COST-BENEFIT ANALYSIS ON ISO 9001 CERTIFICATION AND HIGHER EDUCATION ACCREDITATION

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Abstract: ISO certified institutions expect to enjoy high level of accreditation as both ISO and accreditation support quality management system of higher education. This study aims to analyze the costs and benefits of the application of ISO 9001 which intersects with accreditation (APT) in the quality management system of higher education. The research was conducted through case study and descriptive approach. The research team conducted a survey of 120 new students of State Polytechnic in Batam with quota sampling technique for benefit estimation. Furthermore, a survey was conducted to 17 employees of the polytechnic who is responsible for the fulfillment of ISO 9001 certification and accreditation in all departments with purposive sampling technique to compare the benefits and costs. The research team found that both accreditation and ISO benefited the polytechnic. However, accreditation offers more benefits on performance improvement, student number, student satisfaction, and organizational reputation compared to that by ISO. Nevertheless, ISO benefits more on document improvement than accreditation. In terms of costs, ISO is considered to require a larger cost and more work time than accreditation. Thus, based on cost benefit analysis of both tangible and intangible aspects, quality management of higher education using accreditation is superior to using ISO alone.

Keywords: ***ISO 9001, accreditation, cost benefit***

ANALISIS MANFAAT BIAYA SERTIFIKASI ISO 9001 DAN AKREDITASI PERGURUAN TINGGI

Abstrak: Institusi tersertifikasi ISO berharap meningkatkan nilai akreditasinya sebab ISO dan akreditasi sama-sama mendukung sistem manajemen mutu pendidikan tinggi. Penelitian ini bertujuan untuk menganalisis manfaat dan biaya penerapan ISO 9001 yang beririsan dengan akreditasi perguruan tinggi (APT) dalam sistem manajemen mutu pendidikan tinggi. Penelitian menggunakan studi kasus dan pendekatan deskriptif. Tim peneliti melaksanakan survei terhadap 120 mahasiswa baru Politeknik Negeri Batam dengan teknik *quota sampling* untuk estimasi manfaat dan terhadap 17 karyawan yang bertanggung jawab pada pemenuhan sertifikasi ISO 9001 di semua bagian/jurusan dan APT dengan teknik *purposive sampling.* Penelitian dilakukan dengan membandingkan manfaat dan biaya yang terkait serta penerapan ISO 9001 dengan manajemen mutu berorientasi APT. Hasil penelitian menunjukkan bahwa kedua sistem manajemen tersebut memberikan manfaat kepada institusi. Namun, manfaat akreditasi lebih tinggi pada poin peningkatan kinerja, jumlah mahasiswa, kepuasan mahasiswa, dan reputasi organisasi. Di pihak lain, nilai ISO lebih baik pada poin kebermanfaatan untuk perbaikan dokumen, namun dianggap membutuhkan anggaran biaya yang lebih besar dan pengorbanan waktu kerja yang lebih banyak dibandingkan akreditasi. Dengan demikian, berdasarkan analisis manfaat biaya baik yang dapat dikuantifikasi maupun yang sulit dikuantifikasi, pengelolaan mutu pendidikan tinggi menggunakan akreditasi lebih unggul daripada menggunakan ISO saja.

Kata Kunci: ***ISO 9001, akreditasi perguruan tinggi, manfaat biaya***

INTRODUCTION

In the midst of tight efforts to improve competitiveness, all organizations are trying to win the competition in various ways including by increasing the quality of products and services. The growing attention of organizations and the wider community to the quality of products and services causes a high need for quality management systems. Quality management system is a set of documented procedures and

standard practices for system management that aims to ensure the suitability of a process and product to the needs or requirements set by the customer and organization (Gasperz, 2002).

The internationally recognized quality management system standards are ISO 9001. ISO 9001 has become a global benchmark for quality management systems especially after it was adopted by more than one million organizations worldwide (Lloyd's Register Quality Assurance, 2015). ISO certification does not guarantee a process or product at the maximum level of quality, but only states that the entity has a quality management system that gives confidence to users that the company is consistent with their quality procedures (Brown & Wiele, 1996).

Wibawa (2002) stated that some of the company's motivation in obtaining ISO certificates was to improve product quality and efficiency, competitive advantage, increase market share, increase product selling prices, reduce costs and increase stock prices. As a result of the active promotion of the European Community Institute, ISO 9001 penetration has grown tremendously. Over the past two decades, there has been a steady increase in the number of countries that have adopted ISO 9001 as their national quality standards, as well as a continuous increase in the number of companies in these countries that have been certified (Karapetrovic, Casadesus, & Saizarbitoria, 2010). Nevertheless, the implementation of ISO 9001 in universities is still a relatively new thing in Indonesia with a low level of certification penetration. Most universities choose not to do ISO certification because it is not mandatory. Based on the Law number 20 of 2003 concerning the National Education System, the quality assurance system that must be carried out by universities is the accreditation of BAN PT, not from other institutions. Thus, there are not many higher education that carry out ISO 9001 certification (Antariksa, Surachman, & Setiawan, 2014). Although research in Universitas Brawijaya and UIN Syarif Hidayatullah Jakarta (Umiyati, 2015) found a positive and significant influence on ISO 9001 on college performance.

In the context of higher education, ISO 9001 certification and Higher Education Accreditation (APT) both become an integral part of the external quality assurance system. But according to the National Accreditation Committee (KAN, 2016), there are differences between the terminology of certification and accreditation. Accreditation is a formal recognition given by an accreditation body to the competence of an institution or organization in carrying out certain conformity assessment activities. Whereas certification is a statement of conformity from third parties related to products, processes, management systems or personal to certain standards.

As with other organizations, initially the motivation of the State Polytechnic in Batam in obtaining an ISO 9001 certificate was to improve service quality and efficiency. However, after implementing ISO for 10 years, a number of complaints emerged, including the under-achieved performance improvement of ISO 9001 indicated by the stagnant level of accreditation even though the campus staff had exerted considerable energy to carry out exhausting documentation and spend a lot of money to obtain this certificate. There is a thought that an organization could be more interested in gaining the prestige inherent in ISO 9001 certificate than the goal of quality improvement itself, so that in the long run, what will happen is the performance of ISO-certified organizations will be worse than organizations that are not ISO certified.

State Polytechnic in Batam has obtained ISO 9001 certification since 2006, and has obtained B accreditation for all study programs since 2004. Until now, a number of ISO 9001 quality targets set at this Polytechnic are part of the indicators on APT assessment, so that there are slices between the two. The integration of the two quality management systems holistically cannot be implemented because a number of resources are not ready for integration implementation.

Act No. 20 of 2003 concerning the National Education System encourages universities to make efforts to improve quality. These quality improvement efforts are carried out referring to the quality standards set by Higher Education National Accreditation Board. The efforts to meet the quality standards in accordance with the accreditation policy are expected to increase competitiveness so that it can have an impact in the form of an increase in the number of students at each new student admission, fulfillment of adequate academic qualifications, more adequate facilities and infrastructure, and the increase in external partnerships.

In accordance with the Law, accreditation is compulsory for universities. Unaccredited universities are threatened with closure. It is different with ISO certification which is not a government regulation so that the stimulus is the need of the organization. The difference in quality management and ISO is also in its scope. In contrast to the accreditation that is of a quality barometer at the national level, the ISO is a quality benchmark recognized internationally. This study aims to reveal the benefits and costs of ISO-oriented quality management compared to APT. Cost-benefit analysis is a systematic approach to considering the weaknesses (costs) and strengths (benefits) of the choices available (Rodreck, Ngulube, & Dube, 2013). This analysis can be applied to feasibility studies and decision making to evaluate the use of economic resources so that scarce resources can be used efficiently. Analysis of benefits and costs only focuses on the efficient use of factors of production without considering other problems such as distribution, economic stabilization and so on (Sugiyono, 2001).

Secondly, this study also attempts to describe the implementation of ISO 9001 which intersects with APT at State Polytechnics in Batam. This description is expected to be beneficial for universities that are currently preparing for ISO 9001 implementation on their respective campuses. Third, by using cost benefit analysis, this study attempts to formulate whether the State Polytechnic in Batam should maintain ISO 9001 certification or use another quality assurance model that might be more efficient.

Practically, this research is very useful for top polytechnic management to evaluate work program. Using the State Polytechnic case study in Batam which has been ISO 9001 certified for a long time, the research team hopes that this research can be useful for other universities in the framework of implementing ISO 9001. Theoretically, this research is also very important to enrich the literature in the field of ISO application evaluation in universities such as Karapetrovic, Rajamani, & Willborn (1998) research on how to implement ISO in universities and Sohail, Rajadurai, & Rahman, (2003) who claim that the application of ISO in universities is very important for the collection of data needed for quality improvement of a college. This research is also expected to be useful to enrich the literature of the quality management system in universities in Indonesia, where the use of cost benefit analysis has not been widely applied in this case.

METHOD

In this article, the research approach carried out is descriptive research and case studies. Cost benefit analysis is carried out through the stages of identifying benefits and costs based on their classification, estimating the value of benefits and costs, and finally analyzing the final value of cost benefits. In identifying the benefits and costs, benefits and costs need to be classified according to the definition described by Mangkoesoebroto (1998). Identification of benefits and costs is carried out through interviews and limited discussions with a number of experts in the field of college quality assurance, namely the quality assurance, ISO internal auditors, and the re-accreditation drafting team. Respondents were also asked to compare the benefits of ISO and accreditation simultaneously, and determine the value of the gap or differences.

Furthermore, the benefits and costs identified were included in the questionnaire instrument. The value of the benefits will then be proxied based on the results of the survey to these students. The survey was conducted on 120 new State Polytechnic students in Batam with quota sampling techniques for estimating benefits. Quotas are proportionally determined per study program both morning and evening class students with an estimated number of samples is 10 percent of the population for descriptive research (Gay & Diehl, 1992). The questionnaires collected actually amounted to 128, but 8 questionnaires were deemed not to fulfill the conditions, namely only choosing a maximum of 5 options from the 13 available options. The population and sample of new students who are respondents in this study are described at Table 1.

Based on the table above, it can be seen that the total population is 1,237 new students consisting of 706 morning class students and 531 night class students. With quota sampling, the data was processed from 120 selected new students consisting of 70 morning class students and 50 evening class students. Quota sampling is

Table 1. Population and Sample

No.	Department Code	Study Program Code	Population		Sample	
			Morning	Evening	Morning	Evening
1.	MB	AK	63	63	6	6
		AM	60	33	6	3
		AB	61	32	6	3
2.	EL	EL	60	31	6	3
		MK	60	43	6	4
		IN	30	21	3	2
		RO	31	16	3	2
		EM	26	30	3	3
3.	IF	GM	57	21	6	2
		IF	61	91	6	9
		MJ	58	61	6	6
4.	MS	KA	32	29	3	2
		PPU	48	0	5	0
		MS	59	60	5	5
	Total		706	531	70	50
			1237		120	

chosen to better represent the characteristics of the actual student population.

Furthermore, a survey of 17 State Polytechnic employees who are responsible for fulfilling ISO 9001 certification and APT. They are: chairman of the department of machinery, business management, informatics, and electro, chair of the Research and Community Service Center, Quality Assurance, Internal Supervisory Unit, Library, Maintenance and Repair, and chairman of the Academic and Student Affairs subdivision, Planning and Cooperation, State Property, Finance, Procurement, Employment, and Administrative Affairs. Employee samples were selected by purposive sampling technique, namely only respondents who were permanent employees were allowed to fill out questionnaires. Questionnaires are given to the head of the department, but the head of department can request the assistance of his staff provided the staff has the status of a permanent employee. This survey was conducted to compare the benefits and costs associated with the implementation of ISO 9001 compared to APT-oriented quality management.

The results of the validity test on 17 respondents are showed in Table 2.

Table 2. The Results of the Validity Test

Statement	Validity (r count)	
	Accreditation	ISO
1	0,712	0,733
2	0,699	0,734
3	0,688	0,743
4	0,696	0,735
5	0,695	0,743
6	0,685	0,770
7	0,665	0,748
8	0,682	0,726
9	0,652	0,737
10	0,694	0,745
11	0,703	0,742
12	0,682	0,748
13	0,678	0,741

Based on the r product moment table, it is known that the r_{table} value for 17 respondents with a significant level of 5 percent is 0.4821. Thus, table 2 explains that all statements in the questionnaire meet the validity test. While the reliability test results are showed in Table 3.

Table 3. The Results of the Reliability Test

Dimension	Reliability (Pearson Product Moment)	
	Accreditation	ISO
Benefit	0,743	0,906
Costs	0,854	0,883

Table 3 above explains that all dimensions meet the reliability test because they are above 0,6.

RESULTS AND DISCUSSIONS

Results

Costs and Benefits of ISO and Accreditation

Based on the results of interviews and limited discussions, we identified a number of benefits and costs of ISO-based quality management and accreditation showed in the Table 4.

Benefits Comparison of ISO and Accreditation

a. Quantifiable Benefits

Among the value of indirect or secondary benefits from ISO and accreditation is an increase in the number of students in the future. In other words, ISO and accreditation are able to attract the interest of new students which have an impact on the further pseudo benefits of the ability of the organization to increase market prices without losing market share. Following are the results of a survey of 120 new students selected using quota sampling.

Based on the table above, there were around 5,6 percent of new students interested in entering the state polytechnic in Batam due to the reputation of this polytechnic which is ISO 9001 certified.

Referring to table 4, it is stated that one of the benefits of ISO and APT is the ability of the organization to increase market prices without losing market share. In 2017, Batam State Polytechnic for the first time imposed an entrance examination fee. Thus, the cost of entrance examinations practically increases market prices. Therefore, in the study, the value of benefits is proxied by the amount of entrance examination income.

Table 5. The Ability of ISO and Accreditation to Attract the Interests of New Students

No	Options	Percent
1	The only "government-owned" campus in Batam	15,3
2	Affordable costs	12,9
3	Reputation with good accreditation	11,8
4	Amenities	11,3
5	Famous reputation in your surroundings	10,8
6	Location (in vicinity / accessible)	10,2
7	Provide scholarships	7,7
8	Reputation with ISO 9001 certification	5,6
9	Reputation as an international winner	5,2
10	Parents' will	3,2
11	Reputation of strict selection for entry	3,2
12	Extensive alumni association	2,0
13	Others	0,7
	Total	100,0

If the amount of non-tax state revenue (PNBP) from the entrance examination in 2017 is Rp 501.850.000, and the allocation is determined based on the percentage in table 5, then the estimated total contribution of income obtained from students interested in this polytechnic because ISO is Rp. 27.930.610 which is the multiplication between income 501.850.000 with 5,6 percent.

Table 4. Identification of Costs and Benefits of ISO and Accreditation

Classification	Definition (Mangkoesoebroto, 1998)	Costs and benefits of ISO 9001 and APT
Real costs and benefits	Benefits / costs incurred for someone that are not offset by loss of benefits for other parties	Benefits in the form of continuous improvement in performance / organizational performance
Pseudo costs and benefits	Benefits / costs that are only accepted by a particular group, but a group of others suffer because of the project	Benefits in the form of an organization's ability to raise market prices without losing market share
Direct / primary costs and benefits	Benefits / costs related to the main objectives of the project or program	• ISO benefits in the form of repairing documents • Certification fees, accreditation fees, audit fees, consultation fees
Indirect / secondary costs and benefits	Benefits / costs that are not directly caused due to a project to be built or a by-product	• Increased number of customers / students in the future • Loss of work time
Tangible costs and benefits	Benefits / costs that can be assessed in the market	Benefits of ISO and accreditation in the form of customer satisfaction
Intangible costs and benefits	Benefits / costs that cannot be assessed in the market	ISO benefits and accreditation in the form of an increase in the reputation of the organization

On the other hand, there are around 11,8 percent of new students who are interested in entering the polytechnic due to a well-accredited reputation.

The contribution of income from Accreditation = 11,8% x Rp 501.580.000 = Rp 59.465.171. Thus, because the amount of income from the entrance examination in 2017 amounted to 501.850.000, then the estimated total contribution of income obtained from students interested in this polytechnic because of accreditation is Rp 59.465.171.

b. Non Quantifiable Benefits

In addition to the benefits of entrance examination income, the benefits felt by these polytechnic employees are based on surveys including.

Based on the table above, it can be seen that ISO does provide benefits in the form of improving polytechnic performance, increasing the number of students, student satisfaction, and organizational reputation, but the benefits of accreditation are higher compared to the usefulness of ISO. The highest gap of benefit value lies in the benefit points to increase the number of students in the future, where accreditation points are much higher than ISO. Even so, ISO values are better at usefulness points for document improvement.

Costs Comparison of ISO and Accreditation

a. Quantifiable Costs

The cost of ISO certification and accreditation is included in code 5742.012.001 Quality Assurance of Institutional and Educational Governance, showed in Table 7.

Table 6. Benefits of ISO and Accreditation

No	Benefits	Percent		
		ISO	Accreditation	Gap
1	Providing benefits in the form of continuous improvement in the performance of state polytechnics in Batam	63,5	87,1	-23,5
2	Providing benefits in the form of improving documents	76,5	70,6	5,9
3	Providing benefits in the form of increasing numbers of customers or students in the future	56,5	89,4	-32,9
4	Providing benefits in the form of customer / student satisfaction	63,5	83,5	-20,0
5	Providing benefits in the form of increasing the reputation of the State Polytechnic organization in Batam	71,8	89,4	-17,6
	Average	66,4	84,0	-17.6

Table 7. Costs of ISO

No.	Activities	Costs (in thousand Rupiah)		
		2017	2016	2015
1.	Training Review, Quality Calendar and Working Procedure Improvement	10.500	8.030	73.982
2.	Internal Audit *	23.400	13.300	11.925
3.	External Audit	18.900	22.610	24.807
4.	Annual Re-Certification Fee to Certfication agency**	15.000	17.110	18.907
5.	Preparation to Upgrade to ISO 2015**	6.000	14.280	-
	Total	73.800	75.330	129.621

* ISO allocation internal audit fees are obtained through estimation because the internal audit carried out consists of ISO internal audit activities and financial audits which are both entered into one account

** Especially for 2017, certification agency fees and ISO upgrade preparation fees are still in the form of estimates because the real invoice has not been received.

Table 8. Costs of Accreditation

No	Activities	Costs (in thousand Rupiah)		
		2017*	2016	2015
1	Institution accreditation assessment	92.500	-	-
2	Study program accreditation and re-accreditation assessment	51.090	20.850	44.800
	Total	143.590	20.850	44.800

* For 2017, the cost contains an element of estimation because all activities have not been realized.

There are various costs that arise in addition to the certification agency fees, namely internal audit and external audit activities that are quite costly. This fee is routine every year. While the costs that are not available every year but will appear periodically as part of ISO quality improvement is the cost of upgrading, which starts with gap analysis training, followed by improvements to work procedures.

The costs for accreditation showed in Table 8.

When compared to accreditation costs with ISO costs, it is seen that over the past two years, accreditation costs are always lower than the cost of ISO. Besides that, it can be seen that the fluctuation of accreditation costs is higher because it adjusts to the number of study programs that need re-accreditation or accreditation, for example in 2015 and 2017 there are 3 study programs that need re-accreditation, while in 2016 only accreditation preparations.

What is different in 2017 is that the budget for institutional accreditation because of institutional accreditation has not been submitted so that this polytechnic still needs to invite several speakers to help it understand the instruments of institutional accreditation and various other preparations. With the moment of new institutional accreditation, the budget for accreditation soared sharply from previous years.

b. Non Quantifiable Costs

As for costs that are difficult to quantify in rupiah, but felt by employees through a perception survey showed in Table 9.

Based on the table above, it can be seen that ISO is considered to require a considerable amount of work time sacrifice if averaged over one working year compared to accreditation. ISO is also considered to be quite expensive. This may be due to the annual routine cost of ISO which is internal, external, and certification agency fees, compared to accreditations that only costs after 3 to 5 years. This perception is supported by costs data over the past two years, it can be seen that the cost of ISO is higher than accreditation.

The work time per person needed if averaged within one work week in each section for completion of ISO work is 21 hours from a maximum of 40 hours per week. While for completion of accreditation work is 16.5 hours per week.

Comparison of the Implementation of ISO and Accreditation

The implementation of ISO which is in line with accreditation can be seen in the following (Table 10).

Based on the table above, ISO requires more time to socialize improvement priorities, while accreditation does not. The table above also explains the high commitment, socialization and communication of top management to accreditation and the high level of employee

Table 9. Costs of ISO and Accreditation

No.	Costs	Percent		
		ISO	Accreditation	Gap
1.	It costs a lot of money	88,2	62,4	25,9
2.	It requires a considerable amount of work time sacrifice if averaged in one working year	83,5	64,7	18,8

Table 10. Implementation Factors of ISO and Accreditation

No	Statement	Percent		
		ISO	Accreditation	Gap
1	Top management commitment	68,2	77,6	-9,4
2	Socialization and communication from top management	58,8	63,5	-4,7
3	Employee involvement	75,0	78,8	-3,8
4	Coordination between department	67,5	72,5	-5,0
5	Adequate time for socializing priority improvements	63,8	61,3	2,5
6	The quantity and quality of human resources are adequate	60,0	63,8	-3,8

Table 11: Future Improvements on the Implementation of ISO and Accreditation

No	Statement	Percent
1	The motivation of human resources to continue to implement ISO is still high	65,9
2	Quality objectives are according to the needs of the organization	72,9
3	Quality objectives support accreditation	72,9
4	Quality objectives support the strategic plan (Renstra) of the organization	76,5
5	Organizations focus more on maintaining certificates than trying to improve performance	77,6
6	ISO makes organizations focus on performance rather than focus on making documents	58,8
7	ISO procedures are too bureaucratic so they tend to inhibit rather than help work	77,6
8	The ISO procedure is good, does not require any changes	52,9
9	The audit focus is conformity to procedures (incomplete documents, etc.) rather than efforts to improve performance	81,2
10	There is still a system (which is done everyday) but is outside the ISO system	70,6
11	Documents for ISO are prepared some time before the audit	82,4
	Average	71,8

involvement and coordination between departments to support accreditation.

ISO implementation in line with Accreditation

For future improvements, a number of applications that can be improved showed in Table 11.

The table above explains the existence of ISO document preparation practices just before the audit. In addition, ISO procedures need to be updated every year because changes to adjust organizational dynamics are still needed. HR motivation to keep applying ISO is below the average value. Employees disagree that ISO makes organizations focus on performance rather than focus on preparing better documents otherwise they agree more to the statement that the audit focus is conformity to procedures (incomplete documents, etc.) rather than efforts to improve organizational performance.

Table 11 above also indicates that there are still ISO document preparation practices shortly before the audit which actually shows an inappropriate ISO implementation. Indeed, all documents are filled periodically or together with their activities, not filled out when the audit is to be carried out. Sudden document preparation practices like this might make the audit tiring because the actual document work is done at once.

Table 11 also suggests that ISO procedures need to be updated every year. Changes in procedures to adjust organizational needs are still needed. As the procedure progresses, the procedure owner needs to review which procedures require simplification which procedures require more detail.

Table 11 shows that management needs to carry out a number of activities to increase HR motivation because of employees' motivation to continue to implement ISO below the average value. Employees need to be constantly reminded of the initial ISO objectives for this polytechnic, not just carrying out the supervisor's direction. The initial goal of obtaining ISO remains valid until now and can be the basis of motivation for improving the performance of state polytechnics in Batam.

Employees disagree that ISO makes organizations focus on performance rather than focus on making documents otherwise they agree more to the statement that the audit focus is conformity to procedures (incomplete documents, etc.) rather than efforts to improve organizational performance. Therefore, re-orientation towards ISO needs to be carried out to correct this perception.

Discussions

The results of this study confirm the results of Kartikasari, Sinarti, Hidayat, & Irsutami (2014) research on the importance of accreditation in influencing campus selection. The difference between the results of this study and Kartikasari et al. (2014) is the addition of ISO variables to the option options offered to students. So that this study is better able to compare the benefits of ISO-based quality management and accreditation-based.

The results of this study also support the research of Willar, Lintong, & Kaparang (2015) which evaluates the implementation of the Higher Education Internal Quality Assurance System (SPMI-PT) Manado State Polytechnic with

reference to the ISO 9001 Quality Management System (QMS). Willar, Lintong, & Kaparang (2015) asserted that if both quality management systems are carried out in tandem and support each other, then the implementation of both will run effectively in developing a strong organizational culture.

Based on the details in the previous discussion, the value of ISO benefits in 2017 is 5,6 percent equivalent to Rp. 27.930.610 while the fee is Rp. 73.800.000. Other than rupiah nominal, ISO is considered to require a considerable amount of work time sacrifice if averaged in one working year compared to accreditation. ISO is also considered to be quite expensive. This may be due to the annual routine cost of ISO which is internal, external, and certification agency fees, compared to accreditations that only cost in 3 to 5 years time. This perception is supported by cost budget data for the past two years, it can be seen that the budget for ISO costs is higher than accreditation. Even so, ISO values are better at usefulness points for document improvement.

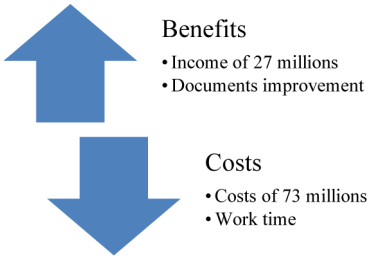

Figure 1. Cost Benefit Analysis of ISO

The value of accreditation benefits in 2017 is 11,8 percent equivalent to Rp. 59.465.171 while the cost is Rp. 51.090.000. Thus, in nominal terms, accreditation is more profitable. In addition to the benefits of entrance examination fees, the benefits felt by employees of this polytechnic include improving performance, increasing the number of students, student satisfaction, and organizational reputation, but the benefits of accreditation are higher compared to the usefulness of ISO. The highest gap in usefulness value lies in the benefit points to increase the number of students in the future, where accreditation points are much higher than ISO. Even so, ISO values are better at usefulness points for document improvement.

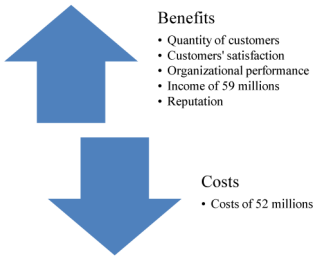

Figure 2. Cost Benefit Analysis of Accreditation

Thus, from the aspect of usefulness that is difficult to quantify, ISO is only superior to one benefit while accreditation on more aspects of benefits. Whereas from the aspect of time cost sacrifice, ISO also requires more time sacrifice. Thus, accreditation is declared superior as an education quality management system rather than ISO based on cost benefit analysis.

The results of this study do not say that ISO should be eliminated because it is less profitable for the organization. This statement is not the result of this study. In the condition that an organization is non-profit and is able to finance both types of quality management systems, both accreditation and ISO can go hand in hand and support each other. However, the organization still has to understand its main priority, namely accreditation, so that the allocation of resources must be directed to support its main priorities, not the other way around.

The principle of cost benefits generally states that only activities that value benefits exceed costs alone need to be implemented (Frank, 2000). This principle sounds very natural even though many critics cannot accept it. One reason for the rejection of this cost benefit analysis is the difficulty of quantifying the benefits and costs so that the decision results cannot be directly translated into good or bad. For example, the results of Figure 1 show that the value of ISO benefits is Rp. 27.930.610 while the fee is Rp. 73.800.000. This means that in rupiah terms alone, one can fall into the conclusion that ISO should not be implemented because the cost is greater than the benefits. But the results of this study do not support conclusions as soon as that. The results of this study state that there are still benefits of ISO in the form of improving documents that are in fact very difficult to quantify because of the many assumptions that must be put by the writers who

are very subjective so that any assumptions made will make the reader of this article more biased. Therefore, Figure 1 is made as above without guidance to quantify the benefits and costs that are difficult to quantify.

The subjectivity of decision making to stop or continue ISO depends on many factors. For example whether the organization has resources that are underloaded or overloaded. Or does the organization focus solely on prestige when it holds an ISO certification or is it true that it is purely running an ISO to obtain its benefits. This subjectivity is influenced by the mindset of all the resources involved in meeting organizational quality management.

The results of research on the importance of accreditation are in line with Suharto (2012). He stated that excellence-oriented primary education is owned if national education standards measured using instruments of accreditation are met. That is, the effort to develop an organization is essentially an effort to fulfill standards which should be the main focus of an organization including universities.

By focusing on accreditation, universities can assess themselves in carrying out education (Suhendro, 1998). Accreditation-based assessment is more standardized at the national level than ISO standards whose quality objectives vary depending on organizational commitment. Nasrun (2009) states that accreditation standards are divided into 3 components with the following indicators: 1) Input, consisting of students, personnel, facilities and infrastructure, and curriculum; 2) Process, consisting of institutional management, program management, learning management, and evaluation; 3) Output, with performance indicators. The three sections above are arranged in seven standards (BAN-PT, 2011). This research continues to support the priority of focusing on accreditation although Prasetyo (2014) found that accreditation does not have an impact on the competitiveness of universities and Wibisono (1999) argues that national accreditation may not be sufficient to face the threat of employment domination from overseas graduates.

In the last decade, there has been a lot of research and debate about the effectiveness of ISO application (Prajogo, 2010). Examples of studies that deny the effectiveness of ISOs, for example Martinez-Costa and Martinez-Lorente (2003), find that ISO certification has no effect on financial performance in Brazilian and Spanish companies. While research examples that prove the effectiveness of ISO include Srivastav (2009) and Rosana (2009). Rosana (2009) concludes that the implementation of ISO 9001 will significantly influence the quality culture so that its application in UNY will change the orientation of organizational culture into a quality culture. This study with various limitations of research methods that limit generalization, indicates that ISO does have an impact on organizational reputation and performance because it is at an average of 66.4 percent (see Table 4), which is higher than its neutral value at 60 percent.

CONCLUSIONS

First, this study aims to uncover aspects of the benefits and costs of ISO-oriented quality management compared to accreditation. Benefits that can be quantified in the form of capability of ISO and accreditation to attract new students so that the income from the entrance examination fee is estimated for ISO is Rp. 27.930.610 while for accreditation is Rp. 59.465.171. The benefits that are difficult to quantify in the form of benefits perceived by public polytechnic employees in Batam include improving performance/ performance, increasing the number of students, student satisfaction, and organizational reputation, but the benefits of accreditation are higher in assessing their usefulness compared to the usefulness of ISO. Even so, ISO values are better at usefulness points for document improvement. For the cost aspect, ISO is considered to require a considerable amount of work time if averaged over one work year compared to accreditation. ISO is also considered to be quite expensive.

Secondly, this research also attempts to describe the implementation of ISO 9001 which coincides with APT at the State Polytechnic in Batam. In its application, ISO is perceived to require more time for socializing priority improvements, while accreditation is not. This study also shows the high commitment, socialization and communication of top management to accreditation as well as high employee involvement and coordination between sections to support accreditation. To improve the application of ISO, activities to pump motivation for HR are needed. Likewise, re-orientation of ISO so that employees focus more

on the substance of quality improvement than just document preparation. This description is expected to be beneficial for universities that are currently preparing for ISO 9001 implementation on their respective campuses.

Third, by using cost benefit analysis, this study attempts to formulate whether the State Polytechnic in Batam should maintain ISO 9001 certification or use another quality assurance model that might be more efficient. Based on the analysis of cost benefits, the research team formulated accreditation excellence towards ISO. Thus, the research team suggested that organizations focus more and devote more resources to accreditation activities. If there is a resource left after the outpouring of resources into accreditation, then the organization devotes its energy to ISO. So that there is a correct priority scale for the organization. Thus the research team suggested that both quality management systems could continue to be carried out as long as sufficient resources were available.

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