Role of MIS Functions in Enhance the Business Processes and Operational Excellence of the Banks

Mohammed Abed Al-Hayy Al-Dalaien[1], Sadun Naser Yassin Alheety[2], Mohammad Mahmoud Alzubi[3]
[1]*Student, Department of Business Administration, Al-Madinah International University, Serdang, Malaysia*
[2, 3]*Assistant professor Al-Madinah International University, Serdang, Malaysia*

Abstract: **- The importance of utilizing of Management Information System (MIS) is increased to manage information, improve the business processes, and enhance the operational excellence of the organizations. There are many challenges faced by applying the MIS system in organization. The organizations should manage the MIS functions based on the nature of the information workflow and working functionality order to enhance the business processes and operational excellence. This study aims to explore the role of MIS efficiency and effectiveness in improve the business processes and the operational excellence of the Jordanian banks. The data of this research is collected from 159 managers in two Jordanian banks; Islamic Jordanian bank and Housing bank. In order to address the research aims, the SPSS and AMOS tools are utilized to conduct several analyses such as demographic analysis, confirmatory factors analysis, and descriptive analysis. The results show that the effectiveness and efficiency of MIS functions would be designed based on the business processes such as information workflow and working functionality. The MIS efficiency includes many dimensions such as throughput, transaction speed, system availability, information accuracy, and response rate. The MIS effectiveness includes many dimensions such as usability, conversion rare and financial requirements. The effective and efficient MIS functions plays important role in improve the operational excellence of the banks such as working innovations and services quality. This research provides useful information about the relationship between the MIS functions, business processes, and operational excellence in the banks.**

Keywords: **MIS functions; business processes; operational excellence; Banks.**

I. INTRODUCTION

In the modern organizations, regardless of industry or sector, every organization has felt the pressure of the need to achieve optimum performance. And with the every-changing nature of the marketplace and its increasing complexity, such a feat becomes a challenge of major proportions necessitating the focus on the basic elements of operational excellence (OE).

Generally speaking, OE definition is reflected by its ongoing aspects of operations and the predicted outcomes (Oakland, 2014). The concept's definition has been led credence to the continuous improvement of quality and profitability of real time industrial processes (Oakland, 2014; Kassinis & Soteriou, 2003). In fact, the achievement of OE calls for industrial firms to increase their operational efficiency and profitability by employing effective control and driving optimum business value from the entire industrial resources, while minimizing their impact on the environment and enhancing safety and protection (Hardy, 2006; Kaplan, 2004). The goals can be addressed by boosting the critical assets of firms, which is the workforce. Prior studies referred to EO using four major themes namely, control excellence, asset excellence, people excellence and environment and safety excellence (e.g., Campbell & Reyes-Picknell, 2015; Irani et al., 2004; Oakland, 2001).

On the basis of the above operational excellence aspects, business process management is required for the management of organizational resources in the form of assets, people and information (Georgakopoulos et al., 1995). In the current businesses, global competition is rampant, the cost of doing business is sky-high and the development of new services and products are dynamic. These are all possible through the constant reconsideration and optimization of business dealings and interactions and IS and applications changes to reinforce business processes (BP) (VomBrocke et al., 2014; Hillet et al., 2007; Liu et al., 2005; Harmon, 2003; Ahmad et al., 2018; Al-Dala'Ien et al., 2016).

Business processes (BP) can be generally understood as the way to organize, coordinate and focus on work to generate a service/product (Van Der Aalst et al., 2003). It may be useful according to Jeston and Nelis (2014), Van Der Aalst et al. (2013), Weske (2012) and Van Der Aalst et al. (2014) in describing the material, information or knowledge flow and in understanding the way management coordinates work using workflow information and functionality. The entire businesses have to be tackle information obtained from different sources (i.e., customers, employees, suppliers, manufacturers and even the government). It is pertinent for businesses to organize themselves in a way that they can use valuable information in an efficient and effective manner (Slack et al., 2010; Al-Dala'Ien et al., 2015; Alaarj et al., 2016a,b).

Advocates of business process management such as Chang (2016), Weske (2012; Trkman (2010), Laudon and Laudon (2004), Broadbent et al. (1999) and Davenport and Short (1990) laid stress on the significant role of IT in the business process. According to them, IT is an enable of the changes in the organization and not merely a tool for business processes implementation (Alaarj et al., 2015, 2016). In fact, the initiative to shift towards BP in most cases stem from the IT departments' requests. For instance, an empirical study that

focused on IT-enabled BP claimed that IT success in enabling BP is rooted on the integration of IS and business strategy (see Grover et al., 1994).

In the past twenty years, information management has been conducting using Management Information Systems (MIS) for optimum decision making and BP execution (Christopher, 2016; Karimi et al., 2007; Laudon & Laudon, 2004; Tallon et al., 2000; Bhatt, 2000). In particular, MIS refers to computer hardware and software used for the management of organizational flow, from internal organization departments and employees or among organizations for the achievement of work activities (Kroenke, 2011). It is a system that enhances BP in a way that not only enhances process efficiency but also enables novel processes to transform the business of the organization (Shipsey, 2010). This may be exemplified by the MIS use to input customers' orders from the privacy of their homes, the obtaining of payment and relaying such order (products and location for delivery) to the suppliers. This is possible to do online through the Internet, enhancing efficiency of order taking process.

Several benefits are also provided by MIS more than what traditional management systems (paper-based) are able to do, with the top being mitigating the physical expenses of services, retrieving information at real time, enhancing service provision accuracy, managing information access based on the responsibilities of the workers (Turban &Volonino, 2010). Hence, the operations and objectives of businesses can be effectively realized through MIS (Kroenke, 2011). Additionally, MIS can increase the activities accuracy and time by enabling workers to share information on the basis of their work needs (Maal-Gharaibeh & Malkawi, 2013).

MIS development and usage benefits organizations by reducing operational costs, employment growth rate, increasing information workflow within the workplace, enhancing reporting through accurate and real time reports with minimal effort, enhancing work environment productivity by managing the functionality of the organization, which in turn, supports teamwork tasks management, and enhance decision-making through timely and precise information and stimulation of decision-makers' interaction. It can also serve as a tool to change the attitudes, activities and interactions of administrators. The above benefits were mentioned by Maal-Gharaibeh and Malkawi (2013), Weske (2012), Noe et al. (2006), Laudon and Laudon (2004) and Clemons et al. (1993).There is a dire need to conduct an evaluation of the MIS functionality performance in light of its effectiveness and efficiency in organizational processes. Such evaluation concerns the evaluation of performances in terms of hardware, software, computer networks, data and human resources (Laudon & Laudon, 2004).

The concern arises among CEO and top management circles concerning the falling short of MIS investments of the expected outcomes as highlighted in Mashhour and Zaatreh's (2008) study. Such concerns arose owing to the weak understanding of the way MIS should be installed and applied for business processes management within the financial institutions. This may be attributed to the fact that a major proportion of MIS literature dedicated to Jordanian banks have been about the use of MIS to provide effective customer services as opposed MIS usage in managing business processes in light of workflow and tasks (e.g., Alalwan et al., 2014; Al-Smadi, 2012; Khraim & Al Shoubaki, 2011; Ahmad & Al-Zu'bi, 2011; Alawneh & Hattab, 2009; Alaaraj et al., 2018, 2018a,b).

Based on the above introduction, this research aims to investigate the role of MIS functions in support the BP in the banks, and improve the OE of the banks. The next section presents the theoretical considerations of this study.

II. THEORETICAL CONSIDERATIONS

Management by objectives (MBO) theory primarily focuses on the definition of organizational objectives that management relays to the members of the organization to decide upon their sequential achievement (Dinesh & Palmer, 1998). This enables management to tackle the objectives in an organized way in order to achieve more productivity in the work environment and it assists the members to clearly be acquainted with their achievements, with one objective at a time, supporting a positive work environment (Antoni, 2005). In an ideal workplace, employees are involved with setting the firm goals and selecting the action to be taken in order to be more inclined towards achieving the main goal (Konradt et al., 2003). The MOB theory cycle (Drucker, 1954) indicates that the set of organizational objectives should be passed down to employees as sequential objectives (refer to Figure 1). Such passing down of objectives have to overseen in their achievement. On the basis of such oversight, the employees' performance can be measured, after which the employees can be rewarded based on their performance prior to distributing the next business objectives.

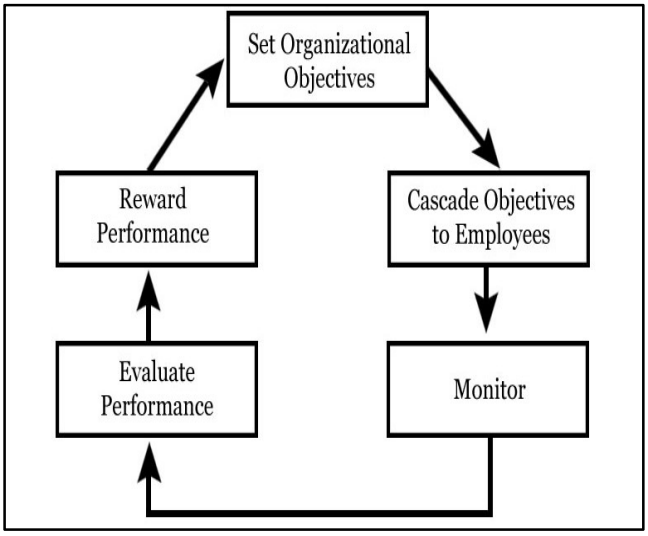

Figure 1: MBO Theory (Drucker, 1954)

From the above Figure 1, there are three main segmented directions to the MBO cycle namely, 1) business processes (e.g., distribution of objectives), 2) business management (e.g., monitoring objectives) and 3) operational excellence (e.g., evaluation of performance). In this regard, MIS can be used for the monitoring of business processes that employees achieve, while measuring the performance of the employees along with the objectives of the organization.

In addition to the MBO, Total Quality Management is another important theory that is reviewed and presented under this section. The focus of TQM is the development of an organizational system that promotes the members' cooperation and learning towards implementing management practices process, and ultimately, towards the processes, products and services ongoing improvement, and the fulfillment of employees, customer satisfaction and survival of the firm (Dale, 2015; Anderson et al., 1994).

In the processes and systems changes, top management has a key role in leading the rest of the organizational members (Yusof & Aspinwall, 2000). Leadership, in this case, ensures the quality management success with the top management creating and communicating a vision for the firm's ongoing enhancement (Alaarj et al., 2017a,b). It is the responsibility of top management to address quality problems and this is handled by establishing clear standards of work to the employees and work methods for their achievement. These also involve a suitable working environment that is devoid of fault-finding, blaming or scare tactics. In sum, the TQM theory primarily focuses on managing business processes in an effective way with the help of systems to reach business operational excellence, as a result of which products and services are enhanced. The connections between TQM processes and organizational productivity are displayed in Figure 2.

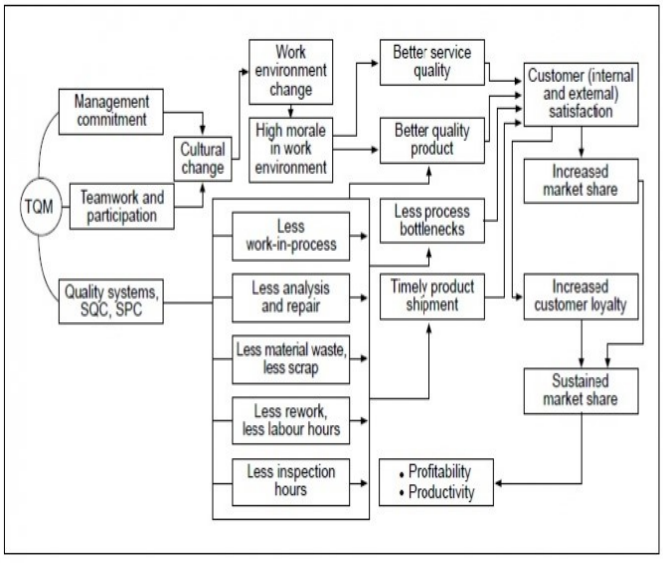

Figure 2: Linkages between TQM processes and organization productivity

2.1 Business Processes (BP)

The business processes of the organization (BP) are what define it and their optimal level and the organizational level originates from the supporting software used. Such software largely depends on the application platform established by the organization (Chang, 2016; Stadtler, 2015). Generally speaking business processes (BP) comprises of one or more than one connected activities that work towards business objectives realization or goal achievement, creating value through the transformation of the input into output with value (e.g., meeting business contract or customer satisfaction) (Stark, 2015; Lindsay et al., 2003; Georgakopoulos & Tsalgatidou, 1998).

BPM has been referred to as a discipline integrating software capabilities and expertise in business in order to precipitate enhancement of BP and business innovation (Peisl, 2009). It assists in achieving the organization's strategic business objectives as it directs the use of resources throughout the organization to dedicate it to processes creating more value for the customer (VomBrocke et al., 2014). Driving overall top and bottom-line success through the combination of verticals and optimization of core work is what distinguishes BPM from traditional functional management disciplines. Moreover, BPM also promotes ongoing process improvements to enhance the production of value and the sustenance of competitive edge in the market (Singh, 2012).

Furthermore, information is used in business processes that are tailor made to achieving working activities and in this regard, information, in contrast to other resources, is not consumed in the process but becomes a part of the transformation process (Osterle, 2013).Such information may be obtained from the customers (external) or from organizational units (internal) or from the product of other processes. Majority of organizations view workflow as the automated BP, in that it is the coordination, control and communication of activities that are automated but in this case, activities may be automated or they may be done by the workers (Polyvyanyy et al., 2015).

In sum, this study argues that BP drivers comprise of workflow information and functionality. The concept of workflow, according to Mentzas et al. (2001) evolved from the manufacturing and office process premise. These processes can be traced back to the era of industrialization and are the outcome of a search for maximizing efficiency through the focus on daily work activities (Harmon, 2010). Work activities can be generally categorized into well-defined tasks, roles, rules and procedures regulating the manufacturing work and the office as evidenced by Milani et al. (2016) and Kumar et al. (2009). On the other hand, Working functionality is connected to that of BPs, in that a functional business indicates the working tasks and responsibilities of each worker, team or department (Tang et al., 2013; Parker, 2003; Shen et al., 2003).An functional business orientation organizes the company based on functions (sales and production) (Nesheim, 2011; Srivastava et al., 1999), while a

process orientation refers to the focus on business processes (e.g., order processing or strategic planning). The companies in each case ensure that their activities are optimally conducted in the functional units or in each process (Chan & Qi, 2003). The main distinction is that the optimization of one functional unit may be detrimental to another, but the optimization of business processes throughout the organization assists the performance of the whole company (Scheer & Nuttgens, 2000).

2.2 MIS Functions

In the past decade, IT has been increasingly utilized in the service sector, specifically the banking industry in the form of products like internet banking, e-payments, security investments, and information exchanges (Karim & Hamdan, 2010; Berger, 2003). The use of IT in financial organizations is expected to provide high quality services to the customers effortlessly.

Information system is generally an arrangement of individuals, data, process and IT interacting for the collection, processing, storage and provision of output (required information) (Fountain, 2004). IS may therefore be described as the arrangement of groups, data, processes and technologies to function together in accumulating, processing, storing and providing information to make informed decisions (Davenport, 2013). In recent times, there has notably been an increase in the level of financial organizations using computer technologies for the facilitation of services provision and this trend is expected to further increase with the technology development (Karim & Hamdan, 2010). The advent of electronics revealed that accumulation, accessing and manipulation of data enhances the decision-making among banks.

Added to the above, Stair and Reynolds (2015) described management information systems (MIS) as one of the top computer based information systems that aims to satisfy the requirement for general information among firm managers or subunits. According to Stair and Reynolds (2015) and Asemi et al. (2011), a subunit may be built on the management levels functional areas. MIS has been defined in different ways but one of the top suitable definitions was mentioned by Qureshi and Abdullah (2013), which referred to it as a system that provides past, present and projected information that are linked to the internal operations of the firm as well as external intelligence. The system reinforces the functions planning, control and operations through the provision of consistent timely information to assist in decision-making (Laudon & Laudon, 2004). The MIS information provides a description of the firm or one of its systems in light of past events, present events and future events. Available information is accessible through periodic reports, special reports and mathematical simulation outputs (O'Brien & Marakas, 2006). Managers make use of such outputs for their decision making and resolution of problems (O'Brien & Marakas, 2006).

In the MIS system, the main issue is the way software and hardware equipment is organized in the organization to ensure its enhanced performance (Mall-Gharaibeh & Malkawi, 2013). The premise does not only stem from MIS installment in the organization but also the management of its functions based on the structure of the organization and the information flow among the sectors geared towards enhancing business processes and achieving the organization's operational excellence.

MIS functions branch out into two directions namely, efficiency and effectiveness (Ward & Peppard, 2016), which are two related concepts. Nevertheless, successful efficiency does not imply successful effectiveness and vice versa. This is because efficiency MIS metrics concentrates on the technology and while they are significant for monitoring, they do not always lead to effectiveness. On the other hand, effectiveness MIS metrics are identified based on the goals, strategies and objectives of the firm and in an ideal situation, a firm desires to operate in order to realize both efficiency and effectiveness.

The efficiency MIS metrics gauges the MIS performance in light of throughput, transaction speed and availability of the system (Gunasekaran et al., 2007; Scudder & Kucic, 1991; Cyrus, 1991). In this regard, efficiency is the level to which a firm optimally uses its resources. MIS efficiency metrics are provided by prior studies (Gunasekaran et al., 2007; Scudder & Kucic, 1991; Cyrus, 1991) as throughput, transaction speed, information accuracy, response time, and system availability. On the other hand, the effectiveness matrix includes the usability, customer satisfaction, conversion rates, and financial return.

2.3 Operational Excellence

Businesses instinctively search for improvement in order to maintain their success in the long-run, which makes them turn to embarking on relentless quests for better things. Ignoring such a search as a top priority will eventually lead to the decline of the organization (Khanam et al., 2016). Thus, operational excellence (OE) has to be the pursuit that great leaders attempt to achieve. It is an all-encompassing approach to optimize daily operations, aligned with the strategic objectives of the firm and its customers' expectations (Zehir et al., 2012). OE is a leadership, team work and problem solving philosophy that is expected to continuous improvement all throughout the firm that considers customer's desires, employees' empowerment and enhancement of existing process activities (Duggan, 2009).

In the banking sector, banks are financial intermediaries that form the core of any economic system entailing the channeling of funds from surplus to shortage (Naeem & Saif, 2010). The fund channeling objective is to increase profitability and for the achievement of a significant number of customers, it is often noted that banks open up branches, which are the points where they provide their products. Products offered by banks are similar from one country to the

next, but the distinction lies in the offering of such products and their quality.

On the basis of the above discussion of literature findings, this study considers two important practices of banks and they are continuous improvement of services and employee innovation. Organizations generally adopt innovation to enhance their level of service delivery to different users with the fundamental attempt to enhance their profitability and their shares in the market (Obasan & Soyebo, 2012). Innovation adoption and characteristic of innovative organizations have evolved in different industries (Walker, 2008; Boyne et al., 2005). In literature, studies evidenced whether or not the adopted innovations (e.g., MIS) are able to deliver expected results.

Furthermore, to produce output with value and operational excellence, there are distinct firm competencies and resources that are bundled and revitalized (Oakland, 2014). Competitive advantage, cost and production reduction and service and product timely delivery could be used to enhance product/service quality improvement to provide accurate products and services (Schulze & Hoegle, 2006). Service and product quality can be realized through the contribution of distinct attributes for the enhancement of excellence to benefit end-users (Pratt et al., 2006).

Quality may also be achieved by quality design, which implies the adaption of product design to function (Ogrine et al., 2008) and quality of conformity which refers to the capability of the organization to transform inputs into outputs that conform (Klefsjo et al., 2001), or outputs based on the specific characteristics, with quality focus represented by competitive advantage and profitability.

2.4 Related Works

In business operations, financial and non-financial functions require information systems (e.g.., decision making of management) (Hemmatfar et al., 2010). In the past, IS used to be relegated to the level of corporate data processing and considered as a back-room operation to support daily tasks. However, the need for operational effectiveness to enhance internal business processes has been underlined to enhance internal business processes execution for competitive advantage over rivals (Porter, 1996). Technological improvements work towards enhancing the satisfaction of both employee and customer circles, quality, and firm productivity, while at the same time mitigating market time, enhancing decision making and activities management, and making efficiency of activities more pronounced. In Asemi et al.'s (2011) related study, MIS is characterized by the following;

1. Report with fixed and standard formation – in this regard, scheduled reports for inventory control may have similar information in the same reports location;
2. Development and implementation of report using information system personnel – and these include system analysts and computer programmers. Both have a hand in the development and implementation of such reports, while the user is involved in designing them but not in writing the computer programs for their production.
3. Users formal request is required – this is because IS personnel are the ones who develop and implement the MIS report and therefore, a formal request to the IS department is required to proceed.
4. Production of scheduled and demand reports – with the main reports types generated by MIS being demand reports (Stair, 1992).
5. External data is not captured by the organization but is utilized in the MIS and they contain information on customers, suppliers and rivals.

With regards to quality, Saffran and Vogt (1999) focused their study on quality management system implementation based on ISO9000 at Deutsche Bank AG. In order to set up a quality system, the structural plan was categorized into four phases namely, tasks and responsibilities determination, studies, implementation and certification. The second step's major component was the quality manual, which was created based on three guidelines namely, simple language, understandable illustrations and essentials focusing. The documentation guidelines were outcome-based planning, consistent methods of procedures description, readability and employees' focus. The basis for evaluation during registration audit was documentation and it had no non-conformities, which enable Deutsche Bank to earn a 3-year registration without limitation. The implementation of quality management system had the bank incurring around 3,975,000 DM, without the registration costs. Implementation benefits were noted and among them were enhanced clarity and employees' motivation, enhanced customer satisfaction and better productivity. Successful quality system initiative of the Deutsche Bank was attributed to employee involvement, customer orientation, open communication and adaptation flexibility to the new system requirements.

In another related study, the relationships within the organizations as they attempt to achieve the expected outcomes of IS was focused on by Janssen and Joha (2006), while Ulbrich (2006) identified three problem areas based on the experiences in business process design initiatives. The areas pertained to the IS implementation and they were business relations, interfaces (with the inclusion of sufficient definition and documentation of processes) and IS location. The three areas are related to relationship management advocated by Janssen and Joha (2006).

Similar to the above studies, Naeem and Saif (2010) studied operational excellence in the financial sector, with a distinct focus on change management issues addressing quality management practices. The authors made use of a quasi-qualitative case study approach, where 20 service companies

from the service sector including healthcare, insurance, consultancy, and banking and financial services were examined over a 2-year period for the assessment of their management practices. The findings of the study revealed that unrealistic expectations concerning the commitment of employees, lack of process focus, lack of information flow, gaps in education and training, and failure to develop ongoing improvement culture were all causes of failure. The authors reached to the conclusion that when real and actual methods to change management followed academic models and change management techniques, the developmental and implementation ability of the organization-extensive change revealed smooth progresses.

Lastly, the achievement of operational excellence goals according to Versendaal et al. (2010) is not the only process problem that can be addressed through the redesign and implementation. However, the aspect of culture is of importance and thus, in the present study, cultural aspects from the X model on organizational culture (Smit et al., 2008) is considered and propositions are made to identify the relationships. Such propositions are validated by surveying a group of IT management experts. Table 1 provides the summary of many related works.

2.5 Theoretical Framework

In this research, the main focus is laid on three major variables namely, BP management, MIS functions and OE of organizations. First, BP management refers to the gathering of related tasks, whose outcome and culmination is the service/product delivery to the client. Business process was referred to by Rosemann and Vom-Brocke (2015) and Compagna et al. (2016) as a set of activities, information and tasks that are combined together to achieve the goals of the organization. Second, MIS functions are described as the management of software and hardware used in the IS of the organization (Mall-Gharaibeh & Malkawi, 2013; Al-Basheer & Shtanawi, 2015; Ward & Peppard, 2016), while OE of the organization, according to Al-Ettayyem and Zu'bi(2015) and Lusch and Nambisan (2015), is an organizational leadership element that lays stress on applying different principles, systems and tools to maintain and improve the major key performance metrics.

The present study is based on the objective of examining the effect of BP management on OE via the MIS functions among banks. This study believes that the lack of effective BP management in banks could lead to OE issues (Asemi et al., 2011), and this calls for the use of MIS to ensure that BP is managed in optimally (Hsieh & Lin, 2016; Alalwan et al., 2014). Nevertheless, as mentioned, the point is to assure that different functions of MIS are directed towards the best BP management based on the bank's environments and not merely about MIS usage (Mall-Gharaibeh & Malkawi, 2013). It is thus crucial to examine the status of MIS functions in the banks for the enhancement of BP management and for the realization of OE. Thus, this research aimed to examine the mediating MIS functions role in enhancing BP management and its effect on OE of banks. BP variables are deemed to be the independent variables, the MIS functions is the mediating variable, while the OE is the dependent variable (refer to Figure 3 for the framework).

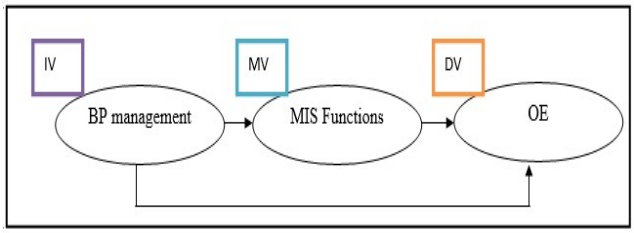

Figure 3.General Research Framework

With regards to the BP management, the variables include workflow and job functionality, with the workflow referring to the organized tasks collection to achieve the processes of business. The tasks are achieved sequentially, and the output of one task continues as the input of the next task and so and so forth, until the tasks are accomplished by a single department or among the departments' collaboration. Therefore, a well-organized information and process workflow is a must in ensuring tasks/services effectiveness achievement. On the other hand, an ineffective workflow could result in poor service provision, delayed service provision, errors in service provision and errors in working responsibilities. In the banks, job functionality comprises of working responsibilities appropriated to each worker and they have to be clear and effective in order to steer clear of clashes. It is important for each employee to be clear and aware of his/her responsibilities to improve BP. Weak definition of jobs functionality could lead to ambiguous achievement of services, ambiguous information on which employee is accountable and clashes in service provision.

Moving on to MIS functions, the variables are efficiency and effectiveness and they focus on technology encapsulating several sub-variables including throughput (information transferred for every transaction), speed of the transaction, availability of the study, accuracy of the information provided and the time of response. Efficiency should also be established for the smooth working of banks; for instance, the MIS throughput has to be 100MB if 90MB size files need to be transferred. MIS also needs to be available within working hours, with no system down time. It should be able to transfer information from one point to the next in seconds. In contrast, an inefficient MIS in the working environment could lead to delayed services, minimized service quality and inability of the employees to obtain information they need for their tasks.

MIS effectiveness concentrated on overseeing MIS and it covers sub-variables like system usability which is the system's ease of use, measurement of the MIS use satisfaction among employees, rate of conversion (number of touches to achieve tasks) and the profitability (profit obtained from MIS should exceed the costs of MIS deployment). MIS

effectiveness should thus assure successful implementation and maintenance of the system in the workplace.

With regards to OE, it refers to the overall services performance of the banks, with two of its top dimensions being innovation and quality improvement of services. First, innovation refers to the creative achievement of the tasks and this could represent new and effective work solutions in the work environment. This may be exemplified by the bank's loan services that could be improved by new simplified communication between employees among departments. Second, quality improvement refers to the service quality of the finished product/service by employees. The services quality is required to tackle the satisfaction of customers. Ineffective quality of service could mitigate the competitive advantage of the organization, and it could lose customers and thus, it is a must to continually enhance the quality of services. Figure 4 illustrates the main variables and its sub-dimensions according to the research paradigm and standpoint.

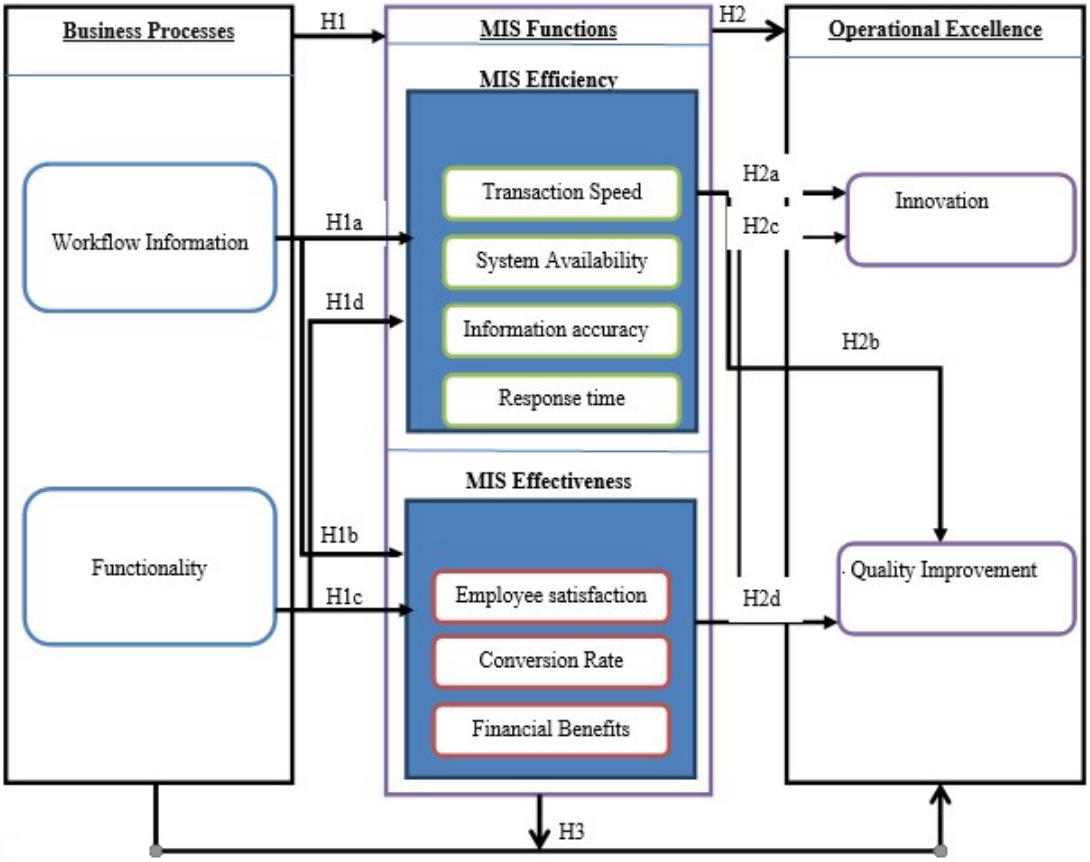

Figure 4. Research Framework

According to the defined research framework variables, three main research hypotheses were developed, which are as the following:

- H1: There is a significant relationship between BP management and MIS functions in Jordanian banks.
- H2: There is a significant impact between MIS functions and OE in Jordanian banks.
- H3: There is a significant mediating effect of MIS functions on the relationship between BP management and OE in Jordanian banks.

III. RESEARCH METHODOLOGY

This study focuses on the variables of MIS function, BP management OE in the actual Jordanian banks and thus, data was collected from the branch level rather than from individual level in that, the unit of analysis is the Jordanian bank, as represented by its managers/assistant managers. The research population comprises of the Housing Bank and Jordanian Islamic Bank's managers. On the basis of the annual report provided by the Jordanian Housing Bank 2018, the number of bank branches in the country is 130, while that of the Jordanian Islamic bank is 97 branches.

The sampling percentage has to be at least 10% of the population size from 101-1000 units (Yount, 2006).Each bank in the study sample, as mentioned, is represented by the manager or assistant manager of the bank branch and based on the Jordanian Islamic bank and the Housing Bank, each branch is managed by a manager and two assistant managers and thus, the study sample should be at least 69 (23 branches*3 managers). However, the questionnaire was

collected from 159 managers in Housing bank, and Islamic Jordanian bank.

The sample selection was conducted depending on the sample segment's usefulness and is based on a distinct proportion. The sample in this study was chosen based on quota technique's two strategies; first, the branches of the banks representing the study sample was selected to cover all bank branches in the region (north, middle and south) to examine the impact of MIS functions in the entire parts of the region. Second, one of the top employee's proportion criteria is the experience held by the managers and in this regard, the sample was gathered from the proportion holding high experience and knowledge on the study variables. Data was generally gathered from managers and assistant managers of over 5 years of experience in bank management based on their knowledge of MIS implementations in their branches.

This study is quantitative one, with the questionnaire being the major data collection instrument. Therefore, the study questionnaire was arranged to comprise of 4 major parts, with the last 3 parts containing 45 items representing the study variables namely, BP management (independent variable), MIS functions (mediating variable) and OE (dependent variable). Every questionnaire part contained items representing each variable's sub-dimension, namely, workflow and job functionality (BP), efficiency and effectiveness (MIS functions) and innovation and quality improvement (OE). The questionnaire was validated by three experts in Management information domain.

The items in the questionnaire were gauged through a 5-point Likert scale that focused on the lower scales, generating relative responses means over their high counterparts (Dawes, 2008). The collected data are analyzed using SPSS and AMOS tools based on many analyses such as confirmatory factor analysis, frequency analysis, and descriptive analysis.

IV. DISCUSSION OF THE RESULTS

The questionnaire copies were distributed to 200 managers of two Jordanian banks namely, the Housing Bank and the Jordanian Islamic Bank. From the distributed questionnaires, 32 were not retrieved and 9 questionnaires were dropped owing to incomplete answers, making the valid questionnaires to be included in the data analysis to be 159 in total. The rate of response was therefore 80% (200/159), considered as a good response rate, indicating that the respondents were interactive in their completion of the questionnaire and gave significant concerns about the issues.

The demographic data of the respondents were analyzed based on the 159 collected responses and they were analyzed to provide a description of the characteristics of the respondents. Demographic analysis ensures the qualification level of the respondents when it comes to their contribution to the data obtained. For instance, low experienced respondents may face issues in providing the right and accurate answers to the items within the questionnaire.

Notably, the primarily aim of the research is to examine the mediating effect of MIS functions on the BP management-OE relationship among Jordanian banks. Accordingly, there were 7 demographic variables analyzed in light of the aim of the research and they are gender, working position, years of management experience, bank branch location, number of employees in the branch, number of daily conducted tasks in the branch, and the MIS use in the branch. Table 1 presents the analysis of the demographic data.

Table 1: Analysis of Demographic Data

Variable	Items	Frequency	Percentage
Gender	Male	131	82%
	Female	28	18%
Working position	Branch manager	90	56%
	Assistant Manager of Branch	28	18%
	Department manager	41	26%
	Other, Specify	0	0%
Management experience years	Below 1 year	0	0%
	1-3 years	3	2%
	4-6 years	21	13%
	7-9 years	24	15%
	More than 9 years	111	70%
Region of bank branch	Middle of Jordan	68	43%
	North of Jordan	33	21%
	South of Jordan	27	17%
	West of Jordan	24	15%
	East of Jordan	7	4%
Number of employees in the branch	Less than 50 employees	141	89%
	50-100 employees	16	10%
	101-150 employees	0	0%
	151-200 employees	0	0%
	More than 200 employees	2	1%
Number of daily conducted tasks in the branch	<50 tasks	101	64%
	50-100 tasks	36	23%
	101-150 tasks	13	8%
	151-200 tasks	7	4%
	201-250 tasks	0	0%
	More than 250 tasks	2	1%
Utilizing of MIS in the branch	Strongly utilizing	102	64%
	Medium utilizing	47	30%
	Low utilizing	10	6%
	No MIS	0	0%

To reiterate, SPSS V. 22 was used for data screening of 159 collected responses. Accordingly, this study conducted the univariate outlier test based on Z-score in SPSS, with the acceptable values being between -4 and +4 as established by Hair et al. (1998) and Tabachnick and Fidell (2007). The results of the Z-score test indicated the 51 items were acceptable from the 159 responses as they fell in the range between -4 and +4. The present study also conducted the multivariate outlier test using Mahalanobis D2 distance, in AMOS. The D2 coefficient value that exceeds 3.5 is deemed to be an outlier (Hair et al., 1998). The results of the test revealed that all 51 items obtained responses that are well below the cut-off (3.5); in particular, the highest D2 coefficient were obtained by the items IWF6 (3.159), WI3 (3.248), and ISQ2 (3.301) and as such, the variables and their items were considered acceptable to be included in the next data analysis phase.

The data screening tests results showed the suitability of data to be exposed to the next data analysis steps, which is data normality. This analysis confirms the validity of data by estimating normal distribution of the data obtained from the questionnaire copies. Normal data distribution shows good relationship between item responses and this supports the study variables validity. This study used two AMOS tests to assess data normality namely, skewness and kurtosis. In the former, the average data normal distribution should be in the range from -3 to +3, and for the latter, the average data normal distribution should be in the range from -7 and +7. Notably, all the items responses had normal distribution, indicating support for the study variables and inclusion of all data in the next analysis phase, which involves CFA.

The overall model containing six 1st order variables was exposed to CFA. The variables include information workflow, working functionality, MIS efficiency, MIS effectiveness, working innovation and improvement of services quality and they were measured by 51 items, which were responded to be 159 respondents. The items and responses were all included in the CFA model's overall assessment.

All the 51 items exposed to the overall CFA model analysis was examined for their factor loadings to determine their level of interaction. On the basis of the modified loadings of the CFA analysis, items that obtained values lower than 0.5 (cut-off) were deleted and they numbered 7 items (IW7, MEI4, MEI13, MEV2, MEV5, MEV11 and ISQ4). The remaining 44 items interactions were acceptable and included as they displayed high factor loadings (>0.5) and to conclude, 44 items were included in the next step of the analysis.

On the basis of the outcome of the modified factor loadings, the 44 items were run through the goodness of fit test and the test revealed that the final model needed further improvement as the GFI coefficient was 0.839 (below 0.9 cut-off value). For this, Hair et al. (1995) recommended to conduct the re-path correlation test based on the detected errors of the indicators of AFC and SHE. Consequently, the modified model's GFI coefficient reached 0.902 by removing IWF2, WF4 and WI1 (items with high within-construct covariance). Their removal was supported by Zanudin (2012) who stated that removal of such items will assure good model fit. As a result, the modified model's goodness of fit depended on the remaining 41 items distributed to measure six variables and based on the final goodness of fit indices values; GFI=0.902, AGFI=0.864, CFI=0.953, TLI=0.962, and IFI=0.981, with RMSEA=0.045 and CMIN/df=2.031. The data reliability and validity values based on the 41 items of the adjusted CFA model are presented in Table 2.

Table 2: Reliability and convergent validity of the overall model

Variable	# of Items	Cronbach Alpha	Average variance extracted (AVE)
Information Workflow	5	0.935	0.874
Working Functionality	4	0.947	0.762
MIS Efficiency	16	0.836	0.711
MIS Effectiveness	9	0.841	0.735
Working Innovation	3	0.929	0.883
Improvement of Service Quality	4	0.872	0.801

The reliability values of the 41 items measuring 6 variables dimensions are tabulated in Table 4.16. They obtained Cronbach's alpha values ranging from 0.836 to 0.947, which are all above the 0.7 cut off, indicating high reliability of the final model version. The model's AVE is over 0.5 for the variables (0.711-0.883), which reveal good model data validity.In other words, the overall final model version is valid and reliability in representing the research outcomes.

The overall modified model was tested for discriminant validity to confirm the correlation among the six dimensions of the variables and the values of discriminant validity are tabulated in Table 3.

Table 3: Discriminant Validity of the Overall Model

	IW	WF	MEI	MEV	WI	ISQ
IW	0.871					
WF	0.235	0.829				
MEI	0.260	0.407	0.805			
MEV	0.179	0.304	0.292	0.759		
WI	0.207	0.418	0.316	0.183	0.892	
ISQ	0.267	0.395	0.169	0.195	0.381	0.884

The good level of inter-correlation among the study variables are presented in the above table based on the 41 items measuring them. Discriminant validity for IW is 0.871, for WF is 0.829, for MEI is 0.805, for MEV is0.759, WI is 0.892, and for ISQ it is 0.884 – all values confirming the

model variable's sufficient interactions. Moreover, the correlations among the variables did not exceed the r2 of the average variance extracted from individual variables, confirming the overall model's discriminant validity.

In sum, the overall model's CFA represented by the values of goodness of fit, reliability and convergent validity and discriminant validity supported the usefulness of the construction of the overall model as evidenced by the results in Figure 5.

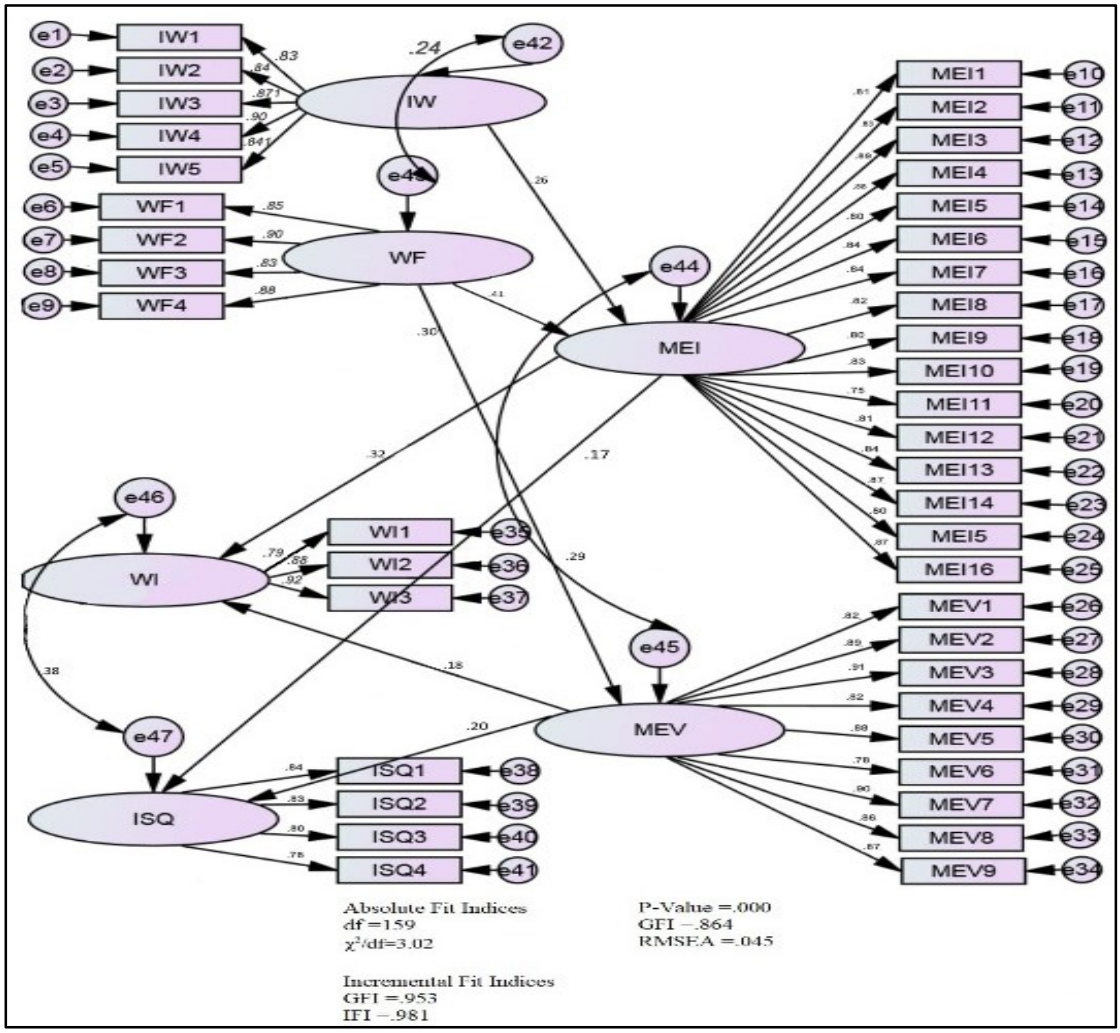

Figure 5: CFA of Overall Model

Based on the above Figure 5, the overall model fit is focused on, followed by the size, direction and the parameter estimates that were previously hypothesized. Hair et al. (2006) proposed indicating the relationships using one-headed path diagram. The structural model is confirmed through the analysis of the proposed relationships among the identified and assessed variables. AMOS and the maximum likelihood estimate method were utilized in this study for the examination of the proposed hypotheses.

In this study, BPM is considered as the independent variable and it covers two dimensions namely, information workflow (IW) and working functionality (WF), MIS is considered as the mediating variable that covers two dimensions namely MIS efficiency (MEI) and MIS effectiveness (MEV), while OE is considered as the dependent variable with two dimensions namely working innovation (WI) and improvement on services quality (ISQ).

Accordingly, this study examined the direct effects of the variables involving, the direct effects of information workflow (IW) and working functionality (WF) on MIS efficiency (MEI) and MIS effectiveness (MEV), representing hypothesis H1, and the direct effects of MEI and MEV were examined on working innovation (WI) and improvement on services quality (ISQ), representing hypothesis H2. Figure 5 depicts the AMOS structural model graphs and standardized regression weights. The study also examined the direct relationships using a significance level of p-value=0.05, to test the possibility of the relationship effect in one direction.

The results of the analysis indicated that R2 value of BPM is 0.24, which means the error variance of QWL is around 76% of the BPM variance (Quaddus & Hofmeyer, 2007). Similarly, the R2 value of MIS functions is 0.29 and of OE is 0.38. Through the parameter estimates, the hypothesized direct effects can be determined. Table 4 displays the path coefficients and results of the hypothesized direct effects.

Table 4: Hypothesized Direct Effects of the Variables in Structural Model

Path	Unstandardized Estimate		Standardized Estimate	c.r.	P-value	Sub Hypotheses Results	Overall Hypotheses results
	Estimate	S.E.	Beta				
IW→MEI	0.247	0.092	0.26**	2.215	0.005	H1a: Supported	H1: Supported
IW→MEV	0.034	0.051	0.09	0.513	0.491	H1b: rejected	
WF→MEI	0.231	0.081	0.41**	2.326	0.008	H1c: Supported	
WF→MEV	0.252	0.065	0.30**	2.876	0.009	H1d: Supported	
MEI→WI	0.226	0.079	0.32**	2.861	0.004	H2a: Supported	H2: Supported
MEV→WI	0.098	0.051	0.18*	2.553	0.011	H2b: Supported	
MEI→ISQ	0.133	0.049	0.17*	2.321	0.017	H2c: Supported	
MEV→ISQ	0.11	0.045	0.20**	2.712	0.007	H2d: Supported	

*p< 0.05, **p< 0.01, ***p< 0.001

In the table (Table 4), hypotheses H1 and H2 results are presented and the findings indicated the following;

- H1: *There is a significant* impact *between BP management and MIS functions in Jordanian banks.* In other words, H1 is based on four sub-hypotheses, which are as follows;
- H1a: *There is a significant* impact *between BP workflow and MIS efficiency in the Jordanian banks.*

  The direct path between IW and MEI in the structural model analysis reveals the following (β =0.26, C.R. = 2.215, and p= 0.005) and thus supporting hypothesis H1a, and confirming the significant relationship between IW and MEI.
- H1b: *There is a significant* impact *between BP workflow and MIS effectiveness in the Jordanian banks.*

  The direct path between IW and MEV in the structural model analysis reveals the following (β =0.09, C.R. = 0.513, and p= 0.491) and thus rejecting hypothesis H1b, because of the weak IW and MEV relationship.
- H1c: *There is a significant* impact *between BP functionality and MIS efficiency in the Jordanian banks.*

  The direct path between WF and MEI in the structural model analysis reveals the following (β =0.41, C.R. = 2.326, and p= 0.008) and thus supporting hypothesis H1c, owing to the significant WF-MEI relationship.
- H1d: *There is a significant* impact *between BP functionality and MIS effectiveness in Jordanian banks.*

  The direct path between WF and MEV in the structural model analysis reveals the following (β =0.30, C.R. = 2.876, and p= 0.009) and thus supporting hypothesis H1d, owing to the significant WF-MEV relationship.

Despite the rejection of H1b based on the results, overall, H1 is considered to be supported as majority of the sub-hypotheses are supported, indicating a positive relationship between BP management and MIS functions among banks in Jordan. The details of the results obtained for the sub-hypotheses indicate the significant role of information workflow in designing MIS functions, including transaction speed and throughput (H1a). MIS functions should be efficiently designed according to the information flow among the employees in the workplace. Moreover, working functionality has a key role in designing effective and efficient MIS functions in the banks (H1c and H1d), necessitating the provision of efficient and effective functions according to the employees' working responsibilities. The MIS functions design in the banks has to be aligned with the information workflow and working functionality management as evidenced by the descriptive analysis results of the study. The results also showed that employees faced challenges in MIS use to manage information workflow and working functionality.

- H2: There is a significant impact between MIS functions and OE in Jordanian banks. This hypothesis is divided into four sub-hypotheses to explain the relationship in detail.

- H2a: There is a significant impact between MIS efficiency and OE innovation in Jordanian banks: based on the results of the structural model analysis for the direct path between MEI and WI (β =0.32, C.R. = 2.861, and p= 0.004), indicating support for H2a. In other words, there is a significant MEI-WI relationship.
- H2b: There is a significant impact between MIS effectiveness and OE innovation in Jordanian banks: based on the results of the structural model analysis for the direct path between MEV and WI (β =0.18, C.R. = 2.533, and p= 0.011), indicating support for H2b. In other words, there is a significant MEV-WI relationship.
- H2c: There is a significant impact between MIS efficiency and OE quality improvement in Jordanian banks: based on the results of the structural model analysis for the direct path between MEI and ISQ (β =0.17, C.R. = 2.321, and p= 0.007), indicating support for H2c. In other words, there is a significant MEI-ISQ relationship.
- H2d: There is a significant impact between MIS effectiveness and OE quality improvement in Jordanian banks: based on the results of the structural model analysis for the direct path between MEV and ISQ (β =0.20, C.R. = 2.712, and p= 0.007), indicating support for H2d. In other words, there is a significant MEV-ISQ relationship.

In sum, this study supports hypothesis H2 and its sub-hypotheses, indicating a positive relationship between MIS function and OE of the banks in Jordan. In this regard, the MIS functions in terms of their effectiveness and efficiency are significant in improving working innovation of banks along with their service quality provision. They enable bank employees to be innovative in achieving their tasks, which in turn, enhances the quality of the services provided.

Also, The SEM approach is a suitable one to employ compared to the regression techniques to test the mediating effect as the former enables modeling of measurement and structural relationships and produces overall fit indices (Browne et al., 1993; Garver & Mentzer, 1999). Specifically, for the mediating effect (H3) examination, this study adopted the bootstrapping method as suggested by Bagozzi and Yi (1988). The findings showed the following details;

- H3: There is a significant mediating effect of MIS functions on the relationship between BP management and OE in Jordanian banks.

  The table (Table 5) shows partial mediation of MIS functions on the relationship between BPM and OE, which means hypothesis H3 is partially supported. In particular, the indirect paths through MEV provided weak coefficient of standardized effect and p-value but through MEI the coefficient of standardized effect and p-value were highly significant. This shows that MEI plays a mediating role in the BPM and OE relationship among Jordanian banks, but not MEV.

Table 5:Paths test for H3

Specific Indirect effect	Standardized total effect	P-value
IW-> MEI-> WI	.173	.028*
IW-> MEV-> WI	-.010	.069
IW-> MEI->ISQ	.167	.019*
IW-> MEV-> ISQ	-.024	.072
WF-> MEI-> WI	.188	.004**
WF->MEV -> WI	-.012	.253
WF-> MEI->ISQ	0.031	.008**
WF-> MEV-> ISQ	-.029	.221

Table 4.25 indicates the presence of significant relationship between information workflow (IW) and working innovation (WI), through the mediating effect of MEI, with the standardized total effect and p-value being 0.173 and 0.028 respectively. This supports the significant effect of MEI ($p<0.05$) on the relationship between (IW) and (WI). However, no such significant relationship was found from MEV on the IW-WI relationship (p=0.69).Along a similar line of finding, MEI was found to significantly affect the IW-ISQ relationship, with the indirect path between the variables obtained as 0.167 (standardized total effect) and 0.019 (p-value). On the other hand, MEV had not such significant mediating effect on IW and ISQ (p=0.72).

Moreover, MEI was found to significantly affect the WF and WI relationship, with the indirect path significance being 0.188 and 0.004 for the standardized total effect and p-value respectively. No effect was again noted for MEV on the relationship between WF and WI (p=0.253).Finally, MEI was found to significantly affect the WF-ISQ relationship with the standardized total effect and p-value being 0.031 and 0.008 respectively. Then again, no such significant mediating relationship was found from MEV on the WF-ISQ relationship (p=0.221).

In sum, hypothesis H3 was partially supported in light of MEI mediating significant mediating effects. The entire indirect supported paths reveal the efficiency of MIS role in the relationship between BPM and OE in Jordanian banks. Stated clearly, working innovation and services quality can be enhanced on the basis of MIS functions efficiency. This supports the importance of MIS use designed tailor-made for the working environment as opposed to a developed MIS adopted from other banks or business entities.

V. CONCLUSION AND FUTURE WORKS

Prior related theories and researches revealed that BPM is controlled by the workflow of information and the working functionality. As a consequence, several studies contended

that the BPM major dimensions are information workflow and working functionality In relation to the MIS services, their effectiveness and efficiency form the matrix of the related functions, with the functions being the MIS facilities characteristics. Efficient and effective MIs could lead to enhanced BPM. Prior studies contended that the MIS functions primarily rest on its efficiency and effectiveness. More specifically, the MIS efficiency matrix encapsulates the throughput, transactions speed, information accuracy, system availability, and response rate, whereas the MIS effectiveness matrix covers usability, customer satisfaction, conversion rate and financial aspect. With regards to operational excellence of the banks, working innovation and improvement of services quality were the two significant dimensions mentioned in literature.

According to the conducted analysis based on 159 responses from managers in Jordanian banks, the argument that managing information workflow and working functionality of Jordanian banks assist in structuring the efficient and effectiveness of MIS function for BPM. In this regard, inappropriate MIS function could lead to serious issues in banking BPM. The structure of BP based on MIS efficiency and effectiveness assist in enhancing banks OE and in increasing the opportunities to achieve tasks innovatively. Also, it could enhance the banks' provision of services.

In the future, the structural equation model would be conducted to show the relationship between the BP and OE through the mediating effect of MIS functions.

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