An Investigation of Information Systems Use in Jordanian Banks

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Abstract: This paper aims at investigating information systems use and applications and the effects of such use on the effectiveness and efficiency of the decision-making process in the Jordanian banking sector. A field study that covered 15 commercial banks working in Jordan was carried out so as to test a number of hypotheses. A structured questionnaire and personal interviews were used to collect data. The study indicated that information systems utilization in banks has not been optimized in a way that would improve decision-making efficiency and effectiveness. It also showed that new technologies have not been fully utilized to increase shared cooperation between banks. Further, the study pointed out that new information systems and technologies have not been properly used in efforts to improve procedures of security and controls. Results indicated the need for better training in the use of information systems in banks and the need to involve different management levels in the proper use of information generated by those systems. Further, it is recommended that banks share in the effort to create a large banking information base that will facilitate the exchange of information between banks in order to improve their performance.

Key Words: Information Systems, Decision-Making, Banks, Jordan

Introduction

Information systems aim at providing mangers with quality information to support managerial activities such as planning, control and decision-making (Alter and Steven, 1999). The use of different types of information systems emphasizes the need to integrate information systems outputs with decision makers' experience and judgement in making more effective decisions (Conhagen et al., 1982).

Information systems technology plays a critical role in supporting both the strategic and tactical operations of commercial banks and, hence, the importance of using such tools in the banking sector can never be overlooked (Keen, 1991).

The Jordanian banking sector witnessed massive changes over the past few years in terms of organizational restructuring, mergers and moving into new and regional and international markets.

Information systems use in general has been investigated to show whether managers in organizations are utilizing information systems capabilities to support the decision-making process, and hence improve the effectiveness of their decisions (Ravichandran and Banerjee, 1994).

Few studies have focused on the use of information systems in the banking sector and none are available on such use in the Jordanian banking sector.

The Research Objectives: The main theme of this research is to verify the impact of information systems on the decision-making effectiveness in Jordanian banks. Although, there are many other factors that may influence the effectiveness of the decision-making process such as the cognitive style of the decision maker, resource availability, this research paper will concentrate on the impact of information systems on the efficiency and effectiveness of the decision-making process in Jordanian banks. The research also seeks to identify the efficiency level of information systems and to identify participants in the process of decision-making. The research further seeks to point out the weakness points in the information systems and ways to address them, thereby improving the effectiveness of the system.

Research objectives, therefore, aim at answering the following questions:

- Is there any significant relationship between the efficiency of the information system used and the effectiveness of decision-making in Jordanian banks?
- Is there any relationship between the efficiency of people working in the information system and the effectiveness of decision-making in Jordanian banks?
- Is there any relationship between the quality of sets that used in the decision-making process and the effectiveness of decision-making in Jordanian banks?
- Is there any relationship between the suitability of information processed by the information system and the effectiveness of decision-making in Jordanian banks?
- Is there any relationship between the economic efficiency of information produced by the information system and the effectiveness of decision-making in Jordanian banks?
- Does the strength of the relationship between people working in the information system and the decision-making effectiveness in Jordanian banks differ from one person to another?

Research Hypotheses: The research has deployed seven hypotheses. Two hypotheses were categorized as the main hypotheses and the other five hypotheses

were categorized as secondary hypotheses.
These hypotheses are as follows:
First Main Null Hypothesis: 1MH0: There is no relationship between the efficiency of the used information system and the effectiveness of decision-making in Jordanian banks.
Second Main Null Hypothesis: 2MH0: There is a positive relationship between the efficiency of the used information system and the effectiveness of decision-making in Jordanian banks.
First Secondary Null Hypothesis: 1SH0: There is a significant positive relationship between the efficiency of the information system and the effectiveness of decision-making in Jordanian banks.
Second Secondary Null Hypothesis: 2SH0: There is a significant positive relationship between the used sets, communications and programs and the effectiveness of decision-making in Jordanian banks.
Third Secondary Null Hypothesis: 3SH0: There is a significant positive relationship between the suitability of the information produced by the information system and the effectiveness of decision-making in Jordanian banks.
Fourth Secondary Null Hypothesis: 4SH0: There is a significant positive relationship between the economic efficiency of the information produced by the information system and the effectiveness of decision-making in Jordanian banks.
Fifth Secondary Null Hypothesis: 5SH0: The efficiency of staff working with the information system does not differ in accordance with demographic factors.
Material and Methods: There were 15 Jordanian banks registered in Amman Financial Market at the time of collecting data that formed our research sample.
The main reason for selecting commercial Jordanian banks is the important role they play in the national economy. Moreover, the nature of their activities and tasks performed indicate a need for large amounts of data, and for continuous data flow. With all these factors taken into consideration, making effective and efficient decisions is never an easy task. A need arose to conduct a field study to analyse different factors associated with information systems use in Jordanian banks and to establish how such factors and usage affect the process of decision-making in those banks. Since the research population has big differences among its items, the researchers decided to apply the stratified sampling technique in forming the research sample. The members of the sample were of the rank of senior managers who were active participants in the process of decision-making allowing for differences in length of experience of various managers. A questionnaire was designed to take into account all the vocal points of the hypotheses that were set.
The questionnaire consisted of 50 questions divided into 4 parts, each part covered one of the following areas:
- The efficiency of people working in the information system (Questions 1-13)
- The type of used sets, communications and programs (Questions 14-25)

- The extent of information suitability (Questions 26-37)
- The economic efficiency of information (Questions 38-50)

130 questionnaire were distributed and 100 were received, a response rate of 77%. Each question in the questionnaire has 5 possible answers each of which evaluated by points between 1-5. The research assumed that to have a satisfactory answer to any question it must score at least 3 points.

Results and Discussions: In order to process the collected data and reach conclusions, variables were categorized into two sets of variables as follows:
Dependent Variable: This variable represents the Effectiveness of Decision-Making (EDM). This variable was selected as the main objective of commercial banks is profitability. Therefore, the research adopted this criterion in judging the precision and effectiveness of the decisions that are made. The research used the concept of Return On Investment (ROI) as an indicator for the profitability of the sampled banks. Table 1 shows the average ROI for the period of 5 years.

Table 1: The Average ROI

Bank Number	Average ROI
1	.84
2	1.10
3	.83
4	.54
5	2.43
6	.66
7	.50
8	.95
9	.48
10	.76
11	.98
12	.96
13	.65

Independent Variables: The research has defined the independent variable as the information system. It uses the following definition for the information system:
Information system represents the process of collecting and analyzing data in order to provide the managers and other users with information that may help them in doing their jobs and decision-making and taking into account the criteria of cost and quality suitability.
With accordance to this definition of the information system the research deduced a model consist of 4 dimensions:
- The efficiency of people working in the system (EW).
- The quality of sets, communication and programs (Q).
- The extent of suitability of information to the needs of users (S).
- The economic efficiency of information (EC).

$f(EDM) = f(EW, Q, S, EC)$

The result of this classification for this sample can be shown in Table 2:

Table 2: Represents the Efficiency of the System and its Components

Bank No.	EW	Q	S	EC	System Efficiency
1	3.75	3.65	3.85	3.9	3.79
2	3.75	3.8	3.85	3.95	3.84
3	3.6	3.5	3.7	3.7	3.625
4	3.65	3.5	3.5	3.5	3.54
5	3.6	3.8	3.8	3.7	3.725
6	3.6	3.6	3.8	3.7	3.675
7	3.45	3.4	3.5	3.45	3.45
8	3.65	3.7	3.65	3.65	3.665
9	3.45	3.4	3.45	3.4	3.425
10	3.6	3.65	3.5	3.7	3.615
11	3.2	3.25	3.2	3.45	3.275
12	3.6	3.85	3.55	3.3	3.575
13	3.55	4.1	3.9	3.3	3.84

The Table below can explain this fact:

Dependent Var.	Independent Var.	Factor	Calculated F	Tabled F
Effectiveness	Worker's Efficiency	Qualifications	0.97	2.31
		Experience	0.98	2.31
		Training	1.28	2.36

Hypotheses Testing: As mentioned earlier, there are 7 hypotheses to be tested:

First Main Null Hypothesis: The null hypothesis assumed that there isn't a significant relationship between the information system efficiency and the effectiveness of decision-making in Jordanian banks. For this we would need to find out if a relationship does exist, and if so to test its significance. This suggests that we have to determine the correlation coefficient then use t-Test to test the significance of the correlation.

Where:

$$t = \frac{r*\sqrt{n-2}}{\sqrt{1-r^2}} \sim t_{d.f=n-2,\ \frac{\alpha}{2}}$$

r is the correlation coefficient; n is number of observations; t is the calculated value of t-distribution; a is the significance level and $d.f$ is the degree of freedom.

In calculating r two variables were used. The first, the Effectiveness of Decision-Making (EDM) represented by the return on investment (see Table 1). The second variable is system efficiency (see Table 2). Applying Pearson's correlation coefficient method resulted in a calculated r for the first main null hypothesis r=0.28. The calculation of r=0.28 would suggest a weak positive correlation.

Testing this hypothesis using t-test we get:

Calculated t	00.96
Tabled t	02.201
D.F	11
Sig. Level	00.05

Since the calculated t is less than the tabled t, then we accept the 1MH0 that there isn't a significant relationship between the system efficiency and the effectiveness of decision-making.

Second Main Null Hypothesis: The previous calculation of the correlation coefficient between the information system efficiency and the effectiveness of decision-making showed that r = 0.28. This would imply that there is a positive relationship and accept the null hypothesis. Our concern is to find out the significance of each part of the system efficiency (i.e. worker efficiency, type of sets, information suitability, and economic efficiency) with the effectiveness of decision-making. Thus we have to test these four assumptions.

First Secondary Hypothesis: The null hypothesis assumes that there isn't a significant positive relationship between the efficiency of people working in the information system and the effectiveness of decision-making in Jordanian banks.

The calculation of r=0.124 would suggest a weak positive correlation. Testing this hypothesis using t-test we get:

Calculated t	00.413
Tabled t	02.201
D.F	11
Sig. Level	00.05

Since the calculated t is less than the tabled t, then we accept the 1SH0 that there is not a significant positive relationship between the efficiency of people working in the information system and the effectiveness of decision-making. The average efficiency of the system worker in the sample was 71%.

Second Secondary Null Hypothesis: The null hypothesis assumes that there isn't a significant positive relationship between the type, communication & programs and the effectiveness of decision-making in Jordanian banks.

The calculation of r=0.304 would suggest a weak positive correlation. Testing this hypothesis using t-test we get:

Calculated t	01.587
Tabled t	02.201
D.F	11
Sig. Level	00.05

Since the calculated t is less than the tabled t, then we accept the 2SH0 that there is not a significant positive relationship between the type, communication & programs and the effectiveness of decision-making in Jordanian banks. The average type, communication & programs in the sample were 72%.

Third Secondary Null Hypothesis: The null hypothesis assumes that there isn't a significant positive relationship between the suitability of information and the effectiveness of decision-making in Jordanian banks.

The calculation of r=0.276 would suggest a weak positive correlation. Testing this hypothesis using t-test we get:

Calculated t	00.952
Tabled t	02.201
D.F	11
Sig. Level	00.05

Since the calculated t is less than the tabled t, then we accept the 3SH0 that there is not a significant positive relationship between the suitability of information and the effectiveness of decision-making in Jordanian banks. The average of the suitability of information in the sample was 73%.

Fourth Secondary Null Hypothesis: The null hypothesis assumes that there isn't a significant positive relationship between the economic efficiency of information and the effectiveness of decision-making in Jordanian banks.

The calculation of r=0.278 would suggest a weak positive correlation. Testing this hypothesis using t-test we get:

Calculated t	00.96
Tabled t	20.201
D.F	11
Sig. Level	00.05

Since the calculated t is less than the tabled t, then we accept the 4SH0 that there is not a significant positive relationship between the economic efficiency of information and the effectiveness of decision-making in Jordanian banks. The average of the economic efficiency of information in the sample was 77%.

Fifth Secondary Null Hypothesis: The null hypothesis assumes that the relationship between the efficiency of worker in the field of information system and the effectiveness of decision-making does not differ with different types of demographic factors.

Testing this hypothesis using the analysis of variance technique (ANOVA), the results showed that calculated F values for the factors: Personal qualifications, Experience and training are less than the tabled F values at 5% significance level. This would allow us to accept 5SH0 and reject the alternative hypothesis.

Conclusion

It is believed that the existence of efficient and effective information systems would have a positive impact on the performance levels and the quality of services that an establishment provides. As for the extent of information system efficiency in Jordanian banks and its relationship to the effectiveness of decision-making, research analysis indicates the following results:

- Though there is a positive relationship between information systems and the effectiveness of the decision-making, but it wasn't significant relationship.
- It isn't necessary that banks with most efficient information systems would produce highest profits, but this would reflect on the quality and readiness of services produced for public.
- The average efficiency for the information systems in Jordanian banks was 72.4%.
- The average efficiency for the workers in the information systems in Jordanian banks was 71%.
- The efficiency of the used sets in the information systems was 72%.
- The efficiency of information output of the system and its suitability for the needs of users was 73%.
- The economic efficiency for the information system was 73.5%.
- The workers efficiency in the information system had 71%.

Recommendations:

- As information systems have great influence on the improvement of quality of jobs, it is recommended here that emphasis is made on re-training and qualifying of workers in the field of information systems.
- There is a necessity for imposing control procedures on the use of information systems and related sets in order to maintain secrecy and safety of information.
- The research recommends that banks in Jordan take the initiative of building an information bank; its main target is to analyze, formulate and integrate information banks receive from other information centers so that information can be shared by all Jordanian banks and other users as and when needed.
- It is recommended that more studies on this topic be carried out in order to give more insight into the topic and reach more comprehensive conclusions.
- Throughout the interviews made, it was clear that the notion of scientific research was not an issue that was taken up seriously by banks. It didn't receive the due attention it deserves. This would affect the credibility of any research carried out and endanger quality of results. It is strongly recommended that the scientific research should be given the due attention it deserves through teaching it at university and college levels emphasizing that by applying it in the work place.

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