

# **Monitoring and Assessing the Impact of Implementing ISO 55000 in an Educational Institute**

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## **Abstract**

ISO standards are getting an increasing attention from different organizations. However, the effects of using different standards on the organizational performance are still unclear. ISO 55000 standard aims to provide all the stakeholders with a better understanding of the asset management system in order to achieve excellence in managing assets. The aim of this study is to assess the impact of moving toward implementing ISO 55000 in an educational institute that has started preparing for implementing it. The process of this assessment started by identifying the key performance indicators (KPIs), shortlisting them and then performing meetings and interviews with experts to evaluate the KPIs based on the available data. It was found that ISO 55000 requirements started to positively enhance the facilities management and planning department and its performance; however, the lack of data and records availability prevented from obtaining a full picture about the impact of ISO 55000 requirements.

## **Keywords**

Assessing, ISO 55000, key performance indicators, educational institute

## **1. Introduction**

Standard of the International Organizations for Standardization (ISO) are getting an increasing attention from different organizations to increase their reputations and achieve excellence (Su, Dhanorkar, & Linderman, 2015). However, the effects of using such standards on the organization performance are still unclear. For instance, some researchers on ISO 9000 concluded a negative impact on the performance (Heras-Saizarbitoria, Arana, & Boiral, 2015) while others concluded a positive impact (Cagnazzo, Taticchi, & Fuiano, 2009). The variation in the results might be due to different set of factors such as the measuring criteria used, the type of service provided, the company size, the regional location, laws and regulations.

With a similar structural level to ISO 9000 (quality management system) and ISO 14000 (environmental management system), ISO 55000 has been published in 2014 for asset management framework (Minnaar, Basson, & Vlok, 2013). According to the British Standards Institute (BSI), it includes overview, principles and terminologies regarding asset management and it can be applied to all organizational types (British Standard Institution, 2014). In addition, ISO 55001 includes the requirements for asset management, however, it does not provide organizations with the way of achieving resources management (Nowakowski, Tubis, & Werbińska-Wojciechowska, 2017). ISO 55001 is followed by ISO 55002 which contains guidelines for implementing ISO 55001 (International Organization for Standardization, 2014). ISO 5500X documents provide requirements for implementing asset management at organizations according their needs (Minnaar et al., 2013).

Some of the expected advantages from the asset management standard are the enhanced financial performance, the improved services and reputation. ISO 55000 standard aims to provide all the stakeholders with a better understanding to the asset systems and achieve excellence in managing assets (British Standard Institution, 2014). The aim of this study is to assess the impact caused by starting the implementation of ISO 55000 in an educational institute.

This paper is organized as follows: Section 2 presents the related work. Section 3 explains the methodological framework. Section 4 presents the results and section 5 discusses the results of the assessment and provides some insight. Section 6 concludes this paper.

## **2. Literature review**

Several studies were conducted on different ISO standards. For instance, Aba and Badar (Aba & Badar, 2004), reviewed the previous studies on the impact of ISO 9000 and ISO 14000 certificates on organization. Poksinska (Poksinska, 2010) investigated the condition of successful implementation of ISO 9001, which includes the involvement of people (especially employee), the commitment of top management and the maturity level which is to what extent the organization can practice the standard for quality management. Moreover, Tarí, Molina-Azorín, and Heras (Tarí, Molina-Azorín, & Heras, 2012) compared between the results of implementing ISO 9000 and ISO 14000. They reported that both standards have effects on people and operations but the effect on financial performance is unsatisfied.

As ISO 55000 was initially prepared based on the Publicly Available Standard (PAS 55), Ma, Zhou, and Sheng (2014) compared the two standards (PAS 55 and ISO 55000) based on the level of details. Minnaar, Basson, and Vlok (Minnaar et al., 2013) summarized the numerical analysis methods for applying asset management systems (i.e., PAS 55 and ISO 55000) such as statistical analysis and Markov Chain. De Vroedt and Hoving (de Vroedt & Hoving, 2014) considered the information needs in an alignment with ISO 55000 requirement during the entire life cycle of assets in a distribution company. According to Basson, (Basson, 2016) as part of ISO 55000, the solution flow can be used for quantitative risk management. Nowakowski, Tubis, and Werbińska-Wojciechowska, (Nowakowski et al., 2017) investigated the possibilities for implementing ISO 55001 in transportation companies in Poland.

Furthermore, Molomo-Mphephu and Amadi-Echendu (2016) reported a positive impact of ISO 55000 on human resources. Albalghouni et al. (2018) attempted to address the challenges of implementing ISO 55000 in an educational institute. Sondalini (Sondalini, 2012) recommended to combine the use of ISO 55001 with reliability solutions to ensure the correct actions and policies to achieve world class asset management.

Based on the above literature review, it can be seen that the studies on the impact of ISO 55000 are very limited and the research on this topic is still immature. Thus, there is a need to examine the effect of ISO 55000 on different organizations during various stages (i.e., preparation stage, implementation stage, and after implementation stage). To the best of the authors' knowledge, no study in the literature analyzed the performance of an educational institute during the implementation stage of ISO 55000.

As a result, in this work, we build on the work presented in (Albalghouni et al., 2018), by providing an assessment methodology to the situation before and after starting the implementation of ISO 55000 in the same educational institute as in (Albalghouni et al., 2018) in order to assess and monitor the impact of ISO 55000 during the implementation stage.

## **3. Methodology**

The methodology of this research (Figure 1) starts by identifying key performance indicators (KPIs) relevant to asset management system. This list of KPIs needs to be shortlisted to suit the organization under study using a survey. Then, a set of meetings and interviews was held with the decision makers and experts in the facilities management and planning department in the institution to measure the KPIs and assess their impact during the implementation stage of ISO 55000.

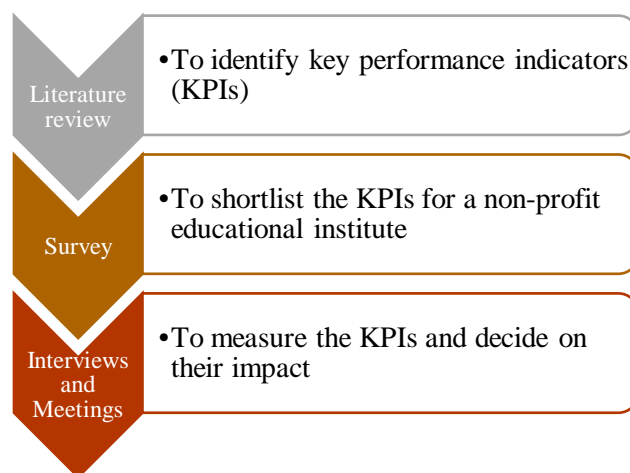


Figure 1. Methodological framework

## 4. Results

### 4.1 Identifying key performance indicators list

Assessing the impact of ISO 55000 requires identifying judgment criteria so called key performance indicators. Key performance indicators must be applicable for asset management system and must also be suitable for the organization type. A thorough literature review was conducted to identify asset management KPIs. A total of 21 KPIs were identified from survey the literature. Cost reduction, customer satisfaction, organization efficiency, maintenance performance, sales growth, innovation, continuous improvement employment development and net profit improvement are sample of the commonly used KPIs in the literature.

### 4.2 Shortlisting key performance indicators list

The 21 identified KPIs in the previous step do not consider the type of the organization, where not all KPIs are applicable to all types of organizations. As a result, the identified KPIs need to be shortlisted to match with the type of organization under study. Since, the case study is about a non-profit educational institute, an electronic survey was prepared to identify eliminate non-relevant KPIs. The survey was distributed to twelve experts in asset management in the educational institute. A follow up email was sent to all the experts; however, only ten out of the twelve provided their feedback.

An agreement among all the decision makers, who participated in the survey, needs to be reached on the KPIs that must be considered in the assessment (similar to Delphi approach). A KPI was eliminated if contradictory results were found, i.e., if at least one expert indicated that it is no relevant and another expert indicated that it is relevant. Table 1 summarizes the shortlisted 16 KPIs. It can be seen that the shortlist KPIs lacks the financial ones that focuses on measuring the organization profit (such as net profit and sales growth).

Table 1. Key performance indicators used in this study

No	KPI
1	Production and operative Cost reduction
2	Increased Customer satisfaction
3	Improved corporate image
4	Systematic processes for handling complaints
5	Improvement in organization efficiency
6	Process and organization effectiveness
7	Reduction of lead time (delivery time to market)
8	Improvement in the quality, reliability of products / services
9	Improved documentation, work procedures, policies and registers
10	Continuous improvement through reduction of mistakes, nonconformity, rework and non-value-added activities
11	Improved maintenance performance
12	Improved working conditions, Health and safety performance

<b>13</b>	Increased employee motivation and commitment
<b>14</b>	Increased employee development, education and training
<b>15</b>	Clear knowledge of tasks responsibilities by employees
<b>16</b>	Encouragement of innovation

#### **4.3 Impact of implementation of ISO 55000 of the KPIs**

Several meetings and interviews were conducted with the facilities management and planning team and decision makers, who are responsible for the educational institute assets, to assess the impact of starting the implementation of ISO 55000 on the organization performance and how each KPI is affected by comparing the status before and after starting the implementation. The KPIs were explained to the decision makers to ensure that all decision makers have the same definitions in mind and the same unit of measurements.

A five-point Likert scale was used to assess the effect of each KPI, where 1 indicates high negative effect, 2 indicates moderate negative effect, 3 means no effect, 4 and 5 indicate moderate and high positive effects, respectively.

Decision makers, during the meetings, were asked to evaluate each KPI using the five-point scale based on their job positions and expertise. For each KPI, an explanation with evidence was requested to justify the selection. The assessments from all the decision makers were averaged.

The assessment of starting the implementation of ISO 55000 and the findings are summarized in Table 2. Team interviews and meetings revealed that the documentation prior starting the implementation of ISO 55000 was very poor, thus, some of the identified KPIs were not applicable for the assessment due to the lack of historical data and records. The implementation of ISO 55000 requirement started to enhance the process in the department and in the educational institute as well. The analysis and the interview results showed that a positive impact in the following KPIs: cost reduction, systematic process of handling complaints, improvement of the organization efficiency, reduction of lead time, improvement in the service quality, and improvement in the documentation.

**Table 2. KPIs assessment results and findings**

<b>No.</b>	<b>KPI</b>	<b>Availability of data</b>	<b>Main Findings /Conclusion</b>	<b>Impact</b>
1	Production /operative Cost reduction	Yes	The department started applying contract performance monitoring which participated in operative cost reduction. <u>This did not exist prior the start of implementation of ISO 55000</u>	Positive
2	Increased Customer satisfaction	No	The received tasks are monitored through an electronic system. However, customer satisfaction is not being yet monitored through this system. Currently, customer satisfaction is measured through an automatic survey sent to each customer after the task completion, where few customers responded to it. The lack of data prevent further analysis.	-
3	Improved corporate image	No	Customer feedback are collected; however, the process of measuring the improvement in corporate image has not been implemented yet	-
4	Systematic processes for handling complaints	Yes	Comparing the two before and after conditions, analysis revealed drastic improvement in the process of handling the complaint-.	Positive
5	Improvement in organization efficiency	Yes	An improvement in the department efficiency is observed in terms of the reduction in the whole request time (receiving, assigning and processing).	Positive
6	Process and organization effectiveness	No	All the implemented processes are now under observation. Effectiveness can be measured at a next stage.	-

No.	KPI	Availability of data	Main Findings /Conclusion	Impact
7	Reduction of lead time (delivery time to market)	Yes	Stock materials are currently procured ahead of time to avoid delays caused earlier due to non-availability of required materials.	Positive
8	Improvement in the quality, reliability of products / services	Yes	The available documents and regulation at the department prove the improvement in monitoring the quality of the provided services.	Positive
9	Improved documentation, work procedures, policies and registers	Yes	Documentation of department processes, work procedures, asset records and maintenance schedules and plans are improved.	Positive
10	Continuous improvement through reduction of mistakes, nonconformity, rework and non-value added activities	No	Measuring continuous improvement cannot be implemented at current stage as it depends on the electronic management system, which is expected to be completed by June 2017. In addition to that a sufficient time period after system completion (around 1 year) is required to measure any improvements or reduction of the frequency of maintenance activities.	-
11	Improved maintenance performance	No	Similar to KPI #10.	-
12	Improved working conditions, Health and safety performance	No	-	-
13	Increased employee motivation and commitment	No	Although team building activities started, the activity is not continued and there is no clear plan of future activities to enable monitoring the motivation.	-
14	Increased employee development, education and training	No	The department has not developed training plan yet.	-
15	Clear knowledge of tasks responsibilities by employees	No	-	-
16	Encouragement of innovation	No	-	-

#### **4. Discussion**

During the interviews, it was found that the assets were poorly managed prior the start of implementing ISO 55000 requirement, which can be noticed from the lack of data to assess 10 out of the 16 KPIs, where the documentation process has started with the start of applying ISO 55000 requirements. As a result, in the future and once the required data is available, the organization can re-assess its state and determine its strength and weakness. It can be noticed that the current practice of measuring the customer satisfaction is not enough, as not all customers are participating in the satisfaction survey, which indicates a need for a better method.

#### **5. Conclusion**

The purpose of this work was to assess the state of the facilities management and planning department at an educational institute before and after the start of implementing the ISO 55000 requirements. The process of this assessment started by identifying the KPIs, shortlisting them and finally performing meetings and interviews to evaluate the KPIs based on the available data. ISO 55000 requirements started to positively enhance the department and its performance;

however, the lack of data and records availability prevented from obtaining a full picture about the impact of ISO 55000 requirements. The assessment process needs to be done on a continuous basis to maintain record of the improvement during the different stages. The process of this assessment started by identifying the key performance indicators (KPIs) and then performing meetings and interviews with experts to evaluate the KPIs based on the available data. It was found that ISO 55000 requirements started to positively enhance the facilities management and planning department and its performance; however, the lack of data and records availability prevented from obtaining a full picture about the impact of ISO 55000 requirements.

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