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THE CONTRIBUTION OF ALIGNMENT BETWEEN COST OF QUALITY IMPROVEMENT ACTIVITIES AND QUALITY ACHIEVEMENTS ON EFFICIENCY IN HOSPITAL

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Abstract

An alignment between two or more aspect in hospitals could have an impact on efficiency. The results of a preliminary study at 9 regional general hospitals showed an inefficient 66.67% in 2015-2016, and there was a decrease in efficiency 33.33% of the inefficient hospital. The purpose of this paper is to analyze the contribution of alignment between the costs of quality improvement activities and quality achievements on efficiency in hospital. This study is an observational analytic research with survey method. The population of this study is general hospitals (government and private) class B and C in East Java of 150 units with a sample of 30 hospitals. Respondents for the alignment assessment are 432 people, while for the efficiency measurement are 118 people. Analysis to determine the contribution of alignment on efficiency using linear regression statistical test. The results showed that most hospitals were in an align between the cost of quality improvement activities with quality achievement of 70%, most of the hospitals were in the efficient of 60%, and the contribution of alignment between the costs of quality improvement activities and quality achievement on efficiency (RoS /CoS ratio) of 4.1% with a value of $R^2 = 0.041$. The conclusion was the contribution of alignment between the costs of quality improvement activities and quality achievements on efficiency was only small, and in fact the contribution (effect) of other than alignment was very large. Recommendation, hospital management cannot be partial but must be comprehensive.

Keywords: Alignment, Cost, Quality, Efficiency

Background

An alignment between two or more aspects within an organization (including hospitals) can have an impact on organizational performance. This refers to several research results which are described below. Health care organizations achieve superior performance through alignment of business strategies and information technology (IT) [1]. An alignment between IT, strategic orientation, and organizational structure has a significant effect on business performance [2]. There is a positive relationship between a firm's degree of alignment of IT flexibility and dynamic capability dimensions on competitive firm performance [3]. Business-IT Alignment does have a positive relationship with organizational performance [4]. There is a direct positive link between strategic alignment and organizational performance [5]. Efficiency is mainly addressed through strategies of alignment between the regional standards of reimbursement and the costs incurred for

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health and nursing activities [6]. Organizational performance is defined as the financial and operational performance of the organization. Organizational performance measures include: market share, profitability, revenue, sales growth, worker productivity, cost control, cost savings, operational efficiency, service quality, return on investment (ROI), and customer satisfaction [1] [2] [3] [4] [5] [7].

Based on the description above, it shows that an alignment between two different aspects (between process and process, or process and output) can affect efficiency. However, the discussion on the relationship or effect of alignment between the two aspects (cost and quality) with efficiency is not found from the reference search. This search is conducted using the search engines Google Scholar, PubMed, ProQuest, and Sciencedirect. In addition, the assessment of alignment between two aspects, namely cost and quality in hospitals is a new research that has not existed before. In this study, an assessment (measurement) of the alignment between program (activities) costs and quality improvement will be carried out.

An alignment between the cost of quality improvement programs (activities) with quality achievements in hospitals can be a parameter for evaluating cost and quality control carried out. Quality and cost control are indispensable for the services provided by hospitals, especially since the program of National Health Insurance in Indonesia has been implemented since January 1, 2014. The Regulation of Health Minister of the Indonesia Republic Number 71 of 2013 in Chapter VI explains that quality and cost control at the level of health facilities carried out by health facilities and the Social Security Agency of Health (SSAH) [8].

This is in line with Taiwan's national health insurance which encourages hospitals to focus on efficiency and cost containment [9]. Currently, most hospitals only focus on measuring quality achievements but have not thought about managing the alignment between the efforts made and output (quality achievements). Efforts are made to mean programs (activities) for quality improvement which is measured based on its implementation and the required costs. This condition can be caused by not feeling the need, there is no demand for hospital accreditation needs, there is no commitment and policy of hospital managers, and other factors.

An alignment has been expressed using multiple terms such as fit, harmony, fusion, integration, and linkage. These terms as synonymous, each other [10]. In general terms, alignment means consistency between strategic goals, metrics and activities [7]. Alignment is the fit between two aspects that are horizontally or vertically and both must go together to achieve balance [11] [12]. An alignment can be divided into strategic, operational, and individual. Strategic alignment is the fit between IT and business mission, objectives, and plan [13]. Operational alignment is a cross-domain linkage of two work units or two aspects. Individual alignment can be interpreted as alignment between individuals with one another, either intra or between units in providing services. In addition, an alignment can be divided into horizontal alignment and vertical alignment. Horizontal alignment is an alignment within one level of a system, namely policies, programs, and performance. Vertical alignment is an alignment between levels of a

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system. There are three methods to assess the alignment between standards and assessment, namely: 1) sequential development, 2) expert review, and 3) document analysis [12].

This alignment is used in related to provide new business services, improve business processes and decisionmaking, and thereby increase business performance [10]. An alignment as a continuous coevolutionary process that reconciles top-down rational designs and bottom-up emergent processes of consciously and coherently interrelating all components of the Business and information system (IS) relationships in order to contribute to an organization's performance over time [11].

Preliminary studies have been conducted at 9 units of regional general hospitals in East Java Indonesia. Efficiency was measured by the ratio method, namely the comparison of output and input. The output was in the form of revenue (R) of service, while the input was in the form of service operational costs or cost (C). Revenue includes revenue from services of public and SSAH patients and revenue from other sources in a year. Operational costs were the sum of salary costs, electricity and water costs, telephone and internet costs, drug and medical consumables costs, non-medical consumables costs, other operational costs, and maintenance costs in a year. The standard of cost efficiency was R/C = 1.

The results of the preliminary study showed the following levels of efficiency. The number of inefficient hospitals in 2014 was 11.11%, while in 2015 and 2016 each of them was 66.67% of the total hospitals. The most inefficient of hospitals in 2015-2016 was class C (50%) of the total inefficient hospitals. In addition, there was a decrease on efficiency at the regional general hospitals in the period 2014 - 2016. All hospitals was 9 hospitals (100%) experienced a decrease on efficiency in 2014 - 2015, while the hospitals that experienced a decrease on efficiency in 2015 - 2016 were 3 (33%) of the total hospitals. The average decrease from all hospitals in 2014 - 2016 was 0.07. Hospitals that were in an inefficient status during 2015-2016 and experienced a decrease on efficiency successively was 2 (33.33%) of the 6 hospitals, namely hospital-BNP1, and hospital-BNP4. Other hospitals were divided into 3 categories. First, being in an inefficient status, then experiencing a decrease on efficiency and then an increase on efficiency. Second, it was in the efficiency status, then it has decreased efficiency successively (2015-2016). Third, being on efficiency status, then experiencing a decrease on efficiency and then an increase on efficiency.

Based on the hospital class, the sample hospitals could be divided into 3 categories. First, the Teaching Hospital class B tends to experience an increase on efficiency in the last 2 years. Second, the Non-Teaching Hospitals class B tend to be mostly (75%) experiencing a decrease on efficiency in the last 2 years. Third, hospitals class C tend to experience an increase on efficiency in the last 2 years. Based on the data above, it showed that the problem behind this research was the decrease on efficiency of 9 hospitals in East Java Indonesia which were on an inefficient status in 2015-2016 of 33.33%.

Efficiency can be refered from two principles, namely the principle of maximizing output and the principle of minimizing costs. The principle of maximizing output states that with

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a predetermined budget, maximum output can be achieved. The principle of minimizing costs states that a predetermined output target is achieved with minimum costs [14]. This is in line with the opinion of Gabbitas and Jeffs, namely technical efficiency is the degree to which the same output can be produced using fewer inputs (input-orientated) or the extent to which output can be increased using the same inputs (output-orientated) given existing technology [15]. Sherman argues that a hospital is defined to be inefficient if it could have produced the same amount and quality of patient care and other outputs with fewer resources than it consumed or if it could have produced greater amounts of its output with the same amount of resource it used [16].

There are three kinds of efficiency in economic theory, namely: 1) technical efficiency, 2) cost efficiency, and 3) allocative efficiency [17]. Technical efficiency is defined as maximizing output for given input levels or, in this context, treating as many patients as possible given the resources available. Hospitals are cost-efficient when they minimize costs for any given output level, called allocative efficiency [18]. Technical efficiency implies attaining the most output from a given set of inputs; and allocative efficiency implies choosing the optimal set of inputs, given their prices, to maximize output and minimize cost [19]. There are two methodologies that can be used to determine efficiency, namely parametric and non-parametric models [20] [21]. There are several parametric methods, including ratio analysis and stochastic frontier analysis (SFA), while non-parametric methods are data envelopment analysis (DEA) [21].

Efficiency is part of performance that can be achieved optimally, of course requires an approach to explain this. In the context of strategic management, resources based view (RBV) is one theory that can be implemented. RBV is a relatively new science within the framework of strategic planning and management. RBV is most relevant for hospitals when used in the implementation of strategic efforts. RBV's focus is on competitive advantage based on internal resources developed or used to implement specific strategies [22]. According to RBV theory, valuable and scarce resources can give companies a competitive advantage [23]. Increased efficiency achieved by hospitals can contribute to healthy business management (health services) and hospital finances in the era of National Health Insurance.

The current phenomenon is that the quality of service and costs tend to be out of sync. Operational costs that have been determined based on real needs should be able to produce a high quality of service. The fact that often occurs is that improving the quality of hospital services is often accompanied by high operational costs. Likewise, operating costs that have been determined based on real needs may not produce in high service quality (or still poor). Even in the era of National Health Insurance, there is a tendency that costs are reduced for savings and service quality is sought to remain good or even sacrificed to decrease so that hospitals can survive.

This is what underlies researchers to measure the alignment between the costs of quality improvement programs (activities) and quality achievements, and is associated with hospital efficiency. Thus, it is hoped that regional general hospitals that have become regional public service agency, and private hospitals can carry out operations both

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technically and financially well. This is considering that hospital revenue from SSAH patients is determined by the tariff of INA CBGs used in the reimbursement system for services provided by the hospital. Therefore, research related to quality and cost control is needed which has been widely needed in health facilities. The results of this study can assist hospitals in carrying out efficiency, and quality and cost control so as to reduce the domino effect in health financing in this era of National Health Insurance. The purpose of this paper is to analyze the contribution of alignment between the costs of quality improvement activities and quality achievements on efficiency in hospital.

METHODS

This type of research is an observational analytic study with a survey method. The research design used was cross sectional, where the data collected was obtained in a certain time period. The research stages consist of: 1) measuring (assessing) the alignment between the costs of quality improvement activities and quality achievements with the instruments that have been made in the previous research, 2) measuring efficiency based on the ratio for revenue of service (RoS) per cost of services (CoS), and 3) analyzing the contribution of alignment between the costs of quality improvement activities and quality achievements on efficiency. Measurement (assessment) of the alignment between the costs of quality improvement activities and quality achievements with instruments that have been prepared by researchers as new findings, including: a) collection of quality achievement data each national quality indicator, b) collecting data on costs of quality improvement activities each national quality indicator, and d) measure (assess) the alignment between costs of quality improvement activities and quality achievements. Efficiency measurement include: a) calculating hospital revenues, b) calculating hospital costs (expenses), c) calculating the ratio for revenue of service (RoS) per cost of services (CoS).

The study was conducted for 15 months in March 2020 – May 2021. The analysis unit of this study was a hospital. The research population is general hospitals (government and private) class B and C in East Java Indonesia. The research population is 150 hospitals. The research sample size is 30 hospitals. Sampling technique used proportional random sampling method, then samples of each type and class of hospital were taken using simple random sampling method.

Respondents for the alignment assessment in the study at each hospital consisted of: 1) committee of quality improvement and patient safety (chairman or secretary and or administrative staff), 2) PIC of committee, consisting of: a) sub-committee of patient safety (chairman or member), b) coordinator or staff of emergency room, c) coordinator or staff of outpatient unit, d) coordinator or staff of central surgical unit (operating room) and or anesthesia unit, e) coordinator or staff of inpatient unit, f) coordinator or staff of laboratory unit, g) coordinator or staff of pharmacy unit, h) committee of *Infection Prevention and Control* (chairman or member), i) coordinator or staff of unit that handling clinical pathways (medical service division, medical committee), j) coordinator or staff of unit that handling customer satisfaction (Education and research department, public relations department), k) marketing department, l) coordinator or staff of complaint handling unit

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(public relations department, marketing department, hospital health education department), m) coordinator or staff of medical record, and n) coordinator or staff of hospital blood bank; 3) the coordinator or staff of the training department; 4) coordinator or staff of IT unit (or information system unit); and 5) the head or staff of the procurement or logistics department. The number of respondents for the alignment assessment was 432 people. Respondents in the study for efficiency measurement were Head of department or Head of sub department or staff of Finance department, Head of department or Head of sub department or staff of Medical Record department (or information system unit), and Head of department or Head of sub department or staff of human resources department. The number of respondents for measuring efficiency is 118 people.

The variables in this study consist of: 1) the alignment between cost of quality improvement activities with quality achievement (X), and 2) efficiency based on the ratio for revenue of service per cost of services (Y). The primary data collection technique used is interviews. Interviews with respondents (PIC of quality indicators) regarding the identification of activities carried out by the hospital to achieve the achievement targets each quality indicator, and the cost components required for each activity. The instruments used are the form for filling in the quality improvement activities and costs (QIAC form) and the assistance form for filling in the details of quality improvement costs (DQIC form).

The secondary data collection technique used is documentation study. Documentation studies were carried out to collect data including: 1) the quality achievement each indicator, 2) the cost of quality improvement activities, 3) the number of visits and patients, 4) the amount of revenue of service, and total revenue, 5) the amount of cost of services, and 6) the number of human resources. The instruments used in the documentation study are the quality achievement form (QA form), the DQIC form, the number of visits and patients (VP form), the hospital revenue and cost form (HRC form), and human resources form (HR form).

The following is a description of data collection through documentation study. First, a documentation study on the quality achievements each national quality indicator in 2019. Second, a documentation study on the volume and amount of unit cost each cost component of each quality improvement activity in 2019. Third, a documentation study on the number of visits and patients in 2019 which includes: a) the number of visits and the number of outpatients (including medical rehabilitation, hemodialysis, chemotherapy, and other special outpatients), b) the number of visits and the number of emergency room patients, and c) the number of days of hospitalization and the number of inpatients per episode. Fourth, a documentation study on the amount of revenue in 2019 which includes: a) revenue from service businesses, b) revenue from cooperation outcome (land rent for ATMs, rent for canteens, and others), and c) other business revenue (revenue from education-training and research, fines compensation for the Social Security Agency of Health, other revenue). Fifth, a documentation study on the amount of costs consumed in 2019 which includes: a) Employee costs, b) Inventory costs, c) Goods and service costs, d) Maintenance costs, and e) Business travel expenses. Sixth, a documentation

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study on the number of human resources in 2019 which includes: a) medical personnel (doctor, dentists, specialists including partner specialist doctors), b) nurses and midwives, c) pharmacists, d) nutritionist, e) physical therapist, f) health technician (analyst, radiographer, electromedic, dental nurse, medical recorder, refractionist), g) non-medical health worker (public health, environmental health, psychologist, etc.), and h) non-health workers.

The data analysis is analyzing the contribution of the alignment between costs of quality improvement activities and quality achievement on efficiency based on the ratio for revenue of service per cost of services. Contribution analysis is used to measure the alignment contribution between cost of quality improvement activities and quality achievement as an independent variable on efficiency based on the ratio for revenue of service (RoS) per cost of services (CoS) or RoS/CoS. The statistical test used is Linear Regression. The analysis step of contribution of the alignment between cost of quality improvement activities and the quality achievement on efficiency consists of 2 activities. First, the normality test to assess the distribution of data that is normally distributed. Considering that this test is used as a condition for an effect analysis to be carried out, the normality test uses visual analysis with a normal PP graph. The normality test was carried out simultaneously with the effect analysis (Linear Regression test). Second, analysis of contribution of the alignment to efficiency (RoS/CoS ratio). The independent variable is stated to have an effect on the dependent variable if the significance is <0.05.

RESULT

The hospitals that participated in the research were general hospitals owned by the government, and private ones (including state-owned enterprises) class B and C in the province of East Java Indonesia. The hospital had 30 units, consisting of 14 government hospitals (10 class B, 4 class C), 16 private hospitals (4 class B, and 12 class C).

A. Assessment Of Alignment Between Cost Of Quality Improvement Activities And Quality Achievements

The assessment of the alignment between the costs of quality improvement activities and quality achievements was carried out based on national quality indicators which were equally measured in 2019 in all sample hospitals, namely 6 of 12 quality indicators. The six quality indicators were: 1) obedience of patient identification, 2) emergency response time, 3) obedience of specialist doctor visit hours, 4) time to report critical laboratory test results, 5) obedience of hand washing, and 6) patient and family satisfaction. This alignment was assessed from the overall quality indicators above (6 items) each hospital. Indicator of alignment (Cut of points) was cost per percentage of quality achievement. The costs of quality improvement activities and quality achievements were categorized in align if the cost per percentage of quality achievement was "in accordance" with the standard cost per percentage of quality achievement in a range. The standard cost per percentage of quality achievement was the average cost per percentage of quality achievement (mean) of the sample hospitals. The standard range of cost per percentage of quality achievement uses the formula = [mean ± (1 x SD) which consists of a lower limit

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[mean – (1 x SD] and an upper limit [mean + (1 x SD)]. Alignment value was given a score of 1 if it was aligned, and was given a score of 0 if it is not aligned. Alignment assessment was carried out by using assessment form of alignment between cost of quality improvement activities and quality achievement (ACQA Form) in an excel program. The alignment between costs of quality improvement activities and quality achievement each hospital in 2019 was described below.

Table 1: Alignment Value each Hospital in East Java, 2021

No	Hospital	Cost per Percentage of Quality Achievement (IDR)	Standard Cost per Percentage of Quality Achievement (mean) IDR	Standard Range of Cost per Percentage of Quality Achievement [mean ± (1 x SD] SD = IDR 1.931.178		Align-ment Score	Align-ment Value
				Batas Bawah (IDR)	Batas Atas (IDR)		
			3.116.625	**1.185.447**	**5.047. 803**		
	Hospital class B						
1	H-1 (RSSD)	22.348.738				0	Non Align
2	H-2 (RSJB)	14.846.499				0	Non Align
3	H-3 (RSIT)	6.860.732				0	Non Align
4	H-4 (RSGK)	2.722.024				1	Align
5	H-5 (RSKT)	1.668.781				1	Align
6	H -6 (RSKB)	5.269.670				0	Non Align
7	H -7 (RSBP)	3.616.579				1	Align
8	H -12 (RSHP)	2.270.549				1	Align
9	H -14 (RSLM)	2.241.034				1	Align
10	H -15 (RSIG)	6.558.074				0	Non Align
11	H -16 (RSML)	5.400.962				0	Non Align
12	H -17 (RSPHC)	1.858.582				1	Align
13	H -32 (RSIS)	2.079.438				1	Align
14	H -33 (RSHS)	11.749.317				0	Non Align
	Average of Hospital class B	**6.392.213**					
	Hospital class C						
15	H -8 (RSWJ)	4.411.729				1	Align
16	H -9 (RSBJ)	1.975.316				1	Align
17	H -13 (RSSP)	1.502.942				1	Align
18	H -18 (RSCM)	2.814.919				1	Align

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No	Hospital	Cost per Percentage of Quality Achievement (IDR)	Standard Cost per Percentage of Quality Achievement (mean) IDR	Standard Range of Cost per Percentage of Quality Achievement [mean ± (1 x SD] SD = IDR 1.931.178		Align-ment Score	Align-ment Value
				Batas Bawah (IDR)	Batas Atas (IDR)		
			3.116.625	**1.185.447**	**5.047. 803**		
19	H -19 (RSSG)	8.815.422				0	Non Align
20	H -20 (RSWS)	1.420.517				1	Align
21	H -21 (RSNU)	3.062.849				1	Align
22	H -22 (RSUM)	2.481.689				1	Align
23	H -23 (RSABO)	3.050.056				1	Align
24	H -24 (RSHM)	1.872.382				1	Align
25	H -25 (RSGM)	2.496.446				1	Align
26	H -26 (RSPG)	1.911.023				1	Align
27	H -27 (RSAS)	558.095				0	Non Align
28	H -29 (RSABT)	1.981.492				1	Align
29	H -30 (RSSA)	3.478.714				1	Align
30	H -31 (RSKJ)	1.768.868				1	Align
	Average of Hospital class C	**2.725.154**					
	Average of All Hospital	**4.436.448**					

Data source: Processed

The standard cost per percentage of quality achievement (mean) was IDR 3,116,625 obtained from calculating the average cost per percentage of quality achievement from 30 sample hospitals (3 hospitals with extreme values were excluded). The three hospitals that were excluded were H-1 (RSSD), H-2 (RSJB) and H-33 (RSHS). The lower limit range was obtained from the calculation = [3.116,625 – (1 x 1,931,178) = 1,185,447. The upper limit range was obtained from the calculation = [3,116,625 + (1 x 1,931,178] = 5,047,803.

Table 1 showed that the average cost per percentage of quality achievement was IDR 6,392,213 in hospitals class B in 2019. The average cost per percentage of quality achievement was IDR 2,725,154 for hospitals class C. Overall for hospitals class B and C, the average cost per percentage of quality achievement was IDR 4,436,448.

Alignment categories from all sample hospitals were divided into aligned and non-aligned as follows:

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Table 2: Alignment Category of Research Sample Hospitals in East Java, 2021

No	Alignment Category	Number of Hospital	
		f	%
	Hospital class B		
1	Align	7	50
2	Non Align	7	50
	Sub-total	**14**	**100**
	Hospital class C		
1	Align	14	87,5
2	Non Align	2	12,5
	Sub-total	**16**	**100**
	Hospital class B and C		
1	Align	21	70
2	Non Align	9	30
	Total	**30**	**100**

Data source: Processed

Table 2 showed that most of the sample hospitals were in the align category between costs of quality improvement activities and quality achievements of 21 (70%) of the 30 hospitals. For Hospitals (government and private) class B, there were equal proportions between the align and non-align categories, which were each 7 (50%) from 14 hospitals. For Hospitals (government and private) class C, most of them were in the align category between costs of quality improvement activities and quality achievements of 14 (87.5%) from 16 hospitals.

B. Measurement of Efficiency Based on the Ratio for Revenues of Service per Cost of Services

Efficiency measurement based on this ratio was done by dividing the output by the input to get a comparison of service business revenues and operational costs (expenses) of services. This comparison could describe how many times the cost (expense) per unit of rupiah could generate revenue. The output was revenue of services (RoS), while the input was cost of services (CoS). Efficiency measurement was carried out by comparing the RoS per CoS ratio in 2019 with the standard RoS/CoS = 1. Thus, it was stated to be efficient if the RoS/CoS ratio 1. Efficiency based on the ratio of RoS/CoS in 2019 was described below.

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Table 3: Efficiency Based on Ratio for Revenue of Services per Cost of Services for Each Research Sample Hospital in East Java, 2021

No	Hospital	Ratio for Revenue of Services per Cost of Services and Efficiency Measurement	
		RoS/CoS	Efficiency
	Goverment Hospital		
1	H-1 (RSSd)	0,98	In-efficient
2	H -2 (RSJb)	0,88	In-efficient
3	H -3 (RSIT)	0,91	In-efficient
4	H -4 (RSGK)	0,63	In-efficient
5	H -5 (RSKT)	1,08	Efficient
6	H -6 (RSKB)	0,81	In-efficient
7	H -7 (RSBP)	0,87	In-efficient
8	H -8 (RSWJ)	0,78	In-efficient
9	H -9 (RSBJ)	1,01	Efficient
10	H -12 (RSHP)	0,66	In-efficient
11	H -13 (RSSp)	1,10	Efficient
12	H -15 (RSIG)	0,81	In-efficient
13	H -31 (RSKJ)	0,94	In-efficient
14	H -33 (RSHS)	0,59	In-efficient
	Average	**0,86**	In-efficient
	Privat Hospital		
15	H -14 (RSLM)	2,22	Efficient
16	H -16 (RSML)	1,05	Efficient
17	H -17 (RSPHC)	1,06	Efficient
18	H -18 (RSCM)	1,16	Efficient
19	H -19 (RSSG)	1,12	Efficient
20	H -20 (RSWS)	1,18	Efficient
21	H -21 (RSNU)	1,13	Efficient
22	H -22 (RSUM)	1,11	Efficient
23	H S-23 (RSABo)	0,83	In-efficient
24	H -24 (RSHM)	1,16	Efficient
25	H -25 (RSGM)	1,42	Efficient
26	H -26 (RSPG)	1,27	Efficient
27	H -27 (RSAS)	1,60	Efficient
28	H -29 (RSABt)	1,27	Efficient
29	H -30 (RSSA)	1,16	Efficient
30	H -32 (RSIS)	1,24	Efficient
	Average	**1,25**	Efficient
	Average of All Hospital	**1,07**	Efficient

Data source: Processed

Table 3 showed that the comparison of service business revenues, and operational costs (expenses) of services at Government Hospitals class B and C in 2019 was an average of 0.86 (inefficient). This could illustrate the operational costs (expenses) of services per

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rupiah that could only generate service revenues of 0.86 times. As for Private Hospital class B and C the average was 1.25 (efficient). This could illustrate the operational costs (expenses) for services per rupiah that could generate service revenues of 1.25 times. Comparison of service business revenues, and operational costs (expenses) of services for all hospitals (Government and Private Hospitals Class B and C) was on average 1.07 (efficient). This could describe the operational costs (expenses) for services per rupiah that could generate service revenues of 1.07 times.

The efficiency category was based on the ratio for revenue of services per cost of services from all sample hospitals with reference to table 3 as follows.

Table 4. Efficiency Category Based on Ratio for Revenue of Services per Cost of Services at Research Sample Hospitals in East Java, 2021

No	Efficiency Category	Number of Hospital	
		f	%
	Goverment Hospital		
1	Efficient	3	21,43
2	In-efficient	11	78,57
	Sub-total	**14**	**100**
	Privat Hospital		
1	Efficient	15	93,75
2	In-efficient	1	6,25
	Sub-total	**16**	**100**
	Goverment and Privat Hospital		
1	Efficient	18	60
2	In-efficient	12	40
	Total	**30**	**100**

Data source: Processed

Table 4 showed that most of the sample hospitals in 2019 were in the efficient 18 (60%) of 30 hospitals. For government hospitals, most of them were in the inefficient 11 (78.57%) of 14 hospitals. For private hospitals, most of them were in the efficient 15 (93.75%) of 16 hospitals.

C. Contribution of Alignment between Cost of Quality Improvement Activities and Quality Achievements on Efficiency

Before carrying out statistical tests, normality tests were carried out first. This normality test was used to assess whether the data was normally distributed or not. Considering that this test was used as a condition for an effect (contribution) analysis to be carried out, the normality test uses visual analysis with a normal PP graph. Based on the SPSS output of the normality test which was carried out simultaneously with the Linear Regression test, a PP Plot of Regression Standardized Residual graph was obtained which depicted the points (data distribution) of all variables around the diagonal line. Thus, the variable RoS/CoS ratio was considered to be normally distributed.

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Contribution analysis of the alignment between cost of quality improvement activities and quality achievement on efficiency based on the ratio for revenue of services per cost of services was carried out by using Linear Regression statistical tests. Based on the Linear Regression test using the SPSS program, the results of the contribution analysis were obtained, namely the value of $R^2 = 0.041$. The value of R Square (R^2) or the coefficient of determination of 0.041 could indicate that the alignment between the costs of quality improvement activities and quality achievements has a contribution of 4.1% to the efficiency (RoS/CoS ratio). Thus, most (95.9%) that contribute to efficiency were other factors outside of alignment.

DISCUSSION

The average cost per percentage of quality achievement in 2019 in hospitals class B and C was IDR 4,436,448. If 3 hospitals that have extreme costs (the numbers are very large) were excluded, the average cost per percentage of quality achievement was IDR 3,116,625. The average cost per percentage of quality achievement (mean) was IDR 3,116,625 becomes a balance point between the cost of quality improvement activities and quality achievements in hospitals class B and C. Thus, the standard cost per percentage of quality achievement was below [mean - (1 x SD)] and above [mean + (1 x SD)] from that point as the standard range. Based on a search of published research results and other sources, nothing was found about the cost per percentage of quality achievement.

Most of the sample hospitals were align between costs of quality improvement activities and quality achievements of 21 (70%) from 30 hospitals. For Hospitals class B (government and private), there were equal proportions between align and non-align each 7 (50%) from 14 hospitals. For Hospitals class C (government and private), most of them were align between costs of quality improvement activities and quality achievements of 14 (87.5%) from 16 hospitals. This illustrates between the cost of quality improvement activities with the quality achievements of national quality indicators was balance, so that cost and quality control in hospitals were good. This balance occurs because the cost per percentage of quality achievement was within the standard range (the cost of quality improvement activities was not too low and high compared to quality achievements). This illustrates that the budget provided for quality improvement was relatively within sufficient limits, and or the relative quality achievement was on target. Based on the search for published research results and other sources, nothing was found about the alignment between costs of quality improvement activities and quality achievements.

Hospitals that were in align between costs of quality improvement activities and quality achievements could be supported by the characteristics they had so far as follows. First, the capability of the quality committee personnel and a good working mechanism as well as great support by hospital management. Second, had a good and concrete quality improvement program. Third, the measurement of quality achievement was carried out with high accuracy and was supported by an information system. Fourth, there was a budget allocation for quality improvement programs (activities) either specifically or

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spread across all units in the hospital. Fifth, good participation of the work unit and its personnel in quality improvement activities.

In this study, only the alignment between cost of quality improvement activities and quality achievements for national quality indicators was described which was both measured in 2019 in all sample hospitals. This was because the national quality indicator was a quality indicator that must be measured by all hospitals. Because the measurement of national quality indicators was implemented by the government in 2019 there were still several national quality indicators that had not been measured by the sample hospitals until the end of 2019 because they were not ready and capable. Therefore, only 6 of the 12 national quality indicators analyzed in 2019 because only these national quality indicators were equally measured in all sample hospitals. The six quality indicators were: 1) obedience of patient identification, 2) emergency response time, 3) obedience of specialist doctor visit hours, 4) time to report critical laboratory test results, 5) obedience of hand washing, and 6) patient and family satisfaction.

The national quality indicators applied in hospitals consist of 12 indicators [24]. Thus, 6 national quality indicators were not analyzed, including: 1) waiting time of outpatient, 2) postponement of elective surgery, 3) obedience for the use of the national formulary, 4) obedience of efforts to prevent the risk of injury due to patient falls, 5) obedience of clinical pathways, and 6) speed of response to complaints [25]. The priority quality indicators were not assessed for alignment and analyzed because the priority quality indicators each hospital were not the same. Priority quality indicators were set according to the goals (vision and mission) and conditions (problems experienced) each hospital.

The alignment between costs of quality improvement activities and quality achievements describes the balance of outcomes obtained per structure (input) used based on "process". Outcomes were quality achievements. Structure (input) were resources that were identified in the form of costs consumed by quality improvement activities. The Donabedian model for quality of care approach consists of 3 components, namely: structure, process, and outcome. In this approach, the structure affects the process, and the process affects the outcome [26]. A good structure could improve a good process and in turn could improve a good outcome. Therefore, it was possible to construct a causal model in which each factor was a necessary condition for the next factor [27].

Efficiency based on the ratio of service business revenue per operational cost (expense) for services in 2019 showed that for Government Hospitals class B and C the average was 0.86 (inefficient). This could illustrate the operational costs (expenses) for services per rupiah that could only generate service revenues of 0.86 times. As for Private Hospital class B and C the average was 1.25 (efficient). This could illustrate the operational costs (expenses) for services per that could generate service revenues of 1.25 times.

The results of this study could be analyzed that the ratio for service business revenue per operational cost (expense) of services for private hospitals was better, where per rupiah could generate service revenues greater than government hospitals. This could be due to the relatively higher cost of services at Government Hospitals due to poor efficiency. Meanwhile, efficiency in private hospitals was carried out in all aspects, including

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employee costs, inventory costs, goods and services costs, and official travel costs. Efficiency of employee cost was carried out by minimizing the number of employees and expanding the work area. Efficiency of inventory cost was carried out by tightening control over the use and distribution of pharmaceutical and logistical goods, as well as regular monitoring and evaluation. Efficiency on cost of goods and services was carried out by controlling the use of electricity, water, telephone, and minimal costs of cooperation with third parties. Efficiency of official travel costs was carried out by minimizing the volume and costs of official travel or related to hospital activities.

The efficiency ratio based on the service business revenue ratio per operational cost (expense) for services in all sample hospitals (Government and Private Hospitals class B and C) in 2019 was an average of 1.07, meaning that it was efficient compared to the standard. This could illustrate the operational costs (expenses) for services per rupiah that could generate service revenues of 1.07 times. The results of this study were in accordance with the standard efficiency ratios stated as follows. Inefficient with an efficiency ratio of less than ($E < 1$) and efficient with a ratio of 1 ($E = 1$) [16]. The criteria of the R/C ratio include: the value of the R/C ratio > 1 means it was efficient, and the value of the R/C ratio < 1 means it was inefficient [28].

However, the results of this study were not in accordance with the financial reports presented by several hospitals published in the media, as follows. The efficiency ratio of R/C at Sukoharjo Hospital in 2018-2019 was an average of 0.63 (inefficient) [29]. The efficiency ratio of R/C in RSUD dr. Loekman Hadi Kudus in 2019 was 0.67 (inefficient) [30]. The efficiency ratio of R/C at Tidar Magelang Hospital in 2018 was 0.85 (inefficient) [31]. This was because these three hospitals were categorized as government hospitals, and the results of the research for Government Hospitals class B and C were on average 0.87 (inefficient). In government hospitals, the cost for services tends to be relatively high due to poor efficiency.

If based on the efficiency category of all sample hospitals in 2019, it showed that most of the sample hospitals were efficient of 18 (60%) from 30 hospitals. For government hospitals, most of them were inefficient of 11 (78.57%) from 14 hospitals. For private hospitals, most of them were efficient of 15 (93.75%) from 16 hospitals. The sample hospital was efficient because in general the revenue from the service business was quite large, and operating costs were relatively small. Most of the revenue comes from claims of Social Security Agency of Health, considering that the number of patients in hospitals were members of National Health Insurance. Although some tariff of INA CBGs were relatively low, sample hospitals could optimize revenue by increasing the volume (more patients) visiting the hospital, and maximizing the coding of claims submitted. Operational costs in all sample hospitals had been controlled and efficient in various aspects, although in government hospitals it was less than optimal due to various factors that could not be controlled. The results of this study also showed that private hospitals were efficient, but government hospitals were inefficient. This could be due to differences in efficiency efforts made between the hospitals. A detailed explanation has been described above regarding the difference in the ratio of service business revenue per operational cost (expense) between Government and Private Hospitals.

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The results of statistical analysis, namely the alignment between costs of quality improvement activities and quality achievements contribute to efficiency (RoS/CoS) with a value of R Square (R^2) or a coefficient of determination of 0.041 could indicate that the alignment variable had a contribution effect of 4.1% on the efficiency (RoS/CoS ratio). Thus, most (95.9%) that contribute to efficiency were other factors outside of alignment.

The results of this study were different from other similar studies which stated that there was an effect of alignment on efficiency (RoS/CoS) as follows. There is a positive relationship between a firm's degree of alignment of IT flexibility and dynamic capability dimensions on competitive firm performance. The intended performance, including: cost control, financial performance, reduced operating costs, product and service quality and customer satisfaction [3]. Business-IT Alignment does have a positive relationship with organizational performance. Organizational performance refers to revenue, besides that organizational performance can be in service performance, cost savings, and operational efficiency [4]. An alignment between IT, strategic orientation, and organizational structure has a significant effect on business performance. Business performance is measured using four financial items, namely: ROA, sales growth, profitability, and liquidity [2].

Other similar studies that are also different from the results of this research were as follows. There are two types of supply chain alignment are defined shareholder and customer but only customer alignment (CA) has a direct positive impact on business performance, while shareholder alignment (SA) is its antecedent. Business performance is defined as the financial performance of an organization. The items measured are: net profit, revenue, market share, and return on investment (ROI) [7]. There is a direct positive link between strategic alignment and organizational performance. Organizational performance evaluated according to four criteria: improved production, cost reduction, the ability to innovate and customer satisfaction [5]. Health care organizations achieve superior performance through alignment of business strategies and information technology (IT). Organizational performance is defined as the financial and operational performance of the organization. Organizational performance measures include: market share, profitability, revenue, sales growth, worker productivity, cost control, cost savings, and service quality [1]. Other similar studies that are also different from the results of this research. Similar research which states that there is an effect of alignment on efficiency according to Garavaglia et al. described in the previous discussion [6].

The difference in the results of this research and several other similar studies above shows that the alignment between costs of quality improvement activities and quality achievements contributes little to efficiency (RoS/CoS ratio) in hospitals. This appraisal is strengthened by the value of the correlation coefficient (R) of 0.202 which indicates the relationship between the two variables is weak, and the value of R Square (R^2) is 0.041, which means that it has an influence contribution of only 4.1%. This is because efficiency based on the ratio for revenues of service per cost of services (RoS/CoS) in hospitals is more influenced by other factors.

Revenue can be affected by many factors other than the alignment. Other factors that influence the revenue from hospital services are: the services number of outpatient,

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emergency room and inpatient [32], tariff regulation, and the number of insured patients [33]. In addition, many factors other than alignment that can affect efficiency in hospitals as follow. Factors other than alignment that can affect efficiency in hospitals include: 1) resources, especially human capital and information technology [34] [35] [36], 2) cost containment, including cost control in pharmaceuticals (policy for limiting non-essential drug prescriptions and certificate-of-need regulations) [17] [37] [38], 3) payments based on diagnosis-related group (DRG) [17] and reimbursement systems [39], 4) lean management, one of the tools in lean management that can affect efficiency are Kaizen Events [40] [41] [42], 5) clinical pathways [9] [43] [44], 6) hospital class and types of hospital ownership [38] [45], and 7) economic behavior, including productive behavior (effective and efficient behavior) [17] [46], 8) performance management for service, tariff and budget regulation [17], 9) the role of insurance [38].

CONCLUSION

The conclusions obtained are based on the results of research and discussion carried out as follows:

1. Most of the sample hospitals are not align between costs of quality improvement activities and quality achievements.
2. Efficiency of sample hospitals based on the RoS/CoS ratio is mostly efficient (especially for Government Hospitals are inefficient, and Private Hospitals are efficient)
3. The contribution of alignment between cost of quality improvement activities and the quality achievement on efficiency (RoS/CoS ratio) is only small. This can be caused by many factors that affect the performance (efficiency) in the hospital, other factors outside of alignment.

Referring to the conclusions above, suggestions or recommendations that can be submitted are as follows:

1. Hospitals should monitor and evaluate the alignment between quality achievements and cost on periodical.
2. For government hospitals that are not yet efficient based on the RoS/CoS ratio, they should make efforts and comprehensive evaluations to be financially healthy and support quality services.
3. Alignment between costs of quality improvement programs (activities) and quality achievements in hospitals is important to do to achieve a balance of costs and quality by keeping standarded service quality or in accordance with consumer and stakeholder expectations.
4. Hospital management is expected to be not partial but must be comprehensive. It is because many factors that affect the performance (efficiency) of the hospital, other factors outside of alignment.

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