



UM ESTUDO SOBRE A VIABILIDADE DA IMPLEMENTAÇÃO DE UM SISTEMA DE GESTÃO DE QUALIDADE, BASEADO NO MODELO EUROPEAN FOR QUALITY MANAGEMENT (EFQM) NUMA ESCOLA DE ENGENHARIA

A STUDY ON THE FEASIBILITY OF IMPLEMENTING A QUALITY MANAGEMENT SYSTEM, BASED ON THE EUROPEAN FOR QUALITY MANAGEMENT (EFQM) MODEL IN A SCHOOL OF ENGINEERING

UN ESTUDIO SOBRE LA VIABILIDAD DE LA IMPLEMENTACIÓN DE UN SISTEMA DE GESTIÓN DE CALIDAD SOBRE EL MODELO EUROPEAN FOR QUALITY MANAGEMENT (EFQM) EN UNA ESCUELA DE INGENIERIA

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RESUMO

Introdução: Atualmente, e num contexto competitivo, as Instituições de Ensino Superior (IES) dependem cada vez mais da qualidade dos seus serviços prestados, não só para satisfazer os seus diferentes *stakeholders*, como também, para atrair financiamento.

Deste modo, as IES tendem a incorporar na sua estratégia, Sistemas Internos de Gestão da Qualidade (SIGQ), com vista a uma melhoria continua do seu desempenho.

Este trabalho pretende analisar a aplicabilidade de uma IES, baseada no modelo da *European Foundation for Quality Management* (EFQM), através da sua implementação numa IES publica Portuguesa.

Objetivos: Contribuir com uma análise critica da aplicabilidade de um SIGQ no desempenho organizacional de uma IES, baseado no modelo EFQM, e implementado numa IES publica.

Métodos: Revisão bibliográfica da aplicabilidade de SIGQ's em IES, incluindo o modelo EFQM. Recurso a ao caso de estudo, análise documental e entrevistas com elementos intervenientes no estudo.

Resultados: Foram obtidos um conjunto de vantagens e dificuldades. Para as dificuldades obtidas, foi proposto um conjunto de sugestões para a sua superação.

Conclusões: A aplicação do SIGQ na IES em estudo, revelou-se proveitosa, devido a um conjunto de vantagens percepcionadas, entre as quais, o aumento da eficiência organizacional.

Para cada uma das desvantagens identificadas no estudo, foi proposto um conjunto de soluções para a sua mitigação, permitindo deste modo, reforçar o potencial de aplicação do modelo EFQM numa IES.

Palavras Chave: TQM, Melhoria Continua, Autoavaliação, EFQM, Ensino Superior

ABSTRACT

Introduction: Currently, and in a competitive context, Higher Education Institutions (HEIs) increasingly depend on the quality of their services, not only to satisfy their different stakeholders, but also to attract funding.

In this way, HEIs tend to incorporate Internal Quality Management Systems (IQMS) into their strategy with a view to the continuous improvement of their performance.

This work intends to analyze the applicability of an HEI, based on the European Foundation for Quality Management (EFQM) model, through its implementation in a public Portuguese HEI.

Objectives: Contribute to a critical analysis of the applicability of an IQMS in the organizational performance of an HEI, based on the EFQM model, and implemented in a published HEI.

Methods: A number of advantages and difficulties were obtained. For the difficulties obtained, it was proposed a set of suggestions for its overcoming.

Results: A number of advantages and difficulties were obtained. For the difficulties obtained, it was proposed a set of suggestions for its overcoming.

Conclusions: The application of the SIGQ in the HEI under study, proved to be beneficial, due to a set of perceived advantages, among them, the increase of the organizational efficiency. For each one of the disadvantages identified in the study, a set of solutions was proposed for its mitigation, thus allowing to reinforce the potential of applying the EFQM model in an HEI.

Key Words: TQM, Continuous improvement, Self-assessment, EFQM, High Education

RESUMEN

Introducción: Actualmente, y en un contexto competitivo, las Instituciones de Educación Superior (IES) dependen cada vez más de la calidad de sus servicios prestados, no sólo para satisfacer a sus diferentes *stakeholders*, sino también para atraer financiamiento.

IES tienden a incorporar en su estrategia, Sistemas Internos de Gestión de la Calidad (SIGC), para una mejora continua de su desempeño.

Este estudio tiene como objetivo examinar la aplicabilidad en una IES, del modelo de la Fundación Europea para la Gestión de la Calidad (EFQM), a través de su aplicación en el IES publica.

Objetivos: Contribuir con un análisis de la aplicabilidad de un SIGC en el desempeño organizacional de una IES, basado en el modelo EFQM, e implementado en una IES pública.

Métodos: Revisión bibliográfica de la aplicabilidad de SIGC's en IES, incluyendo el modelo EFQM. Recurso al caso de estudio, análisis documental y entrevistas con elementos intervinientes en el estudio.

Resultados: Se obtuvieron un conjunto de ventajas y dificultades. Para las dificultades obtenidas, fue propuesto un conjunto de sugerencias para superación.

Conclusiones: La aplicación del SIGC en la IES en estudio, resultó provechosa, debido a un conjunto de ventajas percibidas, entre las cuales, el aumento de la eficiencia organizacional.

Para cada una de las desventajas identificadas, se propuso un conjunto de soluciones para su mitigación, permitiendo de este modo reforzar el potencial de aplicación del modelo EFQM en una IES.

Palabras Clave: TQM, Mejora Continua, Autoevaluación, EFQM, Enseñanza Superior

INTRODUCTION

In the last years, most European governments have been confronted, with a series of structural problems regarding a "heavy" and inefficient public administration (Twizeyimana & Andersson, 2019), in a way that public institutions, and in particular, Higher Education Institutions (HEIs), have begun to adopt even more quality management models from the private sector (Simões, 2011). Currently, there is a tendency for HEIs to adopt management techniques, usually applied to the private sector, in order to respond to the efficiency and effectiveness requirements, increasingly imposed by the current governments, and in particular, by the Portuguese government, which has provided greater administrative autonomy for HEIs. In this context, the need to have more quality management systems certified in HEIs has become even more important in recent years (Saraiva et al, 2017). Despite the vast literature on "Quality", it is not easy to define it as a concept, mainly when applied to an HEI (Osseo-Asare & Longbottom (2002) and Overberg *et al* (2019)).

This is due, in part, to the fact that HEIs needs to serve various stakeholders, namely, the government, students, teachers, researchers, etc.. In this context, HEIs have tried to follow the good examples practiced by other organizations, by adopting Internal Quality Management Systems (IQMS). This concern was already a constant of HEIs, a little throughout the world, and in Portugal, these themes began to assume special relevance, due to the emergence of an institution mandated by the Portuguese Government, and within the framework of European directives, namely the Agency and Accreditation of Higher Education (A3ES). In addition, HEIs increasingly provide services to their stakeholders, mainly through their laboratories and Research and Development (R & D) centers, which leads to a higher requirement in the scope of the quality provided into their services. In this context, HEIs need to find effective and efficient ways to respond to A3ES certification requirements (Sa *et al*, 2011) by promoting quality through increased resource efficiency and at the same time improving the quality of the service provided (Hall et al ,2012). It is known, that many HEIs, have adopted lately, several quality models, however, there are no certainties about the results of their implementation (CRE Project, 2001 and Yingqiang & Yongjian, 2016). According to Rosa & Amaral (2012) and McCowan (2018), the adopted internal quality management system (IQMS), have a set of techniques based on theories, sometimes incompatible with the management policy of HEIs. Authors such as Sa et al (2010) and Munastiwi (2015) argue that HEIs should promote self-assessment of their performance in a logic of continuous improvement. The use of models such as EFQM (European For Quality Management), could be a solution to consider.

The present research aims therefore, to study the feasibility of the implementation of an EFQM model into a public HEI's IQMS, by studying it, in a School of Engineering in Portugal. To pursue this end, it will be analyzed, among other aspects, any difficulties encountered with the model implementation, namely the compatibility with other management procedures, already existed in the institution, as well as with legislation and other Portuguese entities, associated with the organization, namely QUAR¹, A3ES² and the Professional Engineering Society.

Initial Problem

Through previous findings, the central question that defines the problem, created around this study, has arisen:

How can the EFQM model be implemented into an organization with the characteristics of a public HEI?

In order to contribute with answers to the main question, it was evaluated an EFQM model implementation into a Portuguese HEI.

In this sense, several questions have arisen, which will enable us to answer the main question, mentioned above, namely:

- What are the difficulties found on designing an IQMS into an HEI, regarding the EFQM model framework, in order to satisfy its different stakeholders, and given the different perceptions about the concept of "quality"?
- How can EFQM frame, as an IQMS, the strategic guidelines to be defined (or existed already) by the organization, as well as any existing evaluation systems / requirements to which the organization is subject (e.g. A3ES, Portuguese Professional Engineering Society, etc.)?

¹ Evaluation and Accountability Framework – A Portuguese management tool

² Agency for evaluation and accreditation in higher education - A Portuguese agency to promote quality assurance on HEIs

- What are the advantages, that the different stakeholders can achieve with the implementation of an IQMS within the framework of the EFQM?

Research objectives

The research objectives to be carried out, are as follows:

- Analysis of possible advantages with the implementation of an IQMS according to the EFQM model, given its own organizational structure, as HEI;
- Analysis of any difficulties faced with the implementation of an IQMS, according to the EFQM model, seeking to provide alternatives for overcoming them;
- Contribution to the study and analysis of the feasibility, regarding the application of the EFQM model into a HEI;

1. CONTEXT AND LITERATURE REVIEW

1.1. Quality management on Higher Education Institutions (HEI)

Despite quality in higher education, being a subject, that has raised concern about HEIs around the world, and over time, it is however in the last decades, that this subject has assumed a greater importance (Sá *et al* (2009) and Hall *et al* (2012)).

Factors, such as the growth and exponential appearance of HEIs, as well as the changes in the scope of their supervision, whether private or public, have contributed to the government having a supervisory role, rather than control, resulting therefore in an increasing of the autonomy of these institutions (Rosa & Amaral (2012) and Eryilmaz *et al* (2016)).

However, quality as a concept, particularly in HEIs, is not easy to define. In fact, the various debates concerning the quality of higher education (e.g. EUA (2007), Yingqiang & Yongjian (2016) and Leeuwenkamp *et al* (2017)) have revealed some difficulties in obtaining some consensus, not only on the definition of quality itself, but mainly on its implications for higher education (Sarrico *et al*, 2010).

According to Munastiwi (2015), one of the main factors for the lack of consensus in its definition, is the multidimensionality of HEIs. This characteristic is reflected in the wide variety of missions, usually associated with the various stakeholders, which have enabled the HEI to create even greater dynamics than it did a few years ago. The dynamics created, although positive in many respects, have contributed in part to an erosion of confidence in the higher education system (Sa *et al* (2009), Yingqiang & Yongjian (2016) and Guglieri *et al* (2017)).

This "erosion" has been studied in most countries, mainly due to a large extent, enabled to promote the expansion of the discussion around the concept, as well as the quality assurance activities in higher education institutions and systems (Massy (2003), Yingqiang & Yongjian (2016), Leeuwenkamp *et al* (2017)).

In this context, countries such as Netherlands, Flanders and Portugal, whose HEIs were in charge of the national evaluation system, have seen their governments turn to independent accreditation agencies of HEIs, recognizing that they would provide the necessary results, free of any interest or internal pressure.

According to the A3ES, Quality in higher education can be defined as follows: "Multidimensional concept, multilevel and dynamic, related to the context of an educational model, with the institutional mission and objectives, as well as with the specific rules and terms of reference of a particular system, institution, course, program or disciplinary unit" (A3ES, 2018).

Also, according to A3ES (2018), quality can take on different meanings (sometimes conflicting with each other), and which depends essentially on:

- Perspective of different stakeholders in higher education (e.g. students, teachers, industry, investors, society, government);
- Internal references (e.g. inputs, processes, outputs, missions, objectives, etc.);
- Attributes or characteristics of the academic world to be evaluated;
- Historical period in the development of higher education;

In addition, the promotion of Quality systems in HEIs, through the evaluation of their performance, implies the creation of organizational structures, models and indicators, which supports a culture and dynamics of their own. Although they're not rooted in HEIs, this issue is essential for the promotion of evaluation cycles, helping institutions to take responsibility to their stakeholders (Maslow *et al*, 2006).

The importance of quality is thus seen, as one of the most relevant aspects of higher education reform around the world, in a time when the reduction of public funding to HEIs is becoming more and more evident (Rosa & Amaral, 2012).

In this sense, the European Union (EU), through the European Association for Quality Assurance in Higher Education (ENQA), has established directives for each Member State to adopt measures for the promotion and accreditation of quality in higher education, a challenge to which Portugal has responded, by creating the A3ES (Sá *et al*, 2010).

In this context, the importance of accreditation in the field of HEIs, can be seen through the definition of the EUA (European University Association) group, where accreditation is a formal statement published regarding the quality of an institution or program, following a cyclical assessment based on agreed standards (CRE Project, 2001).

Furthermore, it is important, at the first view, to emphasize the role of evaluation in HEIs.

According to A3ES (2019), the evaluation of higher education can be defined, as: "Systematic and critical analysis process for the issuance of judgments and recommendations on the quality of a higher education institution or a study cycle". The key concepts implicit in this definition were obtained by the Agency, based on the work of UNESCO-CEPES (2007) and later adjusted to the Portuguese context of HEIs.

Several studies have been developed in this scope, (e.g. Munastiwi (2015), Eryilmaz (2016), Shin (2017), Liu & Liu (2017), Tserendagva & Jamts (2017)).

The evaluation generates learning, promotes professional and personal change, so it takes a prominent place in the policy discussions and the management of the HEIs themselves.

The evaluation, being internal and/or external, serves the organization in the sense that, the evaluated ones are also evaluators. Internal evaluations should take place in the HEIs, by specifying the obtained results in a report, which shall serve as a basis for the external evaluation (Sobrinho, 2003). It is in this context, that A3ES takes on special relevance, contributing to the improvement of the quality of higher education in Portugal through the evaluation and accreditation of HEIs and their study cycles, within the scope of their mission.

Still in relation to the internal evaluation, the process of self-evaluation will only succeed after all the participants understand and share the same theoretical framework.

Benavent & Giner (2011), as well as Guglieri *et al* (2017), reinforces the importance of internal evaluation, by recommending that organizations should seek to implement the IQMS, in order to improve quality, regardless the external quality assurance systems, to which they may be subject.

In the last years, there were proposed several models, to meet these requirements, as well as to develop some consensus around the practice of quality assessment (e.g. Benchmarking Exercises (Jackson & Lund (2000), Munastiwi (2015) and Tserendagva *et al* (2017)), the EFQM model (Rosa & Amaral (2012), Guglieri *et al* (2017)), and the US Institutional Evaluation Program (Amaral *et al*, 2008)).

From all the studies, that can be found, some of them are related with the EFQM model, which is based on Total Quality Management (TQM) approach. Given the success regarding its implementation on industry and based on what was referred before, this model has been gradually applied in the management of HEIs, all over the world (e.g. Sheffield (2003), Munastiwi (2015) and Yingqiang & Yongjian (2016)).

1.2. Internal Quality Management Systems (IQMS) on HEI: The Portuguese context

As it referred before, the A3ES agency, comes from the initiative of the Portuguese government, on behalf of the new legal regime for the quality of higher education, approved in 2007, which is based on European recommendations, published by the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG)³. This agency has the objective of evaluation and accreditation of HEIs and their study cycles.

This legislation sought to provide the HEIs with some autonomy regarding the responsibility for quality assurance in their institutions (in part ensured by the freedom to choose the adopted IQMSs), while ensuring that the Government maintains the power to demand the responsibility of HEIs quality.

The certification of the IQMS, regarding each Portuguese HEI, is also a competence of the A3ES, although, the agency has developed earlier, a strategy to make the quality assessment and accreditation system for study cycles more flexible. The main objective is to enable HEIs in general, through their audited and certified IQMSs, to be addressed in a lighter manner, supported by institutional audits and accreditation of HEIs and their study cycles. This legislation sought to provide the HEIs with some autonomy regarding the responsibility for quality assurance in their institutions (in part ensured by the freedom to choose the adopted IQMSs), while ensuring that the Government maintains the power to demand the HEIs accountability in terms of quality. The certification of the IQMS of Portuguese HEIs is also a competence of the A3ES, and lately this agency has developed a strategy to make the quality assessment and accreditation system for study cycles more flexible. The main objective is to enable HEIs in general, through their audited and certified IQMSs, to be addressed in a lighter manner, supported by institutional audits and accreditation of only a sample of study cycles (Rosa *et al*, 2015).

For the implementation of the IQMSs, the A3ES has developed a set of ten references, which acts as recommendations for the implementation of the IQMSs in Portuguese HEIs. The use of these benchmarks by HEIs, and subsequently the accreditation of their IQMS, constitutes a powerful instrument for consumer protection, in a way that is pretended to be increasingly international, in order to effectively consolidate the principles of the Bologna Process (Sá *et al*, 2009). In the audit process carried out by the A3ES, it is assumed as a fundamental assumption, respect for the autonomy of HEIs, with the main objective of this process, being essentially the strategic institutional evaluation for the quality and the way it translates into an effective and efficient IQMS.

³ Elaborated by the European Network for Quality Assurance in Higher Education (ENQA) in collaboration with the European University Association (EUA), the European Association of Institutions in Higher Education (EURASHE) and the National Unions of Students in Europe (ESIB).

In a benchmarking perspective with the present case study, and in order to provide a broadest possible view of the different IQMS developed by Portuguese HEIs, an analysis of the Quality Manuals from various institutions was carried out. The Quality Manual translates into a document that aims to describe the IQMS of an HEI, defining its organization functioning, the stakeholders (teachers, staff, students, etc.), as well as the Institution's Quality Policy. For this purpose, we chose three HEIs manuals, namely the Polytechnic Institute of Guarda, Instituto Superior Técnico and Minho University, with a view to identify common aspects in both publications.

Regarding all the quality manuals analyzed, organization chart is presented, and on each institution, there is a team responsible for the monitoring of the IQMS. In the same monitoring area, three common axes were identified in the three manuals, namely: teaching, research and external relations. For each of them, the same institutions present a set of methodologies described in their respective quality manuals (**Table 1**).

Table 1 - Procedures and methodologies referred in the Quality Manuals

| Research | Teaching | External Relationships |
|---|---|--|
| <ul style="list-style-type: none"> • Evaluation process carried out by the Foundation for Science and Technology (FCT) • Self-assessment reports from R & D centers • Indicator monitoring | <ul style="list-style-type: none"> • Student and faculty surveys, performed at each course • Course reports • Indicator monitoring | <ul style="list-style-type: none"> • Indicator monitoring |

It should also be noted that in all the three manuals, the roles and responsibilities associated with the various stakeholders, are described, according to everyone, i.e.: teachers, students, personal staff, *alumni*, employers and other external entities. It is fundamental for each one of these stakeholders, to monitor their satisfaction degree.

1.3. Main models used in HEIs

The accumulated experience in industry, regarding the development of the "Quality Management" with its products/services, has served as a reference for some HEIs, to feel that they need to rely on quality management models to certify their services (Sa *et al*, 2011).

From the models universally accepted and considering that HEIs have to implement reference models for their IQMSs, we could mention some of them, namely the European Foundation for Quality Model (already referred above), the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG), from the European Association for Quality Assurance in Higher Education (ENQA) (Leeuwenkamp, 2017), the Balanced Score Card (BSC) (Munastiwi, 2015) and the International Organization for Standardization (ISO) standards (Yingqiang & Yongjian, 2016).

The last and the first models mentioned here, were adopted from the industry. In the last years, these models were mainly focused on TQM⁴ approaches, with some of them, also based on continuous improvement and assuming therefore a greater relevance in the universe of HEIs (Galvão *et al*, 2011).

Given the complexity of the HEIs, due to the service provided and the stakeholders involved, it is not easy to adopt and implement a system based on TQM approach, although it can be a feasible option (Sheffield (2003), Benavent & Giner (2011) and Tserendagva & Jamts (2017)), whereby HEIs can pursue to improve the quality of the service provided (Rosa & Amaral, 2012), which is in line with the TQM philosophy, and the EFQM⁵ model.

1.4. Advantages & Difficulties found in the literature with its implementation

In addition to the diversity of stakeholders with different perceptions and requirements in terms of quality, other difficulties in the implementation of IQMS, can be pointed out, namely the fact that the organization's employees are the ones who knows its work (and therefore its procedures) better, although they rarely share it, causing barriers in improving the process (Campatelli *et al*, 2011), demonstrating therefore, the difficulties felt in HEIs, especially the public ones, given the frequent mobility of the workers, from public administration.

Other difficulties are pointed out in literature, such as the lack of experience in process improvement, coupled with a small number of Human Resources (HR) dedicated to quality and improvement (Soeiro, 2011), or even the compatibility of the implemented IQMS, with the requirements of other existing systems, such as A3ES, associated to the Portuguese context (Sa *et al*, 2011).

⁴ Total Quality Management

⁵ European for Quality Management

One of the advantages, associated with the use of the EFQM model in HEIs is its own nature, where, according to Maslow *et al* (2006), it can focus on the organization's "key clients", while meeting the current and future needs of its stakeholders.

In order to do this, the model uses a series of appropriate indicators to monitor the performance of the organization through its various processes, accounting as well the improvement to be performed through benchmarking actions, whether internal, either externally.

Another advantage is its certification, where, according to Soeiro (2011), it allows to attest the quality of the management practiced in the HEI, increasing the levels of efficiency and effectiveness, through the allocation of resources, allowing at the same time the increase in the recognition, both nationally and internationally, between HEIs and the societies with which they are integrated as partners⁶.

1.5 The EFQM model

The EFQM model was created in 1992 to support organizations in Europe and aims to establish a quality management system, that allows the evaluation of organizations with the objective of continuously improving their performance, aiming the attribution of the European Quality Award (EQA).

Currently, the model is used by many organizations from different economic sectors, namely banks, insurance companies, oil companies, energy companies, health, schools, universities, etc.

The evaluation of the organization is performed according to a set of criteria and sub criteria, which are assigned a pre-established score (APQ, 2019a).

The principles of the model, are based on 8 fundamental concepts, which allows any organization to reach "Excellence" in a sustained way, and to establish a common language among managers (APQ, 2019b):

- Add value to Clients;
- Building a sustainable Future;
- Develop organizational Capacity;
- Take advantage of Creativity and Innovation;
- Leading with Vision, Inspiration and Integrity;
- Manage with Agility;
- Succeed Through Talent of People;
- Maintain Outstanding Results.

Based on these concepts, the model proposes to the organizations the use of nine criteria, in order to analyze the relations of cause and effect, namely what the organization "does" through the means that it has, and what they "obtain" in matter of results (APQ, 2019a), defining the EFQM model as a whole (Fig. 1).

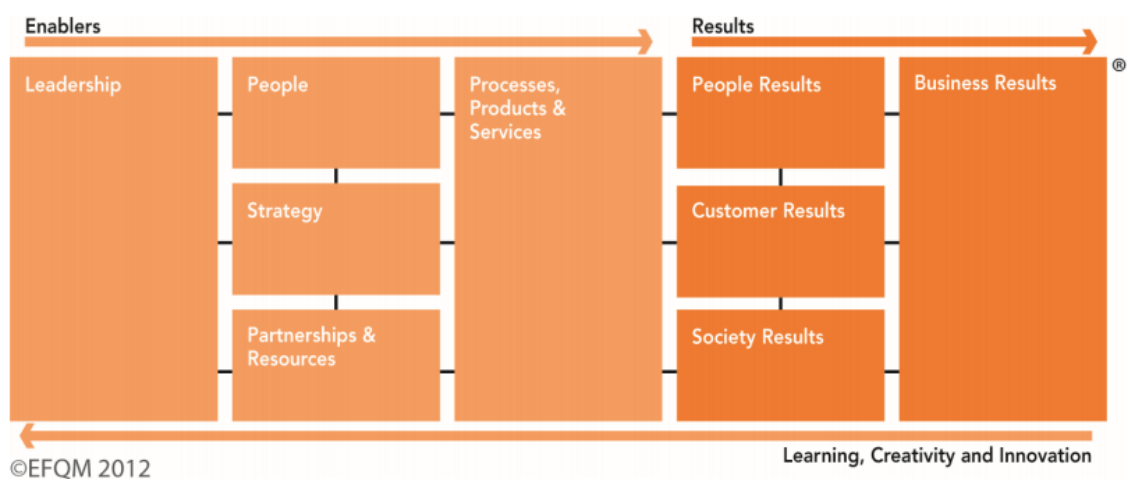


Fig. 1 – The 9 criteria of the EFQM 2013 Model (EFQM, 2019)

2.6 Examples of the EFQM model in HEIs, found in the literature

Besides the examples, already mentioned before, other studies regarding EQM application, can be found on literature, with some of them still in progress, while others, have been already completed. While some of these model applications, have been partially

⁶ See example on International Association of Continuing Engineering Education Society

implemented in services (e.g. Tari *et al* (2006) and Sofia *et al*, 2015), others have been fully implemented, such as the DAETE project of the University of Porto (Soeiro, 2011).

The last one is a project financed by the European Commission and by the USA, under the Atlantis program, which aims to develop several tools based on the EFQM model and applied in the context of HEIs. To this end, several self-assessment tests were carried out, covering 42 HIEs in Europe, the USA and China, and the process was later adopted by the Association of Continuing Engineering Education as a tool for assessing the quality of management at a global level (Soeiro, 2011).

Other studies have been developed, namely the adaptation of the EFQM model by the University of Sheffield in Hallam (Pupius, 2003), the study of Campatelli *et al* (2011), regarding the implementation of the EFQM model in the analysis and improvement of processes at the University of Firenze in Italy, the work of Fooladvand *et al* (2015) by combined EFQM with Balance Score Card approach, the work of Overberg *et al* (2019), applied in a Laboratory associated to a HEI, among others.

2. METHODS

2.1. Data

Regarding the techniques, used for collecting information, these are based on the following:

- Documentary analysis.
- Observation throughout the process of implementing the IQMS in the HEI.

The first one was based on the documentary analysis of several documents assigned to the different functional areas, and regarding the HEI under study, namely Departmental Areas assigned to the different courses taught, services (e.g. Financial, Human Resources, Procurement), complementary units (e.g. Library, Informatics), offices (e.g. Audit and Quality, Communication, Accounting & Assets), Laboratories and R & D Centers.

The documentary analysis also focused on the following documents addressed to the management, as well as the entire HEI in general, namely:

- Various regulations, associated with the governing bodies of the institution (e.g. Supervisory Board, Technical-Scientific Council, Management Council, among others)
- School Strategic Plan (SSP)
- Annual Activity Report (AAR)
- Annual Financial Reports (AFR)
- Annual Budget Report (ABR)
- Evaluation and Accountability Framework (QUAR)⁷ of the HEI under study

The second one was based on data collection from the Office of Audit and Quality, responsible for the proposal for the implementation of the IQMS in the HEI under study, as well as the consultation of the different human resources, regarding the several functional areas mentioned above, as well as other elements belonging to the institution's government bodies.

2.2. Procedures

In order to try to answer the above questions, the case study methodology will be used, since it is the most appropriate strategy in answering the research questions posed in the "how" or "why" (Yin, 2003). According to the same author, the indicated methodology allows us to define an empirical approach that seeks to investigate a current phenomenon inserted in real context, particularly appropriate when the boundaries between the phenomenon and the context are not clearly evident, still allowing the construction of a theory, not only from the literature review, but also as a result of empirical observations or actual experiences that may result in both qualitative and quantitative research.

In this sense, this research is based on an inductive logic, since the possible confirmation of the applicability of the EFQM model in the HIEs under study, does not constitute evidence by itself, to be applicable into other HEI, but may contribute to the analysis and discussion of its viability (Lakatos & Marconi, 1992).

2.3. Case study

The case study presented here, refers to a HEI, more specifically to a School of Engineering in Portugal, which aims to satisfy a diversity of stakeholders that are part of it (Fig. 2).

⁷ *Tableau de board* (mission) regarding the strategic objectives, targets to be achieved, performance indicators, available resources (human and financial) and identification of possible deviations and their reported causes.

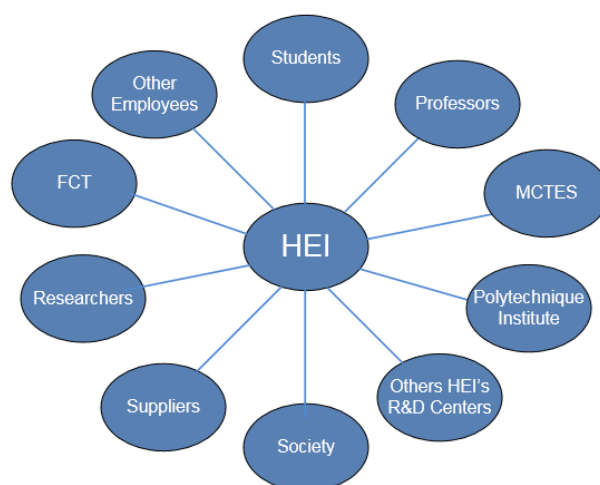


Fig. 2 –Stakeholders diversity regarding the HEI studied

By making a correspondence between the different functional areas and the correspondent stakeholders, there is a diversity of stakeholders with different perceptions and quality requirements, which varies according to the functional area to which they relate (Fig. 3).

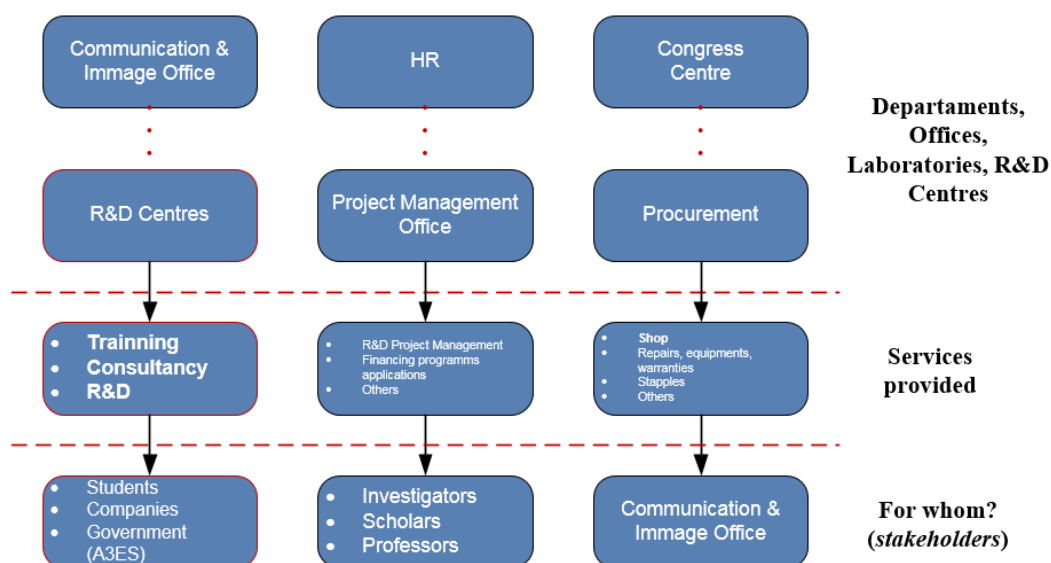


Fig. 3 – Example of relationship between functional areas and the stakeholder's diversity regarding an HEI

Observing Fig. 3, the organization can be subdivided into small models of self-assessment, which corresponds to subdividing the IQMS into parts according to their functional area, although related to each other.

According to Tari *et al* (2011), an HEI can be evaluated in three broad areas: teaching, research and services.

It will be in the context of the services, where it will be studied the feasibility of implementing an IQMS within the framework of the EFQM model in a HEI.

3. RESULTS

From all the evidences obtained during the EFQM implementation phase in the HEI, only a few, considered as the more relevant ones, will be presented. These evidences are related to the advantages, difficulties and ways of overcoming the difficulties encountered during the EFQM implementation. The purpose is to contribute for the discussion of the problem raised initially, ending the same with the respective conclusions.

4.1. Advantages obtained during model implementation

- Compatibility between the implemented IQMS, the Strategic Plan and the Assessment and Accountability Framework (QUAR) of the organization.

One of the advantages, regarding the EFQM model implementation, and shown in the School Strategic Plan (SSP), is the focus of the model on the obtained results, resulting from the processes developed / managed, allowing the realization of an appropriate alignment between the school SSP's framework and the EFQM model, as well as the organization's QUAR, due to the unfolding of its criteria and sub criteria in "means" and "results".

This evidence is clear in the institution's SSP, by deploying the strategy developed into "strategic axes", by establishing the "operational objectives" (as a way of implementing the axis) and finalizing the "actions" and "expected results", which are monitored and validated through indicators associated with predefined objectives and in accordance with QUAR.

As an example of the alignment mentioned above, the Strategic Axis E5 (Efficiency and sustainability), presented in the SSP, meets one of the purposes of the EFQM model, as well as the recommendations of the A3ES, presented in A3ES (2018a), namely to ensure the efficiency and the sustainability of the actions developed in the organization, in this case the HEI under study.

Therefore, the recommendations of the A3ES, mentioned on literature review, results from a set of ten references, which acts as recommendations for the implementation of the IQMS in the Portuguese HEIs, and whose use, constitutes a powerful instrument of consumer protection, in accordance with the principles governing the Bologna Process (Sá *et al*, 2011).

- Creation of "quality groups" for the continuous improvement of the processes

The EFQM model allows the creation of quality groups in each functional area (also often referred in literature as the "improvement commissions") in order to develop / reshape their processes under continuous improvement and according to the EFQM principles. In the case of this school, the commissions have covered each functional area within the framework of a TQM approach, and it is also planned to create regular meetings between functional areas with a view to promoting internal benchmarking of the organization, to disseminate best practices between functional areas. Consequently, it is expected that employees will be more involved in the continuous improvement of the processes, together with the further development of industrial relations.

- Operational efficiency

It was noticed, that during the first few months when EFQM implementation took place, that was achieved some operational efficiency, namely through the cost' reduction with consumables (e.g. paper, printer toners, folders, etc.) to some existing functional units, namely human resources department, procurement, project office, quality office, technical maintenance services, among others. Such reduction represents about 6.7% compared to the previous year (2017) at the beginning of the model implementation. Notice that, there were no signs of "interference" of the EFQM model in scientific production. To prove this statement, is the increase of the scientific production volume of 8.13% in scientific papers between 2017 and 2018.

Also, and at the level of the number of partnerships with companies, there were no signs of "interference", just as there were no services provided to students in general, the latter being observed, evidenced by the degree of satisfaction. The latter was measured by student survey, in relation to services provided (overall), with a slight increase from 81.1% to 81.8% in the period between 2017-2018. The above-mentioned operational efficiency meets the needs, previously mentioned by Maslow *et al* (2006), since it is possible to promote Quality in HEIs by evaluating their performance through the creation of models and indicators (e.g. the EFQM model), which support a very specific culture and dynamics, helping the institutions to assume their responsibility to their stakeholders, already mentioned here. Such needs arise in the context identified by Rosa *et al*. (2015), where, at a time of reduction of public funding to HEIs, is notorious worldwide, the same authors emphasize the importance of quality as one of the most relevant aspects, related to the reform of higher education, particularly in what concerns the promotion of efficiency and funding of private financing. According to Pupius (2003) and Fooladvand *et al* (2015), the operational efficiency identified here, allows us to attest to the quality of the management practiced in the HEI studied, which is materialized by the certification under the EFQM model.

4.2. Difficulties occurred during model implementation

- Lack of management tools that act as an EFQM support models

This school, like all HEIs, does not have plans, supported by management techniques, that are enough evidence to satisfy certain sub criteria within the framework of the EFQM model. This happens (mainly), given the differences regarding the management and procedures, between public and private sectors, with the last one, being the initial purpose of the EFQM model existence.

Nowadays, on behalf of a greater administrative autonomy of HEIs, in relation to the Government, and in response to the Government's higher requirements in terms of efficiency and effectiveness, a new "transition phase" begins in the reduction of the dependence of the HEI management, regarding the public administration, through the increase on adoption of new management techniques, from the private administration (Balance Score Card, SWOT Analysis, among others).

In this sense, and since many HEIs are still in this "transition phase", this absence constitutes a barrier in the implementation of an IQMS under the EFQM model.

- Resistance to the change by the employees

This difficulty is strongly related to the previous one, since it is essentially related with the use of models, supported by private management techniques.

Since the training and experience of many employees in the public HEIs, is based on public administration procedures, the assimilation of new skills, when implementing the EFQM, it will change some of these procedures. In this case, the new skills, were related with the use of the Balance Score Card as well as, with the management of the Social Responsibility, recently implemented in the organization.

Thus, and regarding the training of new competencies, there is some inertia within its adoption, which causes some delay in the EFQM implementation process, namely at the level of self-evaluation process.

Another aspect is the assimilation of skills by the employees of the organization, with a view to a broader understanding of the model, thus allowing more effective self-evaluation. It is a difficulty, partly pointed out in the literature by some authors such as Campatelli *et al* (2011), when mentioning, among other aspects, the lack of experience in process improvement, and the lack of training in the scope of adopting private management techniques, favoring in this way, a certain resistance to change, as previously reported, through Campatelli *et al* (2011) and Leeuwenkamp *et al* (2017).

4.3. Ways to overcome difficulties encountered

As a way of solving the difficulties mentioned above, some solutions are presented to overcome the difficulties encountered, namely:

- A better planning (time and resources allocation) of EFQM implementation

As with the case, regarding the model implementation in private organizations, also in public organizations, it is relevant an adequate planning, which prevents in a timely way, the team, responsible for the IQMS implementation, about the possible requirements for the elaboration of the IQMS.

A team consisting of external and internal elements with technical skills from private management, as well as with experience in the EFQM implementation, is also required, in order to work with elements with public administration skills, together with Quality Managers and other representative elements of the organization.

- Dissemination and provision of EFQM training to employees, and holding regular meetings to monitor their implementation

The previous disclosure of the intention by the leadership, would allow a first approximation of the employees with the EFQM model and its specificities.

In that sense, and at a later stage, the employees would be given an introductory training course, followed by a training plan, appropriated to each functional area.

This would be done, to assimilate the skills developed in the management techniques used in the organizational framework at the level of the EFQM model.

Such solution, would reduce the time adaptation of the employees to the new procedures, ensuring a better execution of the model, after its implementation.

CONCLUSIONS

This work has shown that like the most public HEIs, this school didn't have plans initially supported by private management techniques, to satisfy certain EFQM's sub criteria, making it difficult, the model application, since EFQM, was originally developed for industries and companies, normally supported by private management techniques.

However, and based on what was discussed in this paper, this difficulty can be surpassed if there is a greater organization and planning, regarding EFQM implementation, therefore anticipating, the difficulties associated with the EFQM implementation, by employing the necessary private management techniques, as well as the training actions for the organization's employees. Both measures, will be performed within the framework of the general concepts inherent to the EFQM model and in the scope of management techniques, related to each organization's functional area.

These measures also make it possible to reduce the effect of resistance to change, related with the employees, which was another difficulty found, during the course of the implementation process.

The second question, regards the way in which the EFQM model, can be framed within the strategic guidelines of the HEIs under study. Regarding this issue, and based on the perceived advantages in this work, it was possible to verify, that there was compatibility between the implemented IQMS, the Strategic Plan and the organization's QUAR. Given the nature of the EFQM model, there is some correspondence between its criteria and sub criteria, and the framework of the School Strategic Plan, as well as the organizational QUAR. This correspondence occurs, mainly due to the unfolding of the strategy developed into "strategic objectives", "operational objectives", "actions" and "expected results", which are latter monitored and validated, by using indicators associated to the objectives pre-established, and in accordance with QUAR.

The final question regards to the advantages that different stakeholders could obtain with the employment of an IQMS based on EFQM model. The EFQM model with the different school management tools (Strategic Plan, Activity Report, Budget, etc.), allows the HEI to have gains in terms of efficiency and effectiveness, through the reduction of operational costs, without change the needs of the different stakeholders involved.

Based on what was referred before, it was concluded that there was a (previous) success, regarding the implementation of the proposed IQMS, due to the framing of the specificities of HEI within the scope of the nine criteria associated with the EFQM.

Briefly, this study has contributed with some answers to the problem initially raised, about the feasibility of the implementation of the EFQM model in an HEI, through the obtained results.

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