

Measurement Models Of Information Service Quality: A Study On The Banking Sector

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Abstract:- Competition in the financial industry is intensified due to the globalization and the advancement in information technology. Today, the adoption of information systems has evolved from office automation to providing comprehensive information critical in decision making. By far, the quality of information service becomes one of the important factors in customers' assessment of service quality even before making purchase decisions. Likewise in the banking sector, customers' decision to subscribe to the banks services would depend on amongst, the ISQ. This study aimed at identifying the measurement of ISQ based on customers' expectations. With the use of questionnaire survey customers' perceptions of quality of information service were identified. Questionnaires were randomly distributed to banks customers upon obtaining permission from the banks' branch managers. To meet the research objectives descriptive and causal analyses were applied. SEM technique was applied to propose the measurement models of a four-construct ISQ. Theoretical and managerial implications were discussed. Finally this study presented some future directions of research.

Keywords: - *information technology, service quality, banking sector, Libya.*

Introduction

The financial industry is witnessing fierce competition from major countries around the world that dominate the world's economy. Traditionally, competition was centered on the aspects of service quality which comprised of services rendered to the customers, for example at bank counters, types of products offered to the customers and so forth. However, with the evolvement of new technologies, information has become vital part of this rigorous competition, especially in the banking sector. One of the reasons why financial institutions place such great emphasis on information is because of the direct effect of the level of the quality of service provided that in turn enhances the profitability of the financial institution. [1] Have reported that there is a link between ISQ provided and the profitability of the financial institution and its market share. Besides increasing the quality of information generated and provided to potential customers, information quality also has proven to reduce costs significantly in commercial banks.

Information Services in the Banking Sector

Defining Information Services

The American Association of Information systems defines the information system in general as an automated system to collect, organize, deliver and display information for use by individuals in the area of planning and monitoring of the activities carried out by organizations [2], [3]. Further [4] suggested that information system is also known as a system that provides the banking sector with the essential information for decision making at the appropriate time and suitable for the managerial level. Such a system will receive information, then save, process, and compile them, which will then be provided for its users at the right time and place.

Information Services in the Banking Sector

Indeed, the growth in communication channels in the banking sector renders information systems increased importance in providing information as a service, both vertically and horizontally within a company, and allowing for a mutual exchange between each other. Primarily, the presence of information in any banking sector is essential, but might not be adequate in solving all the problems faced by the banking sector unless the information put into a system is capable in providing the essential and necessary information at the right time and with the right value which will determine the quality and level of information services, be it good or poor [5], [6]. Consequently, ISQ has become a critical concern in today's financial institutions. Although recent studies of information systems indicate an increasing importance in understanding the attributes of ISQ, research is still limited. Recent research shows that ISQ measures are increasingly important for any information systems implementation. At the same time, literature indicates that trade-offs between various ISQ measures do exist. This study aimed at empirically identifying the ISQ measures and seeks to propose the measurement models of ISQ appropriate for the banking sector.

Measurement of Information Service Quality (ISQ)

Many studies have confirmed that ISQ is a multi-dimensional concept [7], [8]. ISQ has been defined as fitness for use, in a way that data or information of high quality "meets or exceeds the users' requirements" [8]. In addition, [9] defines ISQ as the provision of information at the level expected by customers while [10] defines ISQ as meeting the needs and requirements of the customer from the first contact point. Further, [11] define ISQ as the provision of information at the right time to meet the needs and expectations of customers to coincide with the consensus that are consistent and coherent. [12] Have developed a set of lists of desirable ISQ measurement in an attempt to define information service quality. These measures include items such as accuracy, timeliness, reliability, consistency, importance, precision, understand ability, usefulness and conciseness. In addition, [13] proposed an Information Systems Success Model which includes systems quality, information quality, user satisfaction and organizational impacts. On the other hand, [8] proposed a framework which was based on an extensive survey of the opinions of information service practitioners and resulted in the specification of four constructs of ISQ: intrinsic, access,

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contextual, and representational. These constructs were used to group the sixteen most important ISQ measures. Overall, many researchers have pointed out various measures of the ISQ. Drawn upon measures reported by previous studies on information systems quality i.e [8], [13] this study examined the appropriate measurement models for each constructs of the ISQ which are applicable to the banking sector.

Access Construct

The first measure is Accessibility which refers to the extent to which information is quickly retrievable [14]. The second measure is security which concerns appropriate restricted access to information [14].

Intrinsic Construct

The ISQ is seen as being determined by the integral characteristics of information service. The essential characteristics which are considered as giving information have its degree of integrity [15]. The measures associated with Intrinsic construct which comprises four elements: believability, accuracy, objectivity and reputation. The first measure is Believability. It is the extent to which information is regarded as credible [14]. The second measure is Accuracy, which is defined as the degree of correctness pertaining to the content of the data [16]. Next, is Objectivity which refers to the extent of which information is unbiased, unprejudiced, and impartial [14]. The fourth measure is Reputation, which refers to information to be highly regarded in terms of its source or content [14].

Representational Construct

The Representational construct of ISQ is represented by four measures: conciseness, understandability, interpretability and consistency. Conciseness involves information supplies is relevant to the information needs of the recipient. In addition, the information should be provided in the most compact form possible. This view is advocated by [13], [8]. The second measure is Understandability as proposed by [8] which is concerned about the data being clear, readable, unambiguous and easily comprehensible. Next is Consistency, which can be achieved if the representation of the information is the same in all cases. It involves continuous representation of information in the same format, compatible with previous information, and consistent in presentation [7], [8]. The fourth measure is interpretability and it relates to the extent to which information is disseminated in appropriate languages, symbols, and units with clear definitions [14].

Contextual Construct

Contextual construct highlights the requirement that information quality must be considered within the context of the task at hand; it must be relevant, complete, timely, and appropriate in terms of amount, so as to add value. The measures associated with Contextual ISQ include five items: Value-added, Timeliness, Relevancy, Amount of data and Completeness. The first measure is Value-added, indicating the possibility of increasing some "value" (e.g., customer's satisfaction) by using information [17]. Such information concerns the customers' needs which are also value adding because the fulfillment of the needs increases the customer's satisfaction. The value-added amount is calculated as the difference between the value that can be realized without using specific information and the value that can be realized

with specific information. The second measure is Timeliness, that is, the information should be available when needed. Providing of early information may deem to be no longer current when used. If the information is supplied too late, it will be of no use. Next is the Amount of data, which refers to the volume of information appropriate for the task at hand [14]. The fourth measure is Relevancy, that is, the information supplied should be relevant to a particular situation and should meet the information needs of the recipient. The final measure is Completeness. It concerns information provided should be able to match the information needs of the recipient. Incomplete information may compromise other attributes of ISQ, such as scope and accuracy.

Scope and Objectives of Study

This study focuses on North African Region, in particular Libya. The North African countries are similar in many aspects such as political, economical, and social. Most of them have the same problems inherited in from the banking sectors, but when compared to other North African countries, Libya s' financial capacity is much bigger. Yet the banking sector in Libya is still unable to compete aggressively in the global financial industry. One of the factors that contribute to the growth of the banking sector is the increase in the number of customers within sector. Access to quality and efficient ISQ is important in order to gain customers' trust. This study seeks to provide better understanding on customers perceived quality of information services in the banking sector, in turn would assist managers in planning and improving the overall service quality.

Research Method

Questionnaire Design

Prior to testing this instrument for a pilot study, academic experts' opinions were sought to review the questions for validity purposes. Having made some changes to the draft, a pilot study was conducted on a smaller, yet representative sample than that of the intended sample of the study. The questions yielded high reliability indicating good internal consistency. Some respondents suggested rewording of some questions so as to avoid ambiguity. These comments were incorporated in the final questionnaire. The questionnaire consisted of two sections: Section A consisted of questions assessing the respondents' opinions on preferred information service quality provided by banks; Section B comprised of demographic information and the respondents' activities pertaining to banking in terms of frequency, years of experience, types of subscribed services and the degree of satisfaction. All items were measured on 5-point likert scales, ranging from 1 = strongly disagree to 5 = strongly agree.

Sampling and Data Collection

The target respondents in this study were the current customers from five major banks (Al-Sahara Bank /PNP Paribas Group, Al-Umma Bank, Al-Gumhouria Bank, Al-Wahda Bank and The National Commercial Bank) in Libya at the time the survey was conducted. To recognize and treat the sampling frame difficulty, the target population was defined as customers who had banking accounts. To meet the research objectives, the data analysis techniques for this research were descriptive analysis, and causal analysis using SEM. SEM is very sensitive to sample size and is less stable when

estimating small samples [18]. As a general rule of thumb, at least 300 cases were deemed comfortable, 500 as very good and 1000 as excellent [18], [19], thus it was decided to target a total of 1000 respondents from the five major banks mentioned above. Letters seeking permission to distribute the questionnaire to the banks customers were sent out to the branches of the banks in major cities in Libya: Tripoli, Benghazi, Al Jabal Garbi and Al Jabal Al Akhdar,. A total of 30 branches were contacted out of which 23 were willing to cooperate. The rest did not respond or turned down the request. Upon obtaining permission from the banks' branch managers, the data collection began with researchers randomly distributing the questionnaires to the banks customers. The self administered questionnaires were returned in a collection box once the customers have responded.

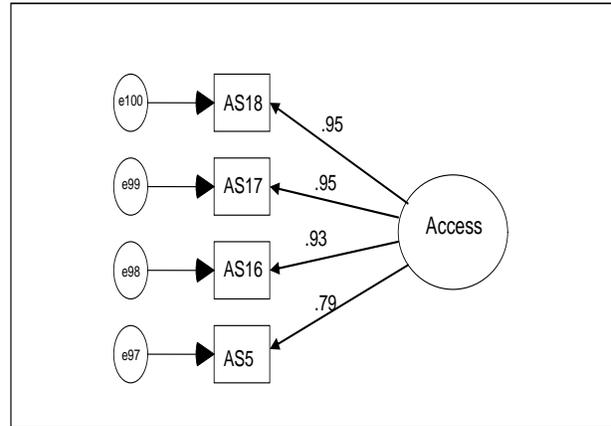


Figure 1. CFA of Access

Data Analysis

Descriptive analysis was performed for easy interpretation of the data, such as frequency distribution and the mean. Next, correlation and factor analysis were conducted to determine the existence of inter-relationships between the variables and the clustering of data into identifiable components, which were steps to be taken before proceeding further with causal analysis. To understand the measurement that form customers' perceived quality of information service, causal analysis of SEM was conducted using the AMOS 20.0 software. Where ever applicable, AMOS even suggested how the model may be improved to obtain a good-fit between the data and the model [18]. Standardized betas were used to determine the strength and direction of the relationships in the model. SEM provided the cause-effect relationship between the research items as well as modeling the measurement of ISQ.

TABLE 1: Goodness-of-fit Statistics for the Measurement Model of Access

Standardised Regression Weight	Estimate	Goodness-of-fit measures	
AS 5 ← ACCESS	0.79	Root mean error of est.(RMSEA)	0.000
AS 16 ← ACCESS	0.93	Goodness-of-fit index(GFI)	0.98
AS 17 ← ACCESS	0.95	Tucker-Lewis index(TLI)	0.99
AS 18 ← ACCESS	0.95	Comparative Fit index(CFI)	0.99
Keys:			
ACCESS - Accessibility and Security			
AS 5 - The information about the company's stock market is quickly retrievable	AS17- Data are treated with high confidentiality		
AS16 - The bank has a secured database that provides high restriction on data to maintain its security	AS18 - Data are safeguarded with high security		

Results

Measurement Models of ISQ

Measurement Model of Access Construct

This section presents a uni-dimensional model of Access construct. Initially, the measurement model consisted of five observed variables. However, one item, AS1: "The information is readily available for investment decisions" had poor loadings and was dropped. The reliability level, standardized regression weights and goodness-of-fit statistics (RMSEA= 0.000, CFI= 0.99, TLI= 0.99 and GFI= 0.98) indicate that the four-indicator variables are good measures of the Access construct. As shown in Table 1, the standardized regression weights are all above the desired level at (≥0.50). Hence, this study suggests a four-item measurement model of Access construct (Item No. 5, 16, 17 and 18). Figure 1 depicts the proposed model.

Measurement Model of Intrinsic Construct

The results showed a very good fit of the data to the model. The internal reliability is very good indicating high internal reliability and consistency. In addition, the goodness-of-fit statistics: RMSEA= 0.023, CFI= 0.99, TLI= 0.99 and GFI= 0.99, indicate that the five-indicator variable model represents the Intrinsic construct well.

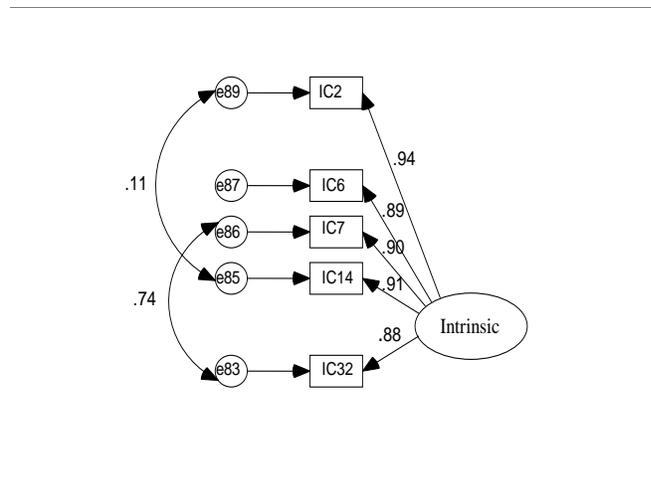


Figure 2 CFA of Intrinsic

TABLE 2: Goodness-of-fit Statistics for the Measurement Model of Intrinsic

Standardised Regression Weight	Estimate	Goodness-of-fit measures	
IC2 ← INTRINSIC	0.94	Root mean error of est.(RMSEA)	0.023
IC6 ← INTRINSIC	0.89	Goodness -of-fit index(GFI)	0.99
IC7 ← INTRINSIC	0.90	Tucker -Lewis index(TLI)	0.99
IC14 ← INTRINSIC	0.88	Comparative Fit index(CFI)	0.99
IC32 ← INTRINSIC			

Keys:

INTRINSIC - Accessibility and Security	
IC2 - The information is reliable	IC14- The content of the data is unbiased.
IC6 - The information provided by the bank is correct	IC32 - Information provided by the bank is characterized by a high degree of credible
IC7 - The information provided is regarded as credible.	

TABLE 3: Goodness-of-fit Statistics for the Measurement Model of Represent

Standardised Regression Weight	Estimate	Goodness-of-fit measures	
RL8 ← REPRESENT	0.80	Root mean error of est.(RMSEA)	0.00
RL13 ← REPRESENT	0.83	Goodness -of-fit index(GFI)	0.99
RL24 ← REPRESENT	0.97	Tucker-Lewis index(TLI)	0.99
RL26 ← REPRESENT	0.91	Comparative Fit index(CFI)	0.98
RL29 ← REPRESENT	0.94		

Keys:

REPRESENTATIONAL -

RL8 - Summarized information which is easily comprehended is preferred.	RL26 - The meaning of information provided by the bank is easy to understand.
RL13 - The information provided can be easily understood.	RL29 - The information is presented in a compact form.
RL24 - The information is provided by the bank is easy to interpret what this information means.	

Measurement Model of Representational Construct

Next, the results of the measurement model of Representational construct are discussed. Initially, the measurement model consisted of ten observed variables. However, due to extremely low factor loadings i.e less than 0.5, five items: RL12, RL20, RL25, RL27, and RL31 were eliminated so as to reach a significant model as hypothesized. The reliability level, standardized regression weights and goodness-of-fit statistics indicate that the five-indicator variables are good measures of representational construct as shown in Table 3 and Figure 3

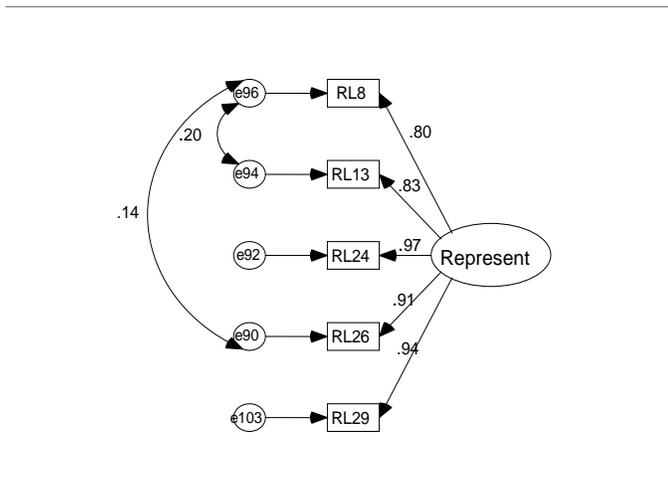


Figure 3. CFA of Representational

Measurement Model of Contextual Construct

The uni-dimensional model of Contextual construct is presented in this section. Initially, the measurement model consisted of eleven observed variables. However, due to low factor loadings, five items CL11, CL15, CL23, CL30, and CL35 were eliminated in order to reach a significant model that fits well with the data. Having done omitting low loading items, the internal reliability was found to be very good, with the support of the convergent validity. The good-of-fit statistics of this model, as shown in Table 4 are reinforced by RMSEA= 0.000, CFI= 0.99, TLI= 0.99 and GFI= 0.98. Therefore, this study proposes a six-indicator model of Contextual construct as illustrated in Figure 4

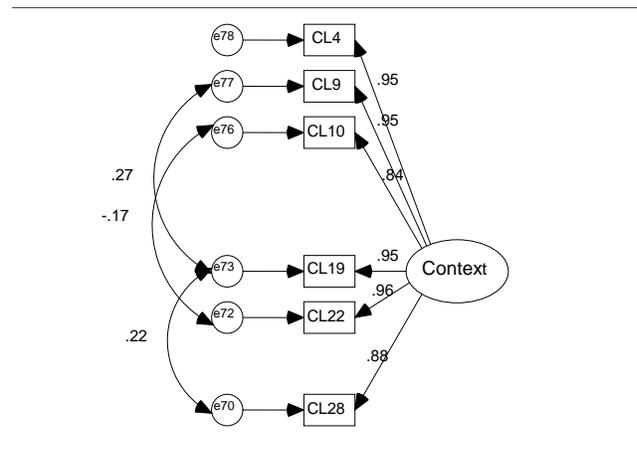


Figure 4. CFA of Contextual

TABLE 4: Goodness-of-fit Statistics for the Measurement Model of Context

Standardised Regression Weight	Estimate	Goodness-of-fit measures	
CL4 ← CONTEXTUAL	0.95	Root mean error of est.(RMSEA)	0.030
CL9 ← CONTEXTUAL	0.95	Goodness-of-fit index(GFI)	0.98
CL10 ← CONTEXTUAL	0.84	Tucker-Lewis index(TLI)	0.99
CL19 ← CONTEXTUAL	0.95	Comparative Fit index(CFI)	0.99
CL22 ← CONTEXTUAL	0.96		
CL28 ← CONTEXTUAL	0.88		

Keys:

CONTEXTUAL -

CL4 - The information provided consists of appropriate amounts of data required for the investment decision.

CL9 - The information available to clients is complete.

CL10 - The information that is available to clients is sufficient for the investment decision

CL19 - The information provided is up-to-date.

CL22 - The information provided has added-value advantage

CL28 - The information provided by the bank is sufficiently timely

TABLE 5: Measurement Model of ISQ (2nd Order Analysis)

Standardised Regression Weight	Estimate	Goodness-of-fit measures	
AS ← ACCESS	0.92	Root mean error of est.(RMSEA)	0.030
IC ← INTRINSIC	0.83	Goodness-of-fit index(GFI)	0.97
CL ← CONTEXTUAL	0.65	Tucker-Lewis index(TLI)	0.97
RL ← REPRESENTATIONAL	0.65	Comparative Fit index(CFI)	0.98

Keys:

ACCESS
AS 5- The information about the company's stock market is quickly retrievable.
AS 16- The bank has a secured database that provides high restriction on data to maintain its security.
AS 17- Data are treated with high confidentially.

INTRINSIC
IC 2- The information is reliable.
IC 7- The information provided is regarded as credible.
IC32- Information provided by the bank is characterized by a high degree of credible.

CONTEXTUAL
CL 19- The information provided is up-to-date.
CL 22- The information provided has added-value advantage.
CL 28- The information provided by the bank is sufficiently timely.

REPRESENTATIONAL
RL 13- The information provided can be easily understood.
RL 24- The information is provided by the bank is easy to interpret what this information means.
RL 26- The meaning of information provided by the bank is easy to understand.

Measurement Model of the ISQ (2nd Order)

The results showed a very good fit of the data to the model of ISQ. The internal reliability and consistency are evident from an excellent level of error (P = 0.000), which indicates that the twelve item model is good and significant to measure the ISQ construct. The fit indices: RMSEA=0.030; CFI = 0.984, TLI = 0.979 and GFI= 0.975, indicate a good fit of indices. Based on the values of standardized regression weights, reliability and goodness-of-fit statistics, the measurement model of ISQ fitted well with the data. The twelve-indicators as significant indicators in the measurement model of ISQ are illustrated in Figure 5 and Table 5.

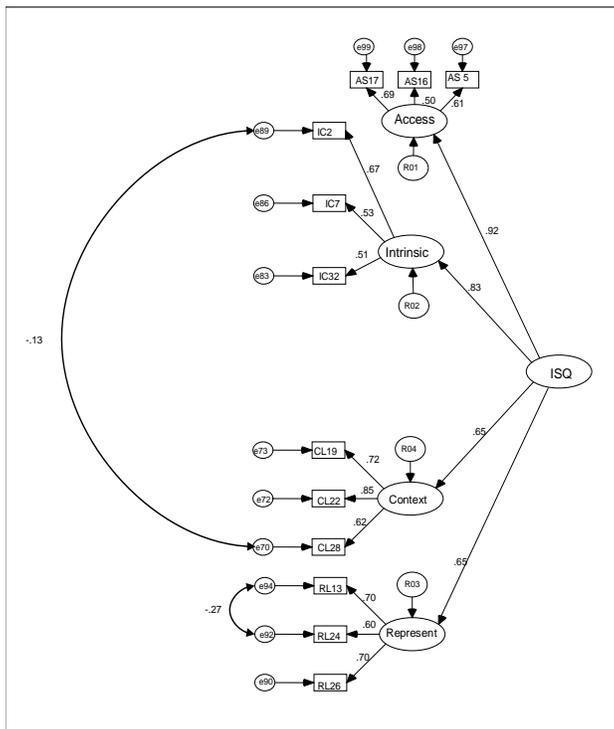


Figure 5. Measurement Model of ISQ

The paths between errors are suggested as modification indices which should be added in order to get a better model fit (as cited above). However, play around with adding some correlations between the error terms to get a better model fit according to the Chi-square value [17]. The negative correlations between the error terms (e89 and e70 and e94 and e92) are both theoretically and empirically justified. Theoretically, poor information provided to the customer by banks (e70) cannot be easily understandable (e89) [8] and both e92 and e94 are error terms for measures of the reliable and sufficient timely of the information provided by the banks (the correlation between the both errors in the model was negative, this means that there are no reliable and sufficient timely of the information). Empirically, the correlated error terms discussed in this section and subsequent sections were identified in the estimation process. Though they are post hoc adjustments to improve model fit, they are acceptable if they are theoretically justified [20].

Discussion and Conclusion

To be more competitive in the service industry, bank managers should comprehend the factors that are imperative in customers' overall assessment of service quality. One of the critical factors affecting perceived quality is the level of information services rendered to banks customers. Indeed, customers' decision to trust and be loyal to a banking service provider depends on the firm's credibility and reliability of safekeeping customers financial information. Simultaneously, assurance of high security practices is imperative in increasing the level of confidence in the banks ISQ. The findings from this study suggest that customers mostly prefer information to be easily understood and simple suffice for them to make decisions, particularly related to investments. In addition, information provided in relations to investment opportunities should be correct, up-to-date and appropriately sufficient to their needs. Theoretically, this study has contributed to empirically identifying the measurement of ISQ and modeling the multiple-constructs of ISQ which the previous studies lacked. Next, as the research was carried out in Libya, this study has filled the gap in the literature which lacks findings from the North African region. From the industry perspective, this study has reported the salient measurement of what constitutes quality information services as perceived by the customers. With a better understanding of customers

expectation of ISQ banks managers may be able to strategize and adopt an incremental leap to enable them to function efficiently and effectively in view of competition in the global economy. Although the research was conducted in Libya other financial institutions in North Africa could benefit from the findings through the recognition of the importance of the ISQ which will attract potential customers to patronage and subscribe to the banking services. Similar research may be replicated in other North African countries such as Egypt, Algeria, and Middle East Countries such as Saudi Arabia, Yaman, Oman and Jordan since these countries have economic and cultural backgrounds that are similar to Libya. Further studies may examine how culture and diversity influence the perceptions of ISQ. Finally, it is suggested that for future studies, a qualitative approach such as interviews and focus group discussions may add more depth to the findings of the study. The study was conducted in the banking sector. The findings may not reflect the overall situation in other sectors, such as the public sector in Libya. As such, further research should be conducted in other organizational cultures and business environments to determine the generalization of the findings.

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