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MODELING OF INFORMATION QUALITY MANAGEMENT IN MALAYSIAN PUBLIC SECTOR: A PLS-SEM APPROACH

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ABSTRACT

In every organization, the importance of information is undeniable since it exerts prominent effects on all internal activities, ranging from strategy-devising to operational exercises. In the absence of high-quality information, an organization will not be able to adopt sound resolutions, which in turn squander opportunities and augment business risks. For decision-making processes, efficient and effective management of information is needed in order to make the same readily accessible as well as up to date. The aim of this research was to devise a model on information quality management with respect to the factors that had an impact on the quality of information. As such, there was a need to first evaluate the relationship of the aforementioned factors with information quality. A questionnaire was utilized to obtain quantitative data from Malaysian public organizations. There were 273 respondents (response rate: 63.5%) responses for which the data was assessed via partial least squares structural equation modeling (PLS-SEM). The findings show that top management commitment, policy, training, record and information management, employee involvement, continuous improvement, teamwork, customer focus, innovation, and information supplier management are capable of acting as a predictor for the information quality products managed in organization. However, benchmarking, employee empowerment, and reward are found incapable to act as a predictor for information quality. Apart from being suitable for use as a source of guidance in organizational implementation and evaluation of information quality, these results could improve the information quality management measures as well, which in turn enhances service-delivery, particularly in public organizations.

Keywords: *Information Quality; Information Quality Management; Information Management; Information System; Information Assets*

1. INTRODUCTION

Information is essential and central to any organization as it is considered as an asset which can determine the success or failure of an organization. The concept of information as an asset was introduced by the Hawley Committee in 1994 with the intention of pressuring the company's board of directors into acknowledging the importance of information and taking responsibility in its management [1] in view of the fact that the value of this asset is unlikely to depreciate [2]. As mentioned, quality information needs to be assigned a high priority since it has a significant impact on all organizational activities [3]–[7], which range from strategic planning to operations [8]. Hence, the leaders need to consistently come up with the best strategies to manage quality information. This is to enable the achievement of the organizational objectives apart from fulfilling the stakeholders' right to obtain the said asset.

In the post-industrial era, information is a critical resource for generating wealth as well as obtaining a competitive advantage [9]–[12], especially during uncertain economic situations. Information, including those which are generated internally, can determine the success of any society and nation provided that they are competent in the optimization of these intangible resources. On the other hand, information of unknown quality can impede an organization from becoming competitive, thus lowering the quality of service delivery [13]. The quality of information, which is a crucial prerequisite for organizational success, can be ascertained only if information quality management practices are in place.

While the importance of quality information is well-known, researches on the factors that have an impact on the quality of information and its management are lacking [14]–[17]. As such, it is practically impossible to come up with an

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information quality management model which is based on the factors that influence the quality of information. Such a model is required to guide an organization in the implementation of efficient and effective information quality management measures.

Every division or department requires high quality information to make well-informed decision-making, especially the division in charge of human resource matters. Human resources are critical for organization to remain in their respective business environment [18], [19].

As per the current requirements and limitations of the literature, this study was aimed to develop for public organizations an information quality management model which was based on the factors that influenced the quality of information. The relationships between each of these factors and information quality were assessed. This research was focused on manually- or electronically-managed human resource information. Apart from being suitable for use as a source of guidance in organizational implementation and evaluation of information quality, these results could improve the information quality management measures as well, which in turn enhances service-delivery, particularly in public organizations.

2. INFORMATION QUALITY

Information quality – which is one of the widely-discussed topics in the literature – has been explored from various perspectives. Problems have been formulated from different angles, thus enriching the body of knowledge. Nonetheless, quality of information is the core concern in areas like information systems and information management [20].

The concept that information is a product which is equivalent to a physical product or service has been widely accepted since 1980. This has resulted in the application of the principles of total quality management (TQM) in the context of information quality [21]. Evidently, the aforementioned principles covered all measures in the attempt to efficiently and economically satisfy the customers' demands and expectations as well as the organizational objectives [22]. This causes the concept of information as a product to be fundamental to most models present in the literature.

Information quality as a consistent corresponding of the information needs and expectations of the knowledge workers and end-customers with the aim of fulfilling their business or personal objectives effectively [3]. Additionally, information is not a mere product or documentation but is a direct product of the process of obtaining knowledge to carry out business affairs.

Information is of quality if it is useful to users, especially for decision-making [23]. On the other hand, information that has no or low quality but available in various sources poses problems hence liabilities to both information users and organizations [11], [12], [24]. Although scholars have put forward a few dimensions of information quality, [25] found that the accuracy and completeness of information had a direct impact on the effectiveness of decision-making processes or adoption of sound decisions. Informational accuracy can be defined as information which is true, reliable, and free from errors. Meanwhile, informational completeness concerns the adequacy of the scope and details of information that is utilized in specific tasks [26].

3. FACTORS INFLUENCING INFORMATION QUALITY

Information needs to be treated as an organization's product equivalent to tangible products and services [3], [26]–[28]. In this regard, the philosophy and principles of information quality management (especially TQM), apart from previous studies on the same, were taken as the basis in the identification of factors that influenced information quality. This idea was in line with the scholars' opinions on information quality and its management [15]–[17], [22]. Hence, this study embarked on the same approach in identifying factors that influence information quality in public organizations. All the identified factors are appropriate in the context of information quality management in public organizations in Malaysia as verified by three experts.

Table 1 shows thirteen factors that influence the quality of information extracted from previous studies of quality management, information management, and information quality management, and thus are focused on in this study.

Table 1: Factors Influencing The Quality Of Product/Information

Factor	Source
Top management commitment	[16], [17], [29]–[41]
Policy	[16], [29], [31], [34]
Supplier management (Information supplier management)	[16], [29]–[32], [35], [37], [39], [41]

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Continuous improvement	[15], [16], [31], [35], [41], [42]
Innovation	[35]
Benchmarking	[30], [32], [35], [39]
Employee empowerment	[30], [32], [40]
Employee involvement	[30], [35], [40], [41]
Teamwork	[16], [17], [34]
Reward	[16], [31], [33]–[35], [37]
Training	[15]–[17], [29]–[32], [34]–[37], [41]
Customer focus	[16], [17], [30], [31], [35], [37]–[41]
Process management (Record and information management)	[29], [38], [39], [43]

Aquilani et al. [41] found that top management commitment was the most important factor for TQM if measured in terms of the frequency that this factor was focused on in previous studies. Apart from that, customer focus, training (and education), supplier management, process management, continuous improvement, and employee involvement (commitment and attitude) are among the top ten important factors of TQM in terms of frequent focus in previous studies. Xu [17] also conclude that top management commitment was the most critical factor affecting the quality of information, although Xu's study focused on information in accounting information system. In addition, Xu also highlights the nature of information systems, input controls, customer focus, personnel competency, teamwork, and education and training as the ten major factors that influence information quality in terms of importance and performance.

In addition, the policy on information quality and its management is also an important factor for the success of information quality management in the organization [29], [44]. Organizations need to develop an easy-to-understand and enforceable policy to ensure smooth implementation of information quality management in organization. In this regard, Xu [16] and Lin [34] find that policy is a factor that influences information quality in accounting information systems and engineering asset management, respectively. Organizations should also have a form of management that can evaluate and ensure the quality of data or raw information supplied by other parties or information suppliers [16], [34].

Innovation is also an important factor that affects the quality of organizational products [35], including information products [16], [34]. Innovation in this study refers to innovation on information products and its production processes. This also includes the design of information products and information systems used to manage and process information. Additionally, organizations also need to make comparisons of products and practices to improve overall quality through benchmarking. Benchmarking is important as it enables organizations to improve performance by studying competitors in the market [39].

Employee empowerment is an important aspect of TQM. The management should empower their employees to make decisions and solve problems related to their works because employee empowerment has been proven to be an effective strategy of assuring high quality products [30], [40]. In addition, organizations need to have a reward system that can impact employees' commitment, satisfaction, and productivity, apart from the well-being of the organization. Xu [16] and Lin [34] argue that giving reward to employees can improve the quality of information managed by them. Organizations also need to implement effective process management throughout the production process and the management of organizational information products. According to [43], information, even in different forms or mediums, should be managed by eight principles of RIM, namely accountability, transparency, integrity, protection, compliance, availability, retention, and disposition to ensure its quality.

4. CONCEPTUAL MODEL AND HYPOTHESES

With reference to the literature review, we have proposed a conceptual model (figure 1) as well as 13 hypotheses on the relationship between the two constructs in the model. Each hypothesis [Hypothesis 1 (H1) to Hypothesis 13 (H13)] predicted a significant positive relationship between the factor in question and the quality of information:

H1: Top management commitment is positively related to information quality.

H2: Policy is positively related to information quality.

H3: Information supplier management is positively related to information quality.

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H4: Continuous improvement is positively related to information quality.

H5: Innovation is positively related to information quality.

H6: Benchmarking is positively related to information quality.

H7: Employee empowerment is positively related to information quality.

H8: Employee involvement is positively related to information quality.

H9: Teamwork is positively related to information quality.

H10: Reward is positively related to information quality.

H11: Training is positively related to information quality.

H12: Customer focus is positively related to information quality.

H13: Process management (record and information management) is positively related to information quality.

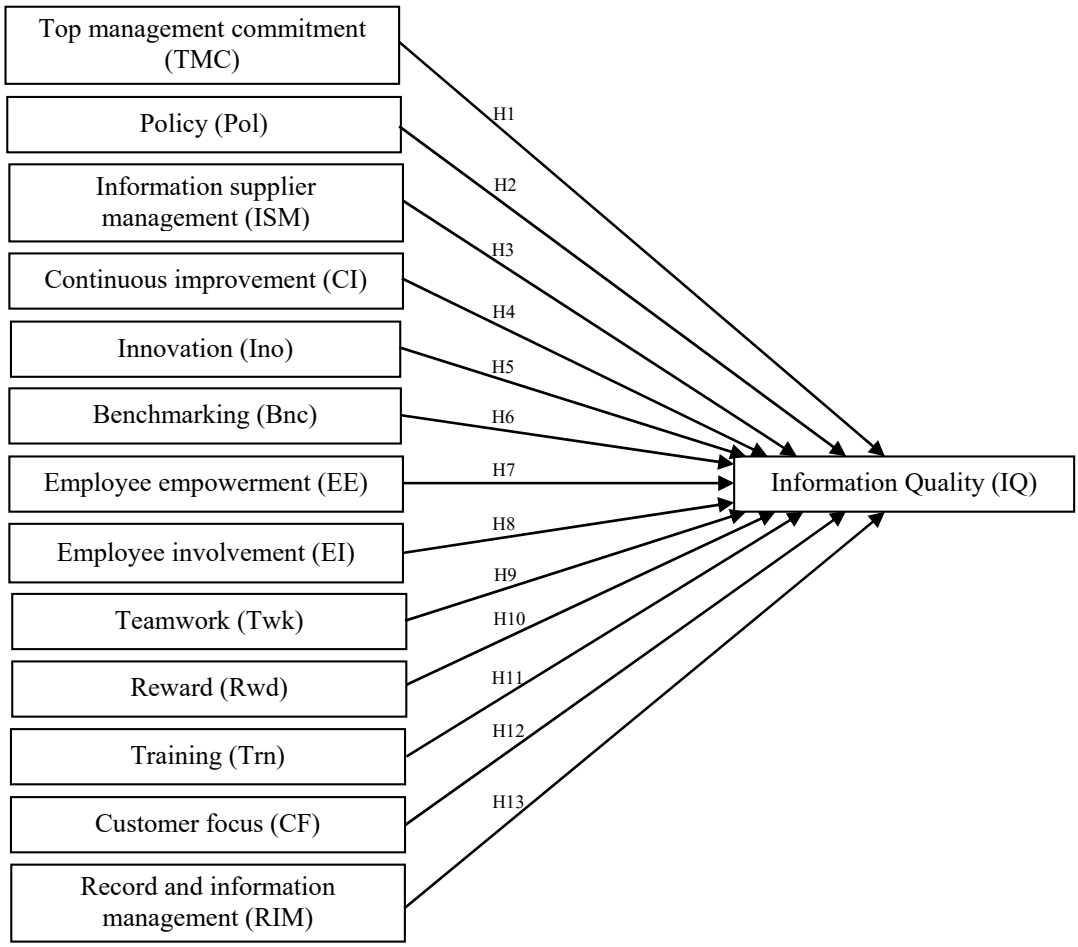

Figure 1: Conceptual Model

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5. METHODOLOGY

This study used the mixed method sequential explanatory design by implementing quantitative and qualitative approaches [45]. However, this paper only reports the quantitative approach, while the qualitative approach is reported in a separate publication. Quantitative data was collected using questionnaire and SmartPLS software version 3.2.6 was used to analyse the data and validate the research model.

5.1 Questionnaire Instrument

A pre-test was conducted to test the validity of the questionnaire whether it is able to measure the concept correctly [46], [47]. The content and face validities of the questionnaire were analyzed by thirteen specialists in the following fields: statistics, Malay language, information management, quality management, information systems, and PLS-SEM model development. Specifically, they were theorists (academicians) as well as practitioners (managers of information) in public organizations. The questionnaire was then improved based on the feedback received prior to implementing a pilot study involving 32 respondents. A total of two items were eliminated because they did not reach the acceptable reliability value during the pilot study data analysis. Subsequently, the collection of actual survey data was carried out from May to September 2017. The questionnaire instrument used a seven-point Likert scale with a label at the end with the value of 1 representing "strongly disagree" and the value of 7 representing "strongly agree" [48].

5.2 Sample

This study used proportionate stratified random sampling technique to get the best sample to ensure proper representation of the population.

The analytical units comprised all Malaysian public establishments which in turn were made up of federal public services, state public services, federal statutory bodies, state statutory bodies, and local authorities. Every sampled organization had a representative (respondent) whose posts were any of the following: directors/ managers, deputy director managers, and senior human resources/ management officers. Some 430 questionnaires were delivered, of which 279 (64.9%) were returned. From there, 273 (63.5%) provided data for evaluations; this final figure was still larger than the minimum sample size required for PLS-SEM analysis [46].

Table 2 shows the demographic analysis of this study's sample. The majority of the respondents were men and among the director (or equivalent) divisions. Meanwhile, the organizations with the most participants are state public services with 89 respondents (32.6%) while the organizations with the least participants were local authorities with 32 respondents (11.7%). Among the factors that are expected to contribute to the percentage of organizational participation in this study is the actual number of organizations that existed for the type of service.

Table 2: Demographic Profile

Demographic variable	Category	Frequency/ Percentage
Gender	Male	166 (60.8%)
	Female	107 (39.2%)
Position	Director or equivalent	189 (69.2%)
	Deputy Director or equivalent	61 (22.3%)
	Senior officer	23 (8.4%)
Organization 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%)

6. DATA ANALYSIS AND RESULTS

The PLS-SEM model analysis covers the analysis of the measurement model and the structural model [46] and was done by using the SmartPLS software version 3.2.6.

6.1 Measurement Model

Measurement model analysis involves the assessment of item (indicator) reliability, internal consistency reliability, convergent validity, and discriminant validity. The reliability of the items is assessed using outer loading values that can show the

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reliability of the relationship between construct and item. An item is considered to have the reliability of measuring the construct if its outer loading value is 0.6 and above [49]. However, in the early stages of this study, two items, Tmk5 (teamwork construct) and CF5 (customer focus construct), did not achieve the minimum outer loading value because their values were 0.243 and 0.357 respectively. These two items were then dropped one by one, starting with Twk5 and followed by CF5. After elimination of these two items, all remaining items had an outer loading value that exceeded the minimum level and were considered appropriate for measuring their respective construct. The elimination of both items made the total of all remaining items to be assessed in the next process to be 59. Table 3 shows the outer loading value for each item according to their construct. The findings show that the highest outer loading value is 0.925, belonging to EE2 item (for employee empowerment construct), while the lowest value is 0.701, belonging to RIM2 item (for record and information management construct).

Table 3: Outer Loading

Item	Outer loading	Item	Outer loading
Construct: TMC		Construct: Twk	
TMC1	0.784	Twk1	0.820
TMC2	0.878	Twk2	0.892
TMC3	0.796	Twk3	0.782
TMC4	0.796	Twk4	0.826
Construct: Pol		Construct: Rwd	
Pol1	0.795	Rwd1	0.756
Pol2	0.851	Rwd2	0.757
Pol3	0.848	Rwd3	0.758
Pol4	0.902	Rwd4	0.757
Construct: ISM		Construct: Trn	
ISM1	0.854	Trn1	0.851
ISM2	0.875	Trn2	0.829
ISM3	0.904	Trn3	0.890
ISM4	0.852	Trn4	0.876
Construct: CI		Construct: CF	
CI1	0.878	CF1	0.893
CI2	0.900	CF2	0.860
CI3	0.896	CF3	0.884
CI4	0.874	CF4	0.886
Construct: Ino		Construct: RIM	
Ino1	0.852	RIM1	0.705
Ino2	0.865	RIM2	0.701
Ino3	0.825	RIM3	0.732
Ino4	0.887	RIM4	0.715
Construct: Bnc		RIM5	0.748
Bnc1	0.868	RIM6	0.713
Bnc2	0.822	RIM7	0.708
Bnc3	0.804	RIM8	0.705
Construct: EE		Construct: IQ	
EE1	0.902	IQ1	0.861
EE2	0.925	IQ2	0.843
EE3	0.751	IQ3	0.809
EE4	0.847	IQ4	0.839
Construct: EI			
EI1	0.767		
EI2	0.788		
EI3	0.795		
EI4	0.829		

Table 4 shows the findings of internal consistency reliability and convergent validity. Internal consistency reliability was assessed using Cronbach's alpha (Cα) value and composite reliability (CR) for each construct. All constructs have their Cronbach's alpha values within the range of 0.752 to 0.910, indicating that all of them are reliable and acceptable as the values exceed 0.7 [50]. Continuous improvement construct has the highest Cronbach's alpha value while reward construct has the lowest value. For composite reliability, all constructs have values in the range of 0.871 to 0.937, indicating that they are acceptable as they exceed 0.7 [46]. Benchmarking construct has the highest composite reliability value while continuous improvement construct has the lowest value.

Table 4: Consistency Reliability And Convergent Validity

Construct	Number of items	Cα	CR	AVE
TMC	4	0.830	0.887	0.663
Pol	4	0.871	0.912	0.722
ISM	4	0.896	0.927	0.759
CI	4	0.910	0.937	0.787
Ino	4	0.880	0.917	0.735
Bnc	3	0.778	0.871	0.692
EE	4	0.893	0.918	0.738
EI	4	0.806	0.873	0.632
Twk	4	0.853	0.899	0.691
Rwd	4	0.752	0.843	0.573
Trn	4	0.890	0.920	0.742
CF	4	0.904	0.933	0.776
RIM	8	0.864	0.894	0.513
IQ	4	0.859	0.904	0.702

The convergent validity assessment shows that each item measured their respective constructs and did not measure the other constructs because the average variance extracted (AVE) value for each construct exceeded the required minimum level (0.50) [46] as shown in table 4. Continuous improvement construct has the highest AVR value of 0.787 while RIM construct has the lowest AVR value of 0.513.

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Table 5: Fornell-Larcker Criteria

Construct	TMC	Pol	ISM	CI	Ino	Bnc	EE	EI	Twk	Rwd	Trn	CF	RIM	IQ
TMC	**.814**													
Pol	.565	**.850**												
ISM	.226	.374	**.871**											
CI	.530	.562	.418	**.887**										
Ino	.297	.400	.357	.503	**.857**									
Bnc	.478	.629	.484	.510	.467	**.832**								
EE	.218	.134	.282	.010	.250	.212	**.859**							
EI	.340	.447	.399	.476	.420	.473	.273	**.795**						
Twk	.228	.395	.342	.253	.232	.326	.057	.290	**.831**					
Rwd	.387	.651	.429	.417	.442	.580	.213	.413	.465	**.757**				
Trn	.320	.365	.231	.179	.138	.448	.111	.252	.204	.445	**.862**			
CF	.263	.359	.075	.357	.392	.281	.038	.326	.173	.334	.157	**.881**		
RIM	.366	.425	.368	.365	.342	.477	.310	.463	.312	.431	.329	.166	**.716**	
IQ	.676	.739	.500	.720	.556	.609	.150	.667	.486	.573	.488	.487	.628	**.837**

Diagonals (in bold) represent square roots of average variance extracted (AVE) while off-diagonal represent correlations

Table 6: HTMT Value

Construct	TMC	Pol	ISM	CI	Ino	Bnc	EE	EI	Twk	Rwd	Trn	CF	RIM	IQ
TMC														
Pol	.653													
ISM	.243	.421												
CI	.597	.622	.436											
Ino	.336	.465	.391	.555										
Bnc	.586	.773	.570	.596	.558									
EE	.228	.127	.305	.075	.255	.231								
EI	.406	.532	.464	.550	.498	.596	.285							
Twk	.246	.438	.376	.271	.253	.388	.076	.339						
Rwd	.473	.803	.529	.495	.549	.760	.223	.535	.575					
Trn	.335	.364	.244	.170	.163	.505	.138	.255	.193	.520				
CF	.300	.405	.091	.391	.440	.330	.069	.379	.204	.398	.149			
RIM	.422	.477	.394	.402	.390	.571	.335	.545	.330	.523	.349	.192		
IQ	.791	.837	.546	.789	.630	.728	.146	.787	.553	.695	.504	.550	.713	

The next analysis was a discriminant validity analysis to detect if each of the construct is different from one another [51], [52], besides detecting the difference for each item [53]. Discriminant validity analysis of the study was carried out using three evaluations, namely cross-loading assessment, Fornell-Larcker criteria, and heterotrait-monotrait ratio (HTMT). Cross-loading assessment showed that all items for each construct have a higher cross-loading value than the cross-loading value of the item for other construct. This finding proves that all the constructs in the research model differ from one another and verify the existence of discriminant characteristics.

The findings of the Fornell-Larcker assessment criteria are shown in table 5. The off-

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diagonal values are the correlations between the latent constructs and the diagonal values are square roots of AVEs, showing that all the square roots of AVEs on their own construct are higher than all of their correlations with other constructs. This finding also confirms the existence of discriminant characteristics.

Assessment of discriminant validity was also carried out using the ratio of heterotrait-monotrait correlation (HTMT). HTMT was implemented even though the assessments of cross-loading and Fornell-Larcker criteria had been implemented because according to [54], cross-loading assessment often fails to detect the nonexistence of discriminant validity. The Fornell-Larcker's criteria assesses the discriminant validity at the construct level, while cross-loading assesses the discriminant validity at the item level. Hence, [54] suggest that HTMT should also be implemented to verify the existence of discriminant validity. HTMT is a new approach based on multitrait-multimethod matrix to detect the existence of discriminant validity at the construct level. HTMT values needs to be below 0.85 to meet discrimination validity criteria [49], [55]. Table 6 shows the value of HTMT obtained. The findings show that the value of HTMT for all constructs is in the range of 0.069 to 0.847 which proves that all constructs meet the discrimination validity criteria.

Overall, the analysis of the measurements model shows that all the constructs and items used to develop the research model are reliable and valid according to the established and acceptable conditions.

6.2 Structural Model

A structural model analysis was implemented to detect the strength of the relationship between the constructs, and the accuracy and relevance of model predictions. The structural model analysis for this study included collinearity, path coefficient (hypothesis testing), coefficient of determination (R^2), and impact size (f^2) assessment. Collinearity assessment is carried out to detect high correlation value between constructs [46], [50]. A high correlation value shows the existence of problems related to the concepts and interpretations of the concepts to be studied [46]. Variance inflation factor (VIF) value is used to detect collinearity problems. An acceptable VIF value is less than 5.0 [46]. Table 7 shows the VIF value for each relationship between exogenous constructs (factor influencing information quality) and endogenous construct (information quality). The findings show that VIF values for all constructs are within the range of 1.363 and 2.591, which prove that there is no collinearity problem.

Table 7: VIF Value

Relationship	VIF
TMC→IQ	1.831
Pol→IQ	2.591
ISM→IQ	1.664
CI→IQ	2.317
Ino→IQ	1.729
Bnc→IQ	2.331
EE→IQ	1.375
EI→IQ	1.693
Twk→IQ	1.377
Rwd→IQ	2.349
Trn→IQ	1.438
CF→IQ	1.363
RIM→IQ	1.598

The path coefficient (β) was used to test the hypotheses of this study, the results of which are shown in table 8. A total of ten hypotheses (H1, H2, H3, H4, H5, H8, H9, H11, H12, and H13) were accepted (i.e. the factors had a significant positive relationship with information quality with each t-value exceeding 1.645 and *p*-value being less than 0.05) while three hypotheses (H6, H7, and H10) rejected. With reference to the β values, the 10 factors which had an influence on information quality were in the following order of importance: (1) top management commitment, (2) policy, (3) training, (4) RIM, (5) employee involvement, (6) continuous improvement, 7) teamwork, (8) customer focus, (9) innovation, and (10) information supplier management. On the other hand, benchmarking, employee empowerment, and reward had no significant positive relationship with information quality because their one-tailed path coefficients were negative.

Although each hypothesis was validated through hypothesis testing, a structural model analysis needs to be performed to assess and validate the research model. Accordingly, the analysis was continued with a coefficient of determination (R^2) to assess the level of ability of a structural model to make predictions. The R^2 value determines the model's ability to make weak (0.250 and below), moderate (0.251 to 0.5), strong (0.51 to 0.75), and very strong (0.751 and above) predictions [49]. Table 9 shows the findings of the coefficient of determination assessment. The value

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of R^2 for information quality construct is 0.924 and it is very strong. Hence, the entry of exogenous constructs (factors influencing information quality) into the PLS-SEM path model contributes 92.4% of the changes in endogenous construct (information quality).

Table 8: Path Coefficient

Hypothesis	Path coefficient (β)	t-value	Result
H1: TMC is positively related to IQ	0.254	10.168	Supported*
H2: Pol is positively related to IQ	0.224	6.851	Supported*
H3: ISM is positively related to IQ	0.130	4.691	Supported*
H4: CI is positively related to IQ	0.162	6.656	Supported*
H5: Ino is positively related to IQ	0.140	6.581	Supported*
H6: Bnc is positively related to IQ	-0.148	4.584	Not supported
H7: EE is positively related to IQ	-0.105	4.791	Not supported
H8: EI is positively related to IQ	0.201	8.084	Supported*
H9: Twk is positively related to IQ	0.155	6.492	Supported*
H10: Rwd is positively related to IQ	-0.144	5.694	Not supported
H11: Trn is positively related to IQ	0.214	11.733	Supported*
H12: CF is positively related to IQ	0.148	6.721	Supported*
H13: RIM is positively related to IQ	0.209	11.204	Supported*

*$p < 0.01$ (1-tailed).

Table 9: R^2 And R^2 Adjusted Value

Endogenous construct	R^2	$R^2_{Adjusted}$	Level
IQ	0.924	0.921	Very strong

Table 10: Effect Size

Relationship	f^2	Effect size level
TMC → IQ	0.467	Large
Pol → IQ	0.255	Medium
ISM → IQ	0.135	Small
CI → IQ	0.151	Medium
Ino → IQ	0.151	Medium
EI → IQ	0.315	Medium
Twk → IQ	0.229	Medium
Trn → IQ	0.421	Large
CF → IQ	0.213	Medium
RIM → IQ	0.363	Large

Effect size was evaluated using f^2 value to indicate the impact of exogenous constructs on endogenous constructs [46]. The effect assessed in this study was limited to ten constructs which were found to have a significant relationship with the construct of information quality. Table 10 shows the value of f^2 obtained. The findings show that effect size values for the constructs of top management, training, and RIM are large. Meanwhile, effect size values for the constructs of policy, continuous improvement, innovation, employee involvement, teamwork, and customer focus are medium. The effect size value of information supplier management is small. The results show that all effect size values of ten factors influencing the quality of information range from 0.144 to 0.474.

Overall, the analysis and validation of the research model using the PLS-SEM approach obtained through bootstrapping procedures with 5000 reuse samples in the SmartPLS software version 3.2.6 is shown in figure 2.

7. DISCUSSION AND IMPLICATIONS

As per the analysis, top management commitment, policy, training, RIM, employee involvement, continuous improvement, teamwork, customer focus, innovation, and information supplier management had significant effects on the quality of information in Malaysian public organizations. On the other hand, employee empowerment, reward, and benchmarking did not significantly influence the quality of information.

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Figure 2: PLS-SEM Model

Top management commitment had an influence on the quality of information in an organization. In fact, this factor is the most important one owing to the fact that the visions and instructions by the top management can drive the employees to manage information at an optimal quality. The results of this study were in line with those of [16], [17], [33], [34], whereby top management commitment had an influence on information quality, although the aforementioned studies have evaluated different aspects of information. Specifically, [16], [17] focused to information quality in accounting information systems of both public and private organizations. Meanwhile, [34] concentrated on engineering asset management and [33] on information systems.

In an organization, existing policy on information quality and its management is factor that influence the quality of information as well. Organizations and all their employees have to comply with this policy, which can facilitate the implementation of information management practices by prioritizing quality information. The findings of this study were similar to those of [16], [17], [34], whereby policy had an effect on the quality of information.

This study has also found that organizational training on the quality of information and its management was a determinant of information quality. Through these exercises, the competencies and skills of the employees can be improved, apart from promoting awareness of the importance of quality information. The said outcome was similar to those of [15]–[17], [22], whereby training was a factor that influenced the quality of organizational information.

RIM has an impact on the quality of information. This study has confirmed that the

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management of organizational information required an organization and its employees to comply with and execute eight RIM principles: accountability, transparency, integrity, protection, compliance, availability, retention, and disposition [43].

Employees are an important aspect of the quality management process because they are responsible for producing quality work outcomes. In line with that, this study has found that employee involvement had an effect on the quality of information in public organizations. Employees should work with high levels of morality and ethics, apart from optimally utilizing their skills and abilities. The findings of this study were in agreement with those of [16], [17], [34], whereby the competency and experience of the employees were factors that influenced information quality. In addition, the quality of information in the manufacturing industry was dependent on the ethics of the employees as well [14].

Continuous improvement is yet another factor which has an impact on the quality of information in public organizations. Constant inspection and control of the informational products of an organization are needed to ensure that the said products are of the highest possible quality. These outcomes were in line with those of [15]–[17], whereby continuous improvement was a determinant of the quality of information. [15] have examined this factor in terms of two different aspects, which were continuous improvement of information quality and continuous improvement of information quality management.

This study has also found that teamwork was a factor that influenced the quality of information managed by public organizations. As information management activities typically involve various parties, teamwork – which combines the expertise and capabilities of each individual in a group – is paramount. The aforementioned finding was parallel to those of [16], [17], [34], whereby teamwork is a determinant of the quality of information.

In this study, focus on customers was yet another determinant of the quality of information in public organizations. The needs and requirements of information users should be prioritized by an organization and its employees, apart from becoming the basis for the improvement of the quality of information. The findings of this study were consistent with those of [16], [17], whereby customer focus was the factor that influence the quality of information.

The study has also found that innovations on informational products and its processes of production had an effect on the quality of information managed by public organizations. The top management should promote innovations on informational products, especially in terms of the designs of the products. In addition, the usage of quality information systems by an organization is important to ensure the high quality of information within the same. The outcomes of this study were similar to those of [34], whereby technological factors such as (1) computing infrastructure and resources, (2) adoption of systems, (3) integration of systems and synchronization of databases, (4) capability constraints of systems and user interfaces, (5) data-cleansing, (6) usage of data quality tools/ monitors/ controls, (7) verification of data, as well as (8) automated capturing of data had an influence on the quality of information. The findings of this study concurred with those of [16], whereby the characteristics of the information systems had an impact on information quality. Likewise, [56] have reported that the quality of an information system had an influence on the quality of information as well.

This study has also found that the management of information supplier had an effect on information quality. As mentioned, the quality of information managed by an organization largely depends on the quality of data or raw information obtained from other sources (i.e. information suppliers). Hence, there should be a form of management of the said parties to ensure that the obtained information is of good quality and fit to be processed as well as used within the organization. The outcomes of this study concurred with those of [16], [17], [34], whereby the management of information supplier was one of the factors that influenced the quality of information.

This study has also demonstrated that three factors (benchmarking, empowerment, and reward) were not significantly related to the quality of information in Malaysian public organizations. Benchmarking was found to have no significant positive relationship with the quality of information. This could have been due to the fact that not many public organizations were willing to be a source of reference for their information quality management practices. Hence, it is suggested that organizations conduct detailed studies prior to introducing benchmarking practices so that the implementation of the same can be done smoothly, apart from maximizing the benefits of these practices.

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Employee empowerment is an important aspect of quality management. Defects in any product (including informational ones) during the manufacturing process need to be rectified as soon as possible or before the current process is over. Therefore, employees play a vital role in the correction of these informational flaws. Accordingly, organizations need to empower their employees to enhance their decision-making and problem-solving skills. However this study has found that it was not a factor which significantly influenced the quality of information in public organizations. A possible explanation for the same was they the employees were still highly dependent on their superiors for decision-making. In addition, most organizations are still unable to provide sufficient resources that can help the employees solve problems and make sound decisions.

Rewarding of employees can influence the quality of organizational information [16], [17], [34]. This measure is known to increase the motivation and morale of the employees to produce work outcomes of high quality. However, as per this study, reward did not have a significant influence on the quality of information. The basis for the said scenario could be due to the fact that public organizations concentration on delivering services to the public rather than generating profit. Therefore, civil servants need to work without expecting any reward. In addition, as the number of civil servants in Malaysia exceeds 1 million [57], a huge budget is needed to provide remunerations to these groups. Therefore, public organizations appear to have no capacity to reward their employees, especially in terms of monetary remunerations that are well within the capacities of most private sectors.

The findings of this study have given rise to important implications in three aspects: theory, research methodology, and practicality. In terms of theoretical contributions, we have identified important details pertaining to the factors that have been shown to influence the quality of information, as discussed in detail above. Methodology-wise, the questionnaire has achieved the validity and reliability standards in order to produce accurate and credible findings. As for practicality, the findings could be used as a guide to improve the organizational information quality management practices.

8. CONCLUSION AND FUTURE RESEARCH

The ability of organizations to survive is dependent on a vital asset called quality information. Therefore, there should be no compromise in the maintenance of high-quality information. Accordingly, the leaders need to identify the factors that influence the quality of information in their respective organizations so that information quality management strategies can be formulated and implemented effectively.

This study has developed and tested a model of information quality management in Malaysian public organizations. The said model was based on the factors that had an effect on the quality of information. Also, the relationships between these factors and quality of information were assessed to rank the former according to their importance. As per the analysis of the measurement model – which included assessments of reliability as well as convergent and discriminant validities – the instrument used in this study has fulfilled the validity and reliability standards, Thus, our research findings could be considered as accurate and reliable.

As per the outcomes of the path coefficient assessments (hypothesis testing) in the structural model analysis, (1) top management commitment, (2) policy, (3) training, (4) RIM, (5) employee involvement, (6) continuous improvement, (7) teamwork, (8) customer focus, (9) innovation, and (10) information supplier management were the ten factors (in descending order of importance) that had an influence on the quality of information.

Therefore, in order to ensure the good quality of information, organizations need to (1) ensure that the top management are highly committed to information quality management programs and activities, (2) devise and implement policy on information quality and its management, (3) provide training to improve the competency of employees in the management of quality of information, (4) manage information in compliance with the RIM principles (5) involve employees in activities that improve the quality of information (as well as ensure that they work with strong moral and ethical principles apart from optimally utilizing their skills and abilities), (6) promote continuous upgrading of information products, (7) improve the teamwork spirit among the workers (which in turn facilitates the pooling of individual expertise and capabilities), (8) give priority to the information users' needs and requirements, (9) encourage innovation in the creation of information products and the processes involved in the same, as well as (10) effectuate a form of management system to ensure that all data or raw information received from the suppliers are of a specified level of quality.

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This study has also predicted the ability of organization to effectively implement information quality management practices with reference to the factors which have been identified to be able to influence the quality of information. However, it is necessary to take into account the constraints of the conceptual model and methodology of this study. First, since this study was cross-sectional, was unable to elucidate the issues pertaining to the relationships between the constructs. Second, there were only 13 factors here, and that the explorations were limited to the context of public organizations.

For future studies, the abovementioned limitations need to be addressed. Other study designs, such as longitudinal ones, can be carried out to collect more detailed data, apart from describing the patterns, directions, and strength of the relationships between constructs. Also, both public and private organizations should be studied together to obtain a more comprehensive outcome. Likewise, it is crucial to take into account and explore other factors that can influence the quality information. Hence, these recommendations should be given due consideration as they can help generate more robust outcomes.

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