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MASTER DATA QUALITY MANAGEMENT FRAMEWORK: CONTENT VALIDITY

AZIRA IBRAHIM*, IBRAHIM MOHAMED† AND MOHAMMAD KAMRUL HASAN‡

Abstract. Organizations rely on high quality master data as a critical component in achieving their operational and strategic performance. To accomplish high quality master data, they need to be managed properly through a systematic and holistic framework. However, prevalent master data quality management frameworks lack in providing comprehensive management practice in assuring the quality of master data. Hence, stimulates the need to develop an improved master data quality framework. Prior to the development of the framework, the identification and validation of factors that contribute to the management of master data quality must be performed. Thus, this paper underlined four elements and seven factors affecting master data quality management. Further, the identified factors were validated using a questionnaire as the validation instrument. The questionnaire consists of 95 items representing the identified seven factors that were derived from previous studies in the domain of total quality management, data quality management, and master data. Since the items are derived from the different contexts of study, content validation is a need. Previous research has suggested several techniques for performing content validation, covering both quantitative and qualitative approaches. The quantitative approach employed objective assessment and the result was statistically analysed. While the qualitative approach adopted subjective assessment such as comments, ideas, or respond. In this paper, the quantitative approach is selected over the qualitative approach, considering the effort in analyzing several items (95 items) is less complex compared to the qualitative approach which is more difficult to interpret and account for biased results. The selected panel of experts validate the instrument using a three-point scale namely "1 = not relevant", "2 = important (but not essential)", and "3 = essential". Later, using the technique proposed by Lawshe, the value of the content validity ratio (CVR) is calculated. As a result, 92 items are accepted, and 3 items are rejected. The elimination of the 3 items is due to the unsuitableness to be used in the context of the public sector. The validated items can be used as an instrument to validate the factors affecting master data quality management. The proposed factor would support the organization in managing master data quality more effectively.

Key words: content validity; total quality management; data quality management, master data.

1. Introduction. Master data represents the company's core business entities which is the main component in executing business processes, reporting, and decision making [13, 21, 33]. In the setting of the public sector, data about customers, services, products, and service providers are categorized as master data [13].

Master data retain worthy information about an organization, accounting for the preeminence to be managed [31, 14]. The consequence of master data on the organization's performance either operationally or strategically is highly evidenced. Hence, managing master data to assuring and maintaining its quality must be the focal point for the organization [33, 14].

The quality of master data is managed by a master data quality management framework covering management tasks on strategic, governance, and technical aspect [35, 32, 40, 42]. Most of these frameworks highlighted the most imperative objective in master data quality management is the achievement of high quality data [6].

However, previous researchers emphasized the need to improve the existing framework since data quality issues are context specifics where one size does not fit all[48]. Furthermore, correlative with the digital transformation, the roles of data have evolved from just fulfilling the business process requirement and achieving the strategic objective of the organization to the strategic and valuable resource for the organization, hence creating the need to continuously update the current model or framework [35, 24].

As highlighted by [6], the fundamental reason why different frameworks or models are needed is due to the evolution in technology and the consequent growing complexity in data quality. As debated by [39], most

*Centre for Software Technology and Management, Faculty of Information Science and Technology, Universiti Kebangsaan Malaysia, 43600, Bangi, Selangor, Malaysia

†Centre for Software Technology and Management, Faculty of Information Science and Technology, Universiti Kebangsaan Malaysia, 43600, Bangi, Selangor, Malaysia Nurhizam Safie Mohd Satar§

‡Centre for Cyber Security, Faculty of Information Science and Technology, Universiti Kebangsaan Malaysia, 43600, Bangi, Selangor, Malaysia

Table 1.1: Factors for managing data quality from the total quality managament (TQM) appraoch

Factor	Description	Reference
Leadership	The top management role in driving and strengthening the management of master data quality including establishing an effective master data quality governance	[14, 8, 29, 3, 26, 18, 15, 34, 41, 45, 50]
Strategic planning	The development and implementation of a strategy to manage master data quality to achieve the outlined vision, missions, and goals	[14, 8, 3, 26, 34, 41, 45, 50]
Customer focus	The prioritization of customers' master data quality requirements and ensuring master data quality fulfills customer's requirement	[8, 3, 18, 34]
Human resource focus	The provision of an adequate and capable workforce, a conducive working environment, a culture that promotes workforce engagement, and a training and development program	[8, 3, 26, 18, 34]
Operation focus	The design, production, and quality control of master data, data supplier management, safety and security of data operational environment, and innovation management	[32, 3, 26, 18, 15, 34, 41, 45, 50]
Master data quality	The product data quality in terms of conformance to specification, is usable in a specific context, concisely represented, and available and accessible	[14, 40, 46, 50, 4]
Result	The effect of a high quality master on an organization's strategic and operational performance	[8, 3, 18, 15, 34, 41]

data quality frameworks are provisional, intuitive, and fragmentary, and consequently produced measurement models that are not robust and systematic. Significantly, current master data quality management frameworks do not accentuate the requirement to adequately manage the quality of master data such as: (i) overlooking the effect of master data quality on an organization's performance [40, 42], (ii) incompletely defining master data quality dimension [35, 32, 40, 42], (iii) partially underline a holistic and systematic management practice in managing master data quality [42], and (iv) most importantly developed and validated in context other than public sector [35, 32, 40, 42].

Thus, to deal with the insufficiency of the present frameworks and models, the total quality management (TQM) concept is proposed as a pillar to determine the factors that affect the management of master data quality.

In accordance, this study proposed a Master Data Quality (MDQM) Framework that comprises elements and factors that affect master data quality management in the context of the public sector. The MDQM Framework is developed from the perspective of TQM by adapting two influential models which are Malcolm Baldrige National Quality Awards Model (MNBQA Model) [8], and Wang and Strong Model [46]. These two models were chosen to highlight the synergy of leadership, strategic planning, customer-oriented, human resource management, and operation in guaranteeing the high quality of master data, further supporting the organization in achieving its strategic and operational performance.

Moreover, the selected models are sufficiently able to accommodate the need to establish a more methodic framework emphasizing the systematic master data quality management practice in the organization in line with the important roles of high-quality master data in digital transformation specifically in supporting organizations to make informed decisions, increase operation efficiency, and improve service delivery. The proposed framework ensures the effective master data management practice in place by coherently integrating all aspects of the management practice revolving from top management commitment, data governance, strategic planning, capability and capacity of human resources and also process effectiveness to ensure the availability of high quality master data.

The description and reference for factors affecting master data quality management are explained in Table 1.1.

Further, to ensure the applicability of the above-proposed factors in the context of the study, a validation process needs to be performed. Later, the validated factors can be synergized to establish a master data

Table 1.2: Description of items for the quastionnaire

Factor	**Item Code**	**Description**
Leadership	1.A1-1 : 1.A1-6 2.A1-7 : 2.A1-12	• Top management commitment • Top management knowledge and experience • Top management communication skills • Establish a master data quality policy • Define master data quality roles and responsibilities • Involve technical and business people at all levels.
Strategic planning	4.A2-1 : 4.A2-5 5.A2-6 : 5.A2-11	• Establish a strategy development process • Involve customer in strategy development • Implement innovation • Analyse strengths, weaknesses, opportunities, and threats • Align strategic objectives with the vision, mission, and master data quality management • Establish a short-term and long-term action plan • Implement action plan • Allocation adequate resources • Develop human resource planning • Implement change management • Assess and monitor action plan performance
Customer focus	7.A3-1 : 7.A3-5 8.A3-6 : 8.A3-11	• Interact with customers using various medium • Provide customer support services • Identify and categorize customer • Build and manage customer relationship • Evaluation complaint and suggestion • Identify master data quality requirements • Assess the quality of master data • Analyse the quality level of master data • Appraise and update periodically master data quality requirements
Human resource focus	10.B1-1 : 10.B1-5 11.B1-6 : 11.B1-10	• Develop a human resource management plan • Define the skills and expertise needed for each task • Appoint personnel with the right knowledge, experience, and qualification • Provide a conducive working environment • Provide appropriate benefits and policies for the workforce • Establish the right organizational culture • Manage human resource performance • Develop a training and development plan • Provide technical and business training related to data quality • Assess periodically the effectiveness of the training and development plan
Operation focus	13.B2-1 : 13.B2-7 14.B2-8 : 14.B2-11	• Establish a systematic methodology for designing and production of master data • Design and produce master data based on business and technical requirements. • Define and document data flow • Establish a systematic methodology for designing and production of master data • Design and produce master data based on business and technical requirements. • Define and document data flow • Integrate master data from multiple sources • Control quality of master data throughout the life cycle • Monitor master data quality and production process • Improve continuously the quality of master data quality and production process • Control master data production cost • Manage data supplier • Provide a secure operating environment • Manage innovation for master data and production process
Master data quality	16.C1-1 : 16.C1-4 17.C1-5 : 17.C1-9 18.C1-10 : 18.C1-13 19.C1-14 : 19.C1-15	• Master data comply with the specification • Master data can be used to perform a specific task • Master data concisely represented • Master data available, and accessible
Result	21.D1-1 : 21.D1-8 22.D1-9 : 22.D1-18	• Master data quality impact on the strategic performance of the organization • Master data quality impact on the operational performance of the organization

quality management framework. The validation of the factor is performed using an instrument that consists of a developed questionnaire. The questionnaire's items are obtained from a comprehensive study of previous research in the domain of TQM, data quality management, and master data. Then, the identified items were reworded to befitting the study context. The developed questionnaire consists of items that represent all the factors that affect the master data quality management. The description of the items for the questionnaire is elucidated in Table 1.2.

Table 1.3: Summary of iteams for the questionnaire

Factor	Element	No. of Item	Item Code
A:Leadership	A1: Leadership	13	1.A1-1 : 2.A1-12 3. General item
	A2: Strategic planning	12	4.A2-1 : 5.A2-11 6. General item
	A3: Customer focus	12	7.A3-1 : 8.A3-11 9. General item
B: System	B1: Human resource focus	11	10.B1-1 : 11.B1-10 12. General item
	B2: Operation focus	12	13.B2-1 : 14.B2-11 15. General item
C: Master Data Quality	C1: Master data quality	16	16.C1-1 : 19.C1-15 20. General item
D: Result	D1: Result	19	21.D1-1 : 22.D1-18 23. General item
Total item		95	

Overall, the questionnaire consists of 95 items, representing 4 elements and 7 factors that form the master data quality management framework. The summary of the items for the questionnaire is explained in Table 1.3

Based on the table above, the questionnaire consists of 95 items covering 88 individual items and 7 general items. Referring to [5, 1], one general item is needed to enable the experts to validate the importance of each factor. For that reason, for each factor, one general item is added to better validate the MDQM framework. All the items are quantitatively evaluated by applying a three-point scale: "1 = not relevant", "2 = important (but not essential)", and "3 = essential". In addition to that, one column section is also provided next to each item as a provision for the experts to state any comments.

Taking into account that the establishment of an instrument grounded on the theoretical theory and items are generated based on the existing instrument, later reworded based on the researcher's comprehension of the theory concept and the study context, the validity of the items is uncertain. Hence, content validity must be performed after the items have been developed [37]. The validation of the questionnaire is needed to assure it is relevant and suitable for representing the research concept [38]. An instrument that is valid is necessary to measure what it is supposed to measure [11]. According to [43], content validity is described as "the degree to which items in an instrument reflect the content universe to which the instrument is to be generalized". Instruments that lack content validity will negatively impact the final result of the study [30]. Content validity could be performed using a few methods as detailed in the following sub-sections.

1.1. Intensive Literature Review. Contents are validated by relying only on an intensive literature review [7, 47]. Most of the items are derived from a comprehensive literature review and existing instruments and do not involve any expert assessment [7, 47]. This method relies solely on the researcher's subjective judgment.

1.2. Intensive Literature Review. The experts' engagement is important to achieve content validity [23, 27]. Experts are individuals that have experience with the capability to communicate their opinion on the subject [5]. Expert assessment can be performed using a qualitative or quantitative approach [19]. Through a qualitative approach, no statistical calculation is involved and purely depends on the subjective review of the item by the selected experts [5]. However, through a quantitative approach, experts will validate the contents in terms of the degree to of each item is relevant and suitable to the construct, and involve statistical calculation and analysis which informs either the item should be retained or rejected [5]. The quantitative approach can be performed via a few techniques as detailed below.

- Content Validity Ratio (CVR) by [23]: Experts will evaluate the degree of relevancy and suitability of each item on a three-point scale: "1 = not relevant", "2 = important (but not essential)", and "3 = essential". CVR value was calculated for each item by applying a formula developed by [23]. Then, later items are removed or retained based on their rating.
- Content Validity Index (CVI) by[27]: Experts will rate the degree of relevancy and suitability of each item on a four-point scale: "1= irrelevant", "2 = somewhat relevant", "3 = quite relevant", and "4 = highly relevant".

Based on[5], content validity assessment via subjective judgment either through intensive literature review or expert assessment method can result in biased outcomes due to its unstructured nature and the process involved may be difficult to reproduce. Furthermore, the outcome of the qualitative approach is usually hard to explicate due to the numerous items in the questionnaire [5].

Hence, [5, 28] proposed that quantitative judgment has a better outlook due to the more systematic process and relies on statistical calculation rather than subjective judgment. [5] also highlighted that the quantitative method suggested by [23] is better than the method suggested by [27]. This is due to the reason that Lawshe's technique does not involve too many panels of experts, and provides a clear and easily understood table in deciding either to accept or reject the item. Furthermore, the calculated CVR value using Lawshe's technique is pragmatic and can be performed in a reasonable time frame, especially during the evaluation process [44]. Additionally, only small number of experts are required to implement Lawshe's technique.

In contrast, this study did not apply the CVI technique since a four-point scale is not common and could be increased by coincidence [44]. Furthermore,[5] highlighted that CVI is not appropriate for a small number of experts and could produce inconsistency due to the uses of normal distribution. Thereby, the quantitative approach as introduced by [23] was chosen to validate the content due to its practicality.

Thus, the content validity process involved four steps which are the selection of a panel of experts, invitation and distribution of the instruments to the appointed panel of experts, calculation and analysis of CVR value and lastly finalising the instruments. The selected panel of experts validated the instrument using a three-point scale namely "1 = not relevant", "2 = important (but not essential)", and "3 = essential" as suggested by [23]. Based on the response, the CVR value is calculated and analysed accordingly. Later, the instrument is revised based on the analysis. The validated instrument mainly contributes to improving master data quality in the public sector domain by the systematization of more rigorous management practices.

The remainder of this article has been organized as follows: Section II explains the materials and method, Section III details the result and discussion, and Section IV describes the conclusion.

2. The material and method. The process for conducting content validity was adapted from [5, 1, 2] which consist of four steps as explained below.

2.1. Step 1- Selection of a Panel of Experts. The chosen panel of experts should possess adequate technical knowledge and experience in the domain of study, be inclined to participate, be able to spend reasonable time, and have satisfying communication skills [9, 36]. Apart from that,[5, 9, 36, 17, 16, 20, 22] emphasized that the panel of experts should also consist of individuals from an academic and practical field that have expertise in the domain of study and also instrument development. Hence, in this study, the panel of experts should present the characteristics below:

- pose knowledge and experience in quality management and/or, data quality management, and/or master data, in either academic or industry area and/or
- have a publication in quality management and/or, data quality management, and/or master data, in either an academic or industry area.

In deciding the number of experts that should be involved, the suggestions by previous researchers vary. The number of appointed experts usually depends on the scope of the research, the availability of the resources available, and the objective of the research [10]. According to [36], at least three panels of experts should be selected. Other than that, [12] suggested that the total number of individuals should be in the range of two to 20. [14] suggesting 11 experts in the field of academics, industry, and statistics. [1] proposed 8 experts for content validation.

Nevertheless, there is no specific procedure for determining the total number of experts that need to be involved in the process of content validation [49]. Nonetheless, the number of a selected panel of experts should consider the criteria for agreeing or denying the items as regards the number of experts as proposed by [23].

2.2. Step 2- Issuance of Invitations and Distribution of Instruments. The invitation was done in two stages. The first stage involves informal communication to get an early agreement. Once the agreement was received, an official invitation was done through e-mail which include detailed instructions on performing content validation.

Table 2.1: CVR value interpretation

CVR Value	**Interpretation**
1.00	all experts answer "3=essential", which indicates 100 percent agreement, and the item is valid
0 - 0.99	more than 50 percent, but less than 100 percent of the total number of experts responded "3=essential", which indicates a positive value
<0 (negative value)	less than 50 percent of the total number of experts responded "3=essential", which indicates a negative value

Table 2.2: Minimum CVR value based on the number of experts

No. of Experts	**Minimum CVR Value**
5	0.99
6	0.99
7	0.99
8	0.75
9	0.78
10	0.62
11	0.59
12	0.56
13	0.54
14	0.51
15	0.49
20	0.42
25	0.37
30	0.33
35	0.31
40	0.29

Source: [23]

2.3. Step 3- Computation and Analysis . CVR value was computed for each individual and general item by applying the equation suggested by [23] as below:

$$CVRValue = (2Ne/N) - 1$$

Note:
Ne = number of experts who answer "3=essential"
N = total number of experts

The computed CVR value is interpreted in Table 2.1

Referring to [23], only the item with the response "3=essential" is considered valid and should be included in the CVR computation. However [5, 25] suggested that the items with the response "2=important (but not essential)" was considered relevant as regards the positive value result. Consequently, this study considers all items with the answer "3=essential" or "2=important (but not essential)" in the CVR calculation.

In [23] also highlighted the issue of the probability the items get positive CVR value purely based on chance. Therefore, [23] suggested the setting of acceptance criteria for each item based on a minimum CVR value that was settled at 5 percent probability (p = 0.05) concerning the total number of experts involved as detailed in Table 2.2

2.4. Revision and Finalising the Item. Regards to the analysis of the CVR value, the items are revised and finalized.

Table 3.1: Summary of the panel of experts

Expert Code	Title	Experience
Academic field		
Expert 01	Lecturer in the Faculty of Technology and Informatics	Data management specializing in the data visualization
Expert 02	Lecturer and Head of Department in the Faculty of Information Technology	Data management specializing in the data security and database management
Expert 03	Lecturer in the Faculty of Technology and Information Science	Data management
Expert 04	Lecturer in the Faculty of Technology and Information Science	Data management, information system, impact study, strategic development, and quality model
Public sector		
Expert 05	ICT Officer and Ph.D candidate in the information management field	Data management specializing in the data visualization
Expert 06	ICT Officer in the field of strategic development	Data management and strategic planning
Expert 07	Head of ICT department	Data management and ICT management
Expert 08	ICT Officer in the field of ICT architecture	Data management, system development, and ICT strategic and architecture management

3. Result and discussion. The result of the content validity process is explained in sequence based on the steps adapted from [5, 1].

3.1. Step 1- Selection of a Panel of Experts. A total of eight experts from the public sector and academic fields had been involved in the content validation process. The list of participating panel of experts is shown in Table 3.1.

3.2. Step 2- Issuance of Invitations and Distribution of Instruments. All selected panels of experts were unofficially approached through phone calls and online medium communication to get prior consent before the issuance of an official invitation. Then, an official email was sent to the panel of experts with details on how to perform the content validity. The email was attached with an official letter endorsed by the institutions and the instrument to be validated. The panel of experts was given 14 days to return the completed instrument through e-mail. The panel of experts is also allowed to contact the researcher if needs further explanation on the content of the instrument.

3.3. Step 3- Computation and Analysis. The instrument consists of 95 items covering 88 individual items and 7 general items. The formula proposed by [23] was applied to calculate the CVR value for individual and general items. Referring to the explanation in Section III for step 3, the minimum CVR value to be accepted is depending on the total number of experts selected. Since this study appointed eight experts, hence the minimum CVR value for the item to be accepted is 0.75. An example of the CVR value calculation for the strategic planning factor and operation focus factor is depicted in Table 3.2.

Based on Table 3.2 all items in the strategic planning factor are accepted due to all items receiving a CVR value of 0.75 and above (refer to Table 2.2). Meanwhile, only 11 out of 12 items in the operation focus factor are accepted for getting the CVR value of 0.75 and above (refer to Table 2.2), whilst one item (14.B2-8) was rejected for getting the CVR value of 0.50 (refer to Table 2.2). The result for the whole instrument is detailed in Table 3.3.

Referring to Table 3.3 above, the analysis of the content validity for individual and general items is explained below:

- For individual items, out of 88 items, 66 items had a CVR value of 1.00, 19 items had a CVR value of 0.75, and 3 items had a CVR value of 0.50. Referring to Table V, items with a CVR value of 0.75 and above are accepted, making 85 items accepted and 3 items rejected.

Table 3.2: Example of CVR calculation for strategic planning and operation focus factor

Item No	**Expert No.**	**Answer = 2 or 3**	**CVR Value**
	1 2 3 4 5 6 7 8		
A2 – Strategic planning			
4.A2-1	3 2 3 3 3 3 2 3	8	1.00
4.A2-2	3 3 3 3 3 3 1 2	7	0.75
4.A2-3	3 2 3 3 3 3 2 2	8	1.00
4.A2-4	3 2 3 3 1 3 2 3	7	0.75
4.A2-5	3 3 3 3 3 3 3 3	8	1.00
5.A2-6	3 2 3 3 3 3 3 3	8	1.00
5.A2-7	3 3 3 3 3 3 3 2	8	1.00
5.A2-8	3 3 3 3 3 3 2 2	8	1.00
5.A2-9	3 2 3 3 3 3 2 2	8	1.00
5.A2-10	3 3 3 3 3 3 3 2	8	1.00
5.A2-11	3 3 3 3 3 3 2 2	8	1.00
6. (generic)	3 2 3 3 3 3 2 2	8	1.00
B2 – Operation focus			
13.B2-1	3 3 3 3 3 3 2 2	8	1.00
13.B2-2	3 3 3 3 3 3 2 3	8	1.00
13.B2-3	3 2 3 3 3 3 2 2	8	1.00
13.B2-4	3 2 3 3 3 3 2 3	8	1.00
13.B2-5	3 3 3 3 3 3 2 3	8	1.00
13.B2-6	3 3 3 3 3 3 2 2	8	1.00
13.B2-7	3 2 3 3 3 3 3 2	8	1.00
14.B2-8	3 2 3 3 3 3 1 1	6	0.50
14.B2-9	3 2 3 2 3 3 2 1	7	0.75
14.B2-10	3 3 3 3 2 3 3 2	8	1.00
14.B2-11	3 2 3 3 3 3 2 1	7	0.75
15. (generic)	3 3 3 3 3 3 2 2	8	1.00

- Items that get a CVR value equal to 1.00 indicate that all experts evaluate the respected item with the combination of either "3 = essential", or "2=important (but not essential)" only.
- Items that have a CVR value of 0.75 indicate that at least one panel of experts evaluate the item as "1 = not relevant".
- Items that have a CVR value of 0.50 indicate more than two panels of experts evaluate the item as "1 = not relevant". For all three items, a total of two panels of experts give responses "1 – not relevant", one panel of an expert gives responses "2 = relevant (not essential)", and five panels of experts give responses "3 = essential". However, no comment was provided by any panel of experts for those three items.
- As for the rejected items namely 11.B1-7, 14.B2-8, and 22.D1-15 indicate that all three items are not suitable and not representing the study concept and should be rejected. The details of the items are 11.B1-7 (managing staff performance related to the achievement of data quality through the practice of giving rewards, recognition, and also penalties) from the human resource factor, 14.B2-8 (control the costs involved in the production of data products through increase productivity, reduce errors and perform corrections) from the operation focus factor, and 22.D1-15 (cost saving because additional staff is required) from the result factor. This study was contextualized within the public sector domain. Hence, the rejection of all these three items highlighted that the practice of giving acknowledgment or imposing punishment to manage staff's performance, controlling costs by improving the production process and improving the organization's operation performance by hiring additional staff do not reflect the government's convention. Thus, the elimination of these three factors further improves the validity

Table 3.3: CVR value of individial and general iteams for managing master data quality

Element and Factor	**CVR Value for Individual Item**	**CVR Value for Generic Item**
Element A: Leadership		
Factor A1: Leadership	**7 items = 1.00** 1.A-1, 1.A1-3, 1.A1-5, 2.A1-8, 2.A1-9, 2.A1-11, 2.A1-12 **5 items = 0.75** 1.A1-2, 1.A1-4, 1.A1-6, 2.A1-7, 2.A1-10	**1 item = 1.00** Item 3
Factor A2: Strategic planning	**9 items = 1.00** 4.A2-1, 4.A2-3, 4.A2-5, 5.A2-6, 5.A2-7, 5.A2-8, 5.A2-9, 5.A2-10, 5.A2-11 **2 items = 0.75** 4.A2-2, 4.A2-4	**1 item = 1.00** Item 6
Factor A3: Customer focus	**10 items = 1.00** 7.A3-1, 7.A3-2, 7.A3-3, 7.A3-4, 7.A3-5, 8.A3-7, 8.A3-8, 8.A3-9, 8.A3-10, 8.A3-11 **1 items = 0.75** 7.A3-6	**1 item = 1.00** Item 9
Element B: System		
Factor B1: Human resource focus	**7 items = 1.00** 10.B1-1, 10.B1-2, 10.B1-3, 10.B1-4, 11.B1-8, 11.B1-9, 11.B1-10 **2 items = 0.75** 10.B1-5, 11.B1-6 **1 item = 0.05** 11.B1-7	**1 item = 1.00** Item 12
Factor B2: Operation focus	**8 items = 1.00** 13.B2-1, 13.B2-2, 13.B2-3, 13.B2-4, 13.B2-5, 13.B2-6, 13.B2-7, 14.B2-10 **2 items = 0.75** 14.B2-9, 14.B2-11 **1 item = 0.05** 14.B2-8	**1 item = 1.00** Item 15
Element C: Master Data Quality		
Factor C1: Master data quality	**12 items = 1.00** 16.C1-1, 16.C1-2, 16.C1-3, 16.C1-4, 17.C1-5, 17.C1-6, 17.C1-8, 17.C1-9, 18.C1-10, 18.C1-11, 18.C1-13, 19.C1-15 **3 items = 0.75** 17.C1-7, 18.C1-12, 18.C1-14	**1 item = 1.00** Item 20
Element D: Result		
Factor D1: Result	**13 items = 1.00** 21.D1-1, 21.D1-3, 21.D1-4, 21.D1-5, 21.D1-6, 21.D1-7, 21.D1-8, 22.D1-10, 22.D1-11, 22.D1-12, 22.D1-16, 22.D1-17, 22.D1-18 **4 items = 0.75** 21.D1-2, 22.D1-9, 22.D1-13, 22.D1-14 **1 item = 0.05** 22.D1-15	**1 item = 1.00** Item 23

of the framework in the context of the public sector.

- For the general item, all seven items have a CVR value of 1.00. Referring to [26], the result indicates that the measured factors are relevant.

3.4. Revision and Finalising the Item. According to the calculation and analysis performed in Step 3, 92 items are accepted and ready to be used in the subsequent phase. The summary of the finalised item is shown in Table 3.4.

Table 3.4: Summary of the finalized item

Element/ Factor	Total Initial Item	Total Rejected Item	Total Accepted Item
A: Leadership			
A1: Leadership	13	0	13
A2: Strategic planning	12	0	12
A3: Customer focus	12	0	12
B: System			
B1: Human resource focus	11	1 (11.B1-7)	10
B2: Operation focus	12	1 (14.B2-8)	11
C: Master Data Quality			
C1: Master data quality	16	0	16
D: Result			
D1: Result	19	1 (22.D1-15)	18
Total item	**95**	**3**	**92**

4. Conclusion. Based on the CVR value analysis, altogether 92 items are accepted that comprising 85 specific items and seven general items. However, 3 items were rejected which are one item each for the human resource factor, operation focus factor, and result factor. In conclusion, the content validation process involved eight experts successfully validating the questionnaire, and acceptable to be applied as an instrument to validate the MDQM framework. The research findings contribute theoretically to the TQM body of knowledge by extending the concept of master data quality into the TQM thrust and also practically improving the master data quality management in the domain of the public sector. Consequently, the validated MDQM framework can be used by the organization to manage master data quality more systematically.

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