Software development internal audit quality with ISO 9001

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Abstract. Quality management is a common problem in the business processes of the organization. University competition has increased. This is caused by globalization are increasingly cracking to compete among states. Assessment of good quality management and international standards using ISO 9001. This study discusses the maturity level ratings by using the ISO 9001 Quality Management System to see the maturity level of quality management in the organization. Quality management is using PHP programming. Data input used primary data and secondary data obtained by observation. The process gets a level of maturity is done by using the ISO 9001 to see the maturity level of quality management, GAP analysis to see the current conditions, and the conditions that will come to get a recommendation. This research concluded that the whole process of quality assurance at the organization still not profit and concluded that quality assurance for improvement still needs to be done on the entire information system is running. This indicates that ISO 9001 is good enough to use to assess the maturity level of quality management.

1. Introduction

Information technology (IT) is an important factor for success in this information economy era, even today IT is a central part of many business operations. As a consequence, IT and governance can not separate. Governance is a structure of relationships and processes that direct and regulate the organization to achieve its objectives by providing added value from the use of information technology to balance the risk in comparison with the results given by information technology and process [1].

The application of IT governance must be in line with business needs and the results most often experienced in improving risk management, communication and the relationship between business and IT related. The implementation of IT governance is an important part of an organization or company that provides direction and control to ensure that significant investments bring added value. IT resources are a milestone in the responsibility and risk mitigation process [2].

Implementation of IT governance that can be done by organizations or companies is to evaluate information technology or information systems, because governance will always be based on work measurement. Without the presence of measurable indicators, a sustainable movement of company growth will be difficult to realize [3]. Evaluation aims to assess, monitor and ensure that the entire process runs in line with the vision and mission of the organization or company. Implementation of a company or organization's performance evaluation uses standards or references that are used so that it will facilitate the development process better.

Indicator standards for realizing good governance in organizations or companies are referred to related to IT governance standards. Some frameworks that become good governance are COBIT (Control Objectives for Information and Related Technology), ISO (International Standard
Organization), and ITIL (IT Infrastructure Library). Product international standard organizations (ISO) various types such as ISO 9001: 2015 (quality management), ISO 14000: 2015 (environmental management), ISO 27000: 2013 (information security) and others, in the application of standards used will be adjusted to the company or organization of the need. ISO 27001: 2013 is part of a management system in an organization based on a business risk approach that aims to build, implement, operate, monitor, maintain and improve information security. The adoption of ISO / IEC 27001 allows organizations or companies to compare against competition and to provide relevant information about IT security [4]. In this case, the organization or company integrates more than one framework to develop the system, the merging of the framework occurs usually indeed covered by each other such as COBIT 5 with those that intersect with ISO 27001: 2013, 31000: 2009, ISO 38500: 2015, TOGAF, ITIL v3, and Prince2 / PMBOK, and CMMI.

In realizing good governance, ISO 9001 standard needs to be implemented which focuses on internal quality assurance that exists in an organization. ISO 9001 or often called the Quality Management System is referring to organizations doing to manage a process or activity so that the product or service meets its intended purpose. Many organizations or companies consider implementation

The Quality Management System is only needed to move in quality assurance, so there is a lack of awareness in the quality of data in all sectors. In protecting the quality, not only adding a device or application, but all processes in the use of applications and devices must also be monitored, therefore the need to implement a Quality Management System in an organization or company [5]

Based on Ministerial Regulation No. 43 of 2014, concerning the governance of organizations in the Ministry of the Interior. DC and DRC Management Sub Directorate of Population Administration Information Management (PIAK), wants to implement IT governance in accordance with international standards so that good governance is created. Therefore, to create good governance within the Department of Computer Science UNNES, it is necessary to implement ISO 9001 to create good information security. ISO 90001 is a standard that provides a quality management system; this standard is used throughout the world by both commercial and governmental organizations as the management of policies and the implementation of an organization's quality assurance. ISO 9001 is designed flexibly for stakeholders internally and externally as a starting point so that this framework is more focused on business [6]. Related to this [7] states that peer assessment can be implemented in higher education both in the short and long term. So in the process of implementing ISO 9001 [8], a review of the current conditions of the organization will be carried out, then fulfilling the needs needed in making good governance so that a gap can be formulated between the current situation and the situation in the future. In the formulation of a gap, a strategic plan and guidelines will be obtained to achieve the expected value.

2. Methods
This is descriptive research. It was conducted at the Computer Science Department of Universitas Negeri Semarang During observation, the author also conducted an interview and distributed questionnaires to the Department of Computer Science FMIPA itself in order to determine the readiness of the organization. There are several speakers who interviewed [9].

The author makes a GAP assessment in which the presentation value is obtained by adding up scores per variable and dividing by the maximum value of the variable [10]. This stage aims to see how much GAP there is in the Department of Computer Science FMIPA. The smaller the value of GAP, the better it means.

The process of clarifying data is a process of measuring the readiness of the percentage value obtained after conducting GAP analysis. The value of the presentation shows the readiness of the Department of Computer Science in implementing ISO 9001: 2015.

After the implementation of the system in the Department of Computer Science, the author will analyze the readiness of the Department of Computer Science FMIPA in carrying out the standards contained in ISO 9001. From the analysis process, the author will provide recommendations for
improvement in Computer Science Department FMIPA so that in the future will be running his organization according to ISO 9001 standards.

3. Result and Discussion

3.1. Vision and mission of the department of computer science
The goals of an organization will definitely be reflected in the vision and mission of the organization. This includes Education organizations such as the Department of Computer Science. The vision and mission of the Department of Computer Science can be obtained on the official website of the Department of Computer Science FMIPA.

3.2. The curriculum
The curriculum in this research follows the existing curriculum in the Department of Computer Science system to make it easier to develop both students and lecturers. At the Department of Computer Science, there are three applicable curricula, namely, the Informatics Engineering curriculum, the 2018 Information Systems curriculum, and the 2019 Information Systems curriculum.

3.3. Policy and quality of the department of computer science
Quality policy and objectives are an official and written rule of the Computer Science Department which contains the commitment of the Computer Science Department in maintaining and developing aspects of quality in the daily activities of the company itself [11].

3.4. Internal audit SOP document
It is an independent assessment function made in an organization with the aim of testing and evaluating various activities carried out in the Department of Computer Science. The internal audit SOP document aims to assist the Department of Computer Science in ineffective accountability [12].

3.5. SOP documents controlling discrepancies
This corporate operational standards documents for controlling nonconformities are deemed necessary for ongoing evaluation systems improvement, as well as for an orderly administration of internal quality assurance [13].

3.6. Management review SOP document
Management review is a step of the Top Management of the organization to review the quality management system of the organization in the planned time frame to ensure continuity, suitability, adequacy, and effectiveness of the quality management system.

Analyzing is done using Freeman’s theory, tabulating data, and comparison assessment calculation techniques through the formula weighted average value and the customer satisfaction index (IKP) obtained and subsequently evaluated [14].

| No | Element                                      | Score | Category |
|----|----------------------------------------------|-------|----------|
| 1  | Vision and mission                           | 3.1   | good     |
| 2  | Curriculum                                   | 3.05  | good     |
| 3  | Quality policy and objectives                | 2.9   | good     |
| 4  | Internal audit SOP document                  | 3.05  | good     |
| 5  | SOP document of nonconformity control        | 3.05  | good     |
| 6  | Management review SOP document               | 2.9   | good     |
| 7  | Quality standard                             | 3.05  | good     |

From the results of the IKM assessment, it can be seen that all elements are included in the good category. However, two elements get lower scores than the other elements, namely the quality objectives.
policy, and the management review SOP document [15]. This shows that the two elements need to be improved so that the quality of these elements can be improved while the other elements can be developed so that the quality of these elements remains good or even improved.

After obtaining the value of the element, then we calculate the weight value, the Community Satisfaction Index (IKM), and the Customer Satisfaction Index (IKP). The formula to find the weighted average weighted values is as follows:

\[
\text{Weight value} = \frac{\text{value}}{\text{Total element}} = \frac{1}{7}
\]

\[
\text{IKM} = \text{Total Perception Value per element} \times \text{Weight value}
\]

IKM = \(20.95 \times \frac{1}{7} = 2.9\)

IKP = IKM \times 25

IKP = 2.9 \times 25 = 72.5

| Perception Value | IKMP Interval Value | LKP Conversion Interval Value | Service Unit Performance |
|------------------|--------------------|------------------------------|--------------------------|
| 1                | 1.00 - 1.75        | 25 – 43.75                   | Very bad                 |
| 2                | 1.76 – 2.50        | 43.76 – 62.50                | Not good                 |
| 3                | 2.51 – 3.25        | 62.51 – 81.25                | Good                     |
| 4                | 3.26 – 4.00        | 81.26 – 100.00               | Very good                |

4. Conclusion

From the results of the IKM assessment, it can be seen that all elements are included in either category. However, there are two elements that get lower scores than the other elements, namely the quality objectives policy, and the management review SOP document. And after calculating the average IKM and IKP, we get the results that the performance of existing service units in the organization is included in both categories. But even like that, there are two elements that indicate the need for improvement so that the quality of these elements can be improved. While the other elements can be developed so that the quality of these elements remains good or even improved.

References
[1] Andriaole S 2016 IT IT Professional 18 57
[2] Bilbao A and Bilbao E 2013 a. IEEE, 1-5.
[3] SarnoR 2009 Auditing sistem & teknologi informasi (Surabaya: Surabaya ITS press)
[4] Pelnekar C 2011 Planning for and Implementing ISO 27001 Journal ISACA 1
[5] Broderick JS 2006 Inf. Secur. Tech. Rep. 11 26
[6] Humphreys E 2008 Inf. Secur. Tech. Rep. 13 247
[7] Swartzlander 2007 Action Research Projects 25
[8] Bilbao E, Bilbao A, Pecina K and Estremera R 2011 2011 Carnahan Conference on Security Technology (IEEE: Barcelona) pp 1-5
[9] Raco JR 2010 Metode Penelitian. (Gramedia Widiasarana Indonesia: Jakarta)
[10] Nancylia M, Mudjaabar EK, Sutikno S and Rosmansyah Y 2014 8th International Conference on Telecommunication Systems Services and Applications (TSSA) (Kuta: IEEE) pp. 1-5
[11] Chou DC 2014 Comput. Stand. Interfaces 42 137.
[12] GEIT 2011 Global Status Report on the Governance of Enterprise It (USA: ISACA)
[13] Gerber M and Solms Rv 2008 Comput. Secur. 27 124
[14] Martinez MA, Lasheras J, Medina E F, Toval A and Piattini M 2010 Comput. Stand. Interfaces
[15] Ritonga M and Susanto DA 2013 *J. Standarisasi* **15** 91