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The assessment instrument of the alignment between cost and quality or two other aspects: A systematic review

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***Abstract*---**An alignment between two or more things in an organization (including hospitals) could have an impact on the organization performance. The alignment between two aspects (eg between processes and outputs) in the health sector, especially in the hospital is necessary. The alignment between processes and outputs is needed such as the alignment between the costs of quality improvement programs (processes) and the quality achievements (outputs). This alignment could be deployed as an evaluation parameter for the cost control and the quality control carried out in the hospital. The purpose of this paper is to systematically review evidence of the assessment instrument for the alignment between the cost and the quality or the alignment of other aspects. This study was a systematic review of articles on the assessment instruments for the alignment between the cost and the quality or the alignment of other aspects. The inclusion criteria that were used were the assessment or the measurement instrument of the alignment, the assessment or the measurement instrument, the alignment between the cost and the quality, or other alignments. The initial identification process based on the search found 774.139 articles. The study selection according to the title, abstract as inclusion, and full text found 221 articles. The data included was the studies that empirically examined the assessment instruments for the alignment. There were three articles according to the eligibility criteria that would be reviewed. The results showed that articles on the assessment instruments for alignment

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between the cost and the quality were not found. However, the three articles were found on the assessment instruments for the alignment on other aspects. The grouping of important data in articles was done by data description based on title, author's name, journal, and research area, aspect in the alignment, dimension of alignment aspect, the measurement methods, and the measurement tools.

***Keywords*---**Alignment, Assessment Instrument, Measurement Methods, Measurement Tools

Introduction

The alignment between two or more things in an organization (including in hospitals) can have some effects toward the performance of the organization. The alignment can improve the performance of the financial and non-financial sectors [1]. In addition, the business performance depends on the alignment among the strategy of the information system of the company, business strategy, and the structure of organization [2]. Meanwhile, the supply chain alignment produces compatibility or fit among goals, structures and processs between function and the various members in the supply chain that could enhance the business performance [3]. Besides, there are many other sources stating that the alignment could improve the work performance [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15] [16]. The alignment as the variable of moderator could moderate the independent variable toward the dependent one [17].

There are many aligned aspects such as the alignment between the information technology (or information system) and bussiness [2] [7] [18] [19] [20] [21] [22] [23] [24], and or intra information technology (IT) [1] [5] [16] [25] [26], and or intra bussiness [3], and or between IT and others [8] [10] [27], and or between bussiness and others [4] [13]. There are some other aligned aspects, for instance: the alignment between learning outcome and assessment methods in education [28], the alignment between standards and assessment in education [29]. Nevertheless, it has not covered the health sector, specifically on the cost and the quality. This aspect is very important in the health sector as the alignment between these two aspects might be a parameter of the cost and the quality control, especially in the hospital.

The cost and the quality control have a vital role toward the service given by the hospital, specifically since the national health insurance program (JKN) was implemented per January 1, 2014. The Minister of Health Regulation Number 71, 2013 in Chapter VI explains that the quality control and the cost control on the health facility level are implemented by the health facilities and Social Health Insurance Administration Body (BPJS Kesehatan) [30]. This leads to a challenge that the health service always demands the best quality which in turn has an impact on high health costs. On the other hand, the health service has not put its concern on a good cost control. Besides, the income from the health service is still below the operational cost as many INA CBGs rates are still not in accordance with the cost issued to provide the health services.

The alignment between two aspects in the health sector (for example, between processes and outputs), especially hospitals, is very supportive toward the cost and the quality control. The alignment that is being mentioned here is the alignment between the cost of the quality improvement program (process) and the quality achievement (output). Currently, the hospitals generally only focus on measuring the quality achievements but they have not thought about how to manage the alignment between the efforts made (and costs) and the results (quality achievements). The efforts here mean some programs (activities) to improve the quality which is measured based on its implementation and the required costs. The quality achievements are obtained from measurements that is implemented by the hospitals periodically. The condition that is solely on quality achievement based is caused by the need for hospital accreditation, the absence of commitment and hospital manager policies, and other factors.

The purpose of this paper is to systematically review evidence of assessment instrument for the alignment between the cost and the quality or the alignment of two other aspects. The result of the article review will be deployed as the basic of the dissertation research on composing the assessment instrument of the alignment between the cost of the quality improvement program and the quality achievement.

Methods

Design of Study

This study was a systematic review of articles on the assessment instrument for the alignment between the cost and the quality.

Data Sources

The articles database was obtained from Google Scholar, PubMed, ProQuest, Springer, Sciencedirect with keywords "assessment instrument" OR "measurement instrument" AND "the alignment of the cost and the quality".

Inclusion and Exclusion Criteria

The inclusion criteria was the assessment instrument of the alignment or the measurement instrument of the alignment, the assessment instrument or the measurement instrument, the alignment between the cost and the quality or other alignments, English language articles that can be accessed. While exclusion criteria were systematic review methods, only assessing one of aspect. Searches were limited to English language articles, full text, and published from 2005 to 2019.

Study Selection, and Article Extraction

The initial identification process based on the search limit found 774.139 articles. Articles that specifically discussed the assessment instrument for the alignment between the cost and the quality were not found. While, the articles on the assessment instrument for other alignments were Google Scholar whose data base was 11.000, PubMed whose data base was 98.326, ProQuest whose data base was 379.678), and Sciencedirect whose data base was 285.135. The study

selection that is based on title, abstract as inclusion, and full text found 221 articles. The studies that empirically examined the assessment instrument for alignment were also included. There were 3 articles according to the eligibility criteria that would be reviewed. The pursuit and the selection process are explained in Figure 1.

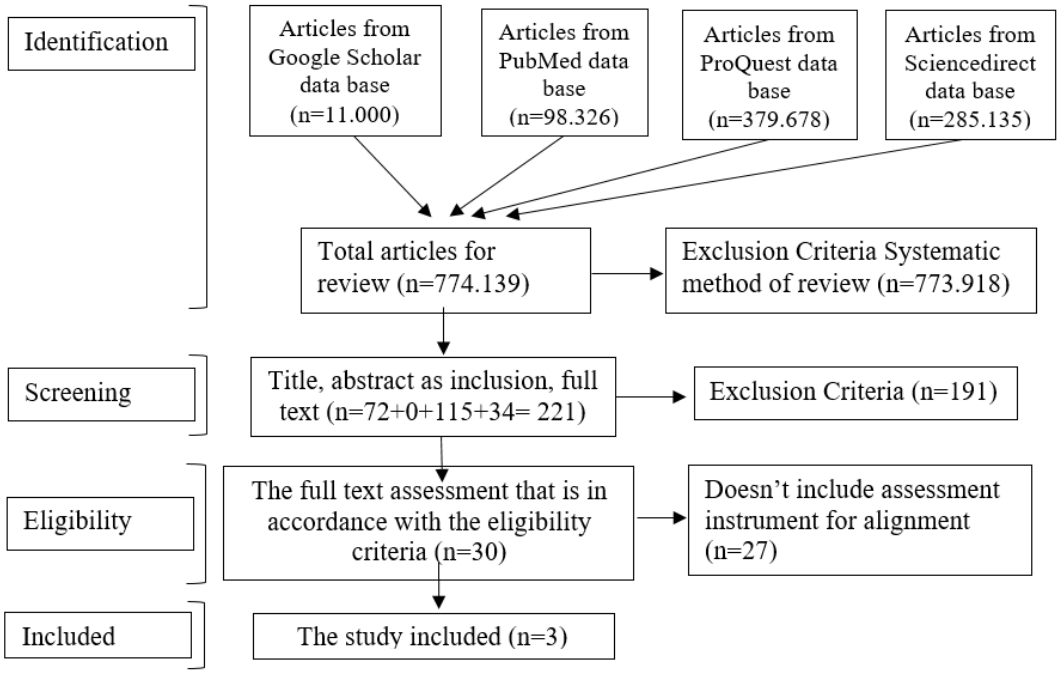

Figure 1. Study Selection, and Article Extraction Flow Diagram

Data Synthesis and Analysis

The main study outcomes were the instrument used to measure the alignment between two aspects. These two aspects were the operational alignment category, and or the horizontal alignment category. Some studies examined different aspect, measurement methods, and measurement tools. The reported findings of operational alignment, horizontal alignment, aspect in alignment, dimension of alignment aspect, measurement methods, and measurement tools were analyzed.

Result

The articles that specifically discussed the assessment instrument on the alignment between the cost and the quality were not found. Therefore, the articles on the assessment instrument for other alignments were reviewed. There were three articles found on the assessment instrument for other alignments. The grouping of the important data in articles was done by analyzing data based on title, author's name, journal, research area, aspect in the alignment, the dimension of the alignment aspect, measurement methods, measurement tools,

and others. The results based on title, research area, author's name, and journal of data extraction can be seen in table 1.

Table 1. The Articles specifically about assessment instrument for alignment

No.	Title	Research Area	Authors	Journal
1.	Aligning learning outcomes and assessment methods: a web tool for e-learning courses	Education sector	Inés Gil-Jaurena and Sandra Kucina Softic	International Journal of Educational Technology in Higher Education, 2016. 13 (17): 1-16
2.	A strategic alignment model for IT flexibility and dynamic capabilities: toward an assessment tool	Firms or industries sector	Rogier Wetering, Patrick Mikalef, and Adamantia Pateli	In Proceedings of the 25th European Conference on Information Systems (ECIS), Guimarães, Portugal, June 5-10, 2017 (pp. 1468-1485). ISBN 978-989-20-7655-3 Research Papers
3.	A Process-Oriented Perspective on the Alignment of Information Technology and Business Strategy	Firms	Paul P. Tallon	Journal of Management Information Systems, 2008, 24 (3): 227–268.

Afterward, the grouping of important data in articles was done by analyzing data based on title, aspect in alignment, the dimension of the alignment aspect, measurement methods, and measurement tools. The results of data extraction can be seen in table 2.

Table 2. The Measurement Instrument of Alignment

No.	Title	Aspect in Alignment	Dimension Of Alignment Aspect	Measurement Methods	Measurement Tools
1.	Aligning learning outcomes and assessmen t methods: a web tool for e-learning courses	a. learning outcome b. assess-ment methods	The dimension of learning outcomes is: 1) remember, 2) understand, 3) apply, 4) analyse, 5) evaluate and 6) create. The dimension of assessment methods is: 1) Multiple choice questions (MCQ),	The decision engine consists of the estimation of the score that measures the best match between the cognitive processes submitted by the user and the specific ones of a given assessment method. The assessment methods are selected on the basis of score,	The TALOE (Time to Assess Learning Outcomes in E-learning) is developed as the web-based tools

No.	Title	Aspect in Alignment	Dimension Of Alignment Aspect	Measurement Methods	Measurement Tools
			2) Essays, 3) Problem solving, 4) Practical work, 5) Short - answer questions, 6) Reflective practice assignments	calculated as the ratio between the numbers of matches between input.	
2.	A strategic alignment model for IT flexibility and dynamic capabilities: toward an assessment tool	a. IT flexibility b. Dynamic capabilities	The Five elementary dimensions of dynamic capabilities are: 1) sensing, 2) coordinating, 3) learning, 4) integrating, and 5) reconfiguring routines. The elementary dimensions for IT flexibility are: 1) loose coupling, 2) standardization, 3) transparency and 4) scalability	The assessment methods use by incorporating both mean scores (μ) as well as the difference between the maximum and minimum maturity scores of the dimensions (for both IT flexibility and dynamic capabilities) as measure for alignment. This mean score is then multiplied by the ratio of the minimum (MIN[IT1..IT4] and [DC1..DC5]) and the maximum score (MAX [IT1..IT4] and [DC1..DC5]) within that same array. Alignment $= \mu \times (Min/Max)^1$ Following this logic, the 'smaller' the difference all dimensions, the 'better' the alignment between the dimensions.	Questionnaire was developed, that included 50 questions covering all relevant dimensions. All items used a Likert scale from 1 – strongly disagree to 7 – strongly agree
3.	A Process-Oriented Perspective on the Alignment of Information	a. Information technology b. business strategy	Business strategy: 1) supplier relations, 2) production and operations, 3) product and service enhancement, 4)	In this study, it uses an approach based on a Delphi technique. Each expert was then asked to review five process business and to determine for each process whether it is	survey instruments

No.	Title	Aspect in Alignment	Dimension Of Alignment Aspect	Measurement Methods	Measurement Tools
	Technology and Business Strategy		marketing and sales, 5) customer relations Information technology strategy (Process-level measures of IT use): 1) supplier relations, 2) production and operations, 3) product and service enhancement, 4) marketing and sales, 5) customer relations	based on differences in strategic foci or value disciplines, a firm's use of IT ought to be above average (score 1), below average (score -1), or just average (score 0). Analysis indicated a high degree of agreement among the panel, particularly as to the locus of above average ratings where nine of ten panelists were in agreement.	

The other differences from the three reviewed articles could be in the form of definition or meaning of the alignment that was being used, the additional explanation on the measurement tools, etc. This differences could be seen in table 3.

Table 3. additional information of the three articles

No.	Title	Description
1.	Aligning learning outcomes and assessment methods: a web tool for e-learning courses	▪ The alignment means relationship between the first two components. A course is aligned or consistent if the description and classification of the learning outcomes and the assessment tasks match. ▪ The TALOE (Time to Assess Learning Outcomes in E-learning) web tool (available at http://taloetool.up.pt) is being developed to help teachers and educators (users) decide on the assessment strategies that will be used in their online courses. ▪ The tool is envisioned to be used by teachers/faculty/trainers, either to check if the existing assessment methods of their course or module are consistent with the stated learning outcomes.

2.	A strategic alignment model for IT flexibility and dynamic capabilities: toward an assessment tool	Based on this paper, the alignment is defined as the degree of balance between all defined dimensions.
3.	A Process-Oriented Perspective on the Alignment of Information Technology and Business Strategy	Profile deviation as used in this paper considers the alignment in the context of a deviation or difference from an ideal situation. Steps in measuring the alignment as profil deviation: Step 1. Ideal IT use profiles Step 2. Stratregy determination Step 3. Ideal IT use in each firm Step 4. Actual IT use Step 5. IT resource positioning (computed as one minus the absolute deviation between actual IT use or step 4, and idel IT use or step 3)

Eventhough the article that talked about the assessment instrument of the other alignments was limited and it was recorded that there were only three that fulfilled the inclusion criteria, the result of this review could be the illustration and reference to compose the assessment instrument of the alignment between the cost of the quality improvement program and the quality achievement in a hospital.

Discussion

Basically, the alignment can be described in some terms. For instance, the alignment was called as fit, harmony, fusion, integration, linkage, and relationship [31] [32] [33], consistency [3], fit, similarity, or match [25], distinguishes [12], shared and support, coherence [31]. All of those terms are the synonym, one with another [32]. The alignment can be defined as something that is strategic, operational, and individual [1]. In addition, the alignment also has some models such as the horizontal alignment and the vertical alignment [6]. Based on those articles, the alignment can be defined as the alignment on two or more objects and one object only.

Thus, the pursuit of the articles is relatively easy as the scope of the alignment is broad. In this review, the focus of the alignment is only as fit or match. The categories that were being pursued were the operational alignment and or the horizontal alignment and or both of those objects. Therefore, there were few articles that meet the inclusion criteria, that were 3 articles. The results of this review would be used as a reference for composing the assessment instrument of the alignment between the cost of the quality improvement activities and the quality achievements in the hospital. This instrument was novelty in dissertation.

Based on the pursuit of the articles, the alignment was mainly used in the business or firm sector [1] [3] [4] [5] [7] [8] [9] [10] [11] [13] [14] [15] [16] [18] [19] [20] [21] [22] [23] [24] [26], and some of which were in education sector [5] [14]

[22], and in the health sector [3] [35] that made the work performance better [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15] [16]. This revealed that the implementation of the alignment concept in the health sector was still low, and the available research was actually from the business sector that was being deployed in the health sector. The study that is going to be implemented is in the hospital, specifically it will talk about the cost of the quality improvement program and the quality achievement.

The result of the article pursuit also revealed that the majority of the aligned aspect was the alignment between the information technology (or information system) and bussiness [2] [7] [14] [18] [19] [20] [21] [22] [23] [24] [34], and or the intra information technology (IT) [1] [5] [25] [16] [26], and or intra bussiness [3], and or between IT and others [8] [10] [27], and or between bussiness and others [4] [13]. The other aspects that were aligned for instance: the alignment between the learning outcome, and the assessment methods in education [28], the alignment between the standards and the assessment in education [29]. According to the result of the previous research, there were no cost and quality on the aspect in alignmnent that has been studied. Meanwhile, the aspect that will be discussed includes: 1) the cost of the quality improvement program, and 2) the quality achievement. The alignment of the aforementioned aspects could illustrate the cost and quality control. Hence, this study could be classified as the new findings.

According to the three articles that had been reviewed, the dimension of the alignment aspect as follows. First, The dimension of learning outcomes, and assessment methods. The dimension of learning outcomes were: 1) remember, 2) understand, 3) apply, 4) analyse, 5) evaluate and 6) create. The dimension of assessment methods are: 1) multiple choice questions (MCQ), 2) essays, 3) problem solving, 4) practical work, 5) short - answer questions, 6) reflective practice assignments [28]. Second, dimensions of IT flexibility, and dynamic capabilities. The elementary dimensions for IT flexibility were: 1) loose coupling, 2) standardization, 3) transparency and 4) scalability. The five elementary dimensions of dynamic capabilities were: 1) sensing, 2) coordinating, 3) learning, 4) integrating, and 5) reconfiguring routines [16]. Third, the dimensions of the business strategy and the information technology strategy were the same: 1) supplier relations, 2) production and operations, 3) product and service enhancement, 4) marketing and sales, 5) customer relations [23].

Then, the dimension of the alignment aspect that would be studied is as follows. The dimensions of the cost of the quality improvement program were the quality improvement activities per quality indicator, the cost per activities, and the cost per quality indicator. The dimension of the quality achievement was the quality achievement per quality indicator. The quality indicators to be studied consisted of the national quality indicator and the priority quality indicators in the hospital. The national quality indicator consisted of 12 items, for example: 1) patient identification compliance, 2) emergency response time, 3) outpatient waiting time, 4) postponement of the elective surgery, 5) specialist doctor visit time compliance, 6) the reporting time for the critical laboratory test results, 7) the compliance on the use of the national formulary, 8) the compliance on hand washing, 9) the compliance on the prevention of risk of injury due to patient falls, 10) the

compliance on the clinical pathways, 11) patient and family satisfaction, and 12) the speed of response to complaints. The indicator of the priority quality and others that were selected from 10 quality indicators, such as: 1) the completeness rate of the initial medical assessment, 2) the incidence of the surgical site infection (IDO), 3) the completeness rate of pre-anesthesia assessment, 4) the blood rate of the transfusion reactions, 5) the discrepancy rate between preoperative and postoperative diagnoses, 6) the completeness of informed consent, 7) the number of the pre-surgical assessment completeness, 8) the incidence of phlebitis, 9) the number of effective communication among the professional caretakers, and 10) the compliance rate of the site marking procedure in patients undergoing surgery.

Methods of the alignmnent measurement that would be discussed was the alignmnent measurement that deployed the measurement tools, not the alignmnent analysis with statistic test. Hence, the article that was suitable with the condition given was solely on three articles. Based on the overview, the methods of the alignmnent measurement will be discussed as follows. First, The assessment methods are selected on the basis of score, calculated as the ratio between the number of matches between input. The scores are given based on the best match between the cognitive processes submitted by the user and the specific ones of a given assessment method [28]. Second, The assessment methods used is based on incorporating both mean scores (μ) as well as the difference between the maximum and minimum maturity scores of the dimensions (for both IT flexibility and dynamic capabilities) as measure for alignment. The Scores that are obtained from the questionnaire assessment are used. This mean score is then multiplied by the ratio of the minimum (MIN[IT1..IT4] and [DC1..DC5]) and the maximum score (MAX [IT1..IT4] and [DC1..DC5]). Alignment assessment, the smaller the difference all dimensions, the better the alignment between the dimensions [16]. Third, Alignment assessment use a Delphi technique. Each expert was then asked to review five process business and to determine for each process whether, based on differences in strategic foci or value disciplines, a firm's use of IT ought to be above average (score 1), below average (score -1), or just average (score 0). Analysis indicated a high degree of agreement among the panel, particularly as to the locus of above average ratings where nine of ten panelists were in agreement [23].

The Alignment assessment in the research that would be implemented was based on the alignment score. The alignment score per quality indicator is a value that illustrates that the quality achieved whether it is proportional to the costs incurred (within the range limit) or incomparable (below or above the range). The method of assessment is given a score 1 (the align category) if the proportion of costs per patient achieved is within the range of the proportion of costs per patient, and a score 0 (not align category) if the proportion of costs per patient achieved is below or above the range limit. The correct proportion of the cost per patient is the amount of the cost per patient to achieve the target according to the standard value. The proportion of the cost per patient achieved is the amount of cost per patient that is in accordance with the quality achievements. The range of the proportion of the cost per patient in the align category is the range that is used as a limit to determine the align category which is set at 10 % below and 10 % above the proportion of the cost per patient that should be. The lower range is

calculated by means of the proportion of the cost per patient that should be reduced by 10 % (in rupiah). The upper range is calculated by means of the proportion of the cost per patient which should be added by a value of 10 % (in rupiah).

In general, the tools of the alignmnent measurement would be discussed as follow. First, the TALOE (Time to Assess Learning Outcomes in E-learning) as the web-based tools to measure the alignment between the learning outcome and the assessment methods [28]. Second, questionnaire, that included 50 questions covering all relevant dimensions. All items used a Likert scale from 1 – strongly disagree to 7 – strongly agree. Then, the score of each dimension or the aspect is entered into the formula that had been decided [16]. Third, survey instruments [23]. Meanwhile, the study that would be executed would include the tools of alignmnent measurement that deployed the filling form and the assessment form in the form of the excel program. The data that should be included is the activity and the cost of the quality improvement per the quality indicator. If the aforementioned data is being entered thus the alignment score will be automatically obtained between the cost of the quality improvement and the quality achievement.

Conclusion

There were only three articles found about assessment instrument for alignment of two aspect, and they were reviewed. Two aspect were learning outcome and assessment methods, IT flexibility and dynamic capabilities, and Information technology and business strategy.

The alignment between two aspects in the health sector, for example between processes and outputs, especially in the hospital, is very supportive toward the cost and the quality control. The alignment here means the alignment between the cost of the quality improvement program (process) and the quality achievement (output). Effort here means the programs (activities) for the quality improvement that is measured based on its implementation and the required costs. The quality achievements are obtained from measurements carried out by the hospital periodically.

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