

## Health-care Quality Management using the Malcolm Baldrige Criteria in Indonesian Advanced Referral Health Service Facilities



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**Abstract**— Quality and cost control policies for the National Health Insurance (JKN) program are currently developed in various measurement indicators. The development of service quality while still paying attention to aspects of hospital efficiency also continues to get wider space. In addition, for Social Insurance Administration Organization (BPJS) or the is very important for the use of Big Data in the development of the JKN Evidence Based Policy program. The aim of this study is determine the structural model of the quality of BPJS advanced referral health facilities based on the Malcolm Baldrige criteria. A cross sectional study using secondary data from BPJS Health Facilities Quality Index 2017 which specifically measures based on Malcolm Baldrige's criteria. Model development was analyzed using the SmartPLS application to produce a quality model design for advanced referral health facilities (FKRTL). The results of the analysis showed that the Service Quality model based on Malcolm Baldrige's criteria describes the entire dependent variable as a good model with an  $R^2$  value of 0.782. From the results of the analysis it was also found that the dependent variable which had a large influence was the measurement analysis and knowledge management variable and Process variable.

**Keywords:** Advanced Referral Health Facility, Health-care Quality Management, Malcolm Baldrige criteria, Social Insurance Administration Organization (BPJS),

### 1. Introduction

Rapid socio-economic development, with different levels of demographic and epidemiological transitions, has led to health inequalities, thus creating a major public health challenge for national health systems in Southeast Asia.<sup>[1]</sup> Health service managers in every country, especially during the Covid-19 pandemic, focus on improving the quality of health services. Pandemics put a huge burden on the healthcare systems due to the surge in the number of patients and healthcare organizations need to learn how to increase capacities to avoid medical crisis.<sup>[2]</sup> Quality concepts such as efficacy, optimality, acceptability, legitimacy, and equity are still relevant issues.<sup>[3]</sup>

Quality has been widely recognized as the antecedent of customer satisfaction<sup>[4]</sup> and it is directly proportional to customer satisfaction, which means that a high quality of the provided services creates better customer satisfaction.<sup>[5]</sup> Following the success of quality management programs in the manufacturing sector,<sup>[6]</sup> the healthcare industry was motivated to adopt quality management practices and principles to ensure delivery of proper care, reduce healthcare delivery costs, and increase patient satisfaction.<sup>[7]</sup>

Measurement of service quality is measured based on the dimensions of structure, process, and outcome.<sup>[3]</sup> Meanwhile, the Approach Deployment Learning Integration-Level Trend Comparative

Integration (ADLI-LeTCI) criteria are known as the Malcolm Baldrige Criteria.<sup>[5]</sup> In 2017, social insurance administration organizations in Indonesia are known as BPJS, measured the quality of advanced referral health services facility using Malcolm Baldrige's criteria.

The National Health Insurance Program in Indonesia through the ministry of health and BPJS continues to improve the quality of health services, including services at advanced referral health facilities (FKRTL), by optimizing the referral system to improve the quality of health services as well as quality and cost control. It is recorded that up to 2022, the number of FKRTL in collaboration with BPJS is recorded at 2,593 hospitals.<sup>[8]</sup>

Quality improvement policies need to be carried out by the government however; this service quality improvement must be based on a model with real data on hospitals in Indonesia. The use of data based on surveys of hospitals could construct models that are relevant to real problems at hospitals. Given the urgency of developing health standards in Indonesia, this research can provide evaluation for development of models for hospital performance in the future. This study aimed to determine the structural model of the quality of BPJS advanced referral health facilities based on the Malcolm Baldrige criteria.

**2. Methods**

A cross sectional study using secondary data from BPJS Health Facilities Quality Index 2017. The population in this study was all hospital health facilities that collaborated with BPJS in providing JKN program services. Data consist of 189 FKRTL taken from 21 provinces and 39 districts/cities in Indonesia.

Inclusion criteria were FKRTL that willing to fill in Malcolm Baldrige Questionnaire and informed consent was obtained before participation. Independent variables were leadership, strategic planning, customer focus, measurement analysis and knowledge management, process management, workforce focus and for dependent variable was results.

The service quality model was analyzed with structural equation modeling (SEM) using the SmartPLS application by setting latent variables with the criteria of having observable (measurable) indicators and setting indicators with the criteria of missing data in all samples.

**3. Results and Discussion**

There were 189 BPJS Advanced Referrals Health Facility from 2017 dataset, however only 161 of these fulfilled the criteria. Status of health facility in Indonesia is divided into two groups, namely facility ownership and facility financial pattern. Based on service capability, health facilities, supporting facilities and human resources, health facility grouped into type A, B, C, D. The characteristics distribution of health facility were performed by descriptive analysis and summarized in Table 1.

**Table 1.** Characteristic distribution of BPJS advanced referral health facility (n=161)

Health Facility Status	Health Facility Type							
	A		B		C		D	
	n	%	n	%	n	%	n	%

<b>Facility Ownership</b>								
Central government	4	36	0	0	0	0	2	5
Provincial government	4	36	10	26	2	3	2	5
District or city government	1	9	9	23	12	16	6	16
TNI/Polri	1	9	4	10	9	12	4	11
BUMN / BUMD	0	0	1	3	3	4	1	3
Private	1	9	15	38	48	65	22	59
<b>Facility Financial Pattern</b>								
Central Public Service Agency	6	55	0	0	12	17	4	10
Regional Public Service Agency	4	36	25	64	22	31	11	28
Non Central Public Service Agency	1	9	14	36	37	52	25	63

Note: Type A: ≥ 250 beds; Type B: ≥ 200 beds; Type C: ≥ 100 beds; Type D: ≥ 50 beds

Among health facility ownership, the proportion of central government and provincial government hospital with type A are equal (36%). Type B, C and D hospital was higher in private ownership (38%, 65% and 59%, respectively). As is observed from facility financial pattern, the majority of health facility were central public service agency for type A (55%) and regional public service agency for type B hospital (64%). Nearly half of health facilities were non central public service agency for type C and type B (52% and 63% respectively).

Multiple Linear Regression from independent variables on the results variable with  $p_{value} < 0.25$ , the results obtained are variable measurement analysis knowledge management (audit management) and process management variable can explain the result variable of 0.775 (adjusted  $R^2$ ), with the correlation coefficient equation between the dependent variable and independent variable: Results =  $8.331 + 2.498 * \text{measurement analysis and knowledge management} + 2.145 * \text{process management}$ .

Table 2 represents the criteria were used to assess the performance excellence in healthcare organizations. Malcolm Baldrige criteria consists total of 7 category on like rt scale for assessing quality performance were ranging from 1 until 6. Respondent’s ratings were averaged for each criteria and the average rating was converted into score with reference to its maximum score.

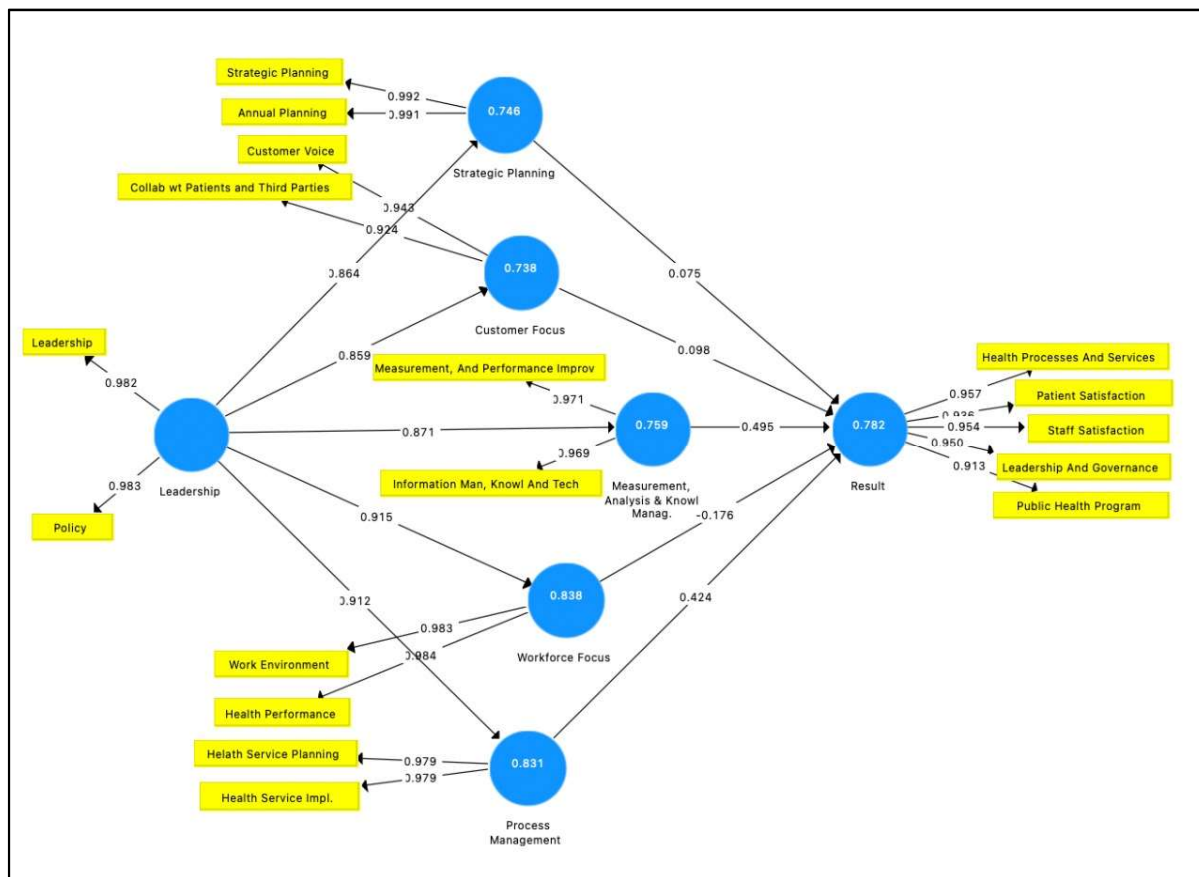
**Table 2.** Advanced Referral Health Facility Score Assessment According to Malcolm Baldrige Criteria

Malcolm Baldrige Criteria (Max Score)	Mean score & % achievement	Malcolm Baldrige Sub criteria (Max Score)	Mean score & % achievement
Leadership (120)	88.1 73%	Leadership (60)	43 (72%)
		Policy (60)	45 (75%)
Strategic planning (85)	59.5 71%	Strategic planning (40)	28 (70%)
		Annual planning (45)	32 (70%)
Customer Focus (85)	58.8 69%	Customer voice (45)	33 (73%)
		Collaboration with patients and third parties (40)	26 (65%)
Measurement, analysis and knowledge management (90)	61.7	Measurement of Organizational Performance Improvement Analysis (45)	30 (66%)

Malcolm Baldrige Criteria (Max Score)	Mean score & % achievement	Malcolm Baldrige Sub criteria (Max Score)	Mean score & % achievement
	73%	Management of Information, Knowledge and Information Technology (45)	32 (71%)
Workforce focus(85)	62.9	Workforce (40)	30 (75%)
	74%	Performance of Health Workers (45)	33 (73%)
Process management (85)	62	Health Service Planning (45)	32 (72%)
	73%	Implementation of Health Services (40)	30 (74%)
Results (450)	295.9	Impact of Health Processes and Services (120)	79 (66%)
	66%	Impact of Patient Satisfaction (90)	62 (68%)
		Impact of Staff Satisfaction (80)	54 (68%)
		Impact of Leadership and Governance (80)	52 (65%)
		Impact of Public Health Program(80)	49 (62%)
<b>Total</b>			<b>689 (69%)</b>

The scoring using weighting according to Malcolm Baldrige's criteria obtained a total score of 689 out of total weight of 1000 or only 69% of standard achievement. The average result of achieving the value of the Leadership variable is only 73% with a total score of 88.1 out of a total score of 120. The average result of achieving a Strategic Planning variable value is 71% with a total score of 59.5 out of a total score of 85.

To obtain Quality of Service model based on Malcolm Baldrige's criteria, 161 samples were analyzed using the Partial Least Square (Smart-PLS) application. The results of Model-161 Malcolm Baldrige as shown at Figure 1.



**Figure 1.**Health-care Quality Management Model according to Malcolm Baldrige Criteria in Indonesian BPJS Advanced Referral Health Facility services

The model showed that variable manifest described by variable latent with *Average Variance Extracted* ( $AVE \geq 0.5$ ,  $R^2 > 0.672$ ) substantial, Standardized Root Mean Squared Residual (SRMR)  $< 0,10$  and Normed Fit Index (NFI)  $> 0,90$ . For construct validity and reliability, effect size for leadership (F square)  $> 0.35$  had strong effect to measurement, analysis and knowledge management.<sup>[9,10]</sup>

The correlation test between 6 independent variables from the Malcolm Baldrige criteria showed that all variables had a strong correlation ( $R^2 > 0.672$ ) with  $p\text{-value} < 0.05$ .<sup>[9,11]</sup> Leadership variable correlates with an  $R^2$  value of 0.804; strategic planning variable with an  $R^2$  value of 0.746; customer focus variable with an  $R^2$  value of 0.738; variable measurement analysis and knowledge management (audit management) with an  $R^2$  value of 0.759; workforce focus with an  $R^2$  value of 0.838; and process management with an  $R^2$  value of 0.831.

From the results of data processing using the 161 BPJS Advanced Referrals Health Facility services dataset, it is showed that all input and process variables contribute to the quality of health facility services. From the model above, an  $R^2$  value of 0.782 was obtained, thus in the Malcolm Baldrige model the quality of the Advanced Referral Health Facility services results that could be explained was 78.2%, while there were still 21.8% that could not be explained.

Although there are other statistical test tools to see the correlation and influence between existing

variables, for example with the chi-square test, principal component analysis. However, as a quality structural model, the Health Facilities Quality Model can serve as a guide for the direction of developing quality control, especially for BPJS Advanced Referral Health Facility services in the future.

Malcolm Baldrige's instrument showed that measurement, analysis and knowledge management criteria is the most important variable. The instrument also provides a strong signal on the importance of leadership and strategic planning which can increase the contribution of other variables in improving the overall quality of Health Facilities (Fit Model).

With these findings, several things that need to be discussed include those related to BPJS Big Data which have actually been directed to backup quality control and cost control. BPJS Big Data that is integrated with all stakeholders is a gateway for quality control and cost control efforts that have a future towards building a data system that is doable, ready to use, zero defect, which has a high level of benefits and is daily readiness. Thus data could be used for the decision making process by leaders, both by the government, providers, and of course BPJS as the Social Insurance Administration Organization.

Developing variables and standards, developing instruments, utilizing information technology, optimizing research and development by all stakeholders will be a bright spot for continuous Advanced Referral Health Facility quality control. So that the right investment is a necessity that needs to be strived for. The owner of the information is at the same time the most likely party to do their best and/or do nothing at all.

#### 4. Conclusion

BPJS Advanced Referral Health Facility services for Health Quality Model from Malcolm Baldrige has good model strength, so it can be used for consideration to improve quality of BPJS Advanced Referral Health Facility services. Conceptually Malcolm Baldrige's model can be used as benchmarking for the development of BPJS Advanced Referral Health Facility services quality indicators.

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