all their responses is that lack of effective communication and collaboration is a huge challenge to the IMIS implementation process.

In this study, I sought to understand how the critical stakeholders perceive the role played by communication in unsuccessful IMIS implementation in the MOE and MOHE.

When asked to respond on the importance of communication, the university supervisors

concurred with the arguments of Burinskiene and Pipiriene (2013) that lack of effective

communication in IMIS implementation leads to lack of success. Lack of teamwork

among the major stakeholders and policymakers is a major contributor to system failure

(Ferreira & Kuniyoshi, 2015). Ineffective communication leads to limited levels of

information which undermine IMIS implementation processes (Kim & Chang, 2015).

MOE and MOHE have a responsibility to build effective communication tools that can

deliver adequate and timely information for better decision making. Ghazal et al. (2017)

contended that collaboration among important players reduces resistance to the changes

being implemented. At the same time, collaboration and effective communication lead to

the formation of formidable and efficient systems that can support IMIS implementation.

  Greenberger (2016) argued that effective communications allow for successful

implementations of projects such as IMIS in learning institutions. The implementation

process, according to Greenberger, is more than tools and processes, for it involves

critical stakeholders with whom the project executors must work to produce expected

results. Successful IMIS implementation requires collaboration among stakeholders and

policymakers who are comfortable working with each other (Borštnar & Pucihar, 2014).

Aubert, Hooper, and Schnepel (2013) also observed that communication enables the

individuals concerned with IMIS to articulate goals, formulate implementation processes,

and build a strong collaborating team.

  Poor communication is a recipe for failure in IMIS implementation (Cresswell,

Bates, & Sheikh, 2013). Effective communication practices and the application of

appropriate tools and strategies improve the implementation process by eliminating numerous barriers such as lack of understanding. As Greenberger (2016) observed, ineffective communication contributes significantly to project failure, time wastage, and increased expenses during implementation. Improved communication is needed during the implementation process to maximize benefits and reduce risks.

Key IMIS implementation areas that should be addressed by effective communication are goals of the project, budget, scope, implementation schedules, risks, and mitigations measures (Nordin & Adegoke, 2015). The stakeholders involved should also consider the impact of jargon when clarifying IMIS implementation because it could lead to confusion and misunderstandings. Communication regarding all aspects of the implementation process should be tailored to various stakeholder groups involved in the entire process. Appropriate levels of clarity and language should be used to ensure every group has a clear vision of the system to be implemented and how they are expected to aid success in the process (Ghobadi & Mathiassen, 2014). Communication is also critical when seeking leadership support regarding system implementation (Zeng & Skibniewski, 2013). The communication practices and strategies adopted when seeking the support of top leadership contributes significantly to improved management commitment (Aubert et al., 2013).

Managers' Perceptions of Factors for Successful IMIS Implementation

Most failures and successes of IMIS systems implementation have been associated with various factors. All participants in the study envisioned and thought of these systems as part of the infrastructure needed to successfully implement IMIS. Each

of the interviewed respondents had perceived issues they thought to be the drivers for either success or failure in implementing IMIS. Participants acknowledge that IMIS gives learning institutions the capability to optimize organizational performance. All the participants interviewed recognized the essential services of MIS. The participants noted numerous factors they believed to be critical success factors. Table 7 is a summary of some of the issues identified by the participants as barriers and critical success factors in IMIS implementation.

Wahdain et al. (2014) investigated the barriers and success factors during IMIS implementation in organizations. From their analysis, they suggested that IMIS implementation requires considerable management support, and availability of both human and material resources. Among the factors their study identified as significant obstacles during implementation included incomplete user requirement and specifications, lack of user support, unclear objectives, and unrealistic implementation timeframes.

Table 8

Barriers and Critical Success Factors in IMIS Implementation

Barriers to implementation	Critical success factors
Poor coordination and distribution of responsibilities	Adequate information and communication on the roles and requirements of the IMIS implementation
Unaligned organizational goals and objectives with the IMIS systems requirements	Adequate and evidence-based strategies for implementation
Confusion or misunderstanding of the issues	Stronger connection and collaboration among the system executors and implementers
Challenges of measuring benefits and inadequate human and material resources	Identification and mitigation of management issues critical to success
Inadequate management support and weak management roles during implementation	Commitment of the top management towards the IMIS implementation.
Collaboration failures and lack of communication	Provision of adequate information and distribution of knowledge to all the stakeholders to ensure every stakeholder share in the goals of IMIS
Lack of training and comprehensive education of the executors and end users	Availing all the necessary resources needed for implementation.

When compared with perceptions of the participants, I can conclude that there is a significant similarity between the research findings and their thoughts. In the results of the study, the acceptance of the project was also identified as one of the most significant success factors in IMIS implementation. Without the users supporting and identifying the change process initiated by the organization, failure of implementation is inevitable (Ghobadi & Mathiassen, 2014). In their research, Ghobadi and Mathiassen (2014) suggested that understanding these fundamental barriers and success factors is critical in IMIS implementation in organizations.

There is a need for the stakeholders involved in IMIS implementation to understand some of the factors that could hinder successful implementation (Hwang, 2014). Identifying these barriers enables the stakeholders to create strategies to sufficiently address any anticipated challenges of implementation (Balaji & Brown, 2014). Incomplete information resulting from ineffective communication disturbs planning and decision making, thereby significantly affecting the implementation process (Mukerjee, 2012). Management should also recognize effects of organizational structure changes to jobs and responsibilities of system executors during implementation. A successfully implemented IMIS is an automated user system tasked with providing needed information to support decision making processes in the organization (Lech, 2016). IMIS increases users' knowledge scope and level of information; thus, they become enabled to make informed decisions (Mukerjee, 2012). Successful IMIS implementation is critical and should be monitored and controlled to ensure success. Mukerjee (2012) noted the incompatibility of system strategies with IMIS being implemented as one of the leading causes of failure, which has been well documented in the literature. Mukerjee contended that the strategies adopted for implementation should be aligned with the objectives and system specifications.

Participants in this study acknowledged that identifying implementation obstacles is a critical success factor during implementation. Functionality of IMIS is a necessity and not just an option according to Belanger and Xu (2015). Every system implemented should guarantee sufficient confidentiality, integrity, and availability of information needed to support all decision-making processes (Mastrogiacomo, Missonier, & Bonazzi,

2014). To ensure success, the challenges in development and IMIS implementation must be identified and addressed by all the major stakeholders. Mukerjee (2012) also did a study on IMIS implementation barriers and identified numerous potential factors.

One of the factors perceived to be a critical barrier included the lack of understanding by the stakeholders and users on system requirements and functionality. When conditions for implementing a system are not defined, a change of requirement could arise, negating the whole process of system implementation (Abdulsalam & Al-Hadabi, 2016). Lack of quality controls and insufficient system security were also identified as critical to implementation success. Ensuring sufficient system controls and checks during implementation improves the chances for the efficient functioning of the system.

Integration of new IMIS requires a complete redefinition of how the information is gathered, stored, processed, and disseminated. Redefinition ensures complete overhaul of the challenges and complexities inherent in the older system, thereby sustaining proper functionality (McGinn et al., 2011). New IMIS should improve the systems they are replacing and circumvent obstacles towards successful implementation and IMIS functionality. The learning environment in MOE and MOHE presents unique data. The information requires scenarios that must be effectively assessed and adequately addressed by the executors of the system.

There is need to identify the type of information required and the individuals who need them because system success relies on the availability of information vital to the processes of decision making (Hai, Tapanainen, & Ishmatova, 2015). For example, the

information necessary from IMIS by students in institutions of higher learning could be different from what academic managers require (Balaji & Brown, 2014). If one group targeted by the system fails to access the relevant information critical to their roles, the system would fail.

How Managers Can Overcome Unsuccessful IMIS Implementation

The IMIS implementation process is influenced by numerous factors both at the individual and organizational levels. Interpersonal factors such as user attitudes and concerns on the material properties of the technology significantly influence successful systems implementation (Hock, Clauss, & Schulz, 2015). Some of the identified factors were perceived to be barriers to implementation while others were perceived as facilitators. The explanation and distinctions of the differences relied on the literature and findings of previous studies on the barriers and facilitators of IMIS implementation (Karim, 2011). This study identified several factors including the system's ease of use, availability of human and material resources, training, management support, and change acceptance. The process of IMIS implementation involves concerted efforts from many stakeholders, each with invaluable input into successful system implementation (Balaji & Brown, 2014). Understanding of the challenges of implementation by stakeholders is vital. These challenges enable the creation of strategies for overcoming the perceived barriers to IMIS implementation.

Before any project can be implemented, it is essential to identify the critical stakeholders in the implementation and how they will be affected by the system (Karlinsky-Shichor & Zviran, 2015). In the case of IMIS implementation in MOE and

MOHE, the policymakers, the students, instructors, and education managers would be the most affected by the implementation. They are the most critical in the process of system implementation (Avison, Davison, & Malaurent, 2017). Support for the system by these stakeholders is critical to successful IMIS implementation. Lack of coordination and lack of effective communication are significant barriers in the implementation process that must be addressed adequately. Respondents interviewed in this study perceived inadequate resources and lack of communication as fundamental barriers towards IMIS implementation. To address these obstacles, a need exists for open and inclusive communication in which information is provided for the right people and at the right time (Belanger & Xu, 2015). Excellent top management such as the leaders at the MOE and MOHE has significant influence in aligning information system strategies with the appropriate communication tools and objectives (Balaji & Brown, 2014).

Creation and sustainability of a robust relationship between the organization's top leadership and the system executors are also essential. This relationship could be used to demonstrate the importance of successful implementation of the system. Besides top leadership support, collaboration among the stakeholders can help solve some of the problems that could negate the implementation process such as weak management (Avison et al., 2017). Management support is essential in the design and the implementation of the management information system. Significant barriers were the identification of poor coordination and sharing of responsibilities during system implementation. Top organizational leaders have a duty to ensure cooperation,

participation of critical stakeholders, and relationships among employees to overcome these obstacles.

Findings of this study revealed that all the participants perceived lack of communication as a significant hindrance in successful systems implementation. When asked to respond on how this challenge could be overcome, one participant stated that "organization of occasional social events and informal discussions establishes confidence among staff, and improves the communication environment." Avison et al. (2017) suggested implementing a strong communications support organizational culture. Another factor identified in the study as the perceived challenge to successful implementation is the "lack of commitment to the strategies and process of IMIS implementation." Top management has a tremendous responsibility in implementing these strategies, and availing the resources needed to implement IMIS systems in institutions of higher learning (Balaji & Brown, 2014). To address the challenges, the organization should ensure sufficient knowledge distribution through channels to facilitate understanding of the implementation process.

Policies of the organization should be flexible to support the changing organizational priorities and changes to the goals and objectives regarding implementation. All the stakeholders ought to prioritize the primary implementation goals, which could be accomplished through the provision of rules, methods, and tools capable of aligning organizational processes. Close collaboration and promotion of organizational harmony in issues critical to IMIS implementation are essential in achieving system functionality (Ghobadi & Mathiassen, 2014). The systems executors

should also explain to all stakeholders the elements crucial to their work and the resources they need for successful IMIS implementation, which could reduce conflicts and inadequate resources required for system implementation (Balaji & Brown, 2014). To decrease the chances of system implementation failure, the organizational leadership must be aware of system priorities and management issues that could negatively impact the system implementation process.

Analysis of existing user and stakeholder experiences helps in the creation of solutions for negative attitudes and perceptions of the system. Explanations of incentives and benefits are crucial in reducing the difficulties executors face in the implementation process. Mukerjee (2012) noted that IMIS has several elements that must all be addressed to sustain consistency and reduce challenges. The learning institutions in MOE and MOHE should support the process of creating IMIS implementation systems. Comprehensive education is needed to improve acceptance of the new systems. With reduced resistance to the system elements and their implementation, Sierra (2013) argued that difficulties would have been significantly decreased and success improved. Implementing IMIS in MOE and MOHE poses many challenges due to distinct social and cultural characteristics (Santapau, Andreu Navarro, Gumbau, & Marzal, 2013). MOE should ensure sufficient provision of information and coordination of other government departments to support the implementation and functionality of IMIS.

IMIS's primary role is to provide the information crucial in decision making (Dao & McDonough, 2017). The successful IMIS system should provide the right information while guaranteeing the privacy, consistency, confidentiality, and timeliness of that

information (Charoen, 2015). Because implementation of the systems could involve numerous challenges, management and system executors should develop strategies to address the challenges arising before and during implementation (Basaleem & Amin, 2014). Users and critical stakeholders should be involved and sensitized to the needed resources to ensure successful implementation of the system. As noted by Mukerjee (2012), an IMIS system should deliver the expected results; otherwise, the implementation process will have failed. Organizational leadership should ensure compliance with quality standards and procedures relating to the sharing of information.

Concerns have arisen due to the limited success rates of information system implementation. Some of the reasons leading to unsuccessful implementation have been explored and interpreted as perceived by the participants in the study. Failures during implementation require new approaches such as stakeholder analysis (Mukerjee, 2012). A good IMIS system should be flexible and functionally sound. Effective planning and adequate strategies by the organizational leadership can turn some of these barriers into facilitation of successful IMIS implementation (Ghobadi & Mathiassen, 2014). Management should also ensure timely implementation of strategies and a comprehensive evaluation of the system to ensure it meets user expectations and is aligned with organizational goals and objectives.

Successful IMIS implementation technology requires communication roles that can support effective collaboration. Most of the participants engaged in the design and execution of these technologies are from various fields, and different domains required integrating and working together as a single unit. Communication plays a critical role in

this process both in the integration of specialized roles and negotiations of the differences, which could negatively impact successful implementation. Communication becomes a crucial aspect of knowledge, exploration, and collaboration. Cresswell et al. (2013) noted successful implementation of an information system such as IMIS must be undertaken with consideration of numerous factors.

One of the factors identified by the researchers is the clarification of what the technology should solve or achieve. IMIS provides vital information necessary for decision making. Its implementation must be geared toward ensuring it meets the standards capable of providing confidential, accurate, and consistent information to stakeholders and end users (Cresswell et al., 2013). Benefits that are to be derived from the system should be well defined to facilitate evaluation of the successes and failures of implementation. Current risks and processes should be adequately mapped and identified to help identify problem areas and areas of possible improvements.

It is also critical to build consensus on the strategic vision of implementing the system and the procedure to be adopted. Management and system administrators are responsible for creating the means of realizing a common goal (Khaparde, 2017). From the study findings, achieving consensus is possible through the creation of leadership teams tasked with guiding design and implementation processes. Different perspectives of the stakeholders should be aligned to reduce resistance and time wastage in endless negotiations. Collaboration can be enhanced through identifying some of the domains on which the management teams and stakeholders agree while paying critical attention to some of the issues creating discomfort (Cresswell et al., 2013).

Managers must also ensure that all the available options are evaluated after registering the need for IMIS implementation. The process of identifying the system to be implemented should not be rushed nor the costs underestimated (Khaparde, 2017). All stakeholders involved should adequately plan for and tailor the system needs to the problems within the learning institutions in MOE and MOHE as identified by various studies such as Yeoh, Richards, and Wang (2014). To implement successful systems, Cresswell et al. (2013) argued that time is needed to evaluate and customize user needs with the design of IMIS technologies. The systems should not be selected based on cost and interoperability considerations only.

The lack of considering the needs of the users is a major contributor to implementation failure. The system to be implemented could be cheap and understandable, but it should be based on meeting consumer needs. If the system implemented is not usable, and does not allow for secondary data uses, the implementation process would have failed (Quintana, 2015). Managers should ensure that the scope of the system implementation is maintained, and they should avoid temptations such as increasing the scope when it is underway (Wolter, 2014). Communication between the stakeholders and users should be kept open and transparent. There is a need for appropriate planning of the whole IMIS implementation process (Quintana, 2015). Also, the implementation strategies should be tailored to organizational objectives, circumstances, and systems (McGinn et al., 2011). Planning should also involve the inclusion of appropriate infrastructure. Inappropriate infrastructure could negatively

affect the implementation process. All the elements of IMIS should be thoroughly checked and analyzed for consistency, appropriateness, functionality, speed, and so on.

Training and comprehensive education of the staff are also very essential because they both facilitate acceptability of the technology among the users and stakeholders (Skorka, 2017). The training should be tailored to the roles of the individuals without restricting individual expression (Sui & Wang, 2013). Training should also be conducted on how to use the IMIS system and on mitigation of system challenges (Biskupek, 2016). This training should be conducted before and during implementation to ensure that the users do not forget some of the most vital functions that can lead to successful implementation. Mukerjee (2012) contended that the whole process of implementation must be evaluated to ensure every element is well designed and implemented. Such evaluation could eliminate costly mistakes that could negatively impact the entire process (Karim, 2011).

The stakeholders should also ensure implementation takes the required time allocated for implementation instead of it dragging on for years. Ranjan et al. (2016) also observed that failure of the system sometimes arises from insufficient or lack of adequate system maintenance. Such a failure could slow the process and lead to unsuccessful implementation. Even though the users' expectations could exceed what the system can achieve, the implementation team needs to keep IMIS operations on course without unnecessary deviations. Management support during IMIS implementation is critical in ensuring success and that the objectives are achieved (Charoen, 2015). Effective

collaboration and transparent communication ensure the understanding of the system design and its implementation process.

Criticality of Communication and Collaboration During IMIS Implementation

MOHE had a very clear opinion about the importance of effective stakeholder communication and collaboration involved in IMIS implementation. These participants perceived communication to be critical in successful IMIS implementation in higher learning institutions. They believed that effective collaboration among the stakeholders involved in IMIS implementation was "inevitable." The ministry personnel were optimistic that the systems, facilitation of colleges and universities, and integration tools would go a long way in creating effective platforms for IMIS systems both in the MOE and MOHE. IMIS was deemed vital for the collection, storage, processing, and dissemination of information crucial in decision making. Among the issues perceived as obstacles to effective collaboration and communication were "ineffective communication tools, lack of alignment of communication tools with organizational processes and low acceptability of the technology."

The ministry personnel thought that there was a challenge in aligning the institutional processes with the current aspects of IMIS. While responding to why they believed the misalignment was a challenge in the implementation, they argued that "there is a need for managers to recognize the importance of organizational processes in facilitating IMIS implementation in educational and government institutions." This perception underlies the criticality of supportive organizational processes in IMIS implementation.

The decision to purchase and implement IMIS in an organization depends on certain variables that must be considered to aid in implementation. As recognized by the university departmental supervisors during interviews, communication and collaboration are critical for successful IMIS implementation. One college manager perceived communication as the "tool which links and helps policy makers and critical stakeholders in clarifying the decisions taken regarding IMIS implementation." Failure is inevitable without efficient and comprehensive communication of system goals and objectives. Robust infrastructure is needed to successfully implement it. The level of communication should be open and conclusive to include all critical stakeholders in the implementation. The college and university supervisors agreed on the need for effective communication using appropriate communication tools that can be understood by all the managers involved.

IMIS implementation requires effective collaboration strategies in which each stakeholder's role is specified. One of the supervisors observed the importance of collaboration by stating, "Cooperation is crucial in building working relationships." Lacking an understanding of the scope of a project to be implemented significantly impacts success or failure during the implementation process. When asked, all managers agreed that collaboration enhanced familiarity and improved performance of the roles critical to project implementation within the education department. They noted that collaboration facilitates a better understanding of the challenges stakeholders are likely to face while trying to implement IMIS within MOE and MOHE. Another important aspect worth understanding was how collaboration among the stakeholders and policymakers

could be achieved. Two of the supervisors suggested "modeling of collaborative behavior through the promotion of practices capable of dealing with diversity issues." University managers noted that another strategy for improving collaboration among stakeholders is to ensure "each member of the team has the requisite skills and education critical to the implementation of the project." All the managers acknowledged the importance of collaboration in enhancing knowledge, an exchange critical in understanding the goals and objectives of system implementation.

IMIS Implementation Factors the Participants Did Not Identify

The stakeholders and managers identified most of what they perceived to be the barriers and critical success factors essential in the IMIS implementation process. The literature mentions other factors that the participants did not identify. Some of the barriers included ineffective implementation strategies, absence of sufficient consulting stakeholders, lack of evaluation of environmental aspects, and inappropriate culture in using information systems. Participants did not identify adequate evidence-based strategies for implementation, as well as sufficient information and communication on the roles required for IMIS implementation as contributing factors.

Despite the slight discrepancy in recognizing barriers and critical success factors, all the participants agreed that successful IMIS implementation systems is essential for MOE and MOHE. IMIS technology significantly transforms human socialization and relationships in an organization to improve information dissemination and interaction among the employees in an organization (Hawking, 2014). It is essential to identify the challenges that could hinder successful IMIS implementation.

Limitations of the Study

The study relied on participants' integrity to provide accurate information on their thoughts and experiences. However, it was not possible to ascertain that all provided information was truthful as anticipated given that there was no way of verifying if the information provided was accurate (Savin-Baden & Major, 2013). Finding participants as scheduled also proved quite difficult because I had to change research strategies to ensure that data were collected as planned. It was also quite difficult to find some of the participants because they were involved in their responsibilities as education managers and administrators (Savin-Baden & Major, 2013). Others were reluctant to participate in the study because of the sensitivity of the research and how it related to their positions. Given that the goal of the study was aimed at understanding the perceptions of users throughout the country, I sought to interview multiple governorates of Yemen. However, it was very challenging, which forced me to use different strategies to locate and interview respondents.

Implications for Management Information System Practitioners

Based on the conclusions already discussed, some of implications compelled me to make the following suggestions:

1. Managers of learning institutions and university supervisors should carefully evaluate their roles and levels of engagement during implementation to improve success rates. Trying to get more resources should be prioritized and designed to facilitate smooth project implementation. Leaders of learning institutions need to engage with the executors of IMIS programs, and provide

training opportunities for the end users and staff to increase the acceptance of innovations.

2. The stakeholders should weigh the essence of successfully implementing IMIS against the failures of doing so. This process could enable them to design adequate funding mechanisms for IMIS implementation, hence, increasing chances of implementation success. Provision of adequate resources is crucial, especially for the top management in MOE and higher learning institutions. Managers and stakeholders tasked with system implementation should also make every effort to engage the end users and staff in MOE and higher learning institutions. This communication and cooperation could enhance the understanding and appreciation of innovations such as IMIS in the provision of accurate, consistent, and timely information critical to decision-making processes.

3. The stakeholders and executors of the system also need to acknowledge the attitudes and perceptions of the users and make efforts to address them before they negatively impact the implementation process. A management system's user behavior is significantly impacted by the perceptions of ease of use by various users. Participation of all stakeholders such as the government is critical in enhancing system acceptance.

Recommendations

Based on the findings and conclusions drawn from this study, I can offer the following recommendations in the IMIS field:

1. Given that technology behind management information systems is changing rapidly, there is a need for longitudinal studies, which would document trends and enhance the understanding and adoption of IMIS. The study focused on the perspectives and experiences of education managers, which could change due to experiences with changing technologies and their applications in solving the problems hindering IMIS integration. The adoption of the systems within learning institutions would also change, which would require a longitudinal study to examine the factors contributing to unsuccessful or successful adoption.

2. Because I have explored the perspectives of critical stakeholders and policymakers in decision making, there is need to evaluate the factors contributing to these perceptions to enable the understanding of bias and reliability of provided data. The participants' motivations and reasons behind their opinions are vital in understanding why they have taken the presented positions. The perceptions could be necessitated, for example, by the ease of use of the technology, inadequate involvement in the implementation process, or lack of understanding of the system design and implementation processes.

3. Because this study did not examine gender and age differences in relation to experiences, there is a need for a study to review the effects of gender and age differences in the perceptions of barriers and success factors critical to the implementation process of IMIS. The possibility that gender and age differences could play a role in the attitudes, opinions, and behaviors of the

end users and education managers should be examined to understand the basis

for their stand on questions raised by this study.

4. Because successful implementation of IMIS systems is critical to better

decision making, there is a need for further research on the application of

evidence-based practices in overcoming the challenges as perceived by the

stakeholders and policymakers. The impact of the strategies I suggested for

addressing the obstacles to implementation should be reviewed to determine

their usefulness and relevance on different case scenarios.

Recommendations for System Executors and Other Stakeholders

Stakeholders involved in the implementation hold a critical role during

implementation because of the knowledge base and experience they have. The findings in

this study should propel educational stakeholders to evaluate the criticality of IMIS and

to develop evidence-based strategies for addressing the barriers to system

implementation. Given that most of the participants raised concerns of lack of

management support and inadequate resources provided by the leadership of learning

institutions, I contend that the system executors should consider the following

recommendations for each of the thematic areas covered in this research.

Overcoming Barriers to Successful IMIS Implementation

Based on the findings of this study, the participants perceived some factors as

significant obstacles to successful implementation (Chadwick, 2016). Some of the factors

identified by the ministry personnel as well as college and university departmental

supervisors included inadequate human and material resources along with lack of

management support, among other factors. Because the obstacles to implementation are of different nature and complexities, I recommend careful consideration of each factor and designing an effective response for each one (Chadwick, 2016). Managers should comprehensively define the goals of the implementation and align them with the objectives of the education ministry and operating procedures.

Given that the study revealed the lack of evaluation of environmental aspects in MIS as a major barrier, the project implementation leaders and stakeholders should ensure there is sufficient technology acceptance, and use the audit to fill some of the gaps, which could be identified as such obstacles that contribute to lack of success (Chadwick, 2016). In addition, I recommend the integration and promotion of an appropriate culture of using computer and information systems within the organization to reduce innovation resistance among the end users. When the departmental supervisors at the higher learning institutions and ministry heads are used to innovations, the rates of adoption and acceptance would be improved considerably. Further, identification of the stakeholders who are involved directly with the implementation would add significant value to the implementation process because knowledge and specialization could enhance understanding of the challenges and mitigation mechanisms.

Effective training of those involved in the implementation is also essential in reducing resistance and raising understanding and collaboration during the process of implementation. Acceptance of this innovation significantly depends on the adoption of well-defined procedures. Managers of learning institutions should ensure effective evaluation of value systems and reasons for system acceptance. Effective training of the

personnel involved is also critical in reducing change resistance and enhancing understanding of end user expectations.

Improving Communication and Integration During IMIS Implementation

Given that the attitudes and the perceptions of the stakeholders are essential during implementation, the system executors should ensure that there are effective communication and collaboration to facilitate successful implementation of the system (Gerrish, 2011). Many system failures can still be attributed to this lack despite the findings revealing the criticality of communication during the implementation process. I suggest the following strategies to enhance communication and collaboration among the stakeholders and system executors.

1. Successful IMIS implementation requires sufficient information and defined communication roles to enhance comprehension of the system and improve innovation acceptance. Effective collaboration and transparent communication ensure understanding of the system design and its implementation process.

2. The management should organize social events and functions with informal discussions to establish confidence among staff and improve the communication environment during design and implementation of the system. In addition, MOE and MOHE should implement flexible organizational policies capable of supporting the changing information landscape. The management of learning institutions should also be aware of the goals and priorities of implementation and participate accordingly through IMIS.

3. MOE and MOHE should also ensure that the design of the working environment is tailored towards creating close collaboration and promotion of organizational harmony in issues critical to IMIS implementation. Supportive working environments facilitate close collaboration and system functionality.

4. MOE and MOHE should also assemble the appropriate communication tools for the analysis of existing user and stakeholder experiences in the creation of solutions for negative attitudes and system perceptions.

5. To address recurring failures, the system should be built on a foundation of sound and acceptable standards. Stakeholder analysis should also be carried out on the factors hindering implementation. Leaders at MOE and MOHE have a huge role in assembling and building the resources and technologies to create a foundation capable of guiding an implementation process. MOE, MOHE, and stakeholders should also engage in effective planning and adequate strategies by the organizational leadership to address communication and collaboration barriers.

The Role of Stakeholders in Successful IMIS Implementation

From the outset, it is essential to identify the critical stakeholders in IMIS implementation and how they could be affected by the system (Kapoulas & Mitic, 2012). Stakeholder involvement and participation is critical in providing the needed experience and resources for system implementation. The systems' executors should create and sustain a robust relationship between the top leadership at MOE and the system executors. Strategic leadership during implementation is critical to build consensus on the strategic vision of implementing the system and the procedure to be adopted.

The stakeholders should also be responsible for crafting the system objectives and how the goal can be achieved. All the available options should be evaluated after initiating IMIS implementation. Costs and interoperability considerations should not be the only criteria considered during selection and implementation. The implementation process should involve adequate training and education of the stakeholders involved according to the findings of the study. Understanding of the methodologies, usability, and implementation procedures facilitates acceptability of the technology among the users and stakeholders (Martinus & Hedgcock, 2015). IMIS is an essential technological development that has a significant impact on the reduction of operational inefficiency.

Recommendations of How This Study Can Be Improved

I offer the following the recommendations on how the study can be improved. An evaluation of the stakeholders' skills and knowledge on management information systems should be carried out even though it can be costly (Martinus & Hedgcock, 2015). The evaluation can enable researchers to determine the level of understanding and reasons behind the perceptions of obstacles and successful factors in implementation. Even though I asked the participants to describe the experience they have had working at the MOHE, it was surety of having the requisite knowledge on information systems and their implementation.

Despite the improvements in information and communication technology tools such as recording devices, researchers should not rely primarily on one recording device because they could fail (Shahiduzzaman & Alam, 2014). Unless a researcher is sure of the usability and functionality of any devices, they should be used with much caution. In

addition, when enquiring about the barriers and success factors for implementing IMIS, researchers should adequately define the term for understanding and clarity of responses.

Finally, the organization of this study revolves around exploring the viewpoints and experiences of education managers and understanding their perspectives on the barriers and success factors leading to lack of success during IMIS implementation (Mondlane, 2012). Information derived from this study has been interpreted to provide insights and meanings into some of the issues leading to unsuccessful IMIS implementation systems (Nisar, 2012). Roles of the critical stakeholders have also been examined as well as strategies they can employ to address the challenges obstructing the implementation process.

As Yemen's MOE and MOHE continues its quest to improve the collection, storage, processing, and dissemination of accurate and timely information through implementation of MIS, this study provides the policymakers and critical stakeholders with essential information in shaping the success of implementing IMIS (Asemi, Safari, & Asemi Zavareh, 2011). This investigation will enable them to mitigate the risks of implementation and reap the rewards of an optimally functioning IMIS for decades to come. Allocating resources such as financial and human capital ones is multifaceted, especially in government institutions with complex objectives and the aim to achieve.

IMIS implementation should be controlled and observed through feedback information, which describes how the implementation is progressing (Eshraghi, Ganjouei, & Esmaeili, 2015). IMIS is crucial both for the technical and human aspects in the learning institutions. In the process of attaining the institution's objectives, IMIS provides

accurate and timely information needed to make decisions for managers and end users (Asemi et al., 2011). It would be challenging to implement the system without feedback and anticipative information. The primary role of IMIS is to provide end users with the right information, whenever it is needed.

Integrated management systems are computer-based systems comprising hardware, software, related technological infrastructure, and the stakeholders tasked with system implementation. Interaction of the users and the crucial stakeholders in the implementation process is, therefore, essential (Mishra, Allen, & Pearman, 2014). IMIS should aim to support the planning process, institutional operations, and decision-making processes. Through the interviews with critical stakeholders, I identified fundamental problems, goals, and implementation processes which should be supported adequately during implementation. Gradual IMIS implementation processes enhance usability because the users gain the necessary skills needed to implement the system (García-Peñalvo & Conde, 2014). The findings of this study revealed the criticality of collaboration because it allows transfer of knowledge among the system executors and stakeholders.

Recommendations for Further Research

There is a need for longitudinal studies that would document trends and enhance the understanding and adoption of integrated management information systems (Olszak & Kisielnicki, 2018). The study focused on the perspectives of education managers. The results could change due to the experiences with changing technologies in solving the problems hindering the implementation of IMIS (Karim, 2011).

In this study, I have explored the perspectives of critical stakeholders and policymakers in decision making. Still, there is need to evaluate the factors contributing to these perceptions to enable the understanding of bias and reliability of provided data (Al-Mamary et al., 2015). The participants' motivations and reasons behind their opinions are vital in understanding why they have taken the presented positions. The perceptions could be necessitated by the ease of use of the technology, inadequate involvement in the implementation process, or the lack of understanding of the system design and implementation processes.

I did not examine gender and age differences in relation to lived experiences, but there is a need for a study that should review the effects of such differences in the perceptions of barriers and success factors critical to IMIS implementation (Mishra et al., 2014). Successful implementation of IMIS systems is critical to better decision making, and there is a need for further research on the application of evidence-based practices in overcoming challenges as perceived by the stakeholders and policymakers (Adebisi, 2016). The impact of the strategies for addressing the obstacles to implementation should be reviewed to determine their usefulness and relevance on different case scenarios.

Summary

This chapter has presented a summary, conclusions, and recommendations of the study. The implications of the finding have also been comprehensively described. From the findings of the study, I drew a number of conclusions related to unsuccessful attempts to implement IMIS. Four critical thematic areas, such as the factors contributing to the unsuccessful implementation of IMIS and the role of communication and collaboration in

unsuccessful IMIS implementation attempts have been used to describe the recommendations, which could help the stakeholders in achieving the expected results when implementing IMIS. The adoption of the systems within learning institutions would require a longitudinal study to examine the factors contributing to unsuccessful or successful adoption.

Education managers should understand the basis for their stand on questions raised by this study. The perspectives of education managers were critical in coming up with the conclusions, implications, and recommendations for further research and the stakeholders tasked with implementing the system. IMIS is crucial in organizations because IMIS facilitates the provision of accurate and timely and consistent information for decision making. In making the recommendations, I considered the role of stakeholders during IMIS implementation and the impact of effective communication and collaboration in successful system implementation. Another factor considered during the implementation of the information systems is the viewpoints of the education managers on strategies for addressing barriers to implementation of IMIS.

Conclusion

In this study, I aimed to explore the factors associated with the success or failure of attempts to implement IMIS in Yemen's MOE and MOHE. The findings of this study are essential in guiding future research and implementation of IMIS in the MOE and MOHE in Yemen. This chapter has provided policymakers with vital information on how to mitigate the factors leading to unsuccessful implementation attempts of IMIS in MOE and institutions of higher learning. Successful implementation of IMIS in the MOHE and

MOE requires adequate information and communication on the roles and requirements of IMIS implementation, sufficient and evidence-based strategies for implementation, and stronger connection and collaboration among the system executors and implementers. Other essential factors include commitment of top managers towards IMIS implementation, identification and mitigation of management issues critical to success, and the provision of adequate information and distribution of knowledge to all stakeholders to ensure each one can share in the goals of IMIS.

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Appendix A: Perceptions Toward IMIS Implementation in Education Management
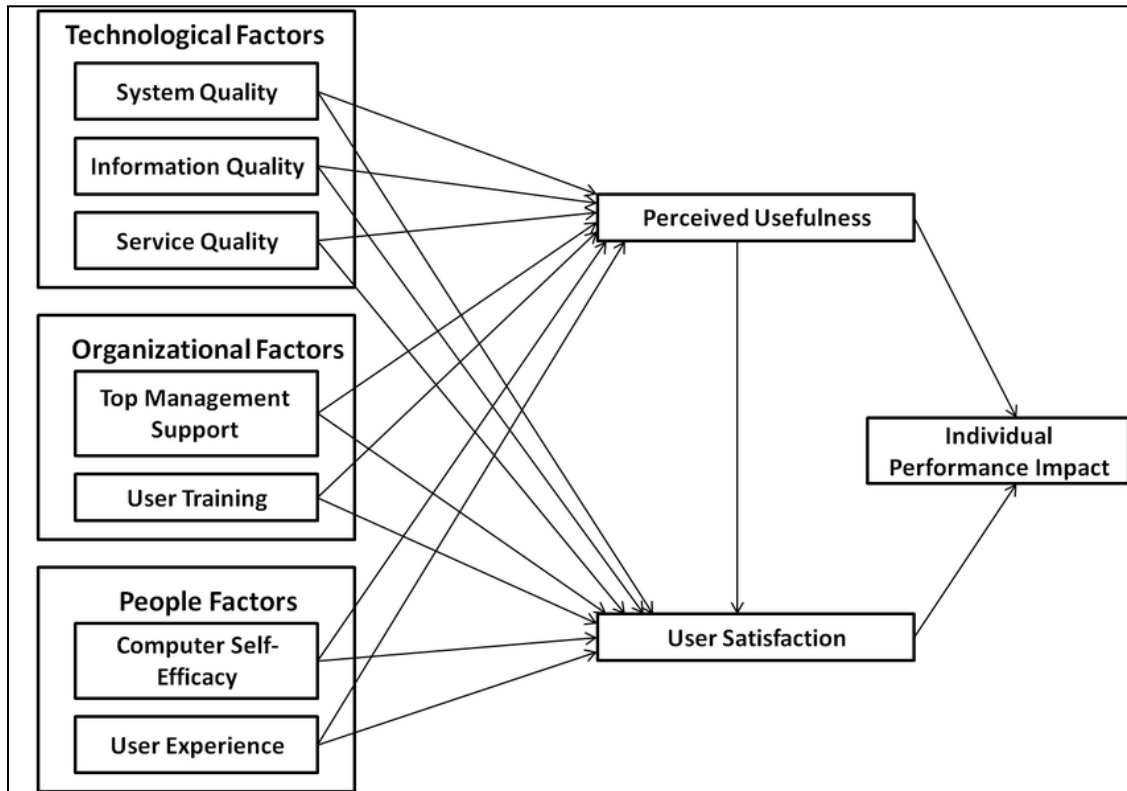
Appendix B: Recruitment Letter

To: [Education Manager]

From: Mahfood Alkaabi: Doctoral candidate at Walden University

Subject: Request for participation in a dissertation on *Perceptions toward Exploring Educational Manager Perceptions towards Integrated Management Information System Implementation in Yemen.*

Body: Your input as a Yemen education manager is essential for my research.

My name is Mahfood Alkaabi, and I am conducting a doctoral research study on *Perceptions toward Exploring Educational Manager Perceptions towards Integrated Management Information System Implementation in Yemen* in partial satisfaction of the doctoral degree requirements. The purpose of this qualitative case study is to identify barriers and success factors related to previous attempts to implement an IMIS in Yemen's Ministries of Education and Higher of Education. Participation will require a 60-minute interview. You will be asked questions regarding your experience with the existing IMIS implementation. If you are interested in participating in this study please review the attached Informed Consent Form, as your agreement will be required to participate.

All data will be kept strictly confidential and personally, identifiable information not be collected or stored.

Many thanks!

Contact info:
Mahfood Alkaabi

Appendix C: Interview Questions

Characterize Study Sample

How long have you worked with MOE or MOHE?

- What is your job title and responsibilities?

- How much experience do you have working with any IMIS?

- How much experience do you have with the MOE or MOHE IMIS?

- How do you use the MOE or MOHE IMIS?

RQ1. What factors contributed to the unsuccessful implementation of IMIS in the MOE

and MOHE?

- Describe what benefits from the MOE or MOHE IMIS were expected but did not

  occur?

- Describe what was your experience of the implementation of the MOE or MOHE

  IMIS?

RQ2. What are the managers' perceptions of critical success factors for successful IMIS

implementation?

- What role did communication and collaboration play in the unsuccessful IMIS

  implementation?

- How are changes to the IMIS communicated? Is there adequate training?

- Were you involved in creating an element of the MOE or MOHE IMIS? Is your

  feedback sought now?

- What role did communicate interaction with the IMIS clear and understandable?

RQ3. How can the managers overcome factors that led to unsuccessful IMIS

implementation?

- How can the relevant stakeholders overcome factors that led to the previous unsuccessful IMIS implementation?

- Describe how could the existing MOE or MOHE IMIS implementation have been done better?

- How can the IMIS be made more useful for the MOE or MOHE?

- How can the IMIS enable you to accomplish goals more quickly.

- How can the IMIS be used to increase productivity?

- How can the IMIS be used to increase the probability of increasing your compensation?

- Was it easy for you to become skillful at using the system? Try not to use y/n questions

- What common barriers emerge in using to using the IMIS?