



Pilot diagnostic study of a Facility Management System according to the ISO 41001 standard in Spanish hospitals

Estudio piloto de diagnóstico de un Sistema de Facility Management acorde al estándar ISO 41001 en hospitales españoles

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Abstract

Healthcare institutions lacked tools to evaluate existing management systems linked to support activities and services aligned to the *Facility Management* discipline. The publication of the ISO 41001 standard has provided the structure and content for the establishment of this type of management systems. The authors of this paper developed the first version of a diagnostic tool for a *Facility Management* system in the health sector and sought to test it in hospitals familiar with ISO management system audits. Eleven members of Spanish hospitals were selected for two questionnaires and an interview. Subsequently, a quantitative analysis of the questionnaires was carried out to obtain the average of the responses on a maturity scale of *Facility Management* activities and, on the other hand, a qualitative analysis of the interview responses. The results showed that the hospitals interviewed have an intermediate level according to the systems maturity scale; however, the interviewees stated that this tool does not support objective answers.

Keyword: Diagnostics, Management Systems, Facility Management, Hospitals, ISO 41001

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Resumen

Las instituciones de salud carecían de herramientas para evaluar los sistemas de gestión existentes vinculados a las actividades y servicios de soporte alineadas a la disciplina al *Facility Management*. La publicación del estándar ISO 41001 ha dotado de la estructura y el contenido para el establecimiento de este tipo de sistemas de gestión. Los autores de este trabajo desarrollaron la primera versión de una herramienta de diagnóstico para un sistema de *Facility Management* en el sector salud y buscaron probarla en hospitales familiarizados con auditorías de sistemas de gestión ISO. Se seleccionaron 11 integrantes de hospitales españoles para realizar dos cuestionarios y una entrevista. Posteriormente, se realizó un análisis cuantitativo de los cuestionarios realizados para obtener el promedio de las respuestas en una escala madurez de las actividades de *Facility Management* y, por otra parte, un análisis cualitativo sobre las respuestas de las entrevistas. Los resultados mostraron que los hospitales entrevistados poseen un nivel intermedio según la escala de madurez de los sistemas, sin embargo, los entrevistados expusieron que esta herramienta no respalda respuestas objetivas.

Palabras clave: Diagnóstico, Sistemas de Gestión, Facility Management, Hospitales, ISO 41001

Introduction

Facility Management (FM), is a discipline that integrates different professions "... in order to influence the efficiency and productivity of the economies of societies, communities and organizations, as well as the way in which individuals interact with the built environment" (UNE, 2018). Today, FM brings together all the activities and support services, and brings strength to organizations through added value to real estate management (Castellanos Moreno, 2013). In the case of healthcare institutions, FM competencies have been assumed by the clinical, hospital or physical infrastructure engineering departments (Noor et al., 2016).

On the other hand, as has happened since the 1990s with other management systems (GS), such as quality, environmental, occupational risks and safety among others, the International Organization for Standardization (ISO) has published in 2018 the ISO 41001 standard (UNE, 2018) linked to the management of buildings and support services (FM in Spanish). This standard like others related to SGs forms a set of coordinated elements at different levels that interact for the establishment of organizational policies and objectives; and, therefore, provide the basis for directing and verifying the organization's actions in order to achieve the proposed goals (Vicente et al. , 2016). However, for the establishment of a *Facility Management System* (FMS) it is necessary to know the

status of the existing FS in a healthcare institution in order to establish action plans that help to implement the desired FMS according to the guidelines of the ISO 41001 standard.

The problem identified from a review of FM in the health sector (Madroñal-Ortiz, 2022) was the lack of diagnostic tools for SFM according to international standards and, therefore, the authors of this work developed a tool suitable for the hospital context, aligned to ISO SG standards and the FM discipline. However, the objective of this work was to test the tool in institutions familiar with ISO SG audits and to evaluate its suitability for use in institutions with SGs not aligned to ISO standards.

Materials and methods

The authors of this study considered that the tool called "DiagSFMHosp v1.0" was based on a version of the "ISO 9001:2015 Self-Assessment Guide" tool (ICONTEC, 2015), lighter than the standardized *Self-Assessment Methodology* (SAM) tool of the *Institute of Asset Management* (IAM, 2014), but without losing the effectiveness and efficiency of the use of this type of tool. In addition, the authors considered that it should conform to the criteria of the SFM of the ISO 41001 standard (UNE, 2018) and the main areas of the FM (Madroñal et al., 2021). Finally, this version of the tool was developed from an analysis of each of the sections of the ICONTEC guide, which were merged and those analogous questions that encompassed the requirements of the ISO 41001 standard were adapted to comprise an appropriate number of questions.

The first questionnaire was composed of 41 questions arranged to obtain answers by means of a structured consultation arranged in an electronic form. The type of response for each of the questions was adjusted to a Likert scale (Complete, Partial, None), coming from the ICONTEC guide, intended to show the status of the different criteria of the high-level structure (EAN) of the SFM in the respective institutions, according to the ISO 41001 standard. However, it was observed that this tool lacked an input factor and the balance in a matrix composed of the 7 SFM criteria and the 6 main areas of the FM (Madroñal et al., 2021): *Asset & Maintenance Management*, *Real Estate & Property Management*, *Energy & Sustainability Management*, *Corporate Project Management*, *Workplace Management* and *Facilities Services Management*. Thus, the authors developed a second questionnaire to show results on the impact of these 6 FM areas on each of the 7 SFM EAN criteria in the organization and to complement the previous questionnaire. The response type for the questions on the FM areas was again adapted to the same Likert scale (Full, Partial, None) showing the maturity status of the FM areas in the respective institutions.

Subsequently, the authors of the research proposed to carry out these two questionnaires to 11 professionals from general services (SSGG) hospitals in Andalusia (Spain). The reason for conducting this pilot test in Andalusian public hospitals was because 100% of these institutions have an ISO environmental management system certificate in the entire organization. This means that these institutions and their employees are familiar with these SGs and, therefore, are aligned to this type of questionnaire similar to ISO environmental audits.

The quantitative analysis of both questionnaires was performed by averaging the results, considering a numerical assignment of the Likert scale responses to reach each level of the Brooks *et al.* (2018) maturity scale for FM activities (Figure 1). That is, three response options (None, Partial, Complete) were answered with a corresponding assignment (0; 0.5 and 1), the average of the questions for each SFM criterion or FM area was performed. Subsequently, the mode was identified among the results in each criterion and the final result was an average among the different criteria in each respondent that was arranged in five ranges from 0 to 1 to adapt it to the maturity scale of the FM (Figure 1). In contrast, the qualitative analysis of the interviews obtained the commonalities among all the interviewees about the SG linked to the FM activities in the Andalusian hospitals and the comments were linked to each SFM criterion or FM area.

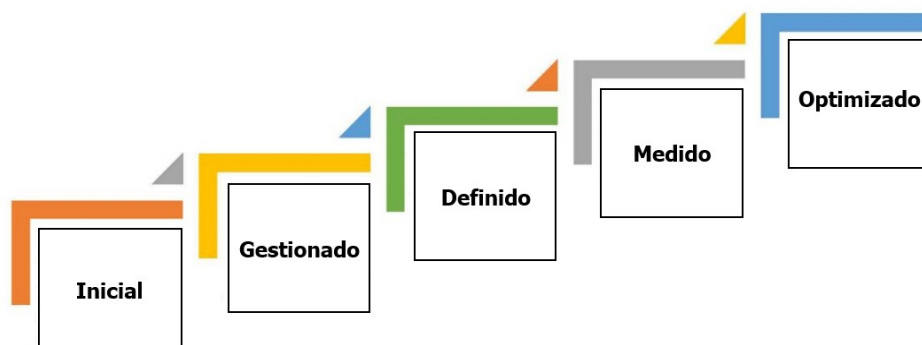


Figure 1. FM maturity scale in organizations.
(Figure adapted from Brooks *et al.*, 2018).

Results

The information provided by the 11 professionals of the SSGGs in this pilot test showed that more than 80% of the interviewees had more than 5 years of experience in areas related to FM. The degree of expertise in FM-related activities at different management levels (strategic, tactical and operational) was medium-high in more than 90% of the respondents; and finally, the degree of expertise in ISO SGs (quality, environmental, energy) was medium-high in more than 80% of the respondents, considering the levels of expertise from 0 to 10 (Table 1).

Table 1. Data on respondents for the diagnosis of MFS in Spanish hospitals.

Interviewee	Experience in Facility Management, Hospital Engineering, Maintenance or Management Systems.	Level of expertise in Facility Management at different levels	Level of expertise in Management Systems at different levels
1	5 - 10 years	5	
	5 - 10 years		
	5 - 10 years	5	5
	0 - 5 years	5	
5	More than 15 years		
	More than 15 years	5	5
	0 - 5 years		
	10 - 15 years		
	5 - 10 years		
	More than 15 years		
	5 - 10 years	1	1

In the results of the first questionnaire of the SFM diagnostic tool in the interviewed hospitals (Table 2) it could be observed that the overall result of the SFM EAN criteria has been identified as MEASURED with respect to the FM maturity scale (Brooks *et al.*, 2018). This result in the SFM criteria of the interviewed hospitals are at the top of the maturity scale, among them the Operation criterion had the best positioning as "OPTIMIZED" (Table 2) and, on the other hand, the Performance Evaluation criterion is in the worst situation as it received the rating as "DEFINED" (Table 2) according to the same FM maturity scale (Figure 1).

Table 2. Results of questionnaires 1 and 2 in Spanish hospitals.

Questionnaire 1		Questionnaire 2	
EAN Criteria	Rating (Average)	FM areas	Rating (Average)
Organizational Context	Measured	MAM	Managed
Leadership	Measured	REM	Initial
Planning	Measured	CPM	Managed
Support	Measured	WM	Initial
Operation	Optimized	ESM	Measured
Performance Evaluation	Defined	FSM	Managed
Improvement	Measured		
Global (Modal)	Measured	Global (Modal)	Managed
ABSOLUTE RESULT		DEFINED	

On the other hand, in the second questionnaire of the SFM diagnostic tool in

interviewed hospitals (Table 2) it could be observed that the overall result of the main areas of FM has been identified as "MANAGED" with respect to the FM maturity scale. This was due to the fact that most of the responses obtained in the second questionnaire were answered on the Likert scale as "Partial", with the exception of the ESM area which has the best overall result as "MEASURED". The authors of this work deduce that this total result of the ESM area (energy and sustainability) is due to the fact that most of the hospitals interviewed have ISO 14001 certification for environmental management in the entire organization and, consequently, this environmental certification has led by inertia to most of the criteria of the SFM EAN being partially realized and the overall result of "MANAGED" on the FM maturity scale being obtained (Figure 1). In summary, as can be seen in Table 2, the absolute result of the hospital SFM diagnosis of the group of SAS surveyed hospitals has been evaluated as "DEFINED", based on the average between the overall results of questionnaires 1 and 2, in accordance with the maturity scale of FM activities (Figure 1).

Despite having obtained good results positioned in the medium-high part of the FM maturity scale (Figure 1), the interviewees expressed that the implementation of this SFM could generate, in the near future, rather than possible benefits, many more bureaucratic formalities. They even expressed that in many cases the management tools, in order to have an MFS in a good state, have to be used by qualified people and currently they are not available and, therefore, they distrust their benefit in the short term if the conditions of human resources are not improved. Likewise, the interviewees stated that all support activities were at a very operational level, with the exception of environmental actions as they have an ISO 14001 certified SG, and that tactical and strategic activities depended heavily on political decisions. In other words, the interviewees argued that the long-term terms (tactical and strategic levels of business management) in public hospitals correspond to the period of political government in the public administration, i.e., they concern elections every 4 years and therefore no real long-term policies can be developed.

The results of both analyses led to a consultation on the responses obtained with other researchers of the similar project on diagnosis of asset management systems in hospitals (Madrónal *et al.*, 2018) in which the first two authors of this paper participated. In the discussion with those researchers, it was noted that the developed tool did not obtain all the information about the SFM of healthcare institutions and that the responses of the respondents could be subjective. Furthermore, in this discussion it was noted that the analyzed results of these questionnaires showed that the Likert scale applied to the responses (Complete - Partial - None) was limited, as respondents expressed the need for

intermediate steps or perhaps a range of associated percentages. Therefore, it was necessary to expand this scale and change the nomenclature so that it would be better understood by the staff to be interviewed.

Conclusions

The authors of this study deduced from the results and from the comments of the interviewees of the diagnosis of MFS in Spanish hospitals described above that this diagnostic tool has limitations in obtaining reliable information on the state of maturity of MFS. Therefore, the authors of this work proposed that the new Likert scale to be used in the tool should have at least 5 levels comprising different states of the status of the FFS criteria; however, the Likert scale proposed for the FM areas is understood to be sufficient. In addition, this work has shown that the interviewed hospitals, which have ISO environmental SG certificates, have a tendency to partially fulfill the requirements of the SFM because the conditions of both SGs have a similar EAN in both standards. Finally, the authors consider that the work presented in this study is a fundamental part for the development of a new version of an EMS diagnostic tool that is made up of questionnaires focused on the demand for evidence that will reflect the establishment of the EMS, even if it does not really request a justification of the existence of this evidence.

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