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## Conceptual Model for Optimization Process of College Quality Assurance System Based on ISO 9000

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### ABSTRACT

This paper aim was to determine simultaneous relationship of leadership effectiveness, staff commitment and internal quality audit processes on college culture development for quality process assurance at private college. This changes can be viewed as a process in dynamic and integrated system of organization as a group that affect each other, with single specific purpose. This study was conducted at 25 private colleges in Sulawesi-Indonesia by using a questionnaire. Assessment the system elements that relatively most effect on quality culture formation was outlined by analytical hierarchy process (AHP) using pairwise comparison to create whole priority to make ranking of each element. This study findings show importance of job description certainty in order to maximize the use of competencies, knowledge, skills and personal creativity to include operation process to understand the interactions between processes in colleges as an integrated system. Samples only at private colleges in Sulawesi, Indonesia, so these findings may not be generalizable to other universities.

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## INTRODUCTION

Today there are great demands on college to become more accountable, efficient, effective and customer-centric. In other words, college is obliged to keep education quality. Republic Indonesia Government Regulations No. 19 year 2005 on national education standards affirmed each college should implement a quality assurance system. These are totality of circumstances and characteristics of inputs, process, outputs, and outcomes that measured based on a number of standards.

One concepts of quality management system that can be adopted in college is a total quality management (TQM). TQM concept that can be applied rightly to college is ISO 9000 (Paul and Lachlan, 1998). Therefore, ISO 9000 has been adopted by Indonesia colleges. However, ISO 9000 implementation, particularly at private colleges in Sulawesi, Indonesia, are not optimal. Accreditation data results of National Accreditation Board for Colleges (NABC) in 2013, an institution external quality audit authority for certifying the college quality in Indonesia, show that from 1437 courses at 354 private college, college with A accreditation (very good) only 8 (0.55 %), B (good) 185 (12.8 %), C (average) 575 (40 %) and not accredited 669 (46.55 %). While only one private university was accredited. This indicates that a college that already has ISO 9000 quality management system has not been able to guarantee the internal quality improvement process of college. This is consistent with findings of Ulf (2009) that development of quality in college is often limited to bureaucratic documentation, but ignores quality development as a holistic organizational culture.

Various case studies revealed that implementation of quality management system requires Sustainable effort and resources commitment, primarily related to changes in attitudes, work systems and cultural. Kim and Thomas (2012) identified four main factors to implement effective quality management systems in colleges, namely leadership, stakeholder engagement, implementation of quality processes and cultural change. Panagiotis and Dimitra (2009) finding also show that organizational culture and staff satisfaction affect services quality provided, as well as increase successful implementation of quality assurance. Commitment and attitude of individuals and groups within organization to quality assessment should be encouraged to behave and follow the rules or regulations prescribed by quality system. It can be said that stimuli will cause commitment

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formation, which then cause certain reactions namely affective, cognitive or behavioral. If value constellation has been internalized, then a staff consciously or unconsciously become a cultural or criterion that affects a person's actions.

One provisions or regulations that prescribed by ISO 9000 quality system is audit quality. Norman (1997) shows higher demands on accountability and more dynamic and efficient methods for purpose to evaluate audit quality. It makes capacity development is very important. What is proposed by Norman (1997) does not consistent with capacity of internal quality audits, particularly in private college in Sulawesi, Indonesia. Internal audit process is only done for preparation of external audit by NABC every five years. Therefore, a gap in quality evaluation process is quite long. In other words, attitude towards quality has not been become a culture within organization. This result is inconsistent with the stages in quality management system process, and does not run gradually. This also confirms opinion of Ulf (2009) that quality development in college is often limited to bureaucratic documentation.

Based on explanation above, this paper intends to find out:

- a. To know relationship between leadership effectiveness, staff commitment and internal quality audits to quality culture growth for process optimization of continuous quality improvement.
- b. To identify the most dominant element on implementation process optimization of quality management system ISO 9000.

#### ***Systemic Thinking In Quality Assurance Process:***

One basic principles of quality assurance process is a process approach to management. Management process uses instrument for assessment, evaluation, and improvement and organization quality assurance. This process must also be accompanied by quality cultural change of managerial staff under system control to avoid a tendency to make quality assurance process only as instruments of mechanistic bureaucracy.

Management should always commit and aware of change needed. Organization changes not only demand individual change but also all element that involved in organizational technical aspects of ISO 9000, namely internal quality audits and implementation aspects of quality assurance process (leadership effectiveness, organizational commitment and quality culture). The change must occur through a simultaneous process because these components have simultaneous relationships effect on consistency of continuous quality improvement in an integrated system of organization. Therefore, the changes can be seen as a process in an integrated system. For example, if p is system element in R relations set, then element behavior in R will different if p elements with R in relation '. Although R behaviors does not differ with R', it can not be said that there is an interaction, and that means that these elements does not depend one with one another, in conjunction with a set of relations R and R'.

Systems approach to college's management sees organization as a group of elements to affect each other that has sole specific purpose. Actions of specific part will affect other parts. Therefore, college leaders can not see individual parts separately, but a whole dynamically. So they must intervene in a total system that consists of inter-related parts to use management functions such as planning, organization and supervision. System behavior can be viewed as a system where there are dependency properties in response to stimuli that are generally expressed as a T transformation of x vector to y vector y, or:

$$y = T(x) \quad (1)$$

Or in vector form:

$$y = f(x) \quad (2)$$

Above discussion show the process of quality assurance in colleges can be seen as comprehensive and integrated system that involving various functions, levels and units within organization that interact to produce graduates. This is relevant to definition of systems as an aggregation or collection of objects that are strung in interaction and interdependence regularly. This opinion is explained clear by Bertalanffy (1940) who explain system as a set of interconnected elements.

#### ***Development of a Conceptual Model:***

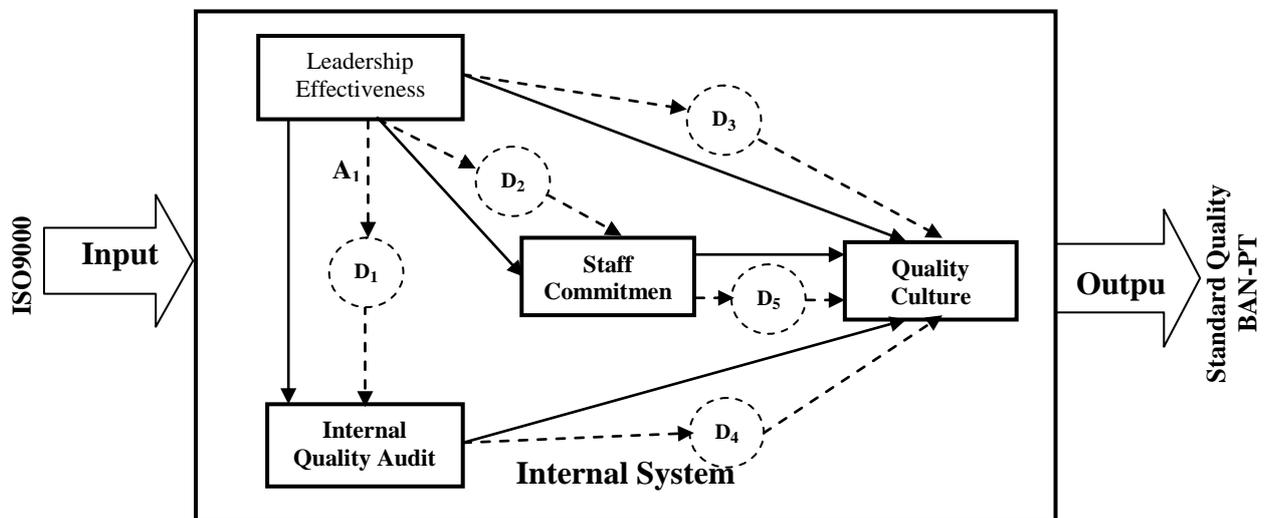
Management as a system is process to convert information into action. This conversion process is explained as decision making. Decision-making in turn is controlled by various policies or behavior, either explicitly or implicitly. Therefore, quality assurance process in colleges can be seen as a policy to convert information into quality system action that comprehensive and integrated to produce a product/service.

There are several elements in college internal system that can affect optimization of internal processes in system. Salaheldin (2009) stated that lack of support from top management is the biggest problem that impedes TQM implementation. Therefore, organizations need effective leaders with ability to understand the goals

themselves and how they are integrated with of broader goals. Leadership process can affect and capable to direct his subordinates to reduce uncertainty towards the achievement of organizational goals. Successful quality management is strongly associated with changes in formation of organization's management staff commitment, determination of purpose, mission development, process understanding, and monitoring (Oakland, 2004; Andrews, 1987). Basically, the staff would like to contribute to achieve organization's goals with different nature and commitment (Meyer and Allen, 1991). Ehlers (2009) stated that development of quality in colleges is often limited by bureaucratic documentation, but still not become holistic organizational culture. This was confirmed by Stravinskiene (2010) that quality assurance processes does not automatically make colleges have culture quality. Therefore, we need a process of internal audit to monitor the consistency of overall stage of process. Norman (1997) said that higher demands on accountability for quality evaluation purposes very need capacity development audit.

This process involves a various functions, units and levels within college organization. Each unit in organization can be viewed as elements (E) in system. These units are different in levels according to function or in system and referred as action (A). The output of action is decision (D). Decision of element action will become information (I) for other elements that called a relation (R). Interaction of each entity in system is shown in Figure 1.

### Transformation Process:



E: element, A: action, R: relation, D: decision, I: information

**Fig. 1:** Transformation Process in system

Relational combination of various elements in system with "n" different elements (sub-systems) will affect on overall system output improvement that formulated as the achievement of performance (Freddy Rangkuti, 2013):

$$P_s = (P_1) \times (P_2) \times (P_3) \times \dots \times (P_j) \dots \dots \dots (P_n) \quad (3)$$

where,

$P_s$  = Overall System Performance

$P_j$  = Performance of j elements

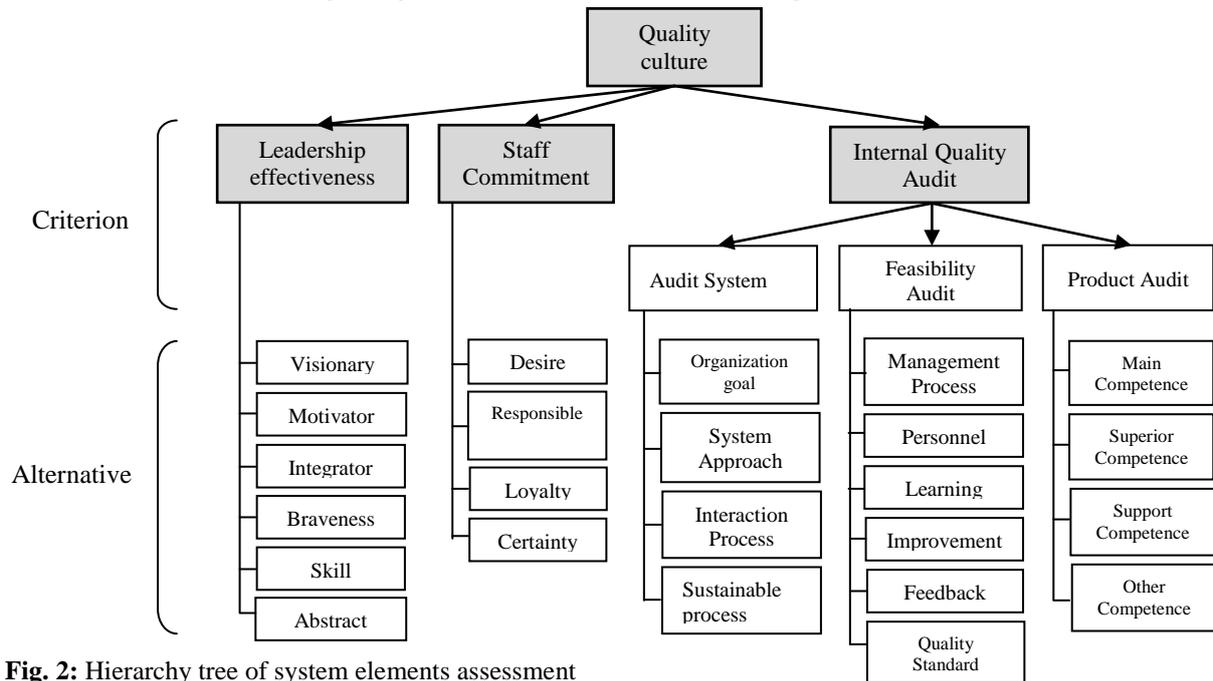
$P_n$  = Performance of n elements

Discussion above show that stimuli (effective leadership and consistent quality audits) can lead to commitment formation, which then cause certain reactions as affective, cognitive or behavioral. In other words, if the value constellation has internalized, then a staff will consciously or unconsciously become a standard or criterion to affects a person's actions that permanently become cultural. To understand the process of transformation that occurs between system elements, internal structural system was developed to illustrate the relational concept of every element in system (Table 1).

**Table 1:** Perspectives of System Elements

System Elements	Sub-system Element	Notation	Attribute	System Perspective	Transformation Process	
Leadership Effectiveness (LE)	Visionary	X <sub>1.1</sub>	Relevance vision, mission and goals of organization	R <sub>1.1</sub> (functional)	Future perspective cause vision, mission and goals of organization is always relevant	
	Motivator	X <sub>1.2</sub>	Higher staff motivation	R <sub>1.2</sub> (functional)	Encouraging staff to achieve organizational goals	
	Integrator	X <sub>1.3</sub>	Harmony working relationship of each field and level	R <sub>1.3</sub> (functional)	Linking institutional environment and liaison between various levels /units within organization	
	Braveness	X <sub>1.4</sub>	There is a certainty of any managerial decision	R <sub>1.4</sub> (functional)	Braveness to take risks in any improvement decision	
	Skill	X <sub>1.5</sub>	Higher staff motivation	R <sub>1.5</sub> (functional)	Quickly see and understand the feelings, attitudes, and needs of organization members	
	Abstract	X <sub>1.6</sub>	Relevance vision, mission and goals of organization	R <sub>1.6</sub> (functional)	Tendency to interpret events in relation to organizational goals.	
Staff Commitment (SC)	Desire	X <sub>2.1</sub>	Higher staff motivation	R <sub>2.1</sub> (performance)	Strong desire to work in organization	
	Responsibility	X <sub>2.2</sub>	Higher staff care and consciousness	R <sub>2.2</sub> (performance)	Strong awareness of every individual in organization to face risk	
	Loyalty	X <sub>2.3</sub>	Higher staff motivation and loyalty	R <sub>2.3</sub> (performance)	Feeling to become part of organization and there is no turnover intention, and there is pride in organization	
	Certainty	X <sub>2.4</sub>	Higher staff motivation and loyalty	R <sub>2.4</sub> (performance)	Strong belief on organization values and a great willingness to strive for organization	
Internal Quality Audit (IQA)	System Audit	Organization goal	X <sub>3.1</sub>	Clear stages achievement of organizational goals	R <sub>3.1</sub> (informational)	To create value, then organization must have right processes associated with organizational goals
		System approach	X <sub>3.2</sub>	Clear stage process towards organizational goals	R <sub>3.2</sub> (informational)	Allows each process operation to achieve its administrative objectives
		Interaction Process	X <sub>3.3</sub>	Clear interactions process towards organizational goals	R <sub>3.3</sub> (informational)	Improving the process by balancing the quality system at a broader scope
		Sustainable process	X <sub>3.4</sub>	Gradual quality improvement	R <sub>3.4</sub> (informational)	Management is fully aware that organization's ability to learn is a key institution of competitive advantage
	Feasibility Audit	Management process	X <sub>4.1</sub>	Quality objectives is relevant to goals of organization unit	R <sub>4.1</sub> (informational)	Every level in organization has standards and quality objectives which are relevant to the goals of organization
		Personnel	X <sub>4.2</sub>	Relevant human resource usage	R <sub>4.2</sub> (informational)	Facilitate personal involvement in organization and to maximize the usage of competencies, knowledge, skills and personal creativity
		Learning	X <sub>4.3</sub>	Relevant organizational goals	R <sub>4.3</sub> (informational)	Enabling organizations to constantly create new values
		Improvement	X <sub>4.4</sub>	Gradual quality improvement	R <sub>4.4</sub> (informational)	Planning and development programs to improve the quality of education that disseminated periodically
		Feedback	X <sub>4.5</sub>	Gradual quality improvement	R <sub>4.5</sub> (informational)	Organization has relevant information in process improvement plan
		Quality Standard	X <sub>4.6</sub>	Gradual quality improvement	R <sub>4.6</sub> (informational)	Every level in organization has standards and quality objectives that relevant to organization goals
	Product Audit	Main Competence	X <sub>5.1</sub>	Relevant human resource utilization	R <sub>5.1</sub> (informational)	Ensuring graduates have the appropriate competency standard in scientific field
		Superior Competence	X <sub>5.2</sub>	Relevant human resource utilization	R <sub>5.2</sub> (informational)	Ensure competitive advantage of each graduate
		Supporting Competence	X <sub>5.3</sub>	Relevant human resource utilization	R <sub>5.3</sub> (informational)	Ensure graduates have competencies in technology support, skills, character and culture
		Other Competence	X <sub>5.4</sub>	Relevant human resource utilization	R <sub>5.4</sub> (informational)	Ensuring graduates have the personal skills and behaviors that can be applied in various situations and conditions
Quality Culture (QC)	Habits	Y <sub>1</sub>	Establishment of a regular work processes and systematic improvement oriented	R <sub>6.1</sub> (performance)	Nature that arises due to the forging of life experiences within organization	
	Beliefs	Y <sub>2</sub>	Awareness toward work oriented improvement	R <sub>6.2</sub> (performance)	Belief in anything that comes from events, either through their own experience or the experience of others in organization	
	Behavior	Y <sub>3</sub>	Work habits gradually awakened	R <sub>6.3</sub> (performance)	Behavior which appears on the surface that appears as the embodiment of habit	
	Attitude	Y <sub>4</sub>	Habits transform to become character	R <sub>6.4</sub> (performance)	Reflection of a staff that is formed from a continuous process of formation	

To assess the relative system elements that most influence on quality culture formation, the relationship between system elements is outlined by Analytical Hierarchy Process (AHP) using pairwise comparison of whole priority to determine the ranking of each element. The system described in form of a hierarchical structure with levels consisting of objectives, criteria, and alternatives (Figure 2).



**Fig. 2:** Hierarchy tree of system elements assessment

### Methodology:

#### Data:

Data samples was obtained through direct surveys and sent randomly to 25 private colleges in Sulawesi, Indonesia. The survey contains questions related to reciprocal comparison to make comparisons and stated preference where that criterion A is more influential than B at x scale, then B to A with  $1/x$  scale. Table 1 shows the technical characteristics of the data.

**Table 1:** Data Technical Specification

Samples	Leader of Quality Assurance Unit
Location	Private College at Sulawesi - Indonesia
Samples Type	12 (48.0 percent) universities; 3 (12.0 percent) institutes; 6 (24.0 percent) of higher school; 4 (16.0 percent) academy. 11 (44.0 percent) private colleges in South Sulawesi; 3 (12.0 percent) private colleges in West Sulawesi, 4 (16.0 percent) private colleges in Central Sulawesi, 4 (16.0 percent) private colleges in North Sulawesi and 3 ( 12.0 percent) private colleges in Southeast Sulawesi.
Sampling method	Stratified random sampling
Data collection	Direct visit + post mailing
Date of fieldwork	January 2013 - April 2013

### Measurement:

Numerical values were given for all comparisons with 1 to 9 (Saaty, 2000), as shown in Table 2 below:

**Table 2:** Assessment scale with pairwise comparisons

Importance Level	Definition	Description
1	Both elements have same effect	Both elements have same effect
3	Slightly more influential than others	One element a little more influential than others
5	One element is essential or very influential than other	Experience and judgment strongly support one element over other
7	One element is clearly more influential than that other elements	One element strongly supported and its dominance has been seen in practice
9	One element is absolutely more influential than other elements	Evidence supporting other elements have highest confirmation level to strengthens
2,4,6,8	Values between the two considerations is adjacent	Compromise is needed between the two considerations

Comparative assessment carried out by respondents to assess influence level of one element to other element, starting from top level of hierarchy. Based on answers of all respondents, it obtained geometric mean scores of each element are compared and calculated by equation (4) to prepare pairwise comparison matrices. Furthermore, it determined value of each criterion and alternative priorities and to set priorities of final element with most influential alternative to quality culture.

$$\text{Log } G = \frac{\sum_{i=1}^n \text{Log } X_i}{n} \quad (4)$$

Description:

Log G: logarithm of geometric mean

X<sub>i</sub>: value of respondents answers

n: number of respondents

#### AHP procedure:

Stages in AHP procedures to make prioritization are follows:

1. Decomposition; break the problem into criterions
2. Comparative judgment; assessment to compare the decomposition elements
3. Synthesis of priority; for each alternatives and criterion, it performed pairwise comparisons. Comparison of relative values then processed to determine an alternative ranking of all alternatives
4. Logical consistency; actual situation will show some deviation from the assessment because of inconsistencies in relationship a person's preference element. AHP model determined that  $CR \leq 0.1$ . It means that judgment was sufficiently consistent

## RESULTS AND DISCUSSION

Figure 1 show that quality assurance process can be viewed as an integrated system to involve elements of effective leadership, staff commitment, internal quality audits and quality culture. Between elements of system have relational relation that will lead to transformation process on each element. This is the dynamic response of series processes of action, decision, and information. Effect relativity level of dynamic response in an element of quality culture obtained through pairwise comparison matrix for each criterion (Table 3).

**Table 3:** Matrix of pairwise comparison criterion

Criterion	Leadership Effectiveness	Staff Commitment	Internal Audit Culture	Priority weight	
Leadership Effectiveness	1,0000	5,0000	3,0000	0,6479	$\lambda_{\max} = 3,0033$ CI = 0,0016 RI = 0,58 CR = 0,0028
Staff Commitment	0,2000	1,0000	0,5000	0,1222	
Internal Audit Culture	0,3333	2,0000	1,0000	0,2298	

Number in i-thy row and j-th column is relative importance A<sub>i</sub> compared to A<sub>j</sub>. Table 3 shows that criteria that most affect the quality culture are leadership effectiveness (0.6479). The next most influential criteria is internal quality audits (0.2298), followed by staff commitment criteria (0.1222). Leadership effectiveness 2.8 times more influence on quality culture than internal quality audits and 5.3 times more influence compared to staff commitment. Internal quality audits 1.8 times more influential than staff commitment. Values CR = 0.0028 indicates the assessment of each criterion is very consistent, so the results of this assessment are acceptable. Internal quality audit system is consists of system audit, suitability audit and products audit. Elements of internal quality audits that the most dominant consecutively are system audit (0.6666), conformity audit (0.2222) and products audit (0.1111), as shown in Table 4, the value of CR = 0.0000.

**Table 4:** Pairwise comparison matrix of internal quality audits

Internal Audit Quality	System Audit	Suitability Audit	Product Audit	Priority Weight	
System Audit	1,0000	3,0000	6,0000	0,6666	$\lambda_{\max} = 3,0000$ CI = 0,0000 RI = 0,58 CR = 0,0000
Suitability Audit	0,3333	1,0000	2,0000	0,2222	
Product Audit	0,1666	0,5000	1,0000	0,1111	

In same way, the value was obtained for effect of each alternative weigh of priority relativity to priority of with total value of CR <10% (Table 5).

**Table 5:** Alternative Pairwise Comparison Matrix

Leadership Effectiveness	Visionary	Motivator	Integrator	Braveness	Skill	Abstract	Priority Weight	
Visionary	1,0000	4,0000	5,0000	4,0000	0,2000	6,0000	0,2292	$\lambda_{max} = 6,4631$
Motivator	0,2500	1,0000	3,0000	0,3333	0,1666	2,0000	0,0740	CI = 0,0926
Integrator	0,2000	0,3333	1,0000	0,2500	0,1428	0,3333	0,0348	RI = 1,24
Braveness	0,2500	4,0000	4,0000	1,0000	0,2000	5,0000	0,1496	CR = 0,0746
Skill	5,0000	6,0000	7,0000	5,0000	1,0000	7,0000	0,4571	
Abstract	0,1666	0,5000	3,0000	0,2000	0,1428	1,0000	0,0547	
Staff Commitment	Desire	Responsibility	Loyalty	Certainty	Priority Weight			
Desire	1,0000	3,0000	5,0000	5,0000	0,5600		$\lambda_{max} = 4,0590$	
Responsibility	0,3333	1,0000	2,0000	3,0000	0,2267		CI = 0,0196	
Loyalty	0,2000	0,5000	1,0000	2,0000	0,1295		RI = 0,90	
Certainty	0,2000	0,3333	0,5000	1,0000	0,0834		CR = 0,0218	
Audit System	Organization Goal	System Approach	Process Interaction	Sustainable Process	Priority Weight			
Organization goal	1,0000	0,3333	0,3333	0,1428	0,0631		$\lambda_{max} = 4,1353$	
System approach	3,0000	1,0000	2,0000	0,2000	0,1825		CI = 0,0451	RI = 0,90
Interaction Process	3,0000	0,5000	1,0000	0,2000	0,1342		CR = 0,0501	
Sustainable process	7,0000	5,0000	5,0000	1,0000	0,6199			
Feasibility Audit	Management Process	Personnel	Learning	Improvement	Feedback	Quality Standard	Priority Weight	
Management process	1,0000	3,0000	3,0000	5,0000	5,0000	5,0000	0,4094	$\lambda_{max} = 6,2490$ CI = 0,0499
Personnel	0,3333	1,0000	2,0000	3,0000	3,0000	3,0000	0,2065	RI = 1,24
Learning	0,3333	0,5000	1,0000	3,0000	3,0000	3,0000	0,1676	CR = 0,0402
Improvement	0,2000	0,3333	0,3333	1,0000	2,0000	2,0000	0,0893	
Feedback	0,2000	0,3333	0,3333	0,5000	1,0000	2,0000	0,0714	
Quality Standard	0,2000	0,3333	0,3333	0,5000	0,5000	1,0000	0,0552	
Product Audit	Main Competence	Superior Competence	Support Competence	Other Competence	Priority Weight			
Main Competence	1,0000	2,0000	3,0000	5,0000	0,4759		$\lambda_{max} = 4,0582$ CI = 0,0194	
Superior Competence	0,5000	1,0000	2,0000	3,0000	0,2681		RI = 0,90 CR = 0,0215	
Supporting Competence	0,3333	0,5000	1,0000	3,0000	0,1755			
Other Competence	0,2000	0,3333	0,3333	1,0000	0,0802			

TQM Implementation in Indonesia colleges is still relatively new namely since government regulations enactment of Indonesia Republic No. 19 year 2005 on national education standards. As a result, college still lags behind other organizations to implement TQM. Various literature reviews related to TQM in colleges show little attention is given to discuss aspects of TQM practices or staff at individual level, particularly related to quality culture. According to Kevin et al (2011), cultural dimension of teamwork is most important factor to improve TQM implementation. Sometimes the attention is more focused on training and technical tools rather than focus on understanding of human factors, namely how to build a proper institutional culture (Jens and Su, 2006). This study contributes to literature on how the leadership effectiveness, staff commitment and internal quality audits are carried out simultaneously, in a systematic and continuous integrated to foster quality culture, to optimize the process of ISO 9000 quality assurance in colleges. This relational relationship are functional, informational and performance (Table 1).

Results of analytical hierarchy process for system elements shows that most dominant system element on quality culture emergence is effective leadership with priority weight = 0.6479 (Table 3). Stoner et al (1996) said that leadership role for organization is to dramatizing, directing, influencing and emphasizing the development of staff skills and capabilities. This process is believed to affect the incidence of organizational commitment, as the third most influential element with priority weight = 0.1222. The organizational commitment is an attitude that reflects the staff intention to loyal to organization and sustainable process through attention to organizational success and sustainable progress (Luthans, 2006). Generally, effective leadership must be able to interpret the future trend then poured into a vision, mission and goals of organization. Therefore, internal quality audits, as second most dominant element at weight = 0.2298, is a reflection leadership process to assess whether all processes to achieve quality plan, that prepared to realize the vision, mission and goals of organization, has been implemented optimally (table 4). Norman (1997) stated that higher demands on accountability and evaluation of audit quality are very important. Kettunen (2012) said that audit can help organizations take corrective action to change the description process or maintain process.

Alternative parameters that the most dominant to affect leadership effectiveness respectively are skills (0.4571), visionary (0.2292), braveness (0.1496), motivator (0.0740), abstraction (0.0547) and integrator (0.0348). Staff commitment was most affected respectively by desire (0.5600), responsibility (0.2267), loyalty (0.1295) and Certainty (0.0834). Alternative parameters that most affect internal quality audits respectively are sustainable process (0.6199) on audit system, management process (0.4094) on audit feasibility, and core competencies (0.4759) on products audit (Table 5).

### Conclusions:

This study result has several practical implications for top management in private colleges in order to foster consistent implementation of quality management system ISO 9000. College should give more attention to leadership effectiveness, staff commitment and the audit process of internal quality simultaneously, systematic and sustainable in order to enhance quality culture

This study limitation was the samples only at private colleges in Sulawesi and does not involve public universities. These findings may not be generalizable to other universities. Further study is recommended to fill this gap. This can help to strengthen this study results and its findings can be generalized. Comparisons to other colleges also can be done to add further insight.

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