

The Effect of Knowledge Management Quality and Management Information Systems on Decision Making Quality

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Abstract

In this study, the researchers used the SEM-PLS technique and analysed the 398 valid questionnaires for assessing the proposed model which was based on the different technology management characteristics. They aimed to determine its impact on the decision-making quality of the governmental organisations in the UAE. The major independent constructs used in the study were knowledge management quality and management information systems. On the other hand, the dependent construct included the decision-making quality. The researchers have described the relationship between the different constructs. This study could improve insight into the significance of decision management systems. Furthermore, the proposed model could explain 54% of the variance that was seen in the decision-making quality.

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I. Introduction

Managers are saddled with the responsibility of leading their organizations to achieve objectives and stated goals. This does not only require versatility and prowess, but more adequate knowledge management with excellent decision-making. The term “knowledge” has been viewed and defined from differing perspectives. According to Davenport and Prusak (1998), knowledge is a blend of contextual information, framed experience, expert’s experience and value that results in innovation and pristine experience. Knowledge is also regarded as organizational culture, skills, reputation, intuition, and codified theory that influences human behavior and thought (Hall & Andriani, 2003).

Nonaka (1991) classified knowledge into “Tacit” and “Explicit” knowledge based on the ease for coding and transferring the available knowledge. Explicit knowledge is easily transferable and coded, while tacit knowledge is rooted deeply into the system within the organization. In its passive form, knowledge is useless, however, when activated through creative processes for application, replenishing and sharing, it may lead to outstanding performance. Therein, knowledge management is the process of activating passive knowledge for the benefits of organizations and to gain competitive edge (Duffy, 2000; Van Buren, 1999).

Furthermore, this paper attributed the evolution of information systems due to the great technological and economic revolution in many countries and the important impact of

globalization on modern organizations, moreover, information systems are becoming increasingly important in all areas also, at a rapid pace, information systems have evolved and their applications have been implemented at all administrative levels (Al-Obthani & Ameen, 2019b; Albreki, Ameen, & Bhaumik, 2019; Alhefity, Ameen, & Bhaumik, 2019b; Alshamsi, Ameen, Isaac, Khalifa, & Bhumic, 2019; Alshamsi, Ameen, Nusari, Abuelhassan, & Bhumic, 2019; Ameen & Ahmad, 2013). As well as it has been relied upon in operational, technical and strategic levels.

This paper will examine the impact of knowledge management quality and management information systems on decision making quality in public sector organizations in UAE.

II. 2. Literature Review

2.1 Decision Making Quality (DMQ)

The decision-making process is significant administrative processes but it must be stressed here that not every process requires a decision, but each process requires a different kind of information than other processes; Given the importance of decision-making in management and the importance of information, attention has been paid to this work. Decision-making is an important issue affecting the functioning of organizations and has a significant impact on the management of human resources (Alhefity, Ameen, & Bhaumik, 2019a; Alkatheeri et al., 2020; Yazeed, Ali, & Al-Shibami, 2018). Where the mechanism of decision-making and taking of the subjects of great importance that occupied the social scientists and researchers, especially those involved with sociology or management, because of its direct impact on the human element in organizations and businesses. (Hall, 2007).

2.2 Knowledge Management Quality (KMQ)

Knowledge management quality refers to the techniques, tools and human resources used to collect, manage, disseminate and invest knowledge within an organization also, the knowledge administration is seen as managing people's knowledge-based skills, not just what is documented in the organization's documents. Moreover, the goal of knowledge administration is linked to decision-making in organizations (Nonaka et al., 2009; Albreki, Ameen, & Bhaumik, 2019). Knowledge management literature abounds with original studies and researches of interrelated nature in various aspects of administrative, economic, human, behavioral and technological sciences, this situation has led to the emergence of many different approaches to knowledge of stability, analysis and in-depth presentation from different perspectives. Consequently, the following hypotheses are proposed:

H1: Knowledge management quality has a positive effect on decision making quality.

2.3 Management Information Systems (MIS)

Management information system refers to a set of interrelated elements that interact to perform a specific function, to achieve a particular goal, or group goals, but remains named Information Systems. Moreover, an information system based on an organization's computer systems includes components of hardware, software, data, communications and similar interrelated elements, which works to achieve the objectives of the organization. (Kandilji, 2008; Al-Obthani & Ameen, 2019; Alneyadi, Al-shibami, Ameen, & Bhaumik, 2019; Ameen & Ahmad, 2011; Ameen, Almari, & Isaac, 2018). Nowadays, work is highly dependent on cutting-edge scientific methods and modern theories, therefore, the work is going through the systems and clear policies that rely on systems, as well as the system can generally be defined as a set of elements or parts that are

integrated and controlled by specific relationships and mechanisms and within a specific scope with a view to achieving a particular objective. (Al-Hassania, 2002). Consequently, the following hypothesis is proposed:

H2: Management information systems has a positive effect on decision making quality.

III. 3. Research Method

3.1 Overview of the Proposed Conceptual Framework

Based on the above literature, the proposed model in figure 1 consists of knowledge management quality (knowledge

diagnosis, knowledge acquisition, knowledge distribution, knowledge implementation), management information systems (organizing data, information retrieval speed, incentive regulation, system quality), decision making quality (identify the problem, gather information, identify the alternatives, take action).

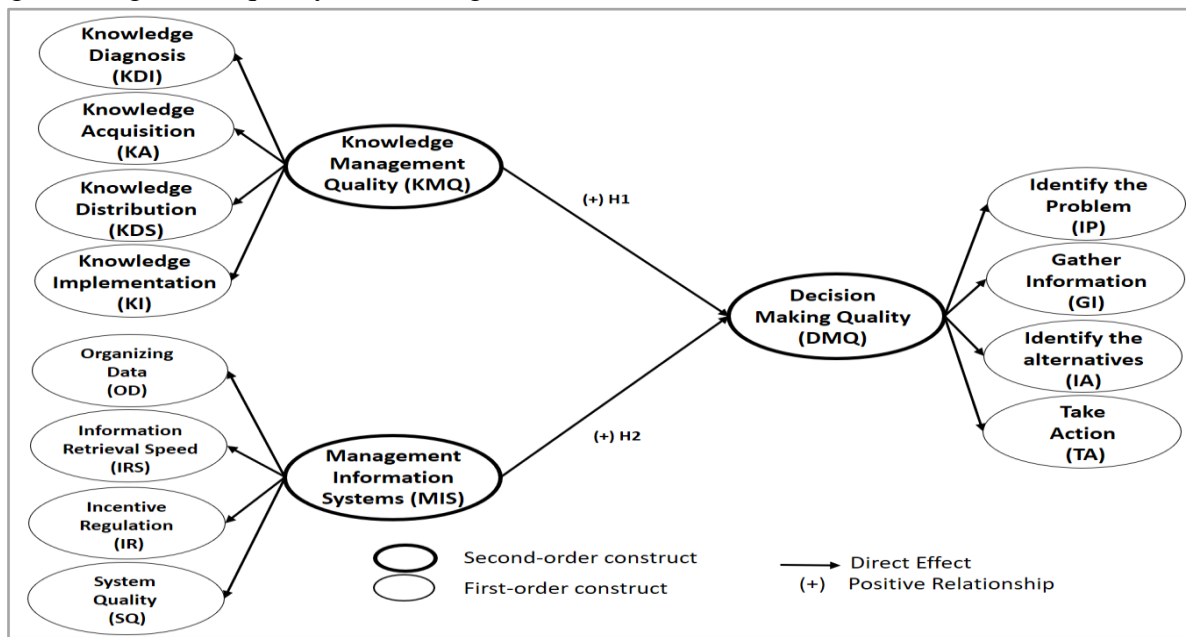


Figure 1: The proposed conceptual framework

3.2. Development of Instrument and Data collection

In this study, the researchers developed the questionnaire tool which consisted of 60 questions. Variables were measured using a Likert Scale which recommended in the previous studies (Isaac, Aldholay, Abdullah, & Ramayah, 2019; Isaac, Abdullah, Ramayah, & Mutahar, 2018). This information was collected by delivering the self-managed questionnaire

‘in-person’ to the employees in the General Directorate of Residency and Foreigners Affairs in Dubai and the Telecommunications Regulatory Authority, UAE, in the period between March 2018 and April 2019. Out of the 500 questionnaires that were distributed, 398 responses were seen to be suitable for analysis. This sample size was sufficient as stated by Krejcie and Morgan (1970) and Tabachnick and Fidell (2012).

IV. Data Analysis and Results

PLS (Partial Least Squares) SEM-VB (Structural Equation Modelling-Variance Based) was employed to assess the research model by utilizing the software SmartPLS 3.0 (Ringle, Wende, & Becker, 2015). The main reasons for choosing SEM as a statistical method for this study is that SEM offers a simultaneous analysis which leads to more accurate estimates (Isaac, Abdullah, Aldholay, & Ameen, 2019; Isaac, Abdullah, Ramayah, & Mutahar, 2017; Mutahar, Daud, Thurasamy, Isaac, & Abdulsalam, 2018).

4.1 Measurement Model Assessment

The individual Cronbach's alpha, the composite reliability (CR), The average variance extracted (AVE), and the factor loadings exceeded the suggested value (Kline, 2010; Hair, Black, Babin, & Anderson, 2010) as illustrated in Table 1. Further, discriminant validity through Fornell-Larcker (see table 2) was found adequate as recommended by (Fornell & Larcker, 1981; Chin, 1998).

Table 1: Measurement model assessment

Constructs	Item	Loading (> 0.7)	M	SD	α (> 0.7)	CR (> 0.7)	AVE (> 0.5)
Knowledge Diagnosis (KDI)	KDI1	0.893	4.31	0.92	0.953	0.964	0.843
	KDI2	0.921					
	KDI3	0.906					
	KDI4	0.938					
	KDI5	0.932					
Knowledge Acquisition (KA)	KA1	0.889	4.00	0.95	0.929	0.946	0.779
	KA2	0.884					
	KA3	0.881					
	KA4	0.896					
	KA5	0.862					
Knowledge Distribution (KDS)	KDS1	0.887	4.07	0.91	0.942	0.956	0.811
	KDS2	0.911					
	KDS3	0.905					
	KDS4	0.905					
	KDS5	0.897					
Knowledge Implementation (KI)	KI1	0.808	3.78	0.93	0.914	0.936	0.745
	KI2	0.887					
	KI3	0.892					
	KI4	0.886					
	KI5	0.840					
Organizing Data (OD)	OD1	0.909	3.90	0.87	0.950	0.961	0.833
	OD2	0.923					
	OD3	0.917					
	OD4	0.902					
	OD5	0.912					
Information Retrieval Speed	IRS1	0.856	3.73	0.96	0.919	0.939	0.755
	IRS2	0.905					
	IRS3	0.864					

(IRS)	IRS4	0.878					
	IRS5	0.841					
Incentive Regulation (IR)	IR1	0.907					
	IR2	0.930					
	IR3	0.893	3.86	0.94	0.944	0.957	0.818
	IR4	0.898					
	IR5	0.894					
System Quality (SQ)	SQ1	0.911					
	SQ2	0.916					
	SQ3	0.899	3.64	0.92	0.931	0.948	0.787
	SQ4	0.900					
	SQ5	0.804					
Identify the Problem (IP)	IP1	0.876					
	IP2	0.869					
	IP3	0.878	3.87	0.83	0.933	0.949	0.788
	IP4	0.910					
	IP5	0.905					
Gather Information (GI)	GI1	0.874					
	GI2	0.908					
	GI3	0.925	3.88	0.85	0.939	0.954	0.805
	GI4	0.916					
	GI5	0.862					
Identify the alternatives (IA)	IA1	0.882					
	IA2	0.923					
	IA3	0.922	4.13	0.91	0.940	0.954	0.807
	IA4	0.933					
	IA5	0.827					
Take Action (TA)	TA1	0.891					
	TA2	0.950					
	TA3	0.937	4.25	0.91	0.951	0.963	0.837
	TA4	0.895					
	TA5	0.901					

Note: M=Mean; SD=Standard Deviation, α = Cronbach's alpha; CR = Composite Reliability, AVE = Average Variance Extracted.

Key: KD: Knowledge Diagnosis, KA: Knowledge Acquisition, KD: Knowledge Distribution, KI: Knowledge Implementation, OD: Organizing Data, IRS: Information Retrieval Speed, IR: Incentive Regulation, SQ: System Quality, IP: Identify the Problem, GI: Gather Information, IA: Identify the alternatives, TA: Take Action

Table 2: Fornell-Larcker criterion

	GI	IA	IP	IR	IRS	KA	KDI	KDS	KI	OD	SQ	TA
GI	0.897											
IA	0.731	0.898										
IP	0.782	0.721	0.888									
IR	0.601	0.566	0.628	0.904								

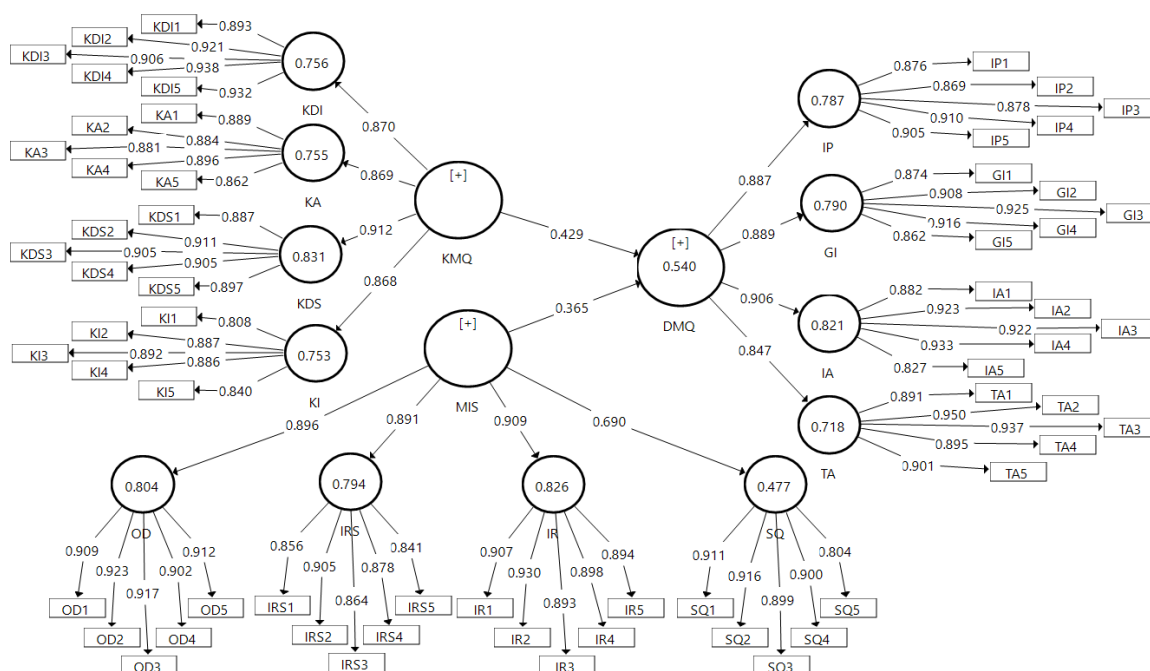
IRS	0.580	0.567	0.607	0.801	0.869							
KA	0.533	0.495	0.536	0.520	0.491	0.883						
KDI	0.463	0.539	0.481	0.574	0.531	0.680	0.918					
KDS	0.580	0.563	0.594	0.647	0.597	0.712	0.725	0.901				
KI	0.575	0.552	0.540	0.647	0.581	0.677	0.639	0.758	0.863			
OD	0.532	0.505	0.572	0.747	0.733	0.540	0.552	0.598	0.564	0.913		
SQ	0.342	0.360	0.401	0.489	0.457	0.405	0.420	0.405	0.382	0.525	0.887	
TA	0.624	0.741	0.631	0.471	0.468	0.491	0.566	0.526	0.523	0.426	0.347	0.915

Note: Diagonals represent the square root of the average variance extracted while the other entries represent the correlations.

Key: KD: Knowledge Diagnosis, KA: Knowledge Acquisition, KDI: Knowledge Distribution, KI: Knowledge Implementation, OD: Organizing Data, IRS: Information Retrieval Speed, IR: Incentive Regulation, SQ: System Quality, IP: Identify the Problem, GI: Gather Information, IA: Identify the alternatives, TA: Take Action.

4.2 Structural Model Assessment

The structural model can be tested by computing beta (β), R^2 , and the corresponding t-values via a bootstrapping procedure with a resample of 5,000 (Hair, Hult, Ringle, & Sarstedt, 2017).



Key: BDQ: Big Data Quality, DQ: Data Quality, DR: Data Relevance, DSH: Data Sharing, DST: Data Storage, KMQ: DMQ: Decision Making Quality, IP: Identify the Problem, GI: Gather Information, IA: Identify the alternatives, TA: Take Action

Figure 2:PLS algorithm results

Figure 2 and Table 3 depict the structural model assessment, showing the results of the hypothesis tests. Knowledge management quality and management information systems positively influence decision making quality. Hence, H1 and H2 are accepted with $t = 6.659$ and $t = 7.725$ ($p < 0.001$) and

$t = 6.659$ and $t = 7.725$ ($p < 0.001$) respectively. Knowledge management quality and management information systems explain fifty-four percent of the variance in decision making quality. The values of R^2 have an acceptable level of explanatory power, indicating a substantial model (Cohen, 1988; Chin, 1998).

Table 3: Result of Direct Effect Hypotheses

Hypothesis	Relationship	Std Beta	Std Error	t-value	p-value	Decision	R ²
H1	KMQ→DMQ	0.429	0.064	6.659	0.000	Supported	0.54
H2	MIS→DMQ	0.365	0.047	7.725	0.000	Supported	

Key: KMQ: Knowledge Management Quality, MIS: Management Information Systems, DMQ: Decision Making Quality

V. Discussion

In this study, the researchers noted that knowledge quality influence could positively affect decision making quality amongst the employees working in General Directorate of Residency and Foreigners Affairs in Dubai and the Telecommunications Regulatory Authority, UAE. A similar observation was noted earlier (Alazmi & Zairi, 2003; Bose, 2003; Shamim, Zeng, Shariq, & Khan, 2018; Taleb, Serhani, & Dssouli, 2018). The finding implies that knowledge management quality is influencing decision making quality of public sector in the UAE represented by General Directorate of Residency and Telecommunications Regulatory Authority. This suggests that The more Knowledge disclosure contributes to the achievement of the Organization's objectives, the process of transforming the underlying knowledge to declared knowledge contributes in making the right decision, the staff capabilities are enhanced through knowledge generation, the organization stores knowledge in order to use it in writing summary reports for decision-makers, which

reduces the search effort, Knowledge dissemination helps facilitate decision making because of the availability of expertise among employees to help them improving their performance, and the organization uses application of knowledge method through multiple internal differences. The more the ability to determine the parties of the problem precisely and clearly, getting descriptive information continuously when making a decision, assess the Possibility to Implement the alternative solution by knowing availability of resources, and acknowledging the importance of integration and interdependence of the management information system and the administration to expand the horizon of managers' knowledge about decisions which will be done.

The results also indicated that management information system showed a positive effect on decision making quality of the employees working in General Directorate of Residency and Foreigners Affairs in Dubai and the Telecommunications Regulatory Authority, UAE, as shown earlier (Ada & Ghaffarzadeh, 2015; Berisha - Shaqiri, 2014; Bharu, 2010;

Hakimpoor & Khairabadi, 2018; Samer & Rawan, 2018). This was based on the fact that the more the system contains all the basic information about employees, continuously updating through its inputs and outputs, provides all the information required by the human resources, allows you to restore files if they are lost, calculates the turnover rate of the employee, makes the employee feels the job security, helps the decision maker to determine the nature the information which benefits the Process Decision making, and updates information efficiently and systematically. The more the ability to determine the parties of the problem precisely and clearly, getting descriptive information continuously when making a decision, assess the Possibility to Implement the alternative solution by knowing availability of resources, and acknowledging the importance of integration and interdependence of the management information system and the administration to expand the horizon of managers' knowledge about decisions which will be done.

VI. Implications

This is one of the first researches to investigate the direct relationships between knowledge management quality, management information systems and the decision-making quality in the context of UAE. Therefore, it contributes to the body of existing literature as follows. The main contribution is the comprehensive knowledge management quality and decision making quality analysis based on empirical data. Most previous studies have investigated the direct relationship between components of knowledge management quality and decision-making quality in different settings. This research has presented a rich and detailed account of the antecedents of the different types of decision-making quality in the public sector (Albreki et al., 2019; Ameen & Ahmad, 2012; Ameen, Almari, & Isaac, 2019; Haddad et

al., 2020). This study has provided many benefits for General Directorate of Residency and Foreigners Affairs, and Telecommunications Regulatory Authority in the UAE and public sector in general to view big data quality and knowledge management quality as a catalyst for the different types of decision-making quality.

One of the limitations of this study is that the data gathered was cross-sectional rather than longitudinal in nature. The longitudinal method might improve the understanding of the associations and the causality between variables (Isaac, Abdullah, Ramayah, Mutahar, & Alrajawy, 2017; Isaac, Abdullah, Ramayah, & Mutahar Ahmed, 2017). Future research should be conducted to investigate the relationship between variables by conducting cross-cultural studies as recommended by previous studies (Isaac, Abdullah, Ramayah, & Mutahar, 2017a; Isaac, Masoud, Samad, & Abdullah, 2016).

VII. Conclusion

This research attempted to expand the knowledge in the area of knowledge management quality, and management information systems and decision-making quality in the United Arab of Emirates, specifically, the General Directorate of Residency and Telecommunications Regulatory Authority. By examining the comprehensive model in the UAE, this study added valuable knowledge to the area of public sector as well as academic research. Moreover, this study added to the understanding on the importance of the moderating effect of management information systems in the public organizations, in the UAE. In regards, this finding highlighted the finding that related to the identified objectives, as well as research contribution to different parties. Furthermore, the independent variables could explain 54% of the variation noted in the decision making quality.

Appendix

Appendix A

Instrument for variables

Variable	Measure
Knowledge Diagnosis (KDI)	KDI1: Knowledge disclosure contributes to the achievement of the Organization's objectives, and to its utilization in the decision-making process.
	KDI2: The organization relies on the scientific research method to transform the underlying knowledge into the declared knowledge.
	KDI3: The process of transforming the underlying knowledge to declared knowledge contributes in making the right decision.
	KDI4: Disclosure of knowledge stored in the organization helps in identifying the skills and experiences of the employees.
	KDI5: The process of knowledge disclosure is ongoing continuously in the organization.
Knowledge Acquisition (KA)	KA1: In the organizations, the knowledge is acquired by relying on R & D departments.
	KA2: The staff capabilities are enhanced through knowledge generation.
	KA3: The Organization follows up-to-date methods of management information systems to storage its knowledge.
	KA4: The organization uses knowledge storage in order to help speed up the decision-making process.
	KA5: The organization stores knowledge in order to use it in writing summary reports for decision-makers, which reduces the search effort.
Knowledge Distribution (KDS)	KDS1: The organization disseminates knowledge to utilize it in various organizational processes.
	KDS2: Knowledge dissemination helps facilitate decision making because of the availability of expertise among employees to help them improving their performance.
	KDS3: In the organization, knowledge transfer and flow depends on the ability of employees to absorb it.
	KDS4: In the organization, knowledge transfer is related to the efficiency of employees training.
	KDS5: In the organization, specialized experts are available to disseminate knowledge correctly to serve the organization's employees and decision-makers.
Knowledge Implementation (KI)	KI1: Effective and effective application of knowledge because of the contribution of decision-makers to implement the decisions in the Organization.
	KI2: The application of knowledge in the organization provides sufficient space for individuals to make appropriate decisions.
	KI3: The organization uses application of knowledge method through multiple internal differences.
	KI4: The organization trains employees to apply knowledge correctly.
	KI5: Knowledge is implemented through Management Information Systems.
Organizing Data (OD)	OD1: The system contains all the basic information about employees.
	OD2: The system classifies employees into specific categories depending on the post they occupy.
	OD3: The system contains courses and experiences the employee possess.
	OD4: The system stores applicants' data for any job even if they were not accepted.
	OD5: The system analysis staff data for reclassification.
Information Retrieval Speed (IRS)	IRS1: The system is continuously updating through its inputs and outputs.
	IRS2: The system is maintained periodically.
	IRS3: The system provides all the information required by the human resources.
	IRS4: There are no errors in the data operation, save, and review.

	IRS5: The system allows you to restore files if they are lost.
Incentive Regulation (IR)	IR1: The system calculates the turnover rate of the employee. IR2: The system makes the employee feels the job security. IR3: The current system is neutral and far from biased. IR4: The organization relies entirely on the system to identify incentives. IR5: The incentive system is in line with staff expectations.
System Quality (SQ)	SQ1: The information provided by the system contributes to the capacity to Forecasting In the future. SQ2: The system helps the decision maker to determine the nature the information which benefits the Process Decision making. SQ3: The system contains software that enables it to recover files if they are lost. SQ4: The system has a back-up of data that is used when needed. SQ5: The system updates information efficiently and systematically.
Identify the Problem (IP)	IP1: I make sure that there is a clear Problem that requires solving. IP2: I make sure that this problem in the range of my responsibilities. IP3: I contact all the related parties to the problem to identify its exact dimensions. IP4: I look for the Reason behind the problem and identify its effects IP5: I Determine the Parties of the problem Precisely And clearly.
Gather Information (GI)	GI1: Confidence in information is essential in decision making. GI2: Decisions making process depends on precise and accurate information in our organization. GI3: I prefer getting descriptive information continuously when making a decision. GI4: I depend on the information provided by our management information systems to make a decision. GI5: I always check the accuracy of the information given to me continuously.
Identify the alternatives (IA)	IA1: I assess each solution alternative separately To learn points Power And weakness in it. IA2: I specify expected results for every alternative solution. IA3: I specify Standards To evaluate Solutions for the problem that needs to be solved. And choose optimum alternative according to standards and considerations Objectively. IA4: I assess the Possibility to Implement the alternative solution by knowing Availability of resources. IA5: I know when is the proper time and circumstances to apply the alternative assessed solution.
Take Action (TA)	TA1: Importance of Integration and interdependence of the management information system and the administration to Expand the Horizon of Managers' knowledge about Decisions Which Will be done. TA2: Importance of Integration of the information to make Accurate solution. TA3: I rely on my powers in Making decisions without Participation of other Parties related to decision-making process. TA4: I sometimes make decisions depending On Intuition. TA5: I know the Response to decision Taken from the employees and how much they accept it.

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