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Quantitative research on the EFQM excellence model: A systematic literature review (1991–2015)

Eva Suárez[a], Arturo Calvo-Mora[b,*], José L. Roldán[b], Rafael Periáñez-Cristóbal[c]

[a] Andalusian Institute of Technology (IAT), Research Group on Knowledge Engineering and Management, C/Leonardo da Vinci 2, 41092, Seville, Spain
[b] University of Seville, Department of Business Administration and Marketing, Av. Ramón y Cajal 1, 41018, Seville, Spain
[c] University of Seville, Department of Business Administration and Marketing, Av. San Francisco Javier s/n, 41018, Seville, Spain

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ABSTRACT

The purpose of the paper is to present the state of the art in quantitative research on the EFQM model that will guide future research lines in this field. For this, a systematic literature review from the period 1991–2015 is carried out in impact journals belonging to the Journal Citation Reports (JCR) and SCImago Journal & Country Rank (SJR). Finally, 53 papers were selected and aspects related to the purpose, nature and instruments of data collection, type of quantitative analysis employed, sector under study and main conclusions and contributions are analysed. As a result, the study presents more than a dozen lines of future research.

1. Introduction

Systematic literature reviews (SLRs) are a type of scientific research that has the purpose of objectively and systematically integrating the results of empirical studies on a certain research problem, with the intention of determining the state of the art in a specific field of study (Sanchez-Meca, 2010).

Within these SLRs are the quantitative or "meta-analyses" and the qualitative. This work will make a systematic literature review of the qualitative type in which the quantitative research on the EFQM model published in impact journals, during the period 1991–2015, will be analysed.

Generally, the SLRs are necessary for the following reasons (Sanchez-Meca, 2010):

(1) When the researcher studies the literature published on a topic, they are not content with reading one article or a small number of articles. Practice teaches us that the results reached in an article are questioned by others, that it is rare for an article to give definitive answers to all the research questions considered or that there are those that display important methodologic limitations that question the results and conclusions reached.
(2) At the present time, and it seems to be an increasing trend, there is an increasing number of scientific journals and articles where the data can be obtained that are needed to consider our research. Faced with this unmanageable volume of information it is very useful to have unbiased summaries of the research on a topic.
(3) The traditional method of literature review (non-systematic or narrative review) has two main disadvantages. Firstly, there is the subjective criterion of the researcher when selecting and analysing the articles (search strategy or selection criteria) and, secondly, that the findings of the articles are not summarised following a clear methodology (rigorous and critical analysis of the information).
(4) The reasons for the discrepancies between the results of different investigations, and gaps in the literature, can be identified to guide new studies.

In the management and quality improvement sphere, general SLRs have been made to investigate what has been done and to

* Corresponding author.
E-mail addresses: esuarez@iat.es (E. Suárez), schmidt@us.es (A. Calvo-Mora), jlroldan@us.es (J.L. Roldán), rafacris@us.es (R. Periáñez-Cristóbal).

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determine future lines of research (Calvo-Mora, Criado García-Legaz, & Pizarro Moreno, 2003; Dahlgaard-Park, Chen, Jang, & Dahlgaard, 2013; Del Río Rama & Martínez Carballo, 2007; Ruiz-Torres, Ayala-Cruz, Alomoto, & Acero-Chavez, 2015). SLRs have also been made on the EFQM model, due to the importance this model is receiving in the international arena (Doeleman, ten Have, & Ahaus, 2014; Kim, Kumar, & Murphy, 2010; La Rotta & Pérez Rave, 2016). Thus, Kim et al. (2010) seek to determine the main subjects and methodologies used in the analysis of the EFQM model, between 1994 and 2007, and to propose future lines of research. In this regard, the most used methodologies are case studies, those of empirical nature and research of a conceptual nature. Regarding the subjects dealt with, it is observed that most of the studies are focussed on analysing the impact of the agent criteria on the results. To a lesser extent, knowledge is sought of the underlying paradigm in the EFQM model and, finally, a deeper knowledge of the leadership and people criteria. Lastly, the authors propose that future research should respond to: the problems that prevent an improvement of performance in the businesses that use the EFQM model, analysing the more important facilitating agent criteria, to achieve the success and the most beneficial measures to improve the performance.

Doeleman et al. (2014) point out that many organisations have used the EFQM model as a reference framework for their development, although success is not ensured. In addition, there are different opinions as to the value of the excellence models. To seek empirical evidence that an improvement in the performance of organisations takes place through use of the EFQM Excellence model, the authors present a literature review analysing a total of 24 articles, corresponding to the period 2002–2012. These articles were obtained from the Business Source Premier database. These articles were analysed and summarised according to the following sections:

- According to the degree of evidence that the article presents. The classification proposed by Reay, Berta, and Kazman Kohn (2009) is used as a reference. This classification is formed by a scale that runs from A1, A2, B, C to D, from a lesser to a greater degree of evidence. The selected articles have a high degree of evidence (between letters C and D).
- The impact factor of the journal (Association of Business Schools – ABS). Articles in journals with a high impact factor have been selected.
- The objective of the research and the method used.
- The results and findings of the research.

The subjects most dealt with in articles are: the practical applications of the EFQM model, the analysis of the relationships between the criteria of the EFQM model, the importance of the leadership criterion and the comparison between this excellence model and others. On the other hand, there is a lack of SLRs, comparative research of a random nature and comparative research with control groups.

Finally, the authors make a series of recommendations for future research: to base these future works on longitudinal studies with a control group, and the search for new uses of the EFQM model.

La Rotta and Pérez Rave (2016), through an SLR, attempt to locate and to characterise relevant literature on the EFQM model and to identify future challenges. The Scopus database was used, selecting 22 articles. Among the most significant results we found:

- More than 60% of the articles are concentrated in Spain.
- The most studied sectors are those of health and higher education. Studies are also emphasised that use several sectors of activity.
- The data are collected mainly from primary sources (managerial and employee), and, to a lesser extent, from secondary sources, such as self-assessment documents or reports from the companies. The most used instruments are the structured questionnaires and the measures that are offered by the EFQM model itself.
- Objectives: study of the EFQM model as a framework for support to decision making, analysis of the relationships between the criteria of the model and the impact of the use of the model in the organisation.
- With respect to the methodology, quantitative research is emphasised, representing almost 70 of the articles, and more specifically the use of structural equations and descriptive statistics.

Against this background, our work is focussed on a subject that has not been treated in depth in previous studies, the analysis of the exclusively quantitative research on the EFQM model. In addition, we contemplate a wide temporal range, 15 years, far beyond that of other research, and articles published in English and Spanish are included. Another novel aspect is that we concentrate our attention on publications made in impact journals, and the publication trends are analysed.

Specifically, the objectives considered are:

(1) To determine the state of the art on quantitative research in the EFQM model.
(2) To indicate the impact journals and media in which the articles have been published.
(3) To identify knowledge gaps in empirical quantitative literature on the EFQM model to guide future lines of research in this field.

2. Methodology

For the search, filtration and selection of the research, for later analysis, we took the stages proposed by Sanchez-Meca (2010) for the qualitative SLRs as reference, as well as the methodology followed in other more specific studies related to the management of quality and to the EFQM model (Calvo-Mora et al., 2003; Doeleman et al., 2014; La Rotta & Pérez Rave, 2016; Ruiz-Torres et al., 2015; Siva et al., 2016). The stages are the following: (1) Formulation of the problem to be solved with the SLR; (2) definition of inclusion criteria and exclusion of articles; and (3) article search and selection.

2.1. Formulation of the problem to solve

This first stage attempts to clearly establish the question that is attempted to be answered, as well as to define the constructs and concepts implied in the same. From the formulation of the question arise the objectives to be reached.

- Research questions to answer:
  1. What has been investigated about the EFQM model through quantitative methodologies?
  2. In what journals and material are the articles published?
  3. What knowledge gaps are found in empirical quantitative literature on the EFQM model?
- Constructs and concepts:
  1. *The EFQM Excellence Model*. It presents a nonprescriptive framework that analyses the relationships between what an organisation does (criteria of the model: leadership, strategy, people, alliances and resources and processes, products and services) and the results that it can achieve regarding its clients, employees, society and other key results, assuming that there are different approaches to reaching excellence. This framework contributes a logical and systematic structure of analysis, which allows organisations (EFQM, 2013):

to undertake a deep review of its management; to arrange elements of comparison with other organisations (benchmarking); to arrange a guide for the definition and deployment of the strategy; to more clearly identify its key objectives and the capacities and resources necessary to reach them and to arrange a diagnostic tool and a measurement framework, based on nine criteria, that serve as the basis for the identification of strongpoints are areas for improvement.

2. *Quantitative research methodology:* is based on the use of statistical techniques to know certain aspects of interest on the population or sample under study (Hueso & Cascant, 2012). This methodology attempts to quantify, measure and grade certain phenomena and their intensity. It seeks to generalise universal results from a sample, within previously fixed margins of confidence and error. Objective (level of sales, profit, share value, percentage of defects of products, costs, etc.) and subjective (opinions of managers and employees) variables can be used. In order to obtain data about these variables, different techniques are used, such as surveys, interviews, measurements, reports, etc.

It is important to specify what we mean when we speak of the *quantitative*. It is usual to relate the quantitative to numbers and the qualitative to words. Nevertheless, quantitative research can include qualitative aspects. Also, the techniques of quantitative analysis can be used to analyse data obtained by means of qualitative techniques, such as open interviews (Sumner & Tribe, 2008). Quantitative research has the strength of creating a series of steps that allow the standardised study of a phenomenon, limiting the bias of the researcher to a great extent. In addition, the communication of the research and the results (tables, graphs) are faster and easier to understand. The important thing is to suitably know the methodologies and techniques available to the researcher, to apply the most suitable according to the type of study, the objectives, the target audience and the resources (Sarabia Sánchez, 1999).

2.2. Definition of inclusion criteria and exclusion of articles

In this phase, the elements that will be used to include or exclude an article from the final analysis are fixed in advance. For the selection of the articles that will be analysed later, the following criteria are used: (Del Río Rama & Martínez Carballo, 2007; Doeleman et al., 2014; Siva et al., 2016):

1) *Temporal scope:* articles between 1991 and 2015. In 1991, the EFQM Model was born thanks to the joint effort of 300 European experts from companies like Bosch, BT, Bull, Ciba-Geigy, Dassault, Electrolux, Fiat, KLM, Nestlé, Olivetti, Philips, Renault, Sulzer and Volkswagen. Year 2015 marks the last complete year, as the study was made during 2016.
2) *Research quality:* only scientific works were selected which were published in journals that in 2015 had a JCR (Journal Citation Reports of Thomson Reuters) or SJR (SCImago Journal & Country Rank by Scopus) impact factor.

   The Journal Citation Report (JCR) is the better-known indicator of quality, and the most valued by the research activity assessment organisations. It measures the impact of a journal based on the citations received by the articles published and included in the Web of Science (WOS). The JCR impact factor has two annual editions, the JCR Science Edition (SCIE) and the JCR Social Sciences Edition (SSCI). The publication window is of two years retrospectively, although there is an impact factor with the data for the previous five years.

   The SCImago Journal & Country Rank (SJR) is an indicator of the impact of journals produced by Moya and Guerrero in 2007, from the SCImago research group, and which is used as a reference indicator in Scopus (Elsevier). Regarding this indicator, the SCImago group presents its ranking of SJR journals which, similarly to the JCR, it classifies by their impact within different categories, ordered by quartiles. SJR provides a relative index of quality of the journals included in the Scopus database from 1996. As with JCR, a calculation is made of received citations to the articles of a journal over a period of three years.
3) *Area of knowledge:* the management of quality is a transverse function in organisations, that is to say, it affects different areas such as the management and organisation of businesses, human resources, marketing, finances, and operations. For that reason, the studies found on the management of quality and the EFQM model are of an interdisciplinary nature, which leads to the consideration of a very wide number of areas of knowledge and journals pertaining to different spheres of specialisation.
4) *Publication language:* due to the context in which the research was made, articles published in English or Spanish are analysed.
5) Key words: taking the research questions as reference the key words used were: EFQM; European quality price; Empirical or quantitative research.

2.3. Article search and selection

This consists of locating the studies related to the questions that are the object of the research and which fulfil the criteria marked in the previous section.

1) *Databases*: the two most important current databases have been used for their broad coverage and quality of content (Siva et al., 2016):
   - Web of Science (Thomson Reuters): this is an online platform that contains databases of bibliographical information and resources for data analysis which allow the research performance to be evaluated and analysed. It allows access to different databases through a single query interface, and can access a single database or several simultaneously. Its content is multidisciplinary, and provides high level academic and scientific information. The following collections of databases were used: Science Citation Index Expanded (SCI-EXPANDED) and Social Sciences Citation Index (SSCI).
2) Scopus (Elsevier): this is the largest database of summaries, with 20,500 publications from more than 5000 international publishing houses. It represents approximately 80% of international publications reviewed by specialists, ensuring current content thanks to its weekly updates. Specifically, the Physical Sciences collections contain more than 7200 titles, among them those related to engineering and environmental sciences (which can have articles related to the management of quality), and the Social Sciences & Humanities collections which contain more than 5300 titles related to business, accounting, management, economics, finance and decisions science.
3) *Database search strategy:* The combination of key words (EFQM; European quality price; Empirical or Quantitative research) in the databases was made in the following fields: Subject (for the WEB of Science) and Title, Abstract and key words (for Scopus). In addition, it was limited by date of publication, which is to say, only articles published between 1991 and 2015 were shown. Also, the search was specifically limited to scientific articles. The searches were made in June 2016.

2.4. Search results

Due to the important number of articles that fulfilled the search requirements, a detailed reading of the Abstract was firstly carried out. Secondly, for articles that appeared to fulfil the requirements,

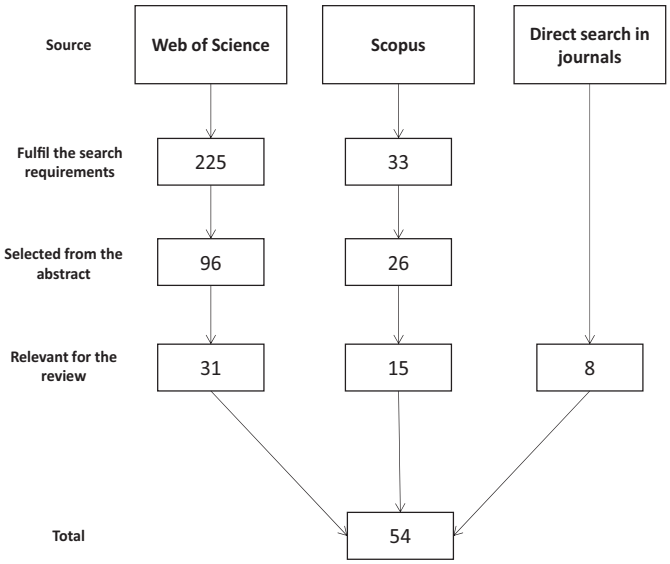

Fig. 1. Article selection process.

a complete analysis of the work was made. The final result was the selection of 53 articles (Fig. 1).

The list of the selected articles appears in the following table. In addition, information is given on the journal in which they were published, its impact factor and the area or scientific category of the journal. The high number of Spanish authors among the articles that fulfil the study requirements is notable. In addition, the high number of journals that have published articles of a quantitative nature on the EFQM model is highlighted (Table 1). Specifically, a total of 26 journals, of which 12 have an SJR impact factor, and 14 with a JCR impact factor (10 with a JCR-SSCI impact factor and four with a JCR-SCIE impact factor). The high quality of the journals that have published articles is also emphasised: eight of 14 JCR publications and eight of 12 publications with an SJR impact factor are currently found in the first two quartiles. Of the 26 journals, only four are Spanish (European Journal of Management and Business Economics; Universia Business Review; Spanish Journal of Finance and Accounting and DYNA Management).

The scientific categories in which the articles are published are very varied (Figs. 2 and 3), although journals on Management, Business and Operations Research in JCR, and Business, Management and Accounting in SJR are emphasised. This point confirms the transverse and multidisciplinary character of the management of quality.

An increasing trend in the number of articles published on quantitative research into the EFQM model can be seen in Fig. 4. The first article was published in 1996. Later, no more articles appear that fulfil the fixed requirements until 2000 and, from that date, articles were published continually. In addition, from 2009 to 2015, 39

Fig. 2. JCR category in which the articles are published.

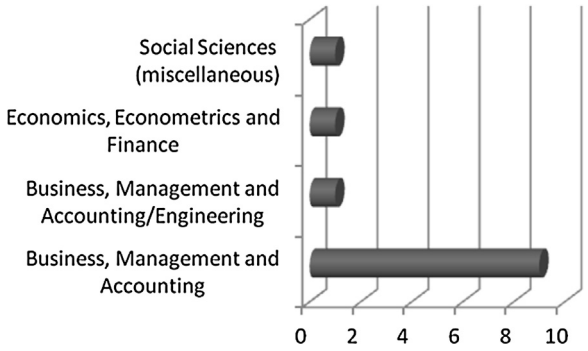

Fig. 3. SJR category in which the articles are published.

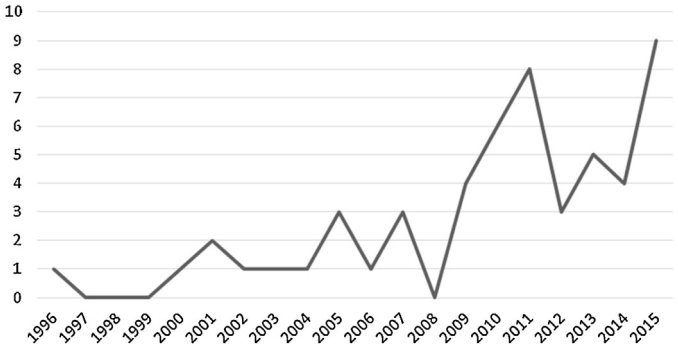

Fig. 4. Evolution of the number of articles per year.

articles were published, representing more than 73% of the total published articles. The most prolific years to the cut-off date have been 2015 with nine published articles, followed by 2011 with eight, and 2010 with six.

As a publication strategy, we can conclude that quantitative studies can be published on the EFQM model in international journals of impact (JCR and SJR), of quality (first two quartiles – Q1 and Q2) and, principally, in the scientific categories of Management, Business and Operations Research. Finally, the probabilities of success would increase if a journal focused on the sphere of management of quality and operations were selected, such as the International Journal of Operations & Production Management, Total Quality Management & Business Excellence, International Journal of Quality & Reliability Management or The TQM Journal.

3. Analysis of the quantitative research

3.1. Country of origin of the authors

The studies led by Spanish authors predominate, representing 52.8% of the total (28 of 53). The case of Iran is also emphasised with 6 publications, 11% of the total, a quite high value in comparison with European countries such as the United Kingdom, Denmark, Germany or Portugal.

3.2. Intention of the studies

As can be observed in Table 2, the main objectives of the quantitative research on the EFQM model are the analysis of the relationships between the facilitating agents of the model (management) and of these with the results (achievements). These studies attempt to confirm that the agent criteria form a system of coherent management, and that its correct design and implementation positively affects the performance of the organisation.

Table 1
Articles selected for the analysis.

Author/s (year)	Journal	Type of impact factor	Area or Category	Impact factor (2015)	Quartile
Adel Hassan Sayed Ahmed (2009)	International Journal of Business Excellence	SJR	Business, Management and Accounting	0.33	Q2
Alonso-Almeida and Fuentes-Frías (2012)	Quality & Quantity	JCR-SSCI	Social Sciences, Interdisciplinary	0.867	Q3
Asghari Zadeh et al. (2011)	European Journal of Social Sciences	SJR	Social Sciences (miscellaneous)	0.11	Q4
Bayo-Moriones et al. (2011)	International Journal of Production Economics	JCR-SCIE	Operations Research & Management Science	2.782	Q1
Bou-Llusar et al. (2005)	International Journal of Quality & Reliability Management	SJR	Business, Management and Accounting	0.54	Q1
Bou-Llusar et al. (2009)	Journal of Operations Management	JCR-SSCI	Management	4.000	Q1
Boulter et al. (2013)	International Journal of Operations & Production Management	JCR-SSCI	Management	2.252	Q1
Calvo-Mora et al. (2005)	Total Quality Management & Business Excellence	JCR-SSCI	Management	0.896	Q3
Calvo-Mora et al. (2013)	WSEAS Transactions on Business and Economics	SJR	Business, Management and Accounting	0.33	Q2
Calvo-Mora and Criado (2005)	Revista Europea de Dirección y Economía de la Empresa	SJR	Business, Management and Accounting	0.14	Q3
Calvo-Mora, Navarro-García et al. (2015)	International Journal of Project Management	JCR-SSCI	Management	2.885	Q1
Calvo-Mora, Picón et al. (2014)	International Journal of Operations & Production Management	JCR-SSCI	Management	2.252	Q1
Calvo-Mora, Picón-Berjoyo et al. (2015)	International Journal of Production Research	JCR-SCIE	Operations Research & Management Science	1.693	Q2
Calvo-Mora, Ruiz-Moreno et al. (2014)	Journal of Business Research	JCR-SSCI	Business	2.129	Q2
Camisón (1996)	Tourism Management	JCR-SSCI	Management	3.140	Q1
Canet-Giner and Balbastre-Benavent (2011)	Service Industries Journal	JCR-SSCI	Management	0.776	Q4
Corredor and Goñi (2010a)	The TQM Journal	SJR	Business, Management and Accounting	0.40	Q2
Corredor and Goñi (2010b)	Spanish Journal of Finance and Accounting	JCR-SSCI	Business, Finance	0.350	Q4
Dadfar et al. (2015)	Total Quality Management & Business Excellence	JCR-SSCI	Management	0.896	Q3
Escrig and de Menezes (2015)	International Journal of Production Economics	JCR-SCIE	Operations Research & Management Science	2.782	Q1
Eskildsen et al. (2001)	International Journal of Quality & Reliability Management	SJR	Business, Management and Accounting	0.54	Q1
Eskildsen et al. (2002)	Measuring Business Excellence	SJR	Business, Management and Accounting	0.34	Q2
Eskildsen and Dahlgaard (2000)	Total Quality Management & Business Excellence	JCR-SSCI	Management	0.896	Q3
García-Bernal et al. (2004)	The Quality Management Journal	SJR	Business, Management and Accounting	0.38	Q2
Gómez Gómez et al. (2015a, 2015b)	Total Quality Management & Business Excellence	JCR-SSCI	Management	0.896	Q3
Gómez Gómez, Martínez Costa, and Martínez Lorente (2011)	International Journal of Quality & Reliability Management	SJR	Business, Management and Accounting	0.54	Q1
Gómez Gómez et al. (2015a, 2015b)	The TQM Journal	SJR	Business, Management and Accounting	0.40	Q2
Gómez-López, López-Fernández et al. (2015)	Total Quality Management & Business Excellence	JCR-SSCI	Management	0.896	Q3
Gómez-López, Serrano-Bedia et al. (2015)	Total Quality Management & Business Excellence	JCR-SSCI	Management	0.896	Q3
Gutiérrez, Torres, and Molina (2010)	Total Quality Management & Business Excellence	JCR-SSCI	Management	0.896	Q3
Gutiérrez, Torres, and Morales (2010)	Spanish Journal of Finance and Accounting	JCR-SSCI	Business, Finance	0.350	Q4
Heras-Saizarbitoria et al. (2011)	Total Quality Management & Business Excellence	JCR-SSCI	Management	0.896	Q3
Heras-Saizarbitoria et al. (2012)	Total Quality Management & Business Excellence	JCR-SSCI	Management	0.896	Q3
McCarthy and Greatbanks (2006)	International Journal of Quality & Reliability Management	SJR	Business, Management and Accounting	0.54	Q1
Nabitz et al. (2001)	Total Quality Management & Business Excellence	JCR-SSCI	Management	0.896	Q3
Nabitz et al. (2009)	Total Quality Management & Business Excellence	JCR-SSCI	Management	0.896	Q3
Olaru, Dinu, Stoleriu, Şandru, and Dincă (2010)	Amfiteatru Economic	SJR	Economics, Econometrics and Finance	0.18	Q3
Olaru, Stoleriu, and Şandru (2011)	Amfiteatru Economic	SJR	Economics, Econometrics and Finance	0.18	Q3
Pesic and Dahlgaard (2013)	Total Quality Management & Business Excellence	JCR-SSCI	Management	0.896	Q3
Pires Da Rosa et al. (2003)	Total Quality Management & Business Excellence	JCR-SSCI	Management	0.896	Q3
Qureshi, Warraich, and Hijazi (2009)	International Journal of Project Management	JCR-SSCI	Management	2.885	Q1

Table 1 (*Continued*)

Author/s (year)	Journal	Type of impact factor	Area or Category	Impact factor (2015)	Quartile
Rowland-Jones (2013)	Total Quality Management & Business Excellence	JCR-SSCI	Management	0.896	Q3
Sadeh et al. (2013)	Total Quality Management & Business Excellence	JCR-SSCI	Management	0.896	Q3
Sadeh and Garkaz (2015)	Total Quality Management & Business Excellence	JCR-SSCI	Management	0.896	Q3
Safari, Abdollahi, and Ghasemi (2012)	Total Quality Management & Business Excellence	JCR-SSCI	Management	0.896	Q3
Santos-Vijande and Alvarez-Gonzalez (2007a)	International Journal of Business Science and Applied Management	SJR	Business, Management and Accounting	0.13	Q4
Santos-Vijande and Alvarez-Gonzalez (2007b)	Universia Business Review	SJR	Business, Management and Accounting	0.22	Q2
Suárez et al. (2014)	Journal of Business Economics and Management	JCR-SSCI	Business/Economics	0.618	Q4
Tejedor-Panchon et al. (2011)	DYNA-Ingeniería e Industria	JCR-SCIE	Engineering, Multidisciplinary	0.302	Q4
Tutuncu and Kucukusta (2007)	Total Quality Management & Business Excellence	JCR-SSCI	Management	0.896	Q3
Tutuncu and Kucukusta (2010)	Quality & Quantity	JCR-SSCI	Social Sciences, Interdisciplinary	0.867	Q3
Vukomanovic et al. (2014)	Journal of Civil Engineering and Management	SJR	Business, Management and Acc./Engineering	0.91	Q1
Yousefie, Mohammadi, and Monfared (2011)	Expert Systems with Applications	JCR-SCIE	Operations Research & Management Science	2.981	Q1

Table 2
Aims of the analysed research.

Aims	Frequency	Relative frequency (%)	Accumulated frequency (%)
Analysis of the relationships between the criteria (agents and results) of the model	16	30.2	30.2
Impact of the implementation of the model on organisational variables	10	18.87	49.07
To evaluate the impact of the implementation of the model or of obtaining a recognition for the performance of the organisation	9	16.98	66.05
Complementariness of the EFQM model with other management and improvement tools (Six Sigma, Standard ISO 9001, Quality Function Deployment, Balanced Scorecard)	6	11.32	77.37
Obstacles and motivations in the implementation of the model	5	9.43	86.8
Use of the EFQM model as support for decision making	3	5.66	92.46
Analysis of the reliability and validity of the EFQM model in different spheres and contexts	2	3.77	96.23
Analysis of the weights or relative importance of the criteria of the model	2	3.77	100.00
Total	53	100.00	

Next, articles are highlighted that analyse the impact of the application of the model on organisational variables (leadership, commitment with the organisation, working conditions, capacity of innovation, human resources management, information systems, knowledge management) and others that study both the effect of the implementation of the model on some type of outcome (satisfaction of the internal and external clients, environmental impact, financial performance, key business results, exports, relationships with interest groups) or to know if the businesses that have obtained quality awards or some recognition of excellence obtain greater profitability than those which have not obtained them.

3.3. Data and the instrument used to obtain them

Regarding the data source and the instruments used to obtain them (Tables 3 and 4), the data obtained on the opinions of the top managers of the organisations through structured questionnaires are highlighted, as are the scores obtained from self-assessment reports and external assessment of businesses that have been presented with some award or system of recognition. The data collected through reports have greater objectivity than the data that represent the opinions of those with positions of responsibility in the analysed organisations.

Table 3
Main sources of the data used.

Source of data	Frequency	Relative frequency (%)	Accumulated frequency (%)
Directors/Managers/Senior executives	31	47.69	47.69
Secondary sources (self-assessment and external evaluation reports of the EFQM model)	18	27.69	75.38
Quality managers	6	9.23	84.61
Employees	6	9.23	93.84
Independent experts or advisors	3	4.62	98.46
External clients	1	1.54	100.00
Total	65[a]	100.00	

[a] There are studies that use more than one source of data.

3.4. Type of quantitative analysis

The quantitative method used will be very much related to the objective of the work and the data type available to the researcher. In addition, the great majority of articles are transverse in nature, and only four have a longitudinal character.

Table 5 shows the techniques that are most used in empirical quantitative research. The use of structural equation modelling

Table 4
Type of instruments for obtaining the data used.

Instrument	Frequency	Relative frequency (%)	Accumulated frequency (%)
Structured questionnaire	32	60.38	60.38
Scores of the EFQM model	18	33.96	94.34
Interviews	3	5.66	100.00
Total	53	100.00	

Table 5
Types of quantitative analyses used.

Types of quantitative analysis	Frequency	Relative frequency (%)	Accumulated frequency (%)
Descriptive analysis	14	17.1	17.1
Structural equations	18	22	39.1
Regression analysis	10	12.2	51.3
Factor analysis	10	12.2	63.5
Difference between means	10	12.2	75.7
Correlation analysis	9	11	86.7
Cluster analysis	6	7.3	94
Correlation coefficient	2	2.4	96.4
Tobit/Probit models	1	1.2	97.6
Cross-reference tables	1	1.2	98.8
Conceptual maps	1	1.2	100
Total	82[a]	100	

[a] There are studies that use more than one type of analysis.

techniques, mainly the Partial Least Squares (PLS) technique, are emphasised for the analysis of the internal relationships between the criteria (constructs or latent variables) of the EFQM model. This is due to the distinction that can be established between behavioural constructs (e.g., attitudes and personality characteristics) and those of design or devices (Henseler, 2015). Thus, we consider that the variables contemplated by the excellence models correspond to the second category, from the moment that such variables are products of theoretical thought, generated theoretically by the human being, with these constructs being understood as a mixture of elements or components.

On the other hand, the regressions and the confirming factorial analysis are used to analyse the weights of the different criteria of the EFQM model, and to identify dimensions within the facilitating agent criteria of the EFQM model (social and technical factors) and to analyse the impact that these factors or dimensions have on the key results of the business. The differences of means (mainly ANOVA and *T*-test) are also widely used. This group of techniques is widely used to verify if significant differences exist between the variables or criteria of the EFQM model, based on the size of the business, sector or ownership. Finally, the cluster analysis is used to define the structure of the data, grouping the most similar observations. This has been used in the sphere of the EFQM model to identify profiles of businesses when implementing the model, based on their motivations for the implementation, the barriers or the identification of excellence profiles.

3.5. Studied activity sectors

The multi-sectoral studies stand out (Table 6). In many cases the researchers attempt to show how the effects of the implementation of the EFQM model, on organisational variables and on the result, are not affected by the type of activity that the organisation undertakes. These results illustrate the universal character of the excellence models, that is to say, they can be used by any type of organisation (Calvo-Mora, Navarro-García, & Periañez-Cristobal, 2015).

Table 6
Main sectors of activity analysed.

Sectors	Frequency	Relative frequency (%)	Accumulated frequency (%)
Several sectors	30	56.6	56.6
Manufacturing	7	13.2	69.8
Services in general	5	9.43	79.23
Education	5	9.43	88.66
Pharmaceutical	2	3.78	92.44
Construction	2	3.78	96.22
Tourism	1	1.89	98.11
Commerce	1	1.89	100.00
Total	53	100.00	

3.6. Conclusions and limitations

3.6.1. Validity and reliability of the EFQM model

There is empirical evidences of the validity, reliability and predictive power of the EFQM model when it is applied to different spheres and sectors of activity (Alonso-Almeida & Fuentes-Frías, 2012; Suárez, Roldán, & Calvo-Mora, 2014). This aspect has been corroborated in specific spheres such as education (Calvo-Mora & Criado, 2005; Pires Da Rosa, Saraiva, & Diz, 2003) or tourism (Camisón, 1996) and also for companies of different sizes, ownership and sector of activity (Calvo-Mora, Picón, Ruiz, & Cauzo, 2014; Gutiérrez, Torres, & Morales, 2010).

3.6.2. Relative importance of the EFQM model criteria

In some articles, the weighting structure for the companies that implement the model varies in relation to that considered theoretically by the EFQM model (Vukomanovic, Radujkovic, & Nahod, 2014). As Eskildsen, Kristensen, and Jørn Juhl (2001), Eskildsen, Kristensen, and Jørn Juhl (2002) verified, businesses perceive that the agent criteria are more important, granting them 700 points instead of the 500 of the original model. Whereas the criteria results were granted 300 points when assessing excellence. Within the agent criteria all were considered of equal importance, whereas more relevance was given to the results in the clients criteria, as opposed to the rest of the results. These conclusions are in line with the weighting offered by the 2013 version of the EFQM model.

3.6.3. Underlying constructs and dimensions in the structure of the EFQM model criteria

Nabitz, Severens, Van Den Brink, and Jansen (2001) proposed a new structure of the EFQM model formed by 13 dimensions. In that structure, much importance was given to the orientation to the clients and to the market, the strategy and to the alliances and resources. In addition, underlying criteria were identified such as the stakeholders and the measurement systems. Along this line, Bou-Llusar, Escrig-Tena, Roca-Puig, and Beltrán-Martín (2009), Calvo-Mora, Picón Berjoyo, Ruiz Moreno, and Cauzo Bottala (2013), Calvo-Mora, Picón et al. (2014), Calvo-Mora, Ruiz-Moreno, Picón-Berjoyo, and Cauzo-Bottala (2014) and Suárez et al. (2014) point out how the agent criteria of the EFQM model reflect the technical and social dimension and the quality management strategy. In addition, they show how these dimensions constitute a management system that has a significant effect on the results. Works like those of Canet-Giner and Balbastre-Benavent (2011) and Calvo-Mora, Picón-Berjoyo, Ruiz-Moreno, and Cauzo-Bottala (2015) show the repercussion of the social factors on the results. These conclusions reinforce the EFQM model as a reference framework for the implementation of the principles and practices of total quality management within the organisations (Bou-Llusar

et al., 2009; Gómez Gómez, Martínez Costa, & Martínez Lorente, 2015b).

3.6.4. Relationships between the agent criteria and the results

There is a strong correlation between the facilitating agents of the model and the results, so that businesses with higher scores in the agent criteria obtain better results (Asghari Zadeh, Safari, Abdollahi, & Ghasemi, 2011; Eskildsen & Dahlgaard, 2000). The businesses that partially used the model did not significantly improve their results. Thus, it is necessary to develop all the facilitators to maximise the correlation of these criteria with the results (holistic approach) and thereby optimising the use of the EFQM model (Bou-Llusar, Escrig-Tena, Roca-Puig, & Beltrán-Martín, 2005; García-Bernal, Gargallo-Castel, Pastor-Agustin, & Ramírez-Alesón, 2004; Suárez et al., 2014; Tejedor-Panchon et al., 2011). More specifically, Calvo-Mora, Leal, and Roldán (2005) emphasise the influence of the leadership, policy and strategy on the other agents of the model. The management by processes mediates the relationship between the agent criteria and the results (Suárez et al., 2014). Gómez Gómez, Martínez Costa, and Martínez Lorente (2015a) identify relationships between the agent criteria and results that were not compared previously, such as between alliances and resources and policy and strategy, between alliances and resources and people, or, between the results in people and the results in society. For Heras-Saizarbitoria, Marimon, and Casadesús (2012) some relationships do not reach an appropriate level of validity, such as those between people and processes, between processes and results in people and society, or between the results in society and the key business results.

3.6.5. The EFQM model, awards for excellence and systems of recognition

It is stated that businesses that have obtained awards for quality, mainly related to the EFQM model, obtain better results than those that have no awards or recognition for excellence (Boulter, Bendell, & Dahlgaard, 2013; Corredor & Goñi, 2010a). In addition, only the pioneers improve their results significantly, and those improved results continue in the year following the award (Corredor & Goñi, 2010b). Escrig and de Menezes (2015) found no significant differences in the distribution and the trend of the scores of the agent sub-criteria in levels +500, +400 and +300 of recognition. The scores were between 30 and 60, with scores being the highest for the +500 level and lowest for +300. The organisations with a greater score in the agent criteria also obtain better results. The most important difference is that the organisations recognised as excellent (+500) grant more importance to the people criterion, which is reflected in a greater score in the results in people.

3.6.6. Impact of the implementation of the EFQM model

Among the most significant effects of the implementation of the EFQM model is the improvement of image, greater client satisfaction, increased commitment (Tutuncu & Kucukusta, 2007) and satisfaction of employees (Nabitz, Jansen, van der Voet, & van den Brink, 2009; Tutuncu & Kucukusta, 2010), greater profit derived from the increase of exports (Dadfar, Dahlgaard, Afazeli, & Brege, 2015), greater predisposition to innovation (Bayo-Moriones, Merino-Díaz-de-Cerio, Escamilla-de-León, & Selvam, 2011; Gutiérrez, Torres, & Molina, 2010), strengthening the effectiveness of knowledge management projects (Calvo-Mora, Picón-Berjoyo et al., 2015) and optimisation of the use of the information systems (Sadeh, Arumugam, & Malarvizhi, 2013). These benefits are linked to the greater competitiveness of the business and to obtaining competitive advantages (Pesic & Dahlgaard, 2013; Santos-Vijande & Alvarez-Gonzalez, 2007a, Santos-Vijande & Alvarez-Gonzalez, 2007b).

3.6.7. Motivations for, and barriers to, the implementation of the EFQM model

For Heras-Saizarbitoria, Casadesus, and Marimon (2011), the most important motivations for implementing the EFQM model are of an internal character: productivity, optimisation of resources, improvement of the quality of products and services, and reduction of costs. In general, the motivations can be grouped into: external market reasons, external reasons of requirements and internal reasons (Gómez-López, Serrano-Bedia, & López-Fernández, 2015).

For Santos-Vijande and Alvarez-Gonzalez (2007b), the main barriers are the lack of understanding of the model and the lack of a clear leadership. Heras-Saizarbitoria et al. (2011) find the greater obstacles to be the lack of resources or the complexity of the model that hinders the assimilation of the principles. For Gómez-López, López-Fernández, and Serrano-Bedia (2015), the most important barriers when implementing the EFQM model are: the lack of time and the lack of physical and financial resources. In general, the barriers can be grouped into: cultural and behavioural barriers, organisational barriers and resource barriers.

3.6.8. Limitations

The main limitations of the articles have their origin in the selected methodology, which has been able to cause the non-inclusion of pertinent research. Firstly, only articles published in journals with a JCR and SJR impact index have been selected, as well as in the databases Web of Science and Scopus. Secondly, we have not contemplated languages of countries with a long tradition in the implementation of the EFQM model, such as French, German or Portuguese. Thirdly, the work revolves around quantitative investigation, and we are aware that there is literature of a qualitative and a mixed nature that contributes important conclusions to the field of the excellence models. Finally, the SLRs are not a panacea or the end of the road, but must be considered as the beginning of new journeys (Massaro, Handley, Bagnoli, & Dumay, 2016). Therefore, the objective of this study is not only to provide a summary of the existing knowledge, but also to identify knowledge gaps and to thereby offer research routes for the future.

4. Future lines of research

After analysing the state of the art regarding quantitative research on the EFQM model, we consider that advances should be produced in the following directions:

- To undertake longitudinal quantitative research, that is to say, to analyse the effects of the implementation and improvement that the EFQM model can have in the organisations through time. We must not forget that the management of quality and the management of excellence are based on continuous improvement and are strategic questions that produce their effects in the medium to long term.
- To extend the analysis of the EFQM model into public organisations and to other sectors such as distribution, since, traditionally the private and the manufacturing sectors have been analysed.
- The study of the social client concept as a combination of the management of quality and the social responsibility of the organisation. It is necessary to investigate the possible incorporation of the principles of ethics and social responsibility into the management and EFQM model environment.
- Another subject that has still not been investigated is that of the management of quality in the supply chain, since, although it is reflected in the alliances and resources criterion, this criterion is very poorly developed.
- Study of the barriers found by organisations when implementing the EFQM model. This line has also been proposed on previous

occasions, and although we have found some studies on the theme, it seems important to us to continue its study to try to bring those possible barriers to light and to investigate how to diminish them.

- Accomplishment of studies which, although focussed on EFQM and using the postulates, criteria and directives of the model, take organisations of any type who are not using this model as a management tool as a population (and, of course, sample elements).
- Taking into account that the new standards of management systems which are appearing (the new ISO 9001 Standard of 2015, for example) demonstrate a progressive approach to the principles that define excellence, to the detriment of less ambitious approaches, it would be interesting to study to what extent businesses are renewing (or adopting for the first time) certifications from systems with the new standards, and assuming, or not, the idea of quality as excellence in preference to simple quality assurance management.
- The EFQM model allows the excellence of an organisation to be assessed on the basis of the use of all and each of its sub-criteria (agents and of results), but it can also be used in alternative ways: (1) exclusively dealing with isolated criteria abstracting from what could be deduced by using the set of criteria at once; (2) taking the idea of "transverse axis" as a reference, when formulating hypotheses and creating research strategies to verify them. The use of this approach allows the researcher to make horizontal readings of the model and seek other mental constructs or research topics, different from those explicitly approached by the model. We understand that the use of these two options has not been sufficiently taken advantage of in the research that uses the EFQM model and, therefore, represent a practically virgin territory in research terms, whether using quantitative or qualitative information and techniques, or mixes of the two.
- For almost one decade there has been a situation of economic crisis that has brutally affected many organisations and economic sectors. We understand that the connections between the use of excellence approaches (for continuous improvement, to increase business performance, to acquire a better market image, to gain a better market share, etc.) and survival, changes to pre-crisis operation or the sudden disappearance of the market for organisations, are topics that are practically without study.
- It is necessary to advance in quantitative research into the excellence models, not only from an explanatory point of view, but also in the assessment of the predictive power of these models. In this case, we refer to the capacity of such models to generate precise predictions from new observations, both temporal and transverse.
- In the analysed studies, the trend is observed to use only one paradigm as a methodologic base and reference to approach or to focus on the research questions. We understand that the mixture or the simultaneous use of several of them could notably enrich the existing knowledge on the subject of excellence, and open the possibility of the emergence of new paradigms to the thread of the combination of perspectives for the analysis of the same question. Along this line, the scope of analysis of the EFQM model and excellence could be extended towards aspects related to institutional theory or legitimation with the purpose of investigating the reasons that lead organisations to adopt excellence models.

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