

# Readiness Analysis of the ISO 9001:2015 Certification in The Magister Program of Industrial Engineering UPN “Veteran” Yogyakarta Using Gap Analysis

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## **Readiness Analysis of the ISO 9001:2015 Certification in The Magister Program of Industrial Engineering UPN “Veteran” Yogyakarta Using Gap Analysis**

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**Abstract.** The competition within the field of education, especially the postgraduate program, and the market demand oblige master study programs to build and develop an internal management system, based on the standards determined by the government. Due to the increasingly strict competition for the postgraduate education, many master study programs have adopted and implemented the quality improvement program effectively. Such quality improvement program is in the Quality Management System (QMS). The development of this system is the ISO 9001 standard certification. The ISO 9001 certification is a standard that contains the requirements of the quality management system initiated by the International Organization for Standardization (IOS). The institution that this research studied was the industrial engineering master program (MTI) at UPN “Veteran” Yogyakarta. This study program had several data weaknesses in its student management system, academic system, payment system, and others. Such problems were the indirect impacts due to the absence of the ISO 9001 certification at MTI of UPN “Veteran” Yogyakarta. This research aimed to evaluate the current condition at MTI of UPN “Veteran” Yogyakarta, and how it readiness was for the preparation of the ISO 9001:2015 certification, and also provided recommendations as well as compiled the study program quality documents that were in line with the ISO 9001:2015 requirements. This research used the Gap Analysis Method. The Gap Analysis was applied to evaluate the existing conditions at MTI of UPN “Veteran” Yogyakarta, and then assessed the readiness of MTI of UPN “Veteran” Yogyakarta for the implementation of the ISO 9001:2015 certification. The Gap Analysis calculation used the checklist that was made based on the ISO 9001:2015 requirements. The calculation results using the checklist would show how much the readiness of the MTI of UPN “Veteran” Yogyakarta was to conduct the ISO 9001:2015 certification.

**Keywords.** MTI of UPN “Veteran” Yogyakarta, Quality Management System, Gap Analysis, ISO 9001:2015

## 1. Introduction

The educational competition and postgraduate market demand oblige master study programs to build and develop an internal management system which is in accordance with the determined standards [1]. The development of this system involves related groups to make decisions in a postgraduate study program. Study program management is a branch of management science to regulate the management of postgraduate education for master programs in order to make it neat, therefore, the task is to tidy up the irregular study program to become well-organized [2]. Actually, the focus of study program management is on the completion and accomplishment of educational service tasks in the study program. In the current education business era, there are many new and innovative initiatives such as programs to improve the quality of education effectively as a study program management strategy [3]. The existence of dynamic changes in education that influence the education business will continue to require an increase in the effectiveness in order to face the competition in educational services. All types of education, both international and national scales, are constantly faced with the need to adopt various strategic changes in education [4]. Due to the increasingly strict competition in the world of education, many study programs have adopted and implemented effective quality improvement programs which are often referred to as the Total Quality Management (TQM) [2]. This is because TQM is considered capable of complementing other supporting strategies for study programs to achieve sustainable educational competition. TQM is a holistic managerial approach with the aim of integrating all management functions in a sustainable manner in order to meet the needs of customers, and improve the system quality for the profit and productivity [5].

The further development of the TQM program caused ISO to become more popular [5]. In order to improve the efficiency, competitiveness, and customers' satisfaction, then more study programs are increasingly adopting the quality management system. This system has been widely developed in the ISO 9001 standard certification [2]. The ISO 9001 standard is one of the standards that has requirements related to the quality management system published by the International Organization for Standardization (IOS) [6]. The goal of ISO 9001 is to help organizations implement and run an effective quality management system by increasing the organization's capabilities in terms of design, production, and the delivery of quality products and services [6].

Millions of organizations in the world have obtained the ISO 9001 standard certification [7]. This condition shows that the ISO 9001 certification has a contribution in the internal organization, both in terms of the product quality and the organization's performance [1]. The quality management system is established as an international quality standard of ISO 9001:2000, which then goes to a refinement process until the final version becomes the ISO 9001:2015 [7]. Inside, there are developments in the corrective and preventive actions with the aim that the corrective and preventive mechanisms conducted can effectively have a positive impact on the processes that occur in the organization [6].

From the customers' perspective, the implementation of ISO 9001 can bring positive sentiment and trust from customers towards industries, including educational services, and increase the customers' satisfaction and loyalty [7]. The performance of educational organizations that have implemented ISO 9001 is much better than the organizations that have not yet implemented ISO 9001 [3]. This can be seen from the level of product quality. In addition, organizations are more process-oriented, which causes the quality and operational performance of an organization to be better [2]. As the main organization that is responsible for the harmonization of standards prevailing in the world, IOS always reviews the published

ISO standards. Currently, ISO 9001 has entered into the fourth revision, namely the ISO 9001:2015 international standard. Inside, the planning and control from the leaders of organizations are the important and main parts [6].

When compared to the previous version, the updates in the ISO 9001:2015 standard lie in the explicit requirements of the risk-based thinking [8]. This way of thinking is always used to support and improve the understanding and application of the existing process approach in the previous version. This is actually included in the requirements for the establishment, implementation, and maintenance, as well as the continuous improvement of the quality management system. When an organization applies the Risk-based thinking, then the results obtained will surely be in accordance with expectations, and be able to achieve continuous improvement [7][8].

The Study Program of Master of Industrial Engineering (MTI) of the UPN "Veteran" Yogyakarta is an organization that is engaged in a postgraduate education service. This organization has three sections, namely: the selection, the learning process, and the final part of the lecture or the thesis. This organization is in the preparation stage to implement some of the required standards, where these requirements have been regulated in ISO 9001:2015, but have not yet reached the certification stage, and this is due to a lack of commitment from the leader, and lack of resources needed to process it.

The Study Program of MTI aims to apply several ISO standards in order to increase its competitiveness, and improve the quality of the graduates. Thus, it is expected that the users' satisfaction of MTI graduates will always be preserved. Nonetheless, the Study Program of MTI is still committed to be ready for the certification stage. The disadvantage that has occurred in a study program is the resignation of prospective students or also due to the students' quality of education. In addition, there are complaints from students about the educational services that do not comply with the agreed standards. This is one of the indirect impacts due to the absence of ISO certification, where the existence of an ISO certificate indicates that the quality management system of the study program has been audited and has been implemented [9]. This research aims to analyze the readiness of the Study Program of MTI of the UPN "Veteran" Yogyakarta in carrying out the ISO 9001:2015 standard certification.

An ISO 9001: 2015 standard certification needs to be done so that the Study Program of MTI of the UPN "Veteran" Yogyakarta obtains a sustainable competitive advantage. The benefits of applying the ISO 9001:2015 standard are: an increase in the product quality assurance, the cost efficiency, the organizational productivity, and an improvement in the organizational image for the public's eyes [9]. Therefore, this research will analyze the current condition of the Study Program of MTI of the UPN "Veteran" Yogyakarta, and compare it with the actual conditions to find out its readiness in conducting the ISO 9001:2015. The method used is the gap analysis. The output of the gap analysis is a comparison between the existing system and the system needed, so that it can identify some deficiencies of the existing system to be used as the basis for improvement [10].

There have been many previous research on the implementation of ISO 9001. [Gamboa and Melão \[1\]](#) examined any factors in ISO 9001 that were considered successful in being applied in higher educations. This research was continued by [Moturi and Mbithi \[2\]](#) where the success of the factors of ISO 9001 was measured based on the university's ranks. Those success factors were the process quality, the management of documentation and recording, and the customers' satisfaction. [Kasperavičiūtė-Černiauskiė and Serafinas \[9\]](#) examined the positive and negative influences of the ISO 9001 implementation in higher educations in



Lithuania. Basir, *et al.* [11], examined the influences of academic culture on the implementation of ISO 9001 in universities in Malaysia. This research is different from the research conducted by Arribas-Díaz and Martínez-Mediano [6]. Arribas-Díaz and Martínez-Mediano [6] analyzed the success of the results of implementing ISO 9001 in education in terms of the aspect of the stakeholder perception model. The research was later refined by Rodríguez-Mantilla, *et al.* [3]. Rodríguez-Mantilla, *et al.* [3] analyzed the implementation results was not enough only from the perception, but also statistically proven using the analysis of variance (ANOVA). Meanwhile, the statistical tools used by Rodríguez-Mantilla, *et al.* [4], in measuring which factors from ISO 9001 provided success in higher educations, was the factor of analysis. Then as the continuation, Rodríguez-Mantilla, *et al.* [12], compared the results of the implementation of the ISO 9001 quality management system with the EFQM (European Foundation for Quality Management) quality management system in higher educations.

The previous research mentioned above have weaknesses. The main weakness is that the results of implementing ISO 9001 are measured or compared with the results of perceptions or assessments of models outside the ISO 9001 standard itself. So the relative size of whether or not the results of the implementation of ISO 9001 are not based on the ideal standard size according to ISO 9001. Thus, this research proposes an analysis of the results of the ISO 9001 implementation plan, which is compared with the ideal conditions according to the ISO 9001 standard itself. Therefore, it can be seen to what extent the gap between the ideal conditions as the target of quality achievement to be reached with the existing conditions. Furthermore, the results can be used as the basis for improvement to achieve the quality target of the ideal ISO 9001 standard.

## **2. ISO 9001:2015**

### *2.1. The Definition of ISO 9001*

The ISO 9001 standardization is a standard that has several technical requirements regarding the quality management system raised by IOS (International Organization for Standardization) [13]. The ISO 9001 standardization is a standardization regarding management requirements, and not a standardization for product specifications [4]. Thus, since ISO 9001 is a standard management requirement, the contents of ISO 9001 are a series of requirements articles to ensure consistency with management processes related to quality in a system [6]. The series of articles in ISO 9001 contains what has to be done for an organization if it will implement and build a good quality management system [6]. Thus, with this ISO 9001 guideline, a management system will be able to explain how to carry out a series of activities that are the specific requirement of each organization [2].

### *2.2. The Quality Management System of ISO 9001:2015*

The ISO 9001:2015 standard is the result of continuous revision of ISO 9001. The revision process to ISO 9001:2008 was started by the ISO/Technical Committee (ISO/TC) 176 [8]. The purpose of this revision is to ensure that the ISO 9001 international standard is able to reflect changes from an increasingly complex and dynamic environment [8]. The difference between the 2008 and 2015 versions is in Quality Management Principles (QMP) [13]. The principles of ISO 9001:2015 define eight quality management system principles so that organizations such as the MTI of UPN “Veteran” Yogyakarta sustainably succeed [8]. These eight principles can be seen in Figure 1.



Figure 1. The principles of ISO 9001:2015

The focus on graduate users implies that it is necessary to fulfill the requirements that customers want to be considered by the study program management so that they can exceed the expectations of graduate users [14]. This is the main goal of quality management. It is very important that the study program identifies its customers and stakeholders (students, educators, graduate users, education personnel, etc.) to understand their needs and expectations [15]. The customer-oriented principle is a prerequisite for the success of study programs or educational institutions [15].

As for the problem of leadership, at each level of the study program, or even the department or the faculty, must be able to set a unified goal and direction so as to create conditions in which human resources in the study program and department are involved in achieving the quality objectives of the department and study program [16]. According to this principle, a study program must determine the direction of its movement, namely the mission, vision, and goals to be achieved [15]. On the other hand, this leadership is also responsible for the environment that educators and education personnel can perform well by offering them opportunities to develop [15].

So how is it different from the people involvement? The purpose of people involvement in ISO 9001 is the competent people. The involvement is at all levels of an organization. This is very important in order to improve organizational capabilities in carrying out the tasks [16]. This principle promotes the active participation of stakeholders and their creative roles, as well as a responsible attitude towards finding solutions [15]. The involvement of stakeholders in various activities and processes in study programs or higher educations has to be increased as the knowledge creation, dissemination, and utilization [15].

In the problem of the process approach, the results of study program graduates are consistently achieved more effectively and efficiently. The condition is when the activities can be understood and managed as the interrelated process that functions as an interacting system. Meanwhile in the aspect of improvement, an organization must focus on a continuous improvement. The process components that must be taken into account are the input and output from teaching-learning, and each research process [15]. In ISO 9000, the Deming cycle or PDCA (plan-do-check-act) methodology can be applied to all processes [15].

In the field of decision making, study programs should have a decision-making system based on the results of analysis and evaluation of the accurate data and information so that it is possible to produce the desired output [15]. Therefore, higher educations should develop a specially designed system to collect and assess the necessary data. In order to make the safe

and sound decisions, the data and information must be clear and accessible, and must be firstly analyzed [15]. In the field of relationship management, it is related to the problem of ongoing success. Organizations are obliged to maintain good relationships with all interested parties, including suppliers and distributors.

The ISO 9001:2015 standardization has ten clauses. The ten clauses are divided into two parts. The two parts are (1) the main part and its attachments, and (2) the requirements section. The first part is in the clause zero to the clause three. Meanwhile, the second part is the part of the requirements in the clause four to the clause ten. All of these clauses have been designed to conform to the structure in Annex SL, namely the High Level Structure (HSL). This structure is the same basic reference for all structures in the management system created by IOS. The ten clauses in ISO 9001:2015 include (1) Scope, (2) Normative references, (3) Terms and definitions, (4) Organizational context, (5) Leadership, (6) Planning, (7) Support, (8) Operations, (9) Job evaluation, and (10) Improvement.

### 2.3. *The Quality Management System of ISO 9001:2015*

Gap analysis is an activity that compares two types of conditions or data between the ideal condition or data and the actual data or condition, and then identifies the differences between the two types of data [10]. In general, the gap analysis is used to identify the comparison of a set of requirements against the object being assessed. Thus, the gap analysis tends to be more structured in terms of identification coverage, as well as criteria or categories. Therefore, the gap analysis will be efficient in seeing which aspects or areas that need to be improved.

With these many advantages, the gap analysis is widely used in some research in the field of education. *Lucasa, et al.* [17] utilized the gap analysis to see how far the gap was between education and training in the renewable energy sector. This was also done by *Gavine, et al.* [18], however, the gap seen was the special education and training for the mother and baby care. *Nyoni and Botma* [19] used the gap analysis to examine the application of a competency-based midwifery program in Lesotho. *Madichie and Fiberesima* [20] used the gap analysis to explore the trends and gaps in the community education centers in a region in London. *Carr-Hill, R.* [21] examined the socio-economic disparities in African communities in accessing the higher education using the gap analysis.

The effectiveness of the gap analysis is due to the checklist which is very appropriate to the aspects of the study, and is very structured. To obtain a high conformity between the checklist and the study is to accommodate anything that becomes the requirement in ISO 9001. Meanwhile, to obtain a very structured checklist is to accommodate the hierarchy process technique in its assessment. Thus, the checklist always includes all common questions, and the one which can provide an overview of the category or topic being assessed. Therefore, all the questions on the checklist will tend to be more complete and very detailed [22]. In addition, the questions may take the form of assigning a value to each component of the requirements that are still needed if there are any. Each question in the checklist is related to one another. This linkage technique is used in order to ensure any traceability.

Basically, the gap analysis only has three stages: (1) determining the score, (2) assessing the checklist, and (3) assessing the gap. In the early stages, the focus is more on identifying value groups or scores of all possible organizational activities that have been carried out so far. Therefore, of course, the worst possible will be given the lowest score. Meanwhile, the possibility of activities in the organization will be rated the highest if it is done very well. In this case, there are five scores provided. The five scores adjust to the condition of how well the organization's activities are carried out, as shown in Figure 2.



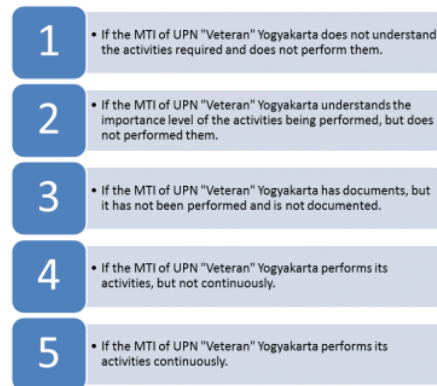


Figure 2. the assessment level

The checklist assessment in this second stage is carried out by the respondent. The assessment is based on the condition of the organization during the visitation. The checklist assessment is to see how well the organization performs its activities is. The more perfect the activity, the higher the score will be. Therefore, the value obtained is the highest score. On the other hand, if the organization does not fully understand what it performs, of course, the lowest score will be given. Therefore, the chosen respondents should have sufficient competence so that they are not carelessly. An objective assessment is very helped by looking at the provisions of the assessment level or scoring in Figure 2.

The final stage is the gap assessment. In this final stage, the gap between the existing condition and the expected condition will be identified. The expected condition is, of course, a condition where all the standards set are achieved. The gap value is known as the number of gap that occurs. Thus, the amount of gap that exists between each component of the actual condition and the expected condition is summed up. The sum of all the gap values is then made in the form of percentage values. The total result is actually the score per variable obtained by the MTI of UPN "Veteran" Yogyakarta. Therefore, to get the percentage values is to divide the total score obtained by the total maximum score that may be achieved for each variable. Thus, the higher the score, the smaller the gap that occurs. And vice versa, the smaller the total score, the bigger the gap that occurs.

The measure of the readiness of the MTI of UPN "Veteran" Yogyakarta in implementing ISO 9001:2015 can be seen from how big the gap is. The smaller the gap or the bigger the percentage values, the more prepared the organization is for implementing ISO 9001:2015. Since percentage values are continuous, intervals are made. Thus, each interval can provide an overview of the readiness of the MTI of UPN "Veteran" Yogyakarta for the implementation of ISO 9001:2015.

### 3. Research methodology

#### 3.1. Research method

The main process as a way of working in this research method is a system of comparison or comparing the condition of the MTI of UPN "Veteran" Yogyakarta when assessing with the ideal condition. The ideal condition here is, of course, measured by the requirements in ISO 9001:2015. The raw materials, as the main process input, consist of



primary and secondary data. All quality system documents owned by the MTI of UPN “Veteran” Yogyakarta are the secondary data. Meanwhile, the results of observations and interviews with information sources are included as the primary data for the MTI of UPN “Veteran” Yogyakarta. The primary and secondary data are then inputted into the process using a tool. This tool is an internal audit checklist model from ISO 9001:2015 [22].

For each item in the internal audit checklist, it is scored on a Likert Scale between the numbers of 1 to 5. Therefore, of all the items in one group of ISO 9001:2015 components, a total score will be collected. The total score is then divided by the total score if all items have a total of 5 points. Thus, the percentage values of the readiness of the MTI of UPN “Veteran” Yogyakarta will be obtained in the implementation of ISO 9001:2015. If each component is added individually for the items that the component has, it means that in order to assess the readiness of the MTI of UPN “Veteran” Yogyakarta for the implementation of ISO 9001:2015 is only the variables in that component.

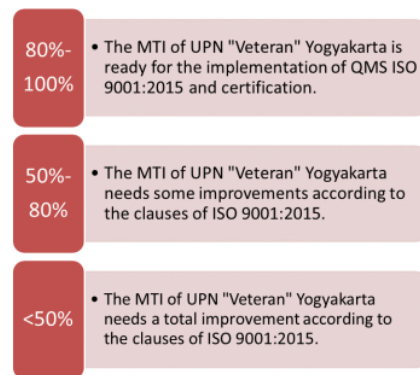


Figure 3. the percentage values into the assesment level

The next step is to classify the percentage values into the group types determined in Figure 3. Each group has its own percentage range. The interval or range is obtained using the Delphi Method. Each group has a description of how readiness the MTI of UPN “Veteran” Yogyakarta is in implementing ISO 9001:2015. The meeting between the percentage values and the group types in Figure 3 will be used as an evaluation of what gaps are the obstacles in the implementation of ISO 9001:2015 at the MTI of UPN “Veteran” Yogyakarta. By making the value of each ISO 9001 component with the percentage range, the gap will be identified, and then the MTI of UPN “Veteran” Yogyakarta can make improvements based on the priority scale with the largest gap.

### 3.2. Research stage

In general, the research flow used has five main stages. The first stage flow is the preliminary study. Here, it departs from the phenomenon that the number of potential students of the MTI of UPN "Veteran" Yogyakarta is very small. After conducting a study of the prospective students, the main source is obtained because of the issue of accreditation. Equipped by this data, the root cause of the problem is identified in the low quality of education at the MTI of UPN "Veteran" Yogyakarta. Thus, accreditation is influenced by the quality assurance in study programs, and this will affect the interest of prospective students

[23]. Therefore, a solution plan for implementing a quality management system at the MTI of UPN "Veteran" Yogyakarta is carried out.

After determining the solution plan, the first stage of the flow is completed, and the second stage is entered. The second stage flow is to review the solution plan by coming up with ideas for improvement. After the solution plan has been verified, then the options for the various types of quality management systems offered are determined. After meeting the quality management system in line with the MTI UPN of "Veteran" Yogyakarta, namely ISO 9001:2015, then to realize the idea is to prepare what requirements should be there before the implementation of the selected quality management system. Thus, the second stage flow comes to the meeting point of the research objectives, namely the assessment of the ISO 9001:2015 quality management system requirements readiness at the MTI of UPN "Veteran" Yogyakarta.

After the second stage is completed, then a literature study is carried out by looking at the various quality management system research that have been carried out. Then, followed by looking at previous research related to one of the ISO 9001:2015 quality management systems. This third stage is needed to see to what extent the originality of the research is. Thus, so that this research also has a theoretical basis that is in line with the scientific principles of a research. For the flow of the next stage is the design of the research model. In this flow, the research activity design has been detailed, started by the data collection, then how to process it, and then assessing the results of data collection from the research instruments.

### *3.3. Research variable identification*

Based on the research objectives, then absolutely this research variables determination has to be used in achieving the research objectives. If the aim is to see how much the level of readiness for the implementation of the ISO 9001:2015 quality management system, then of course the research variables used are the clauses in ISO 9001:2015. The clauses which are the research variables can be seen in Figure 5.

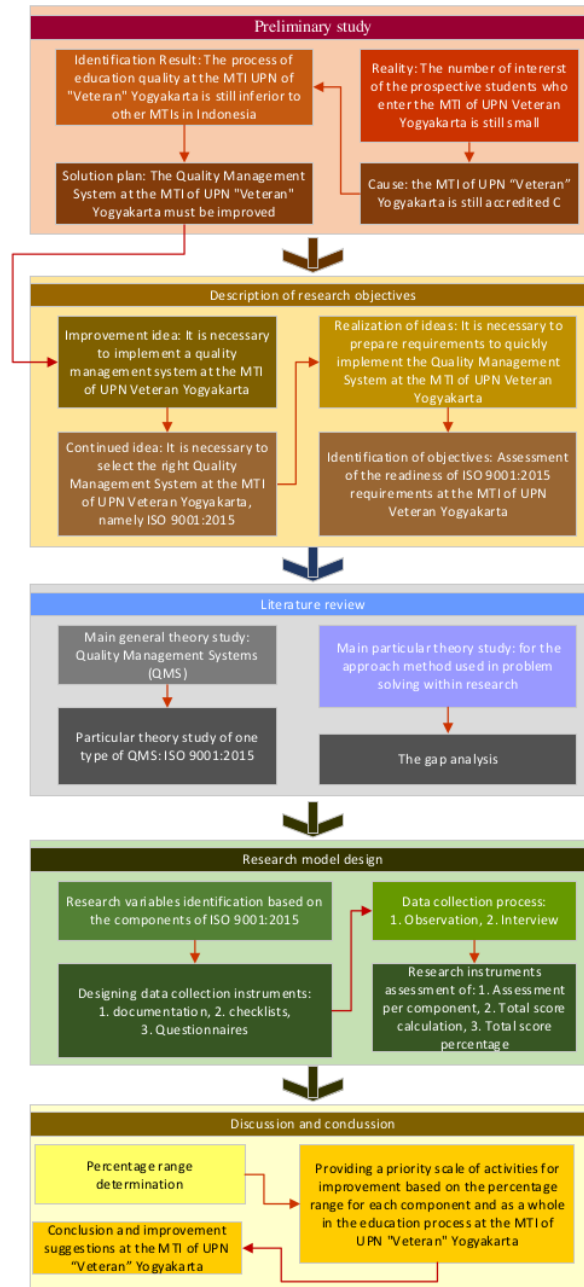


Figure 4. The research stage

## 4. Results and discussion

### 4.1. Checklist data score

The data collection follows the data collection instrument that is made after the research variables are determined. Thus, the use of observations and interviews in the learning process at the MTI of UPN “Veteran” Yogyakarta becomes the tool for searching the primary data source. As the completeness model to the primary data retrieval is the internal audit checklist for the MTI of UPN “Veteran” Yogyakarta. The key informants who become the main respondents in the interview according to the ISO 9001:2015 internal audit checklist are the managers of the MTI of UPN “Veteran” Yogyakarta. These managers are the Head of the Department of Industrial Engineering, the Secretary of the Department of Industrial Engineering, and the Coordinator of the Study Program of the MTI of UPN “Veteran” Yogyakarta.



Figure 5. The research variables using clause component

The initial stage in the data processing is to calculate the score for each data obtained in each clause component in Figure 5. This score calculation is based on the internal audit checklist data [22]. The next step is to calculate the percentage of the score in each component of the clause. Each component of the clause from ISO 9001:2015, that already has a percentage of the score value, will be transposed into the percentage score range. This step is absolutely according to the type of range groups as shown in Figure 3. The summary of the calculation results of the score percentage in each of the research variable from the checklist results can be seen in Figure 6.

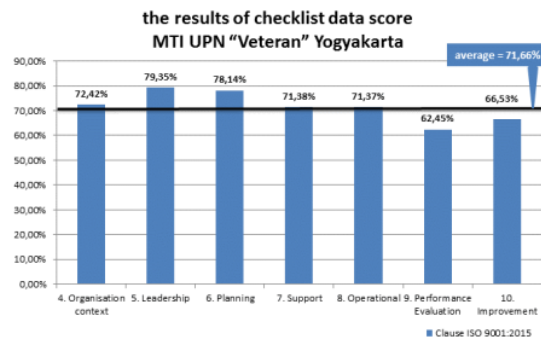


Figure 6. The checklist results

#### 4.2. Clause data score

There are three assessment factors involved in the organizational context clause components. Each factor is then scored according to the data obtained for each of these



factors. The scoring follows the results of the internal audit checklist for the organizational context clause. The percentage value and the average value in each score are then calculated. The average value in Figure 7 is used as the basis for the amount of readiness value for the organizational context clauses for the Study Program of the MTI of UPN "Veteran" Yogyakarta. The result is that the readiness of the MTI of UPN "Veteran" Yogyakarta in the organizational context clause is 72.32%.

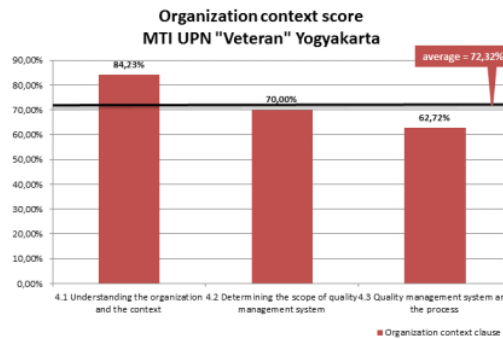


Figure 7. Organizational context clauses score

There are three assessment factors in the leadership clause components. The three factors are then scored according to the data obtained for each of these factors. The scoring follows the results of the internal audit checklist for the leadership clauses. The percentage value and the average value in each score in that factor is then calculated. The average value in Figure 8 is used as the basis for the amount of readiness value for the leadership clauses for the Study Program of the MTI of UPN "Veteran" Yogyakarta. From the figure, it can be seen that the readiness of the MTI of UPN "Veteran" Yogyakarta in the leadership clauses is 79.02%.

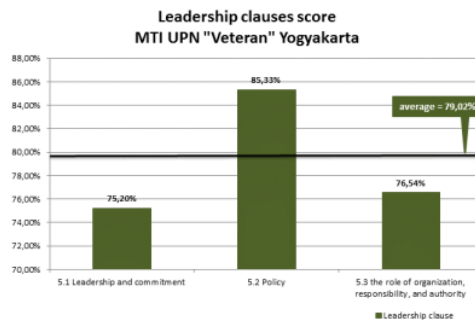


Figure 8. Leadership clauses score

In the planning clauses, there are also three assessment factors. Each factor is also scored according to the data obtained for each factor in the planning clause. The scoring follows the results of the internal audit checklist for the planning clauses. The percentage value and the average value in each score in that factor is then calculated. This average value is used as the basis for the amount of readiness value for the planning clauses for the Study Program of the MTI of UPN "Veteran" Yogyakarta. The results are as shown in Figure 9,

indicating that the readiness of the MTI of UPN “Veteran” Yogyakarta in the planning clauses is 78.91%.

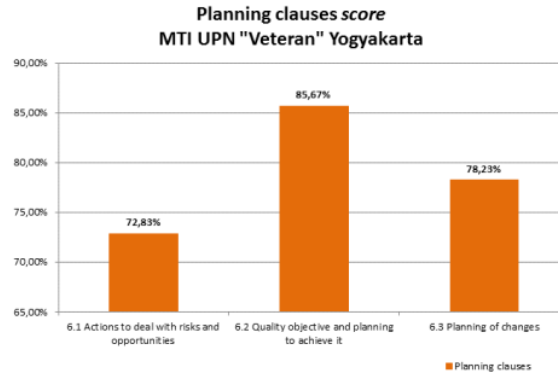


Figure 9. Planning clauses score

There are only two assessment factors in the support clause components. The two factors are then scored according to the data input obtained for each of these factors. The score assessment follows the results of the internal audit checklist for the support clauses. The percentage value and the average value in each score in that factor is then calculated. The average value can be seen in Figure 10. From this figure, it can be seen that the level of readiness for the support clauses for the Study Program of the MTI of UPN “Veteran” Yogyakarta is 71.81%.

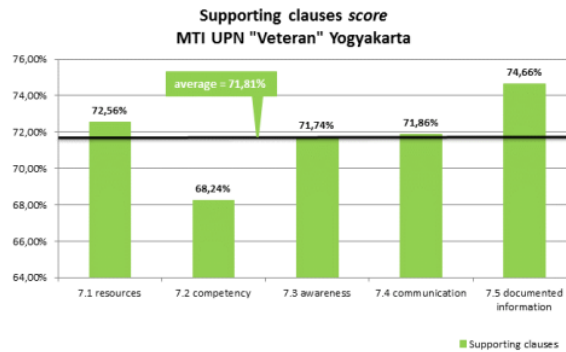


Figure 10. Supporting clauses score

The operational clauses have six assessment factors. By scoring in accordance with the input data from the results of the internal audit checklist for the operational clauses, the percentage value of each factor is obtained. Each percentage value can be seen in Figure 11. From Figure 11, it can be seen that the readiness value for operational clauses for the Study Program of the MTI of UPN “Veteran” Yogyakarta has an average score that is still lacking, especially in the external service problems.

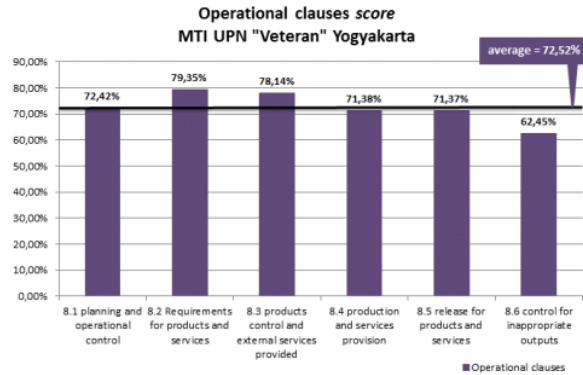


Figure 11. Operational clauses score

In the components of the work evaluation clause, there are three factors that are considered in the assessment. By using the internal audit checklist, a score for each factor is obtained. Then the percentage value is calculated to determine the readiness of each factor and the work evaluation clauses. The full results are summarized in Figure 12.

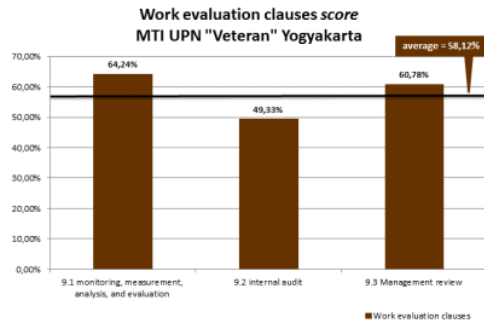


Figure 12. Work evaluation clauses score

In the improvement clause, there are five factors used as the assessment references. Each factor is then matched against its internal audit checklist. The match means scoring, which the value percentage is then calculated. The results of the percentage calculation recap for the five factors in the improvement clause components can be seen in Figure 13.

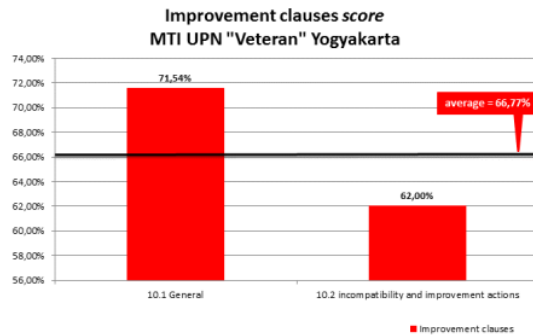


Figure 13. Improvement clauses score

The improvement engineering provided to companies is one of the mandatory document forms that exist in ISO 9001: 2015, and is based on the requirements in the ISO 9001:2015 clauses. In designing a quality documents design, what needs to be considered is that the design can be used as a reference in preparation for the implementation of ISO 9001:2015 at the MTI of UPN "Veteran" Yogyakarta. In the design, several documents are mandatory. This mandatory characteristic is a requirement for implementing ISO 9001:2015. Moreover, there are also several documents for several clauses in ISO 9001:2015. In the organizational context clauses (4), the documents on the scope of the quality management system at the MTI of UPN "Veteran" Yogyakarta should be updated. As for the leadership clauses (5), the quality policy documents at the MTI of UPN "Veteran" Yogyakarta should be updated. In the planning clauses (6), improvements should be made to the quality target documents. In the support clauses (7), the focus of improvement is on the document of the SOP of documents control and the SOP of the recordings control. Both documents are expected to be able to be used as tools for increasing the value in the Clause 7. Whereas in the operational clauses (8), there are many documents that have the opportunity to be used as tools for improvements. These documents include the process flow, the document of the SOP of documents, the documents of the SOP of incompatibility control, and the document of the work form.

In the Management Review clauses (9), there are five attachments that will be used to make improvements to this clause, namely the document of the SOP of Internal Audit, the document of the SOP of Recordings Control, the document of the SOP of improvement and preventive actions, the document of the SOP of management review, and the document of the work form of Internal Financial Audit. In the Evaluation clauses (10), there are three attachments that are used to improve this clause, namely the document of the SOP of Recordings Control, the document of the SOP of improvement and preventive Actions, and the document of the SOP of incompatibility Control.

#### 4.3. *Quality documents design*

The improvement engineering provided to companies is one of the mandatory document forms that exist in ISO 9001: 2015, and is based on the requirements in the ISO 9001:2015 clauses. In designing a quality documents design (see Figure 14), what needs to be considered is that the design can be used as a reference in preparation for the implementation of ISO 9001:2015 at the MTI of UPN "Veteran" Yogyakarta. In the design, several documents are mandatory. This mandatory characteristic is a requirement for implementing



ISO 9001:2015. Moreover, there are also several documents for several clauses in ISO 9001:2015. In the organizational context clauses (4), the documents on the scope of the quality management system at the MTI of UPN “Veteran” Yogyakarta should be updated. As for the leadership clauses (5), the quality policy documents at the MTI of UPN “Veteran” Yogyakarta should be updated. In the planning clauses (6), improvements should be made to the quality target documents. In the support clauses (7), the focus of improvement is on the document of the SOP of documents control and the SOP of the recordings control. Both documents are expected to be able to be used as tools for increasing the value in the Clause 7. Whereas in the operational clauses (8), there are many documents that have the opportunity to be used as tools for improvements. These documents include the process flow, the document of the SOP of documents, the documents of the SOP of incompatibility control, and the document of the work form.

Clause 5	• Document of quality policy
Clause 6	• Document of quality target
Clause 8	• Document of process flow
Clause 4	• Document of the scope of QMS
	• Document of quality manual
Clause 9	• Document of the SOP of quality audit
Clause 7	• Document of the SOP of documents control
Clause 7 s.d. 10	• Document of the SOP of recordings control
Clause 9, 10	• Document of the SOP of preventive and improvement actions
Clause 8,10	• Document of the SOP of incompatibility control
Clause 9	• Document of the SOP of management review
	• Document of work instruction
Clause 8,9	• Document of the work form of financial internal audit

Figure 14. Quality documents design

In the Management Review clauses (9), there are five attachments that will be used to make improvements to this clause, namely the document of the SOP of Internal Audit, the document of the SOP of Recordings Control, the document of the SOP of improvement and preventive actions, the document of the SOP of management review, and the document of the work form of Internal Financial Audit. In the Evaluation clauses (10), there are three attachments that are used to improve this clause, namely the document of the SOP of Recordings Control, the document of the SOP of improvement and preventive Actions, and the document of the SOP of incompatibility Control.

#### 4.4. Recommendation

Based on the results of the previous discussion, there are still several clauses that have low readiness values for the ISO 9001:2015 certification, thus, improvements are needed. The commitment and direct participation of the managements and teaching staff, as well as the education personnel, are the key factors for the successful implementation of ISO 9001, in addition to the good preparation and goal setting [24]. The study programs accompanied by the supports mentioned above, then their implementation of the ISO 9001:2015 quality

management system will be achieved at the time expected [25]. Hence, it needs recommendations from several clauses that have low readiness values, namely:

The Clause 9: The Performance Evaluation. Based on the achievement value of only 58.12%, there are suggestions for improvement for the MTI of UPN "Veteran" Yogyakarta. Such improvements certainly support in increasing the performance evaluation, among others are: (1) Establishing the standard work procedure and work assessment for all educational personnel; (2) evaluating the performance of the quality management system in order to know whether the targets have been achieved or not, once a week; (3) creating quality documents and performance evaluation result documents of the quality management system; (4) conducting the internal audit once a year with the help of the national accreditation institution; (5) applying all suggestions from the results of the internal audit; (6) archiving each document for the performance evaluation of the quality management system, (7) evaluating the management system, such as:

1. Providing questionnaires of students' satisfaction every semester.
2. Creating quality control procedures (check sheets) as a tool for quality control, starting from the selection of prospective students to the registration for the thesis defense.

The Clause 10: The improvement. Based on the achievement value of only 66.77%, there is a suggestion for improvement for MTI UPN "Veteran" Yogyakarta. The proposed improvement is to increase the value percentage in the Clause 10. The proposed improvements include (1) running the management cycle regularly. The budget planning and program activities that have been submitted by the Head of the IT Department of UPN "Veteran" Yogyakarta to the Faculty, in the form of the Work Plan & Budget of State Ministries/Institutions, must be carried out according to schedule. This means that two management functions have been carried out, namely planning and implementation. Therefore, proceed with inspection which is then followed by evaluation. This is done to find out whether there are problems or not, and how to solve the problems if there is any. Besides, the reports from the evaluation results are also used to make plans and work programs for the following year.

## **5. Conclusion and suggestion**

### *5.1. Conclusion*

Based on the gap analysis at the MTI of UPN "Veteran" Yogyakarta, the results of the readiness for the ISO 9001:2015 certification are 71.66%. Reviewing from the readiness of the organizational context clauses (the Clause 4) and the support clauses (the Clause 7), the MTI of UPN "Veteran" Yogyakarta still needs improvements in the quality management system and the processes in the study program (for the Clause 4), as well as improvements in the competence (the Clause 7). As for the leadership clauses (the Clause 5) and planning clauses (the Clause 6), the MTI of UPN "Veteran" Yogyakarta is ready for the ISO 9001:2015 certification. In the operational clauses (the Clause 8), the MTI of UPN "Veteran" Yogyakarta still needs improvements for the graduates control and the graduates user service. Meanwhile, the work evaluation clauses (the Clause 9) still really needs to be improved regarding the performance evaluation of the study program. Similarly for the Corrective Clauses (the Clause 10).

### *5.2. Suggestion*

The weakness in this research is that it has not yet compared with the existing models in previous research. Therefore, further research should be compared with other models or techniques in seeing the results of implementing ISO 9001:2015 in higher educations or study

programs.

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# Readiness Analysis of the ISO 9001:2015 Certification in The Magister Program of Industrial Engineering UPN "Veteran" Yogyakarta Using Gap Analysis

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