

# **Challenges of implementing ISO 55000: a case study from an educational institute**

**Asayel Albalghouni<sup>1</sup>, Fatimah Alkatheeri<sup>2</sup>, Nada Elbaioumy<sup>3</sup>, Wafa Albaiti<sup>4</sup>, Imad Alsyouf<sup>5</sup>, Mohammad Shamsuzzaman<sup>6</sup>, Sadeque Hamdan<sup>7</sup>**

Sustainable Engineering Asset Management (SEAM) Research Group, Industrial Engineering and Engineering Management Department, University of Sharjah  
Sharjah, 27272, United Arab Emirates

<sup>1</sup>[asyelibrahim@gmail.com](mailto:asyelibrahim@gmail.com), <sup>2</sup>[fatimah-alkatheeri@hotmail.com](mailto:fatimah-alkatheeri@hotmail.com), <sup>3</sup>[nadaelbayoumi@gmail.com](mailto:nadaelbayoumi@gmail.com),  
<sup>4</sup>[wafaalbaitii@gmail.com](mailto:wafaalbaitii@gmail.com), <sup>5</sup>[alsyouf@sharjah.ac.ae](mailto:alsyouf@sharjah.ac.ae), <sup>6</sup>[mshamsuzzaman@sharjah.ac.ae](mailto:mshamsuzzaman@sharjah.ac.ae),  
<sup>7</sup>[shamdan@sharjah.ac.ae](mailto:shamdan@sharjah.ac.ae)

## **Abstract**

Organizations want to deliver more for less, thus they could establish, implement, maintain and continually improve an asset management system, in line with the requirements of the international standards to achieve their objectives. Implementing ISO55000 can add significant advantages to any organization by increasing the asset's uptime, and reducing maintenance costs. This paper discusses the challenges faced in implementing the requirements of ISO 55000 through a case study. The case study considers the maintenance department of an educational institute in United Arab Emirates, which is responsible for all assets and their maintenance at the institute's main campus. The results of the study indicate that with the current situation, the institute needs a lot of changes and efforts in order to satisfy the requirements of ISO55000.

## **Keywords**

ISO 55000, ISO 55001, asset management systems, challenges

## **1. Introduction**

Every organization has different types of assets, tangible or intangible, financial or non-financial. These assets are the backbone of a company that keep it in production. They create value to the organization, thus need to be used efficiently and effectively to get the best value compromised between a set of competing objectives throughout the asset lifecycle. Asset management helps the organization to realize that value through monitoring and maintaining these assets through their lifecycle.

The Institute of Asset Management (2012) states that "asset management is not new, people and organizations have been managing assets for thousands of years. What has changed, however, is the cumulative recognition of what good asset management involves the optimization of cost, risk, performance, resources and benefits over the whole asset life- within any absolute constraints". The understanding of the principles of assets management has developed significantly over the last decade and a number of approaches, standards and models have been developed across the world. In January 2014, an international standard which is called ISO55000 (International Organization for Standardization) was published by ABNT (Brazilian Technical Standards Association). This standard could be applied to all types of assets in any organization regardless of its type and size. In 5 February 2014, the International Organization of Standardization launched ISO5500X series. The first document in the series is ISO55000, which provides an overview of the standard with definition of principles and terminologies of asset management. The second document is ISO55001 that specifies the requirements to asset management, and finally ISO55002 that provides guidelines to implement ISO55001.

The implementation of these international standards will add many benefits such as increasing efficiency and effectiveness, improve level of the provided services, enhance the reputation and help in managing risks (British standard Institution, 2014). The ISO5500X standard series are frameworks that provide organizations with what needs to be done but not how to accomplish it therefore it requires using the correct policy, procedure and actions to achieve excellence of asset management (Sondalini, 2012, Minnaar *et al.*, 2013).

The research area on ISO 55000 is still new and immature due to the fact the standard was launched recently. For instance, Sondalini (2012) suggested integrating ISO55000 with world-class reliability solutions to guarantee excellence as the standard makes you only document, manage information and become strategic. Minnaar *et al.* (2013) presented a summary of numerical tools that can be beneficial while implementing the ISO55000. These tools include statistical analysis, Markov Chain, economic order quantity, simulation and forecasting. Ma, Zhou, and Sheng (2014) illustrated the similarities and differences between PAS55 and ISO55000 standards. Ruiter (2015) compared the maturity level of different road infrastructure organization in order to analyze the added value and the need of implementing ISO55000. Ruiter (2015) reported that added value of ISO55000 depends on the organization structure and its type. This paper discusses the challenges faced in implementing the requirements of ISO55000 in the maintenance department of an educational institute in United Arab Emirates. The maintenance department is responsible for all assets and their maintenance.

The organization of the paper is as follows. Section 2 illustrates the methodological framework used. Section 3 demonstrates the results of implementing the suggested methodological framework to the maintenance department at the institute's main campus. Finally, conclusion is provided in section 4.

## 2. Methodological framework

In order to analyze the challenges, we developed the following methodological framework. The proposed framework consists of four stages, which are explained in details in the following subsections.

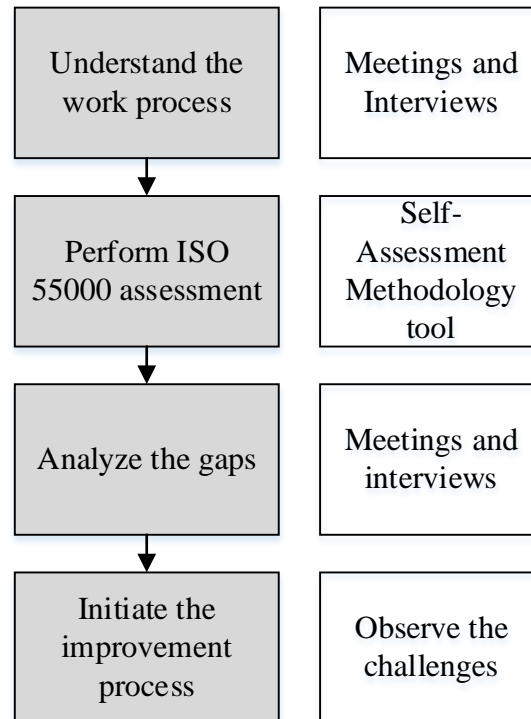


Figure 1. Methodological framework

### 2.1 Understand the work process

In order to identify the causes of the problem and the difficulties associated with implementing the requirements of ISO55000 a deep understanding for the work process in the concerned units is needed. This can be achieved through several interviews with the top managers, directors or senior engineers. Another way to realize the work process is by attending meetings with the concerned units.

### 2.2 Perform ISO 55000 measurement

In order to identify gaps, an assessment of the current status needs to be conducted. This can be achieved using the self-assessment methodology tool available on the institute of asset management (IAM) <<https://theiam.org/>>. The

IAM tool is a software based on Excel that contains 39 questions regarding the ISO55000 requirements, and it provides list of the gaps that need to be filled to achieve the requirements.

### **2.3 Analyze the gaps**

The outputs from the IAM tool is the gaps in the requirements of ISO55000, this output helps decision makers on knowing what is missing. The gaps are then prioritized to produce action plan. Using the action plan, decision-makers can decide on what actions need to implemented and how reasonable are they.

### **2.4 Initiate an improvement process and observe the challenges**

The challenges of implementing the missing requirements of ISO55000 can be observed while implementing the action plan to fill the gaps. The type of challenges depends on the work process, the working environment and actions being implemented.

## **3. Case study**

The proposed methodology was applied to the maintenance department at the institute's main campus. The maintenance department is responsible for all assets and their maintenance.

### **3.1 Understanding of work process**

First, the structure of institute was analyzed to identify the concerned units of analysis. It was found that the maintenance department is responsible for all the assets and their maintenance activities. Several visits for the maintenance department were performed to understand its work process and to know the roles and responsibilities of each member. The maintenance department provides services to different units within the institute's main campus, therefore, it was necessary to hold meetings with those units in order to understand how they can affect the performance of the maintenance department.

### **3.2 Perform ISO 55000 measurement**

The primary purpose of this step is to assess the current situation of the maintenance department against ISO55000 requirements. This was done using self-assessment methodology software. The idea of this software is answering the 39 questions prepared by the software and then these answers are automatically translated into a graphical display in term of radar chart. The radar chart shows the gaps in the current system of the department. Fig.1 shows that the institute scores range from 0 to 1 for different ISO requirements, which indicates unsatisfactory condition. Therefore, major changes are needed to meet the ISO55000 requirements.

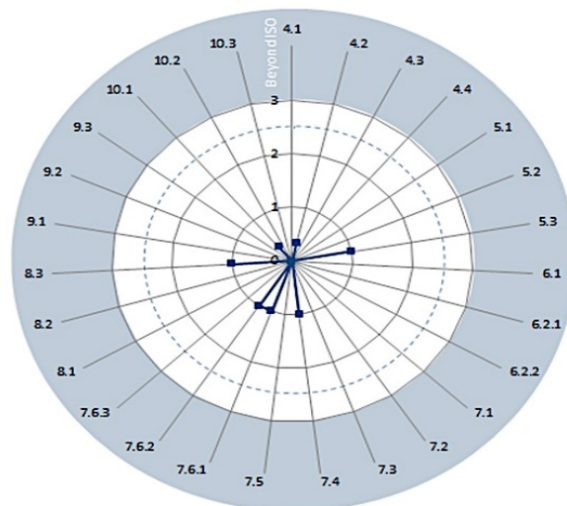


Figure 1. ISO 55000 initial assessment

### 3.3 Analyzing the gaps

After determining the gaps in the current system of the department, it was necessary to study the challenges which cause these gaps and prevent the department from achieving ISO requirements. Based on the radar chart, the following challenges were found:

Table 1. Gap prioritization

No	Clauses	Score	Priority level
4.1	Understanding the organization and its context	0	Priority 1
4.2	Understanding the needs and expectations of stakeholders	0	
4.3	Determining the scope of the asset management system	0	
4.4	Asset management system	0	
5.1	Leadership and commitment	0	
5.2	Policy	0	
6.2.1	Asset management objectives	0	Priority 2
6.1	Action to address risks and opportunities for the asset management system	0	
6.2.2	Planning to achieve asset management objectives	0	
8.2	Management of change	0	Priority 3
5.3	Organizational roles, responsibilities and authorizes	1	
7.1	Resources	0	
7.2	Competence	0	
7.3	Awareness	0	
7.4	Communication	1	
7.5	Information requirements	0	
7.6.1	Documented information general	1	
7.6.2	Creating and updating documented information	1	
7.6.3	Control of documented information	0	
8.1	Operational planning and control	0	Priority 4
8.3	Outsourcing	1	
9.1	Monitoring, measurement, analysis and evaluation	0	Priority 5
9.2	Internal audit	0	
9.3	Management review	0	
10.1	Nonconformity and corrective action	0	Priority 6
10.2	Preventive action	0	
10.3	Continual improvement	0	

### 3.4 Initiate an improvement process

An action plan was developed based on meetings and interviews with the top managers and experts to improve the current condition of the maintenance department. Regarding implementation, the following challenges were observed and identified.

#### 3.4.1 Absence of the basic element of the asset management system

The first step to meet the ISO55001 requirements is to ensure the availability of the basic elements of an asset management system, which are asset management policy, asset management objectives, and strategic asset management plan (SAMP). Those elements form a reference through which an organization can decide if they are on the right track. It will help the organization to ensure that its current work process will help to meet its objectives and its stakeholder needs. ISO55000 states that the absence of one of these elements will prevent the department from achieving ISO requirements. Since the assessment process showed that the department wasn't considering these basic elements, it was a challenge for the department to meet ISO requirements.

#### 3.4.2 Absence of appropriate key performance indicators (KPIs)

One of the main goals of ISO55000 is to ensure that an organization can build a system and follow a work process, which will support the achievement of its goals. This can be done by developing a set of key performance indicators, which can provide useful information to determine both successes and areas requiring corrective action or

improvement. While observing the current system used in the maintenance department, it was shown that the department does not have enough indicators, which measure the performance of the entire asset managed by the department. On other hand, the used indicators were not useful to identify patterns and obtain information regarding the performance of the department.

### **3.4.3 Inadequate risk management approach**

The maintenance department provides a wide-range of services at the institute's main campus. Providing these services needs to set plans that include the required activities and resources. During the implementation of these plans, different types of risks might occur. Such risks can affect the level of the provided services. ISO55001 requires a risk management plan that will minimize the probability of having such risks during the implementation process. The department has failed to meet this requirement due to the lack of awareness of all the risks that may prevent its objectives from being achieved.

### **3.4.4 Inadequate documentation process for the required information**

One of the main requirements of ISO55001 is the determination and documentation of the information which is necessary for the effectiveness of the department performance. This information should be created, updated, and controlled in a way that ensures its availability and suitability for use, whenever it is necessary. During the assessment process, it was found that the department did not use a systematic approach to identify the necessary asset information. Moreover, the current documentation process was not useful to restore the information easily.

### **3.4.5 Difficulties in controlling the outsourced activities**

Due to the large number of services provided by the maintenance department, the department has to outsource some of these services. Outsourcing does not violate the requirements of ISO55001. However, the main requirement is to control the outsourced services by ensuring the ability of the service providers in providing these services at the required level. This requirement was missing within the department because of the absence of people who are experienced in the field of the provided service. Thus, the department faced difficulties in monitoring the performance of the service providers and evaluate if they provide the services at the required level.

### **3.4.6 Lack of competence**

ISO55000 defines competence as the ability to apply knowledge and skills to achieve intended results. It requires the department to map its current competences to its required competences to determine any gaps. Such gap analysis was missing within the department. During the assessment process, it was found that the in general the department is lacking for competent persons at medium and lower levels who can manage the services provided by the department itself and at the same time who can evaluate the level of the outsourced services.

## **4. Conclusion**

This paper discusses a methodological framework for identifying the challenges faced by the maintenance department of an educational institute in UAE to meet ISO55001 requirements. The study was implemented by using the Self-Assessment Methodology software (SAM) and the results were represented in a radar chart. The results were analyzed to identify the gaps in the current assets management system of the maintenance department, and identify the challenges in implementing the requirements of ISO55001.

## **Acknowledgements**

This article is part of an on-going a research project (Project # 1502-040519-p) funded by the University of Sharjah, UAE. The authors would like to thank the manager of the maintenance department and other participants at the educational institute who contributed to this study.

## **References**

- British standard Institution, (BS ISO 55000:2014): Asset Management-overview, principles and terminology, 1st ed, BSI standards, 2014.
- Ma, Z., Zhou, L., and Sheng, W., Analysis of the new asset management standard ISO 55000 and PAS 55. *In: China International Conference on Electricity Distribution, CIGED*, pp.1668–1674, 2014
- Minnaar, J.R., Basson, W., and Vlok, P.J., Quantitative methods required for implementing PAS 55 or the ISO 55000 series for asset management. *South African Journal of Industrial Engineering*, vol. 24, pp. 98–111, 2013.

Ruiter, R., Do we need the ISO 55000? The added value of the ISO 55000 standard series for road infrastructure asset management. *University of Twente*, 2015.

Sondalini, M., How to make PAS 55 and ISO 55001 successful, Lifetime Reliability Solutions, Available: [http://www.lifetime-reliability.com/free-articles/enterprise-asset-management/Make\\_PAS-55\\_and\\_ISO-55001\\_Successful.pdf](http://www.lifetime-reliability.com/free-articles/enterprise-asset-management/Make_PAS-55_and_ISO-55001_Successful.pdf), pp. 1-8, 2012

Institute of Asset Management, Asset Management - an anatomy, vol. 1.1, The Institute of Asset Management, Bristol, UK, 2012.

## **Biographies**

**Asayel Albalghouni** is a part-time research assistant in the sustainable Engineering Asset Management Research Group, University of Sharjah, Sharjah, UAE. She was a student in the Industrial Engineering and Engineering Management Department.

**Fatimah Alkatheeri** is a part-time research assistant in the sustainable Engineering Asset Management Research Group, University of Sharjah, Sharjah, UAE. She was a student in the Industrial Engineering and Engineering Management Department.

**Nada Elbaoumy** was a student in the Industrial Engineering and Engineering Management Department.

**Wafa Albaiti** was a student in the Industrial Engineering and Engineering Management Department.

**Imad Alsyouf** is an associate professor of Industrial Engineering, employed by University of Sharjah, UAE. He is the founder and coordinator of the Sustainable Engineering Asset Management (SEAM) Research Group. He has produced more than 30 conference and journal papers. He has about 27 years of industrial and academic experience in various positions in Jordan, Sweden and UAE. His research interests include reliability, quality, maintenance, and optimization. He has developed and taught more than 25 post and undergrad courses. He delivered training courses in Kaizen, TQM, and organizational excellence.

**Mohammad Shamsuzzaman** is an Associate Professor in the Department of Industrial Engineering and Engineering Management at University of Sharjah, UAE. He obtained Bachelor in Mechanical Engineering from Chittagong University of Engineering and Technology, Bangladesh (1994), Masters in Industrial Engineering from Asian Institute of Technology, Thailand (2000), and PhD in Systems and Engineering Management from Nanyang Technological University, Singapore (2005). His current research focuses on quality control, reliability, simulation and multi-criteria decision-making. He is a member of the American Society for Quality.

**Sadeque Hamdan** is a research assistant in the Sustainable Engineering Asset Management (SEAM) research group at University of Sharjah, UAE. He obtained Bachelor of Science in Civil Engineering in 2013 and Master of Science in Engineering Management in 2015 from University of Sharjah, UAE. His current research focuses on optimization, supply chain management, transportation and multi-criteria decision-making.