International Journal on Advanced Science Engineering Information Technology

Vol.9 (2019) No. 1
ISSN: 2088-5334

Factors Affecting Information Quality in the Malaysian Public Sector

Erizamsha Hassan[#], Zawiyah M. Yusof[#], Kamsuriah Ahmad[#]

[#] *Center for Software Technology and Management, Faculty of Information Science and Technology, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia*
E-mail: erizamsha.hassan@gmail.com, zawiy@ukm.edu.my, kamsuriah@ukm.edu.my

***Abstract*— Information is an important asset that can determine the success or failure of an organization. Hence, the quality of information should not be compromised, instead, it should be an organization's priority. Information should be managed efficiently and effectively to ensure its availability whenever needed, especially for making decisions. Without information quality management, an organization may be seemed unaccountable, holds no integrity, not transparent and competent, thus affecting performance. Most organizations do not implement information quality management because the factors that affect the quality of information are not identified. This study aims to identify the relationship between selected factors and the quality of information. The quantitative data were collected through questionnaire surveys distributed to public organizations (federal public services, state public services, federal statutory bodies, state statutory bodies, and local authorities) throughout Malaysia as the unit of analysis. Questionnaires were distributed from May to September 2017 and involved 273 respondents. Pearson's product–moment correlation coefficient was utilized to analyze the relationship between the factors and information quality. The findings reveal that most of the factors have a high level of correlation. The analysis shows that public organizations need to prioritize the factors focused in this study, especially those identified with a high level of correlation, to optimize information quality. The findings can be a guide for developing policies, strategies, or programmes related to information quality management in organizational decision-making and performance enhancement, thus highlighting and empowering information quality management in public organizations.**

***Keywords*—information quality; information quality management; information management; information assets; information power.**

I. INTRODUCTION

Information quality refers to information that meets the needs of users that aim to take a specified action while also meeting and fulfilling the user requirements. Without information quality, it is impossible for individuals and organizations to make accurate and timely well-informed decisions. This could affect them, cause them to miss opportunities, as well as expose them to risks. Organisations that do not implement information quality management are seen as not practicing a degree of transparency and integrity, and this could jeopardize their competitiveness and survival. Since information is deemed paramount to organizations, it should be managed efficiently and effectively, so that it is ever available and promptly accessible whenever needed. Hence, information quality management should be given the topmost priority so that information is always up to date and reliable.

Although information quality is crucial to an organization, studies that identify factors determining the quality of information or its management are still not sufficiently focused on [1], [2]. The identified factors have not been empirically tested, as the focus has been on theoretical construction or other aspects of information quality [2]. As a result, the relationship between these factors and information quality has not been identified and remains a question mark. Also, this hinders the development of an information quality management model based on factors that affect information quality. A new model should be developed to guide organizations to implement effective information quality management because the majority of the organizations do not implement such management initiatives [3].

Based on the limitations of previous studies, this study aims to identify the relationship between factors from past studies and information quality management in an organization. Thirteen factors have been identified to affect information quality and are the focus of this study: (1) top management commitment; (2) policy; (3) information supplier management; (4) continuous improvement; (5) innovation; (6) benchmarking; (7) employee empowerment; (8) employee involvement; (9) teamwork; (10) reward; (11) training; (12) customer focus; and (13) process management (record and information management). The findings of this research can be used as a guide for developing policies, strategies, or programmes related to information quality management for organizational decision-making and performance enhancement. They also highlight and

empower information quality management in public organizations, particularly in Malaysia.

II. Material And Method

This section discusses the materials of this study, which are information quality, the factors that determine information quality, the hypotheses for the study, and the conceptual research framework. The methods are the sample and measurement.

A. Information Quality

From an organizational perspective, information is an important asset that can direct an organization to the right path towards success [4]–[6]. Information is a collection of data that is processed to give meaning to the user [7]. Information is not merely a product or documentation but is also a direct product of the process of obtaining knowledge in executing business affairs [8].

Information is valuable if it can contribute to the effectiveness of decision-making [9]. Hence, the value of information should be measured to determine whether the information benefits the organization or otherwise [10], [11]. Only valuable and quality information can increase the decision-making, efficiency, and competitiveness of an organization. On the other hand, information that has zero or low quality but is available in a variety of sources poses problems to information users [12] and is burdensome to the organization. Although some scholars list a few characteristics of information quality, Ge [13] found that only two features of information quality are useful for producing quality results: accuracy and completeness of information. Hence, information quality in this study is based on the accurate and complete information. Accuracy refers to accurate, reliable, and error-free information, while completeness of information refers to the details and scope of information sufficient to be used for a particular task [14].

B. Factors Affecting Information Quality

The philosophy and principles of Total Quality Management (TQM) are used as the basis for identifying the factors that determine the quality of information in public organizations in Malaysia. Besides that, past analysis of information quality management is also used. TQM can be appropriately applied for quality management, which includes information quality. English [8] urges that information should be treated as equal to tangible or non-tangible products such as services, which, in turn, helps enhance business competitiveness [15], [16].

Similarly, other researchers have also suggested the TQM approach to identify the factors determining the quality of information and its management [1], [2]. This approach has also been used to identify factors affecting the quality of organizational products in various areas such as manufacturing, milling, services, system development, and food management. Therefore, this study will adopt a similar approach to identify the factors that affect the quality of information.

Thirteen factors have been identified to affect the quality of the product and thus the quality of information products. The factors that are the focus of this study are top management commitment [17]–[21], policy [22], [23], supplier management [19], [21], [24], [25], continuous improvement [21], [24], innovation [24], benchmarking [19], [24], [26], [27], employee empowerment [20], [26], employee involvement [20], [21], [24], [26], teamwork [27], reward [24], [25], training [21], [24], [25], [27], customer focus [17]–[21], and process management [17], [18]. Supplier management, in this study, refers to information supplier management [2]. Process management is more suitably referred to as record and information management (RIM) because information needs to be managed according to the RIM principle to ensure its quality [28]. RIM is one of the foundational elements that support good governance [29]. All of these factors were found suitable within the framework of public organizations in Malaysia, as set out by three experts in the public service, at the time of conducting the preliminary study in November 2015.

In order to achieve continuous quality improvement, the top management should be directly involved in organizing and implementing quality improvement activities [23]. The successful implementation of overall quality management within an organization depends on the top management's commitment [30]. Organisations need to develop policies that can promote the implementation of information quality management [2]. Organisations should also implement a form of management to verify the quality of data or raw information received from the information supplier [19]. Additionally, continuous improvements need to be implemented systematically to enhance performance as well as to ensure the production of high-quality products [31]. Innovation should also be implemented to improve product quality [24]. This study refers to innovation as an extension of innovation of information products and their production processes.

Organisations should conduct comparisons of products and practices to improve overall quality, i.e. through benchmarking for improved quality [24]. Top management also has to empower employees to make decisions and solve work-related problems because empowerment of employees has proven to be an effective strategy in producing high-quality products [26]. Worker commitment is an important element in the success of TQM, as it can prevent product defects, especially in the early stages of the production process [21]. Therefore, employee involvement is seen as an important aspect of quality management and cannot be underestimated. Every worker needs to optimally use their skills and abilities in carrying out their duties in addition to working with high moral and ethics.

Every individual in the organization must also have the team spirit to achieve the goals of the team or organization. Teamwork has proven to improve the quality of an organization's product [27]. A team consists of individuals who have competencies that are interdependent with one another from various aspects such as capabilities, expertise, skills, knowledge, and commitment to team performance. Organisations also need to have a good reward system, as this has been proven to enhance the final product [24], including information products [2]. A reward system can impact employee commitment, satisfaction, and productivity. Organisations also need to provide training for employees, so that they can enhance their skills to achieve organizational goals [21].

Products are considered to be of quality if they meet customer needs and wants. Therefore, employees need to prioritize customers to ensure information products have quality [2]. Process management has also been proven to affect the quality of an organization's product [17], [18]. Process management in information quality studies refers to management throughout the information life cycle [1].

C. Hypothesis and Conceptual Framework

Based on the literature review, the conceptual framework (Fig. 1) and the hypothesis for this study are as follows:

- H1: There is a positive relationship between top management commitment and information quality.
- H2: There is a positive relationship between policy and information quality.
- H3: There is a positive relationship between information supplier management and information quality.
- H4: There is a positive relationship between continuous improvement and information quality.
- H5: There is a positive relationship between innovation and information quality.
- H6: There is a positive relationship between benchmarking and information quality.
- H7: There is a positive relationship between employee empowerment and information quality.
- H8: There is a positive relationship between employee involvement and information quality.
- H9: There is a positive relationship between teamwork and information quality.
- H10: There is a positive relationship between reward and information quality.
- H11: There is a positive relationship between training and information quality.
- H12: There is a positive relationship between customer focus and information quality.
- H13: There is a positive relationship between record and information management and information quality.

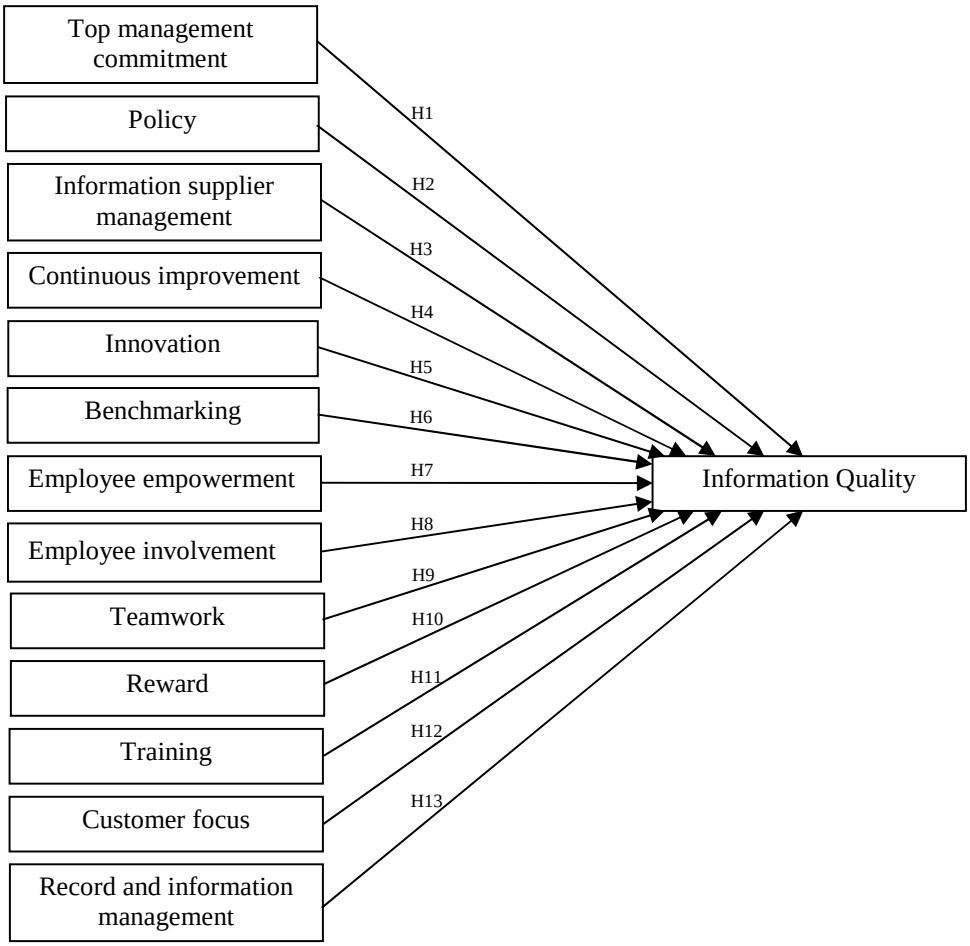

Fig. 1 Conceptual framework

D. Sample

The population for this study includes all public organizations in Malaysia, which comprise five types of services, namely Federal Public Services, State Public Services, Federal Statutory Bodies, State Statutory Bodies, and Local Authorities. Each organization is represented by a respondent, either a director/manager, deputy director/ manager, or senior officer in the human resources/ management service within the respective organizations. A total of 430 sets of questionnaires were distributed, and of that, 279 or 64.9% were returned. However, six of the returned questionnaires could not be processed due to straightlining, and they are missing more than 10% data [32]. Therefore, only 273 (63.5%) questionnaires were analyzed in this study. This study used a proportionate

technique consisting of stratified random sampling to get the best sample and to ensure proper representation of the population.

E. Measurement

The questionnaire technique for collecting quantitative data has been implemented in many studies focusing on identifying factors affecting quality management and information quality management [2], [17]–[22], [24]–[27], [33], indicating that this survey method is appropriate and acceptable. Hence, this study used the same method to test the hypothesis in the study regarding the factors affecting information quality in the context of public organizations in Malaysia.

The questionnaire was developed by adapting questionnaires from past studies on quality management, information management, and information quality management. It was then modified to suit the context of this study. All variables of the 13 factors and the quality of information were measured using items on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Each construct was measured using three to eight items.

This study conducted a pre-test to ensure the validity of the questions. Validity ensures that the developed item can measure the construct correctly [32]. The pre-test involved two phases. Phase 1 involved ten respondents consisting of civil servants in charge of managing organizational information. Meanwhile, Phase 2 involved 13 experts comprising Malay language specialists, and experts in statistics, model development, quality management, information management, knowledge management, and information systems that included theorists (academics) and practitioners (information managers) in public organizations.

A pilot test for the study was subsequently conducted, and a total of 32 completed questionnaires were obtained from the respondents. The pilot test was carried out to ensure the right instrument would be used in the actual study as well as to ensure its smooth implementation. The pilot test is important, as it can identify problems that may arise in the design of questionnaire instruments and ensure the measurement of variables are valid and reliable. The findings of the pilot test data show that two items need to be eliminated. The elimination of these items allowed the Cronbach's alpha value for all the remaining variables to exceed 7.0, thus proving that the measurement is reliable [32]. The Cronbach's alpha value for each variable was within the range of 0.772 to 0.948.

III. Results And Discussion

The analysis of the quantitative data for this study was carried out using statistical methods covering: (1) demographic profile; (2) descriptive statistics; (3) normality of distribution; (4) reliability; and (5) hypothesis testing. Demographic profile and descriptive statistics were analyzed using descriptive analysis to illustrate categorical variables (demography of organizations and respondents) and continuous variables (factors and information quality), respectively. Normality tests were also performed to illustrate data distribution using the value of skewness and kurtosis. Furthermore, reliability testing was performed using Cronbach's alpha value. Hypothesis testing was performed to identify the relationship between two variables tested using Pearson's product–moment correlation analysis.

A. Demographic Profile

The demographic profile for the subject in the study, i.e., the organizations and the selected personnel representing the organizations, is depicted in Table 1. The data for the demographic profile was analyzed using descriptive analysis.

TABLE I
Demographic Profile

Demographic		Frequency	Percentage
Organisation Service Type	Federal Public Service	61	22.3
	State Public Service	89	32.6
	Federal Statutory Body	32	11.7
	State Statutory Body	38	13.9
	Local Authority	53	19.4
	Total	273	100
Gender	Male	166	60.8
	Female	107	39.2
	Total	273	100
Age	31 – 40 years old	9	3.3
	41 – 50 years old	77	28.2
	51 years and above	187	64.5
	Total	273	100
Position	Director or equivalent	189	69.2
	Deputy Director or equivalent	61	22.3
	Senior officer	23	8.4
	Total	273	100
Length of Service in Public Service	Ten years and below	4	1.5
	11 – 20 years	67	24.5
	21 – 30 years	125	45.8
	31 years and above	77	28.2
	Total	273	100

Table 1 shows that 166 (60.8%) of the respondents are male while 107 (39.2%) are female. The majority of these respondents have served between 21 and 30 years, and they are more than 50 years old (64.5%). A total of 89 respondents (69.2%) hold the post of Director in their respective division.

B. Descriptive Statistics

The descriptive statistics for each continuous variable, which are top management commitment (TMC), policy (Pol), information supplier management (ISM), continuous improvement (CI), innovation (Ino), benchmarking (Bnc), employee empowerment (EE), employee involvement (EI), teamwork (Twk), reward (Rwd), training (Trn), customer focus (CF), record and information management (RIM), and information quality (IQ), are shown in Table 2.

TABLE II
DESCRIPTIVE STATISTICS

Variable	Mean	Standard deviation
TMC	5.98	0.58
Pol	5.82	0.66
ISM	5.44	0.67
CI	5.85	0.79
Ino	5.55	0.79
Bnc	5.50	0.73
EE	5.98	0.71
EI	5.94	0.52
Twk	5.37	0.66
Rwd	5.59	0.60
Trn	5.80	0.89
CF	5.17	0.95
RIM	5.80	0.56
IQ	5.71	0.69

The findings show that the mean value of each variable is between 5.17 and 5.98. Top management commitment and Employee empowerment have the highest mean value while Customer focus variable has the lowest value. For standard deviation, Customer focus has the highest value of 0.95 while Employee involvement has the lowest value of 0.52.

C. Normality of Data Distribution

The collected quantitative data need to be identified to determine its distribution (normal or otherwise) in order to obtain a real picture of the data used for analysis [32], [34]. The statistical method with both skewness and kurtosis value can test the normality of data distribution. The data has a normal distribution if the skewness and kurtosis value is in the range of -3 to 3 [35]. Table 3 shows the result of the normality testing using skewness and kurtosis value.

TABLE III
NORMALITY OF DATA DISTRIBUTION

Variable	Skewness	Kurtosis
TMC	-0.192	-0.961
Pol	-0.400	0.749
ISM	0.767	0.641
CI	-0.731	0.071
Ino	-0.202	-0.203
Bnc	0.337	-0.067
EE	-1.141	1.772
EI	-0.299	2.215
Twk	0.303	0.518
Rwd	-0.337	0.959
Trn	-0.440	-1.126
CF	0.358	-0.864
RIM	-0.156	0.238
IQ	-0.832	0.757

Note: Standard error in skewness is 0.147; standard error in kurtosis is 0.294

Based on the 273 sets of data, the skewness values for each variable range between -1.141 and 0.767 while all kurtosis values range between -1.126 and 2.215. Hence, it can be concluded that the data in this study is normally distributed for each variable.

D. Reliability

Reliability refers to the stability and the internal consistency of each variable. Cronbach's alpha value is often referred to as a measurement of variable reliability index. An acceptable Cronbach's alpha value is 0.70 and above [36], but values greater than 0.6 are still acceptable [32], [34]. Table 4 shows the reliability values for each variable involved in this study. The findings show that all variables are internally consistent and reliable because their Cronbach's alpha values range from 0.752 to 0.910. Continuous improvement has the highest Cronbach's alpha value while Reward has the lowest value.

TABLE IV
RELIABILITY VALUES

Variable	Number of items	Cronbach's Alpha
TMC	4	0.830
Pol	4	0.870
ISM	4	0.895
CI	4	0.910
Ino	4	0.880
Bnc	3	0.776
EE	4	0.892
EI	4	0.802
Twk	4	0.853
Rwd	4	0.752
Trn	4	0.890
CF	4	0.904
RIM	8	0.864
IQ	4	0.856

E. Hypotheses Testing

Hypothesis testing was carried out to detect the relationship between the selected factors and information quality. The strength and linear direction of the relationship between two variables can be explained by implementing a correlation analysis when testing the hypothesis [36]. An acceptable correlation value ranges between -0.9 and 0.9, and should not exceed this range because it will otherwise cause multicollinearity statistical problems. Multicollinearity occurs when an independent variable is highly correlated with another independent variable (s). A high multicollinearity value will cause an increase in standard error, which renders the significant relationship between variables insignificant. This study used Pearson's product–moment correlation coefficient to measure the strength of the relationship between two variables, as all the variables are

continuous. The correlation matrix obtained is shown in Table 5. The results show that all correlations between variables have no multicollinearity problems because all correlation values are within a ±0.9 range.

The findings also show that all correlations between factors and information quality indicate significant positive correlation, except for EE→IQ. The significant correlations are TMC→IQ (r=0.67, p<0.01), Pol→IQ (r=0.72, p<0.01), ISM→IQ (r=0.48, p<0.01), CI→IQ (r=0.70, p<0.01), Ino→IQ (r=0.55, p<0.01), Bnc→IQ (r=0.59, p<0.01), EI→IQ (r=0.65, p<0.01), Twk→IQ (r=0.50, p<0.01), Rwd→IQ (r=0.55, p<0.01), Trn→IQ (r=0.44, p<0.01), CF→IQ (r=0.57, p<0.01), and RIM→IQ (r=0.61, p<0.01). The EE→IQ correlation is positive but not significant.

TABLE V
CORRELATION ANALYSIS

Variable	TMC	Pol	ISM	CI	Ino	Bnc	EE	EI	Twk	Rwd	Trn	CF	RIM	IQ
TMC	1													
Pol	.56*	1												
ISM	.21*	.38*	1											
CI	.52*	.56*	.40*	1										
Ino	.30*	.41*	.35*	.50*	1									
Bnc	.48*	.64*	.48*	.50*	.46*	1								
EE	.20*	.10*	.27*	-.01*	.22*	.19*	1							
EI	.34*	.44*	.38*	.47*	.42*	.47*	.22*	1						
Twk	.19*	.39*	.39*	.26*	.26*	.36*	.06*	.34*	1					
Rwd	.37*	.65*	.43*	.40*	.45*	.58*	.18*	.41*	.48*	1				
Trn	.29*	.32*	.22*	.14▪	.11	.42*	.11	.22*	.19*	.43*	1			
CF	.31*	.41*	.18*	.38*	.44*	.34*	.10	.38*	.24*	.39*	.19*	1		
RIM	.36*	.41*	.35*	.36*	.34*	.47*	.30*	.45*	.29*	.42*	.31*	.24*	1	
IQ	.67*	.72*	.48*	.70*	.55*	.59*	.11	.65*	.49*	.55*	.44*	.57*	.61*	1

*. Correlation is significant at the 0.01 level (1-tailed).
▪. Correlation is significant at the 0.05 level (1-tailed).

Table VI shows the correlation analysis result for each hypothesis of this study. The level of strength of the linear relationship between two variables is also shown. The strength of the relationship is based on low (0.10/-0.10 to 0.29/-0.29), moderate (0.3/-0.3 to 0.49/-0.49), and high (0.5/-0.5 to 1/-1) levels [37]. The findings show that all hypotheses have a high and moderate correlation value, except for H7.

TABLE VI
HYPOTHESES TESTING

Hypothesis	Relationship	Pearson's product–moment correlation	Correlation level
H1	TMC→IQ	0.67*	High
H2	Pol→IQ	0.72*	High
H3	ISM→IQ	0.48*	Moderate
H4	CI→IQ	0.70*	High
H5	Ino→IQ	0.55*	High
H6	Bnc→IQ	0.59*	High
H7	EE→IQ	0.11	Low
H8	EI→IQ	0.65*	High
H9	Twk→IQ	0.50*	High
H10	Rwd→IQ	0.55*	High
H11	Trn→IQ	0.44*	Moderate
H12	CF→IQ	0.57*	High
H13	RIM→IQ	0.61*	High

*p<0.01

IV. CONCLUSION

From the analysis of the data gathered, it is evident and acknowledged that information quality management should not be cast aside. Information matters should always be at the core and continuously consulted to ensure well-informed and correct decision-making is made. It is timely to consider information quality management especially in the era of the fourth Industrial Revolution where information has become the lifeblood of all activities and actions.

The findings of the study indicate that all the proposed hypotheses are supported, except for Hypothesis 7 (H7), which measured the relationship between employee empowerment and information quality. Ten factors were found to have a strong correlation with information quality. These factors, which are ranked according to the strength of the relationship in hierarchical order, are: (1) policy; (2) continuous improvement; (3) top management commitment; (4) employee involvement; (5) record and information management; (6) benchmarking; (7) customer focus; (8) innovation; (9) reward; and (10) teamwork. Information supplier management and training factors were found to have moderate correlation while the employee empowerment factor was found to have a low correlation with information quality, and thus was regarded as insignificant.

The top management of organizations can use the findings of the study as a guide in improving the quality of information management initiatives and as an effort to prioritize information matters in organizations. Such an aim can only be achieved if the organization management gives priority to all the factors identified in this study, especially the factors that are found to have a strong and moderate relationship to the quality of information. In doing so, the organization may conduct assessments of information quality management initiatives based on the findings obtained from this study. A SWOT analysis (strengths, weaknesses, opportunities, and threats) can be performed on information quality management, thereby enhancing the effectiveness of organizational decisions and performance apart from enhancing the competitiveness of the organization in a constantly changing and challenging

business environment. However, this study was limited to quantitative approaches only. Future studies should also incorporate qualitative approaches to yield more inclusive and comprehensive research findings. This study used Pearson's product–moment correlation analysis, which yielded the results presented in this paper. It is suggested that future studies in this area employ the PLS-SEM approach to produce a new model.

ACKNOWLEDGMENT

The study was financially supported by the Research Grant GUP-2017-046, Universiti Kebangsaan Malaysia, and the Public Services Department of Malaysia.

REFERENCES

[1] S. Baškarada and A. Koronios, "Critical Success Factor Framework for Information Quality Management," *Information Systems Management*, Vol. 31(4), pp. 276–295, 2014.

[2] H. Xu, "What are the most important factors for accounting information quality and their impact on AIS data quality outcomes?," *ACM Journal of Data and Information Quality*, Vol. 5(4), pp. 1–22, 2015.

[3] S. Baškarada, *Information quality management capability maturity model*, Wiesbaden, Germany: Vieweg+Teubner, 2009.

[4] J. E. Tyler, "Asset management the track towards quality documentation," *Records Management Journal*, Vol. 27(3), pp. 302–317, 2017.

[5] H. Alenezi, A. Tarhini, and S. K. Sharma, "Development of a quantitative model to investigate the strategic relationship between information quality and e-government benefits," *Transforming Government: People, Process, and Policy*, Vol. 9(3), pp. 324–351, 2015.

[6] M. Y. Zawiyah, *Pengurusan Rekod dan Maklumat: Isu dan Cabaran*, Bangi, Malaysia: Penerbit Universiti Kebangsaan Malaysia, 2015.

[7] J. Michnik and M. C. Lo, "The assessment of the information quality with the aid of multiple criteria analysis," *European Journal of Operational Research*, Vol. 195(3), pp. 850–856, 2009.

[8] L. P. English, *Information Quality Applied: Best Practices for Improving Business Information, Processes, and Systems*, Indianapolis: Wiley Publishing, 2009.

[9] M. Mukred, and M. Y. Zawiyah, "The DeLone–McLean Information System Success Model for Electronic Records Management System Adoption in Higher Professional Education Institutions of Yemen," in *International Conference of Reliable Information and Communication Technology IRICT 2017: Recent Trends in Information and Communication Technology*, 2017. pp. 812–823.

[10] T. Jylhä and M. E. Suvanto, "Impacts of the poor quality of information in the facility management field," *Facilities*, Vol. 33(5/6), pp. 302–319, 2015.

[11] M. S. S. Abumandil and Shahizan Hassan, "Information Quality and Decision-making Effectiveness: A Study of Banks in Palestine" *International Review of Management and Marketing*, Vol. 6(S7), pp. 127–132. 2016.

[12] C. Shi, R. Jugulum, H. I. Joyce, J. Singh, B. Granese, R. Ramachandran, D. Gray, C. H. Heien, and J. R. Talburt, "Improving financial services data quality – a financial company practice", *International Journal of Lean Six Sigma*, Vol. 6(2) pp. 98–110, 2015.

[13] M. Ge, "Information quality assessment and effects on inventory decision-making,"Ph.D. thesis, Dublin City University, Sept. 2009.

[14] R. Y. Wang and D. M. Strong, "Beyond accuracy: What data quality means to data consumers," *Journal of Management Information Systems*, Vol. 12(4), pp. 5–34, 1996.

[15] J. C. Pinho, "TQM and Performance in Small Medium Enterprises: The Mediating Effect of Customer Orientation and Innovation," *Journal of Quality and Reliability Management*, Vol. 25(3), pp. 256–275, 2008.

[16] D. Carnerud, "25 years of quality management research – outlines and trends," *International Journal of Quality & Reliability Management*, Vol. 35(1), pp. 208–231, 2018.

[17] A. M. Mosadeghrad, "Developing and validating a total quality management model for healthcare organizations," *The TQM Journal*, Vol 27(5), pp. 544–56, 2015.

[18] E. L. Psomas and C. Jaca, "The impact of total quality management on service company performance: evidence from Spain," *International Journal of Quality & Reliability Management*, Vol. 33(3), pp.380–398, 2016.

[19] G. Mehralian, J. A Nazari, H. R. Rasekh, and S. Hosseini, "TOPSIS approach to prioritizing critical success factors of TQM: Evidence from the pharmaceutical industry," *The TQM Journal*, Vol. 28(2), pp.235–249, 2016.

[20] V. Kumar and R. R. K. Sharma, "An empirical investigation of critical success factors influencing the successful TQM implementation for firms with different strategic orientation," *International Journal of Quality & Reliability Management*, Vol. 34(9), pp. 1530–1550, 2017.

[21] B. Aquilani, C. Silvestri, A. Ruggieri, and C. Gatti, "A systematic literature review on total quality management critical success factors and the identification of new avenues of research," *The TQM Journal*, Vol. 29(1), pp. 184–213, 2017.

[22] J. V. Saraph, G. P. Benson, and R. G. Schroeder, "An instrument for measuring the critical factors of quality management," *Decision Sciences*, Vol. 20, pp. 810–829, 1989.

[23] J. Oakland, "Leadership and policy deployment: the backbone of TQM," *Total Quality Management and Business Excellence*, Vol. 22(5), pp. 517–534, 2011.

[24] A. Das, H. Paul, and W. S. Fredric, "Developing and validating total quality management (TQM) constructs in the context of Thailand's manufacturing industry," *Benchmarking: An International Journal*, Vol. 15(1), pp. 52–72, 2008.

[25] F. A. Abu Bakar, K. Subari, and M. A. Mohd Daril, "Critical success factors of Lean Six Sigma deployment: a current review," *International Journal of Lean Six Sigma*, Vol. 6(4), pp. 339–348, 2015.

[26] S. Ahire, D. Golhar, and M. Waller, "Development and validation of TQM implementation constructs," *Decision Sciences*, Vol. 27(1), pp. 23–56. 1996.

[27] F. Talib, F. Rahman, and M. N. Qureshi, "An empirical investigation of the relationship between total quality management practices and quality performance in Indian service companies," *International Journal of Quality & Reliability Management*, Vol. 30(3), pp. 280–318, 2013.

[28] ARMA International. (2013). Generally Accepted Recordkeeping Principles: Information Governance Maturity Model. [Online]. Available: http://www.arma.org/principles. [Accessed November, 13th 2015]

[29] A. L. Abdullah, Z. M. Yusof, K. Ahmad, and U. A. Mokhtar, "The building blocks of electronic records and information management framework for Malaysia public agencies: contexts and approaches," *Journal of Fundamental and Applied Sciences*, Vol. 10(3S), pp. 738–753, 2018.

[30] A. Douglas, J. Douglas, and J. Ochieng, "Lean Six Sigma implementation in East Africa: findings from a pilot study," *The TQM Journal*, Vol. 27(6), pp.772–780, 2015.

[31] J. Singh and H. Singh, "Continuous improvement philosophy– a literature review and directions," *Benchmarking: An International Journal*, Vol. 22(1), pp. 75–119. 2015.

[32] J. F. Hair, W. C. Black, B. J. Babin, and R. E. Anderson, *Multivariate Data Analysis: A Global Perspective*, 7th ed., Upper Saddle River: Pearson Education, 2010.

[33] M. Levis, "Information Quality Training Requirements Analysis Guideline Demonstrated in a Healthcare Context,"Ph.D. thesis, Dublin City University, Jan. 2011.

[34] U. Sekaran and R. Bougie, *Research Methods for Business: A Skill Building Approach*, 7th ed., New York: John Wiley and Sons, 2016.

[35] B. G. Tabachnick and L. S. Fidell, *Using multivariate statistics*, 6th ed., Boston, MA: Pearson, 2013

[36] J. Pallant, *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using IBM SPSS*, 6th ed., NSW, Australia: Allen & Unwin, 2016.

[37] J. W. Cohen, *Statistical Power Analysis for the Behavioural Sciences*, 2nd ed., Hillsdale, New Jersey: Lawrence Erlbaum Associates, 1988.