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Article

Exploring the Relationships between the Enablers and Results Criteria of the EFQM Model 2013 in the Context of the Greek Public Administrative Services

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Abstract: This study presents a first attempt to apply and validate the European Foundation for Quality Management (EFQM) Model 2013 as a framework in the context of public administrative services in Greece, and to explore the relationships between the model's enablers and results criteria. The methodological approach adopted was quantitative research with a structured questionnaire, while partial least squares structural equation modeling (PLS-SEM) was applied to validate the model and test the cause–effect relationships between the enablers and results on a national sample of 155 managers. The results confirmed the reliability and validity of the EFQM Model 2013 in the context of this study and revealed significant relationships between the model's enablers and results. In addition, the empirical findings of this study may improve our understanding of the underlying relationships between the EFQM model criteria, but should not be generalized, as this study only concerned Greek public administrative services. Finally, this study may provide valuable insights to managers and governing bodies responsible for policy-making about the significance and magnitude of the relationships between the enablers and results criteria so that they can develop strategies to improve the operational and strategic performance of the Greek public administrative services.

Keywords: EFQM Model 2013; enablers; results; causal relationships; public administrative services; Greece; structural equation modeling; partial least squares; PLS-SEM; SmartPLS



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1. Introduction

The European Foundation for Quality Management (EFQM) model is a world-renowned model that was created in 1991 (Fonseca et al. 2021) and has undergone several revisions to remain in line with the developments and advances that have occurred over the years (Santos-Vijande and Alvarez-Gonzalez 2007). The latest update of the model is the EFQM Model 2020, which since its introduction and until the first half of 2021, was in parallel use with the previous version, the EFQM Model 2013, and the interested parties had the choice of using one of the aforementioned models for their assessment according to the context. As a result of the above, there is not enough information currently available about the outcomes of applying the novel version of the model; therefore, it would be a more productive approach to use the EFQM Model 2020 as a research model when adequate information is at hand (Bocoya-Maline et al. 2024). In contrast, the previous version, i.e., the EFQM Model 2013, is a well-established model that has been used by managers to evaluate the performance of their organization, but also by academics in research. The EFQM Model 2013 has nine criteria grouped into two different sets: the enablers and results. The enablers comprise five criteria—leadership; strategy; people; partnerships and resources; and processes, products, and services—while the results comprise four criteria—people results, customer results, business results, and society results (Figure 1).

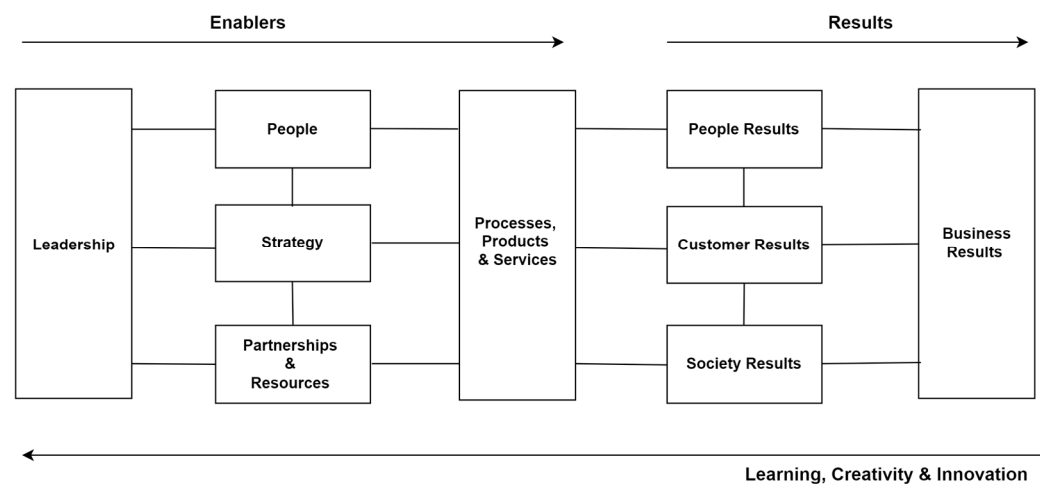


Figure 1. The EFQM Model 2013.

The study of Suárez et al. (2017) reviewed the application of the EFQM model in quantitative research from 1991 to 2015 and found that the EFQM model is a valid, reliable, and cross-cutting framework in quantitative research. Furthermore, Suárez et al. (2017) emphasized the need for future research to further analyze the model in different contexts. Even though the EFQM Model 2013 has been widely used in quantitative research, a review of the literature revealed a limited number of studies that examined the relationships between the enablers and/or results criteria of the EFQM Model 2013 in Europe and beyond. In addition, most of the aforementioned studies focused on private organizations and applied different methodological techniques to investigate the relationships between the criteria of the EFQM Model 2013, such as the structural equation modeling approach and correlation analysis. Specifically, the study by Belvedere et al. (2018) investigated the relationships between the EFQM model criteria in the context of 118 private companies operating in different sectors in Europe, Asia, the Middle East, South America, Australia, and the USA by applying the SEM approach. The study revealed positive and significant relationships between the model's criteria, as leadership had significant and strong positive effects on people, strategy, and partnerships and resources; people, strategy, and partnerships and resources had significant and moderate positive effects on processes, products, and services; processes and products and services had significant and strong positive effects on people results, customer results, and society results; people results and society results had significant and moderate effects on business results; and customer results had significant and modest effects on business results (Belvedere et al. 2018).

Moreover, Para-González et al. (2021) used the SEM methodology to examine the relationships between some of the EFQM 2013 enablers in the environment of 200 industrial companies in Spain, and the study showed that leadership had significant and strong positive effects on people and strategy, while strategy had a significant and modest positive effect on people. Moreover, the study of Andjelkovic-Pesic and Dahlgaard (2013), which focused on 150 companies from the Republic of Serbia, used correlation analysis, and the results showed that there were strong positive relationships between the criteria of the EFQM Model 2013. Also, Zhang et al. (2021) focused their research on 683 construction companies in China and applied the SEM methodology to examine the relationships between the model's enablers criteria. The results of the study showed that leadership had a significant and strong positive effect on people and partnerships and resources, and a significant but moderate positive effect on strategy; strategy had a significant and modest positive effect on partnerships and resources; and people and partnerships and resources had significant and moderate positive effects on processes and products and services, respectively.

As far as the studies focusing on public services are concerned, their number is extremely limited, and they applied different methodological approaches to investigate

the relationships between the criteria of the EFQM Model 2013. Specifically, the study of [Đorđević et al. \(2021\)](#) applied path analysis using regression analysis to investigate the relationships between the model's criteria in the context of 17 Serbian and 21 Russian universities. The results of the study revealed the following: (1) very strong positive relationships between leadership and strategy; people; partnerships and resources; and processes, products, and services; (2) very strong positive relationships between strategy and people; partnerships and resources; and processes, products, and services; (3) a strong positive relationship between people and people results; (4) a very strong positive relationship between partnerships and resources and processes, products, and services; (5) very strong relationships between partnership and resources and people results and society results; (6) a strong positive relationship between partnership and resources and customer results; (7) strong positive relationships between processes, products, and services and people results and customer results; (8) a very strong positive relationship between processes, products, and services and society results; (9) a strong positive relationship between people results and business results; (10) a very strong positive relationship between customer results and business results; and (11) a very strong positive relationship between society results and business results ([Đorđević et al. 2021](#)). Finally, [Kaplani \(2023\)](#) applied the SEM methodology in the context of Greek public primary education (231 kindergarten and primary schools) to investigate the relationships between the enablers and results criteria of the EFQM 2013 model. The results of this study indicated that leadership had a significant and modest positive effect on people, a significant and strong positive effect on strategy, and a significant and modest positive effect on partnerships and resources; strategy had a significant and strong positive effect on people; strategy had a significant and moderate positive effect on partnerships and resources; strategy had a significant and modest positive effect on processes, products, and services; people had a moderate positive effect on processes, products, and services; partnerships and resources had a significant and modest positive effect on processes, products, and services; processes, products, and services had a significant and modest positive effect on people results and customer results (parents and students results); people results had a significant and strong positive effect on customer results (parents and students results) and business results; customer results (parents and students results) had a significant and modest positive effect on business results; and business results had a significant and strong positive effect on society results.

The evaluation system of the Greek public sector services assesses individual performance, collects feedback solely from the services' staff, and monitors the attainment of goals set at both individual and organizational levels. Hence, in comparison with the structure and conceptual framework of the EFQM Model 2013, the evaluation system of the Greek public sector services focuses only on the criteria "people" and "business results". Therefore, there is a need for the Greek public services to adopt a new approach to their evaluation system that will provide them with a holistic view of their operational and strategic performance. The EFQM Model 2013 can serve this purpose, as it can provide insights into several criteria, along with their causal relationships, that are present in every organization. This approach will facilitate decision-making at the organizational level and provide valuable information to policy-makers, which may lead to the formulation of new policies or recommendations for a holistic improvement of the Greek public sector services' operation and performance.

Considering the above, the scholars' recommendation to more deeply explore the EFQM model with a focus on public sector organizations, as well as the fact that the EFQM Model 2013 is a well-established framework extensively referenced in the existing academic literature, the authors chose the EFQM Model 2013 for this research. This choice was based on its solid theoretical foundation, which provides a more substantial basis for analysis and the expectation that its use ensures methodological continuity. This allows for the direct comparison of the findings with those of the existing literature. By focusing on the EFQM Model 2013, this paper contributes to the academic and practical understanding of its applicability, reliability, and validity in the context of the Greek public administrative

services. Furthermore, this focus will enrich the literature with specific insights into the EFQM Model 2013 effectiveness and the details of its implementation in the public sector. Specifically, this study examined the relationships between the constructs leadership (L); strategy (S); people (P); partnerships and resources (PRE); processes, products, and services (PRO); people results (PR); customer results (CR); business results (BR); and society results (SR). Therefore, the hypotheses of this study are as follows:

- H1.** *Leadership has a positive effect on strategy.*
- H2.** *Leadership has a positive effect on people.*
- H3.** *Leadership has a positive effect on partnerships and resources.*
- H4.** *Strategy has a positive effect on people.*
- H5.** *Strategy has a positive effect on partnerships and resources.*
- H6.** *Strategy has a positive effect on processes, products, and services.*
- H7.** *People have a positive effect on processes, products, and services.*
- H8.** *Partnerships and resources have a positive effect on processes, products, and services.*
- H9.** *Processes, products, and services have a positive effect on people results.*
- H10.** *Processes, products, and services have a positive effect on customer results.*
- H11.** *Processes, products, and services have a positive effect on business results.*
- H12.** *People results have a positive effect on customer results.*
- H13.** *People results have a positive effect on business results.*
- H14.** *Customer results have a positive effect on business results.*
- H15.** *Business results have a positive effect on society results.*

The proposed model and the hypotheses are presented in detail in Figure 2 below.

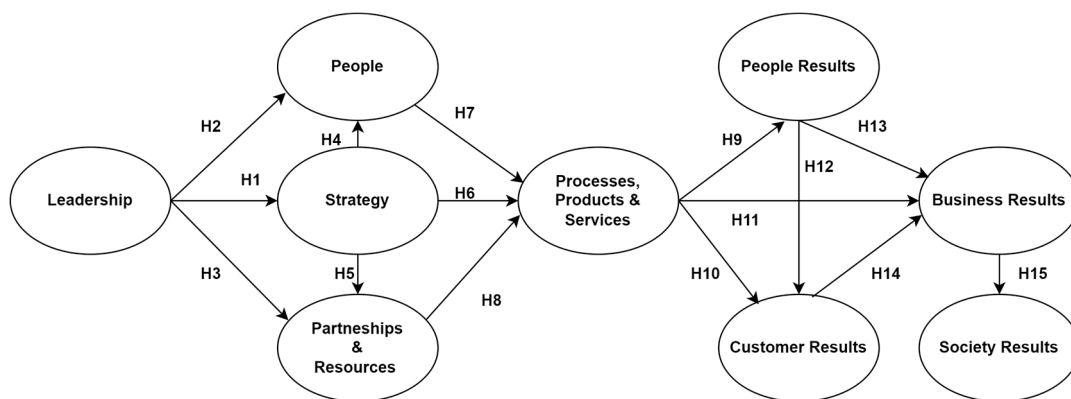


Figure 2. The research model.

The following sections present the study methodology, along with the study results, discussion, and conclusions.

2. Materials and Methods

In this section, the research methodology is presented in detail. In order to achieve the purpose of this study, the authors applied qualitative methods in the first phase to adapt the research instrument to the context of this study. Subsequently, quantitative research methods were applied during the pilot study and the main study phases. Prior to conducting this study, the authors submitted the research protocol for approval to the University Research Ethics Committee and the Ministry of Education, Religious Affairs and Sport of Greece, and both approvals were granted (University Research Ethics Committee Decision No. 37/17-07-2023 and Ministry of Education, Religious Affairs and Sport of Greece Decision No. 86346/N4/31-07-2023).

2.1. Adaptation and Validation of the Research Questionnaire

This study's research tool was based on a structured questionnaire created by [Kaplani \(2023\)](#), which was based on the assessment tool of the EFQM Model 2013. The questionnaire had ten different sections: nine sections for the nine criteria of the EFQM Model 2013, and a section about the participants' demographic characteristics. For the 9 criteria, the 5-point Likert scale of the EFQM model 2013 assessment questionnaire was used (1 = No Evidence/Don't Know, 2 = We have plans, 3 = On our way, 4 = Close to good, 5 = Fully done).

Since the research by [Kaplani \(2023\)](#) focused on school units, an adaptation of the questionnaire was necessary to align it with the context of the public sector administrative services. Specifically, in Kaplani's questionnaire, the EFQM model criterion "processes, products, and services" was formulated as a formative latent factor comprising three dimensions: administrative, educational, and pedagogical. Additionally, the criterion "customer results" was tailored to the school context, focusing on "parents and students results". Given the context and nature of public administrative services, for the present study, the criterion "processes, products, and services" was redefined as a reflective latent variable with only one dimension: administrative. Similarly, the criterion "customer results" focused on the customers of public administrative services. Moreover, the questionnaire's wording was adjusted to suit the context of public administrative services. Subsequently, two focus groups involving 7 managers and 7 staff members of public administrative services were conducted to assess the content and face validity of the questionnaires, as well as the appropriateness of its items for this study's context. This process led to minor adjustments in the wording of the questionnaire items that ensured clarity and relevance.

2.2. Pilot Study

The reliability of the questionnaire was tested in a pilot study. Fifty (50) managers from public administrative services in Greece, which were selected by using the convenience sampling method, participated in the pilot study. The analysis of the data showed that for the 9 scales of the questionnaire measuring the 9 criteria of the EFQM Model 2013, all the Cronbach's alpha coefficients were above the 0.70 threshold; therefore, the pilot study provided evidence of the reliability of the research tool.

2.3. Main Study

The population of this study consisted of the managers of the Greek public administrative services. Specifically, the participants of the main study were the managers of the regional administrative services of the Ministry of Education, Religious Affairs and Sport of Greece. In order to reach the participants, an email was sent to the email address of each service and contained the link to the online questionnaire and a citation of the approval of the Ministry to conduct this study. The data were collected from the 10th of October until the 15th of December 2023. Subsequently, after the data collection phase, the reliability and validity of the research tool were assessed, and the demographic characteristics of the participants were analyzed by using descriptive statistics. In addition, partial least squares structural equation modeling (PLS-SEM) was used to test the reliability and validity of

the research model and the hypotheses of this study. This methodological approach was chosen because of its high efficiency in model estimation (Hair et al. 2021), its growing popularity in the field of quality management (Magno et al. 2022), and it is not affected by the complexity of the research model or by the number of observations used to estimate the model (Hair et al. 2019). All the latent variables were reflective. Each of the nine first-order latent factors corresponded to a criterion of the EFQM Model 2013 (L, S, P, PRE, PRO, PR, CR, BR, SR), while the structural model was designed according to the research hypotheses about the relationships between the latent variables of the model. SmartPLS 4 software was used to evaluate both the measurement and structural models. Therefore, the loadings of the indicators, Cronbach's α , rho_a, rho_c, composite reliability, average variance extracted (AVE), Fornell–Larcker criterion, analysis of cross-loadings, and heterotrait–monotrait ratio (HTMT) of the correlations were estimated. Finally, the path coefficients and the R^2 coefficients were estimated, along with their significance levels, by performing a bootstrap of 10,000 replications.

3. Results

This section presents the results of the descriptive statistical analysis of the participants' demographics, the reliability and validity results of the questionnaire, and the measurement and structural model evaluation results.

3.1. The Study Sample Demographics

The study sample comprised 155 managers from the public regional administrative services of the Ministry of Education, Religious Affairs and Sports of Greece. The majority of the managers were male (59.4%), and two-thirds were 51–60 years old (67.7%). Also, the vast majority of the managers (74.1%) had completed postgraduate studies, while the majority of the study participants (54.8%) were less experienced since they had 0–5 years of management experience (Table 1).

Table 1. The demographics of the study sample.

Demographic Category	Frequency	Percentage (%)
Gender	155	100.0
Men	92	59.4
Women	63	40.6
Age	155	100.0
24–30	0	0
31–40	3	1.9
41–50	27	17.4
51–60	105	67.7
Over 60 years old	20	12.9
Education level	155	100.0
Secondary education degree	5	3.2
Bachelor's	31	20.0
Second bachelor's	4	2.6
Master's	94	60.6
PhD	21	13.5
Management experience (years)	155	100.0
0–5	85	54.8
6–10	33	21.3
11–20	15	9.7
Over 20 years	22	14.2

3.2. Reliability and Convergent and Discriminant Validity of the Research Questionnaire

The reliability tests of the nine scales of the questionnaire showed that the Cronbach's α coefficient for each scale of the EFQM Model 2013 was found to be above the threshold of 0.70. Therefore, the reliability of the research tool was verified. Also, the unidimensionality

analyses showed that the items of each scale produced only one factor. The aforementioned results are not presented in detail in the results of this study.

3.3. Evaluation Results of the Measurement Model

The reliability and validity of the measurement model were tested by applying the partial least squares structural equation modeling (PLS-SEM) method and following the recommendations of Hair et al. (2021) for evaluating the measurement model. According to the results, the vast majority of the loadings of the indicators were above the threshold of 0.70 and only seven had a value that was below 0.70, specifically, their values ranged from 0.575 to 0.693. These seven indicators were not removed from the model because their values were between 0.40 and 0.70, and their removal from the model would not lead to better internal consistency reliability or convergent validity values (Hair et al. 2017; Hair et al. 2021). Regarding the internal consistency reliability, the results show that all values of Cronbach's α , rho_a, and rho_c and the composite reliability were above the threshold of 0.70 (Table 2). Therefore, the reliability and internal consistency were checked. In addition, the average variance extracted (AVE) values were above the threshold 0.50 (Table 2). Therefore, the convergent validity was also checked (Hair et al. 2017; Hair et al. 2021).

Table 2. Reliability and convergent validity of the measurement model.

Construct	Cronbach's α	Composite Reliability (rho_a)	Composite Reliability (rho_c)	Average Variance Extracted (AVE)
L	0.853	0.857	0.902	0.697
S	0.923	0.925	0.939	0.687
P	0.819	0.836	0.871	0.533
PRE	0.879	0.887	0.907	0.583
PRO	0.856	0.862	0.890	0.538
PR	0.819	0.836	0.871	0.533
CR	0.934	0.940	0.947	0.720
BR	0.947	0.951	0.956	0.729
SR	0.927	0.933	0.943	0.733

Furthermore, the results of the discriminant validity test for the Fornell–Larcker criterion showed that the square root of the average variance extracted (AVE, written in bold) of each factor was greater than its correlations with the other factors (Table 3). Therefore, the discriminant validity was also tested using this criterion.

Table 3. Discriminant validity of the measurement model based on the Fornell–Larcker criterion.

Construct	L	S	P	PRE	PRO	PR	CR	BR	SR
L	0.835								
S	0.760	0.829							
P	0.656	0.603	0.730						
PRE	0.561	0.686	0.612	0.764					
PRO	0.493	0.404	0.645	0.567	0.734				
PR	0.203	0.055	0.363	0.120	0.442	0.846			
CR	0.217	0.110	0.374	0.215	0.491	0.841	0.848		
BR	0.081	0.008	0.358	0.065	0.409	0.845	0.746	0.854	
SR	0.133	0.032	0.339	0.070	0.363	0.817	0.785	0.843	0.856

In addition, the discriminant validity was again checked by a cross-loadings analysis, which showed that the indicators of each factor had higher loadings on their factor compared with the loadings they had on the other factors of the model (Table 4). Therefore, the discriminant validity was also checked by the criterion of cross-loadings.

Table 4. Cross-loadings matrix (higher loadings across lines are written in bold).

Item/Construct	L	S	P	PRE	PRO	PR	CR	BR	SR
L_1	0.817	0.685	0.443	0.526	0.306	−0.012	0.030	−0.106	−0.026
L_2	0.859	0.653	0.513	0.446	0.341	0.064	0.113	−0.021	0.039
L_3	0.892	0.629	0.659	0.473	0.555	0.307	0.288	0.172	0.216
L_4	0.764	0.568	0.569	0.427	0.436	0.317	0.293	0.226	0.215
S_1	0.694	0.837	0.499	0.490	0.351	0.062	0.044	0.017	0.062
S_2	0.601	0.770	0.469	0.505	0.318	0.022	0.029	0.071	−0.011
S_3	0.649	0.888	0.549	0.624	0.366	0.024	0.141	0.050	0.054
S_4	0.525	0.796	0.452	0.557	0.411	0.080	0.175	0.050	0.115
S_5	0.665	0.808	0.518	0.582	0.315	0.081	0.117	−0.026	−0.001
S_6	0.672	0.830	0.479	0.572	0.283	0.041	0.055	−0.087	−0.032
S_7	0.595	0.866	0.526	0.642	0.303	0.012	0.075	−0.024	0.000
P_1	0.498	0.526	0.636	0.496	0.359	0.038	−0.014	0.072	0.027
P_2	0.333	0.199	0.708	0.260	0.505	0.480	0.498	0.472	0.449
P_3	0.539	0.564	0.793	0.462	0.442	0.289	0.296	0.326	0.259
P_4	0.624	0.543	0.850	0.493	0.546	0.333	0.338	0.311	0.343
P_5	0.406	0.463	0.575	0.555	0.363	0.083	0.124	0.066	0.041
P_6	0.425	0.307	0.781	0.411	0.593	0.350	0.384	0.309	0.338
PRE_1	0.441	0.600	0.439	0.812	0.447	−0.024	0.066	−0.023	−0.047
PRE_2	0.473	0.590	0.494	0.875	0.436	0.005	0.112	−0.046	0.020
PRE_3	0.420	0.350	0.517	0.648	0.553	0.321	0.357	0.207	0.307
PRE_4	0.409	0.530	0.277	0.693	0.149	−0.082	0.050	−0.121	−0.110
PRE_5	0.421	0.543	0.427	0.759	0.377	0.212	0.306	0.162	0.154
PRE_6	0.383	0.485	0.512	0.748	0.457	0.096	0.127	0.073	0.024
PRE_7	0.451	0.558	0.562	0.789	0.542	0.108	0.138	0.076	0.019
PRO_1	0.486	0.531	0.586	0.520	0.655	0.230	0.202	0.243	0.147
PRO_2	0.405	0.232	0.523	0.350	0.819	0.451	0.439	0.432	0.351
PRO_3	0.392	0.259	0.467	0.315	0.728	0.456	0.492	0.461	0.438
PRO_4	0.405	0.458	0.496	0.625	0.693	0.154	0.274	0.158	0.146
PRO_5	0.211	0.124	0.422	0.298	0.763	0.342	0.383	0.299	0.278
PRO_6	0.255	0.111	0.404	0.304	0.764	0.385	0.483	0.303	0.329
PRO_7	0.377	0.406	0.415	0.557	0.701	0.191	0.190	0.133	0.109
PR_1	0.201	0.101	0.361	0.209	0.419	0.888	0.805	0.770	0.725
PR_2	0.300	0.205	0.418	0.285	0.456	0.848	0.837	0.664	0.698
PR_3	0.169	0.076	0.356	0.138	0.302	0.742	0.490	0.614	0.539
PR_4	0.199	0.034	0.320	0.055	0.371	0.901	0.760	0.755	0.735
PR_5	0.058	−0.084	0.280	−0.047	0.391	0.865	0.693	0.741	0.679
PR_6	0.088	−0.045	0.180	0.056	0.330	0.770	0.615	0.700	0.715
PR_7	0.167	0.018	0.223	−0.002	0.328	0.891	0.716	0.748	0.723
CR_1	0.234	0.202	0.337	0.312	0.407	0.694	0.855	0.570	0.628
CR_2	0.204	0.143	0.322	0.277	0.384	0.760	0.896	0.608	0.642
CR_3	0.199	0.121	0.333	0.257	0.406	0.687	0.867	0.588	0.637
CR_4	0.107	−0.031	0.226	0.069	0.377	0.667	0.841	0.644	0.688
CR_5	0.115	0.006	0.260	0.036	0.375	0.771	0.871	0.697	0.708
CR_6	0.338	0.214	0.448	0.260	0.590	0.562	0.672	0.540	0.553
CR_7	0.132	0.038	0.325	0.109	0.415	0.817	0.914	0.750	0.775
BR_1	0.014	−0.043	0.255	0.093	0.253	0.615	0.542	0.729	0.512
BR_2	0.129	0.091	0.344	0.161	0.374	0.717	0.594	0.863	0.666
BR_3	0.187	0.113	0.423	0.180	0.401	0.722	0.634	0.840	0.609
BR_4	0.056	−0.016	0.325	0.042	0.369	0.744	0.704	0.870	0.794
BR_5	0.049	−0.027	0.300	−0.008	0.403	0.719	0.709	0.871	0.790
BR_6	−0.003	−0.078	0.282	−0.022	0.396	0.753	0.586	0.869	0.711
BR_7	0.050	−0.012	0.279	0.003	0.281	0.702	0.652	0.868	0.800
BR_8	0.079	0.031	0.258	0.030	0.312	0.789	0.660	0.911	0.815
SR_1	0.179	0.151	0.345	0.151	0.314	0.636	0.711	0.613	0.812
SR_2	0.159	0.122	0.375	0.191	0.294	0.680	0.715	0.645	0.830
SR_3	0.184	0.025	0.265	0.045	0.336	0.665	0.707	0.662	0.881
SR_4	0.038	−0.065	0.262	−0.015	0.364	0.681	0.581	0.767	0.803
SR_5	0.093	0.006	0.278	−0.006	0.245	0.723	0.637	0.787	0.899
SR_6	0.066	−0.032	0.244	0.033	0.317	0.790	0.705	0.814	0.906

The discriminant validity was also tested using the heterotrait–monotrait ratio of correlations (HTMT). The results (Table 5) showed that all HTMT values were less than the proposed threshold of 0.90 (Henseler et al. 2015; Hair et al. 2021); therefore, the discriminant validity was checked.

Table 5. Heterotrait–monotrait ratio (HTMT).

	Heterotrait–Monotrait Ratio (HTMT)
Leadership ↔ business results	0.197
Leadership ↔ customer results	0.282
Partnership and resources ↔ business results	0.167
Partnership and resources ↔ customer results	0.270
Partnership and resources ↔ leadership	0.650
People ↔ business results	0.415
People ↔ customer results	0.451
People ↔ leadership	0.776
People ↔ partnership and resources	0.719
People results ↔ business results	0.899
People results ↔ customer results	0.889
People results ↔ leadership	0.269
People results ↔ partnership and resources	0.228
People results ↔ people	0.426
Processes, products, and services ↔ business results	0.440
Processes, products, and services ↔ customer results	0.546
Processes, products, and services ↔ leadership	0.575
Processes, products, and services ↔ partnership and resources	0.667
Processes, products, and services ↔ people	0.772
Processes, products, and services ↔ people results	0.479
Society results ↔ business results	0.883
Society results ↔ customer results	0.847
Society results ↔ leadership	0.196
Society results ↔ partnership and resources	0.179
Society results ↔ people	0.396
Society results ↔ people results	0.872
Society results ↔ processes, products, and services	0.395
Strategy ↔ business results	0.095
Strategy ↔ customer results	0.153
Strategy ↔ leadership	0.856
Strategy ↔ partnership and resources	0.760
Strategy ↔ people	0.687
Strategy ↔ people results	0.116
Strategy ↔ processes, products, and services	0.467
Strategy ↔ society results	0.111
Customer results ↔ business results	0.789

3.4. The Results of Structural Model Evaluation and Hypothesis Testing

The structural model was evaluated according to the guidelines of Hair and Alamer (2022) and Hair et al. (2021). Specifically, the R^2 coefficient of determination was calculated for each of the endogenous variables (Table 6). The R^2 coefficient can range from 0 to 1, and low R^2 values indicate weak explanatory power (Hair et al. 2021). The results of the structural model evaluation showed that the model had strong explanatory power for three of its endogenous factors (CR, BR, and SR); moderate explanatory power for four of the eight endogenous variables (S, P, PRE, and PRO); and only for one endogenous variable (PR), the R^2 value was 0.196. Therefore, the model presented a weak explanatory power, but at the same time, this value was considered satisfactory based on the recommendation of Hair et al. (2021).

The next step was to test the research hypotheses about the relationships between the criteria of the EFQM Model 2013. Following the guidelines of Hair and Alamer (2022), a

one-tailed bootstrapping with 10,000 replications was performed to calculate the values of the path coefficients, along with their significance levels. The results indicated that the vast majority of the research hypotheses were supported by the results. Specifically, for twelve of the fifteen research hypotheses, the analysis showed that the t -values of their path coefficients were greater than 1.96 and their p -values were found to be less than 0.001, 0.01, and 0.05 (Table 7). Subsequently, the evaluation of the effect size of the path coefficients was carried out according to the guidelines of Hair and Alamer (2022), who suggested that if the value of a path coefficient (β) is between 0.0 and 0.010, this is an indication of a weak effect size; if it is between 0.11 to 0.30, then the effect size is characterized as modest; if its value is between 0.30 and 0.50, this indicates that the effect size is moderate; and if the values of the path coefficient is greater than 0.50, then this is an indication of a strong effect size. Based on the above, the results of this study showed that leadership (L) had a significant strong positive effect on strategy (S) and a significant moderate positive effect on people (P). Also, strategy had a significant and strong positive effect on partnerships and resources (PRE) and a significant and modest positive effect on people. In addition, on the one hand, people had a significant strong and positive effect on processes, products, and services (PRO), but on the other hand, partnerships and resources had a significant moderate and positive effect on processes, products, and services. The results also indicated that processes, products, and services had a significant and moderate positive effect on people results (PR), a significant and modest positive effect on customer results (CR), and a significant and weak positive effect on business results (BR). In addition, people results had a significant strong and positive effect on customer results and business results. Finally, the results indicated that business results had a significant and strong positive effect on society results (SR).

Table 6. R^2 coefficients of determination of the model's endogenous variables.

Endogenous Variables	R^2 Coefficients	t -Values (Bootstrapping 10,000 Replications)	p -Values (Bootstrapping 10,000 Replications)
S	0.578	10.382	0.000
P	0.456	6.772	0.000
PRE	0.475	5.999	0.000
PRO	0.475	8.081	0.000
PR	0.196	3.472	0.000
CR	0.725	15.159	0.000
BR	0.734	16.647	0.000
SR	0.710	13.979	0.000

A visual representation highlighting the aforementioned key findings of this study is presented below (Figure 3).

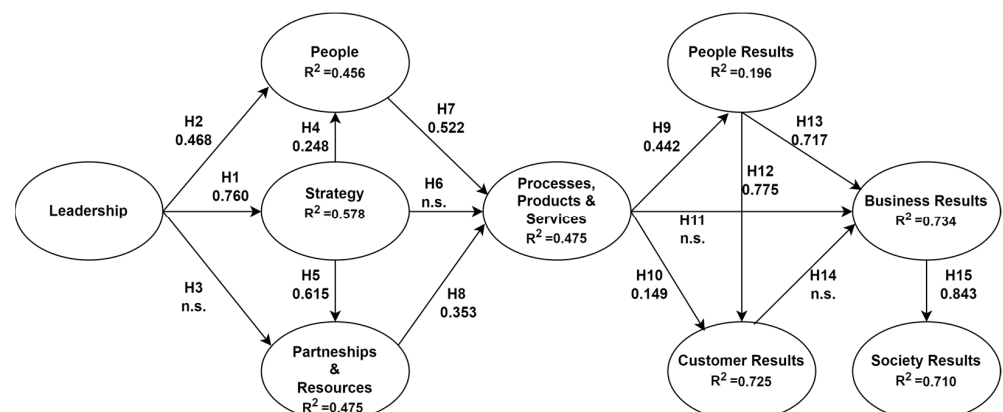


Figure 3. The research model R^2 coefficients, and direct effects (n.s.: non-significant).

Table 7. Results of the structural model assessment.

Research Hypotheses	Paths	Path Coefficients (β)	t-Values (Bootstrapping 10,000 Replications)	p-Values (Bootstrapping 10,000 Replications)
H1	L $\rightarrow$ S	0.760	20.629	0.000
H2	L $\rightarrow$ P	0.468	4.088	0.000
H3	L $\rightarrow$ PRE	0.094	0.901	0.184
H4	S $\rightarrow$ P	0.248	2.165	0.015
H5	S $\rightarrow$ PRE	0.615	5.475	0.000
H6	S $\rightarrow$ PRO	−0.153	1.479	0.070
H7	P $\rightarrow$ PRO	0.522	5.145	0.000
H8	PRE $\rightarrow$ PRO	0.353	3.755	0.000
H9	PRO $\rightarrow$ PR	0.442	6.841	0.000
H10	PRO $\rightarrow$ CR	0.149	3.473	0.000
H11	PRO $\rightarrow$ BR	0.100	1.659	0.049
H12	PR $\rightarrow$ CR	0.775	19.375	0.000
H13	PR $\rightarrow$ BR	0.717	6.176	0.000
H14	CR $\rightarrow$ BR	0.116	0.816	0.207
H15	BR $\rightarrow$ SR	0.843	27.971	0.000

4. Discussion

The EFQM Model 2013 was applied in quantitative research in Europe, but most of the studies were on private organizations. In addition, the number of studies that examined the relationships between the criteria of the EFQM Model 2013 and focused on public sector organizations is extremely limited. Moreover, studies that examined the relationships between the criteria of the EFQM Model 2013 in the context of the Greek public sector services are scarce. The literature review revealed only one study that applied the structural equation modeling approach to investigate the cause–effect relationships between the criteria of the EFQM Model 2013 and focused on the area of Greek public primary education. Therefore, this study aimed to follow the recommendation of [Suárez et al. \(2017\)](#) to conduct more research to further analyze the EFQM Model 2013 with a focus on the public sector. Hence, the purpose of this study was to test the reliability and validity of the EFQM Model 2013 in the context of the Greek public sector administrative services and to investigate the relationships among the enablers and results criteria of the EFQM Model 2013.

The results indicate that the proposed research model was reliable and valid for the context of this study. In addition, this study’s results provide evidence for the confirmation of the vast majority of the hypotheses regarding the cause–effect relationships between the enablers and results criteria of the EFQM Model 2013. Specifically, 12 of the 15 hypotheses were confirmed at high levels of significance (H1, H2, H4, H5, H7, H8, H9, H10, H11, H12, H13, H15). Moreover, the results showed that leadership had positive effects on strategy (0.760) and people (0.468), which are supported by previous literature ([Belvedere et al. 2018](#); [Đorđević et al. 2021](#); [Kaplani 2023](#); [Para-González et al. 2021](#); [Zhang et al. 2021](#)). These findings underscore the critical role that leadership plays in formulating policies and motivating people; therefore, public sector services need to pay great attention to the leadership cultivated in their organizations and provide guidance on how it can be effective.

In addition, the results of this study show that strategy had a positive effect on partnerships and resources (0.615), which is consistent with previous findings ([Kaplani 2023](#); [Zhang et al. 2021](#)), and it had a positive effect on people (0.248), which is also supported by the literature ([Kaplani 2023](#); [Para-González et al. 2021](#); [Zhang et al. 2021](#)). The above show that public sector services must focus on creating a clear strategic plan that must be shared within the organization and at each organizational level so that people can better understand the organization’s strategy and align their actions with it. In addition, public services must integrate into their strategy the aspects of their stakeholders (their employees,

partners, suppliers, etc.) and the management and allocation of their resources so that they can effectively serve the achievement of the organization's goals.

Furthermore, the results indicate that there was a positive effect of people (0.522) and partnerships and resources (0.353) on processes, products, and services, which is consistent with the results of previous studies (Belvedere et al. 2018; Kaplani 2023; Para-González et al. 2021; Zhang et al. 2021). Therefore, public sector services must ensure that their employees are trained and keep up with the advances in their field, as they play a crucial role in the delivery of services to the internal and external customers of the public entity for which they work. In addition, public services must make an effort to build alliances with their partners and establish a collaborative and close relationship with them since their cooperation affects the quality of the services provided by the public sector entities.

The results also show that processes, products, and services had a positive impact on people results (0.442), customer results (0.149), and business results (0.100), which is supported by previous findings in the literature (Belvedere et al. 2018; Kaplani 2023). Therefore, public sector services need to carefully design the processes through which they deliver their services so that they are efficient, effective, and aligned with the needs of their customers. In addition, the results of this study indicate that people results had positive effects on customer results (0.775) and business results (0.717), which is in line with the previous literature (Belvedere et al. 2018; Kaplani 2023). The above underscores the fact that public sector services need to adopt a new approach to monitor the satisfaction, performance, and competencies of their employees; their understanding of their organization's strategic plan; and the quality of communication within their organization, as all of these affect the organization's efficiency, effectiveness, and productivity, as well as the customer results. Moreover, the results have revealed that business results (for the case of public sector services could also be called organizational results) had a positive effect on society results (0.843), which is supported by the findings of Kaplani (2023), and this was the strongest positive effect among the criteria of the EFQM Model 2013 revealed by the results of this study. In light of the above, public sector services must integrate the aspect of sustainability in their operations and decision-making so that their actions are aligned with the principles and goals of sustainable development and with the promotion and realization of actions that have a positive impact on their local community and beyond.

In addition, the study findings regarding the application of the EFQM Model 2013 to public administrative services in Greece could have significant implications for policy-making and practical application. Specifically, implementing the EFQM model 2013 will encourage public administrative services in Greece to align their activities with strategic objectives and priorities. Also, policy-making can be guided by a strategic focus, leading to more coherent and effective public service delivery. Furthermore, the study findings can provide insights into the performance of public administrative services in Greece, enabling policy-makers to assess the effectiveness of policies and interventions and make data-driven decisions to improve service delivery. Also, the results of this study could stimulate public administrative services in Greece to utilize the EFQM Model 2013 to establish a culture of learning and innovation, wherein organizations continually strive to enhance their processes, services, and outcomes. Concurrently, it can enable public services in Greece to utilize benchmarking data to compare their performance with similar organizations locally, nationally, or internationally. This comparative analysis will facilitate the identification of areas of strength and weakness, as well as opportunities for improvement, leading to the adoption of best practices and innovative approaches to public service delivery.

Moreover, the study findings can facilitate policy-makers in Greece to make more informed, evidence-based decisions. The EFQM model provides a structured framework for evaluating the effectiveness of policies and interventions, thereby allowing policy-makers to assess their impact on organizational performance, stakeholder satisfaction, and societal outcomes. This evidence-based approach to policy-making will guarantee efficient resource allocation and the attainment of desired policy objectives. Overall, this study aspired to provide stimulus for a wider application of the EFQM Model 2013 to public

administrative services in Greece, ultimately leading to more strategic, accountable, and effective policy-making, as well as improved service delivery and outcomes for citizens.

Since this study focused only the regional administrative services of the Ministry of Education, Religious Affairs and Sport of Greece, its findings cannot be generalized to the entire population of public services in Greece and may introduce some bias into the results. Also, this focus may limit the generalizability of the findings to other countries or contexts, as the unique cultural, political, and institutional factors that shape public administration in Greece may not be applicable to other countries with different contexts and governance structures. Considering the above and the dynamic nature of public administrative services, future research in similar or different contexts that incorporates a longitudinal or comparative perspective into the study design would be beneficial. Such an approach would enable researchers to track changes and trends in the performance of Greek public sector services over time. Additionally, it would allow for the analysis of differences in responses from similar organizations in other countries, facilitating the identification of best practices or areas for improvement. Furthermore, future research following a mixed-methods approach, which combines quantitative data from structured questionnaires with qualitative data from interviews or focus groups, could provide a more comprehensive understanding since qualitative data can offer insights into the contextual factors that influence organizational performance and aid in interpreting quantitative findings in a nuanced manner.

Subsequently, future research exploring the applicability of the EFQM Model 2013 beyond public administrative services to other types of Greek public sector services, such as public healthcare services, could provide insights into its effectiveness and adaptability in different contexts. In summary, by adopting these approaches, future research can contribute to a deeper understanding of the challenges and opportunities faced by Greek public sector services. It can also identify transferable lessons and best practices that can inform organizational improvement efforts across diverse settings, while also informing strategies for enhancing their performance and effectiveness.

5. Conclusions

The EFQM model has been used by private and public organizations as a compass to facilitate their continuous improvement. To the best of our knowledge, this is the first study that attempted to apply and validate the EFQM Model 2013 in the context of the Greek Public Administration and to explore the causal relationships between its enablers and results criteria. The results of this study confirm that the EFQM Model 2013 is a valid and reliable framework also for the context of the Greek Public Administrative Services. Moreover, the results confirm the vast majority of the research hypotheses that were already verified by previous studies conducted in different settings. Given the prevailing focus of the evaluation system in Greek public services on individual performance assessment, skill enhancement, employee feedback collection, and organizational and individual goal monitoring, there is a clear imperative for a revamped evaluation approach. This new approach should provide a holistic view of the services' operational and strategic performance. The EFQM model can serve this purpose by providing valuable insights into the causal relationships between its factors, which are present in every organization, and facilitate decision-making within the services. Since this study focused only on the public regional administrative services of the Ministry of Education, Religious Affairs and Sport of Greece, its results cannot be generalized. Therefore, further research is necessary to be conducted in other types of Greek public sector services and in different countries and similar contexts to clearly validate the results of the present study. Lastly, future studies that will apply a combination of qualitative and quantitative research methods could provide a more comprehensive understanding of the dynamics of public administrative services. Overall, by adopting these approaches, future studies can contribute to a deeper understanding on this research topic and provide valuable insights to policy- and decision-makers to enhance organizational performance and effectiveness across diverse settings.

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