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INTERNAL AND EXTERNAL EFFECTS OF QUALITY ON COMPETITIVENESS: APPLICATIONS FOR THE HOTEL SECTOR IN SPAIN

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Abstract

The aim of this paper is to analyze — from a global perspective — the main relationships existing between service quality and businesses competitiveness. To this end, a simultaneous equations model is presented. This model enables distinguishing between the external and internal effects of quality on competitiveness, and empirically verifies a set of hypotheses of great significance for the hotel industry.

The data used to empirically verify this model were gathered from hotels owned by a national hotel company in Spain. The client survey carried out by the hotel — in the form of questionnaires — was the basis for creating the service quality indicators and establishing their most relevant dimensions. The quality indicator was created for each hotel based using Structural Equation Modelling (S.E.M.). On the other hand, the economic and financial data pertaining to the hotels served to create competitiveness indicators for each of them.

The sign and value of the coefficients estimated by the model presented lead to a series of conclusions regarding the complex sequence of direct and indirect causal relationships between quality and competitiveness. The estimation obtained was used to empirically verify a set of key hypotheses regarding the competitiveness of these hotels and to propose measures designed to improve it.

I. INTRODUCTION

In the last few decades, business competitiveness has increasingly become a key study area as a consequence of economic globalization, increasing economic integration, and market liberalization as well as the many social, political, and economic changes that are taking place. A review of the theoretical models of business competitiveness reveals the significance of two kinds of factors in regard to this area — internal factors pertaining to the actual firm, and external factors related to the structure of the industry in which the firm operates as well as the economy of the country as a whole. Empirical evidence should corroborate these models by providing sufficient data to identify the relative significance of each individual factor regarding the global improvement of business competitiveness. However, most available studies are partial since they focus on quantifying the effects of macroeconomic variables, the effects of sector variables, or the effects of strictly business-oriented variables.

Quality of service has been one the most widely investigated factors among those strictly related to business. In this context, business competitiveness is positively related to matching the characteristics of the service to the ideal preferences of clients, i.e., their level of satisfaction. This fact reveals the key role of service quality on the improvement of business competitiveness, and how this has an effect not only outside the actual firm, but also on the variables within it. However, most relevant research on this issue deals with the theoretical study of the relationships that exist between quality and business competitiveness or with partial empirical relationships between variables.

The aim of this paper is to analyze — from a global perspective — the main relationships existing between service quality and businesses competitiveness. The data used to empirically verify this model were gathered from hotels owned by a national hotel company in Andalusia. The client survey carried out by the hotel — in the form of questionnaires — was the basis for creating the service quality indicators and establishing their most relevant dimensions. On the other hand, the economic and financial data pertaining to the hotels served to create competitiveness indicators for each of them. The results obtained were used to empirically verify a set of key hypotheses regarding the competitiveness of these hotels and to propose measures designed to improve this.

This paper is organized as follows. We begin by specifying the theoretical model that shows the indirect and direct causal relationships between quality and competitiveness, introducing a set of theoretical hypotheses of key importance to improving the competitiveness of the hotels analyzed in this study. The next section focuses on the analysis of the data used for creating the model's variables. Special emphasis is given to the data provided by the hotels' client surveys. Perceived quality indicators were created for each hotel based on the data gathered and by use of *Structural Equation Modelling (S.E.M.)*. Similarly, the characteristics and dimensions of the service most valued by clients were analyzed. In the following section, the estimation of the model and the analysis of the most relevant results are described, and the theoretical hypotheses introduced earlier are empirically tested. The final section brings together some of the most important conclusions drawn from the research.

II. THE THEORETICAL MODEL

Most research dealing with the effects of quality on business competitiveness generally falls into one of two categories, depending on the kind of relationships under study. The first encompasses those works analyzing the *external effects* of quality on competitiveness, while the second includes those that focus on the *internal effects*. *External effects* show the impact of changes in the quality perceived by clients on business competitiveness. These effects have their source in changes in client behavior and their level of satisfaction which, ultimately, will have a positive or negative impact on volume sales and market share due to variations in clients' willingness to pay, their purchase intentions or level of expenditure within the hotel (Cronin and Taylor 1992; Boulding et al. 1993; Kordupleski et al. 1993; Anderson et al. 1994; Zeithaml et al. 1996; Bou Llusar 1997 or Fuentes 2000). *Internal effects* refer to the influence quality has on competitiveness due to changes in the firm's production processes. Such changes have an influence on productivity input and, therefore, on the firm's production costs (Phillips and Buzzell 1982; Fine 1983; Fuller 1985; Skinner 1986 or Endosomuran 1988).

There is some research that analyses both effects, such as Phillips et al. (1983), Garvin (1988), Rust et al. (1995) or Camisón (1996). The latter two studies are descriptive works which do not empirically verify — through appropriate statistical analysis — the causal relationships proposed.

On the other hand, the work of Garvin (1988) provides a systematic compilation of the main effects of quality on different business economic indicators, such as price, market share, production costs, labor productivity, total productivity, and business returns. However, his work has an important limitation in that it does not specify the simultaneous relationships existing between the variables included; in other words, it only deals with the direct effects of quality on these economic indicators.

Table 1. Hypotheses for the model of Phillips et al. (1983)

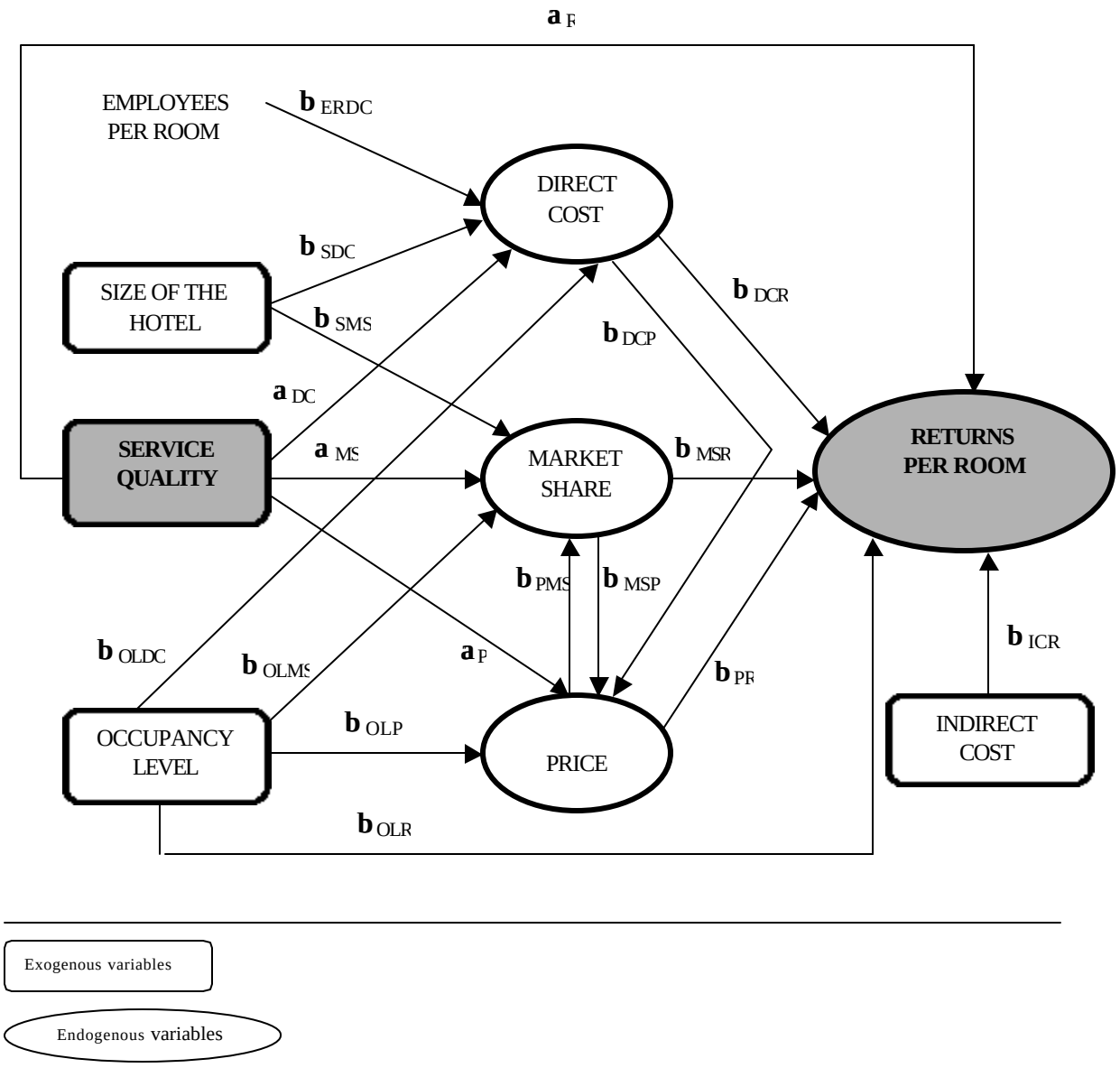
Effect of product quality and direct production costs on investment returns.	H_1: Positive effect of product quality on investment returns.	H_{1a}: Positive effect of product quality on market relative price.
		H_{1b}: Indirect and negative effect of product quality on market share due to price rises.
	H_2: Direct and positive effect of market share on investment returns and indirect but positive effect via direct production costs.	
Product quality on Direct Production Cost.	H_3: Direct positive effect of product quality on direct production cost.	
	H_4: Indirect negative effect of product quality on direct production cost due to a positive effect on market share.	
Other relationships	H_5: Effect of direct production costs on market relative price.	

The work of Phillips et al. (1983) overcomes this limitation by specifying a simultaneous equations model. It includes four equations, one for each of the endogenous variables of the model — the price of the product, direct production costs, market share, and returns on investment. The model of Phillips et al. (1983) attempts to estimate the direct effects of quality on competitiveness as well as its indirect effects via direct production costs, market share, and product price. To this end, it applies a SEM model to the data collected from a series of firms included in the PIMS (Profit Impact of Market Strategy) database to test the theoretical hypotheses defined in Table 1.

The model of Phillips et al. (1983) was used as the theoretical framework for the research described in this paper. However, several changes were introduced regarding specifications and the criteria used to create the variables. Although the four original equations proposed by Phillips et al. (1983) were preserved, new exogenous explanatory variables were introduced to capture some of the structural characteristics of the hotels under study. More specifically, the *number of employees per room, size of the hotel, level of occupancy*, and *average indirect costs* were added. The causal relationships implicit in the model are depicted in Figure 1. The arrows indicate the direction of causation, and the α and β parameters the quantitative measurements of such effects.

Specifically, the α parameters show the direct effect of service quality on the endogenous variables of the model, and the β parameters the effect of the remaining explanatory variables in each equation (both exogenous and endogenous variables) on the dependant variable of the given equation.

Figure 1. Causal relationships in the Model Proposed



The endogenous and exogenous variables used in the model can be grouped into three categories. The first one includes the *service quality* variable, measured through a perceived quality indicator based on the level of customer satisfaction (QI). The second category refers to financial and

economic variables created from the hotels' balance sheet and includes: *price of the service* (P), *market share* (MS), *occupancy level* (OL), *average direct cost* (DC), *average indirect cost* (IC), and *returns per room* (R), which is the *proxy* variable used to quantify competitiveness. The third category includes structural variables associated with the *size of the hotel* (S) and the *number of employees per room* (ER). The criteria used to create these variables are outlined in Table 2. The system of simultaneous equations resulting from the specification of the model proposed is presented in Table 3.

Table 2. Creation of the Variables of the Model

TYPE OF VARIABLE	**VARIABLE**	**CREATION**
Service Quality	***Perceived Quality Indicator (QI)***	Structural equation modelling (SEM)
Economic-Financial variables	***Price of the Service (P)***	Estimated through monthly average prices, due to the difficulty to take into account all the existing prices for each type of client in the different seasons
	Market share (MS)	Monthly operating income of each hotel divided by monthly operating income of all the hotels in the market (1)
	Occupancy Level (OL)	Rooms occupied per month in each hotel divided by rooms available in the same period
	Average direct costs (DC)	Sum of workforce expenditures and other current operations expenses divided by the rooms of the hotel (2)
	Average indirect costs (IC)	Average total cost minus average direct cost (2)
	Returns per room (R)	Monthly business operation divided by the number of rooms available in each hotel
Structural variables	***Size of the hotel (S)***	Size estimated via the number of rooms multiplied by the number of days in each month
	Number of employees room (ER)	Total number of the hotel staff during the month of reference divided by the number of rooms of the hotel

(1) In the case of the Spanish Hotel industry, the concept of market is defined via the division of the country by the Spanish Institute of Statistics ((I.N.E.) into 83 different geographical areas, according to the characteristics of the tourism activity in each area.

(2) According to the Spanish Association of Accounting and Business Administration (A.E.C.A. 1993).

Equation [1] is based on the model of hedonic prices suggested by Rosen (1974), and on Lancaster's consumer theory (1966). According to this theory, consumer willingness to pay, $P_1(Z_i, Y_1)$, depends on the characteristics of the service (Z_i), as well as on a set of consumer characteristics such as income, preferences, educational level, etc., which are encompassed by vector Y_1. Given the lack of data regarding the characteristics of the clients of the hotels under

study, it was not possible to apply any kind of segmenting criteria to the demand in order to establish the *price of the service*. The optimum price set by sellers, $P_2(Z_i, Y_2)$, is not only conditioned by the characteristics of the service, Z_i, but also by some structural variables specific to each hotel, i.e., the *occupancy level* and the *market share*. Such variables, included in vector Y_2, have an effect on production costs, and consequently, on the pricing mechanism used by the hotel.

Table 3. Equations

$P = \alpha_p \cdot QI + \beta_{DCP} \cdot DC + \beta_{MSP} \cdot MS + \beta_{OLP} \cdot OL + u_1$	**Equation [1]**
$DC = \alpha_{DC} \cdot QI + \beta_{SDC} \cdot S + \beta_{ERDC} \cdot ER + \beta_{OLDC} \cdot OL + u_2$	**Equation [2]**
$MS = \alpha_{MS} \cdot QI + \beta_{PMS} \cdot P + \beta_{OLMS} \cdot OL + \beta_{SMS} \cdot S + u_3$	**Equation [3]**
$R = \alpha_R \cdot QI + \beta_{DCR} \cdot DC + \beta_{MSR} \cdot MS + \beta_{PR} \cdot P + \beta_{OLR} \cdot OL + \beta_{ICR} \cdot IC + u_4$	**Equation [4]**

Where u_i is the error term in each equation

In order to analyze the influence of *service quality* on the *price of the service*, Rosen (1974) suggested constructing a quality indicator (QI) from the numerical value of the characteristics offered by such a service, $QI=f(Z_i)$. Consequently, both the price the client is willing to pay and the price the seller is willing to set will depend on the quality of the service. This direct relationship between *service quality* and the *price of the service* is expressed by the parameter α_P.

The *occupancy level* of the hotel will also have an impact on the selling price of the service. In low season periods, the hospitality sector tends to reduce the average price of their service by selling promotional packages to targeted groups or other kinds of offers. The opposite strategy is used during high demand seasons, when the hotels are able to fill all their rooms at considerably higher prices. Indeed, as Figuerola (1995) points out, price policies in the hospitality sector are conditioned not only by the internal factors of the actual firm — such as costs and profit expectations — but also by demand factors. Among the latter factors, *market share* and seasonal variations — measured by the evolution of the *occupancy level* of the hotel — are highly relevant. The relationship existing between *occupancy level* and the *price of the service* is

expressed by the parameter β_{OLP}, while the parameter β_{MSP} expresses the effect of *market share* on such variable.

Among the internal factors, the most relevant is the production costs of the firm, $C(QI,Y_2)$. In this study, production costs have to be broken down into direct and indirect costs. Amat (1993) considers that in order to set the *price of the service*, it is necessary to take *average direct costs* as the starting point. An increment in these costs will generate an increase in the *price of the service*, and so the parameter β_{DCP} must take a positive value. Pricing by using a mark-up makes it possible to also cover *average indirect costs*. Although these costs have an effect on the *returns per room* via the parameter β_{ICR} (Figure 1), they will not have an effect on the *pricing of the service* (Phillips et al. 1983). The Spanish Association of Accounting and Business Administration (AECA) confirms this by advising the incorporation of indirect costs as product costs only in certain analyses — such as returns — but not for pricing purposes (AECA 1993).

Equation [2] specifies the explanatory variables of *average direct costs*. One of the issues that has raised great interest in the literature is the analysis of the effects of *service quality* on business costs. The direct relationship between *service quality* (QI) and *direct costs per room*, $DC(QI,Y_2)$ is expressed by the parameter α_{DC}. If this parameter takes a positive value, it means that it is expensive for the business to increase the level of service quality, as argued by neoclassical models. However, other studies, such as those carried out by Fine (1983) and Wheelwright (1981), argue that it is possible to increase *service quality* and still reduce *average direct costs*, basing their argument on the so-called *learning curve in quality*. According to this model, as workers' experience increases and the management system improves, enhancing the quality of the service becomes increasingly less expensive. This proposal is compatible with the management systems based on *quality total costs* (Juran and Gryna 1988, Rosander 1989).

Average direct costs will not only be conditioned by *service quality*, but also by *occupancy level* and the structural variables characteristic of each hospitality firm — expressed by vector Y_2, $DC(QI,Y_2)$ (Daughety et al. 1984). Buzzell et al. (1975) carried out one of the most pioneering works concerning the effect of *occupancy level* on *direct costs per room*. According to these authors, an increase in the *level of occupancy* causes a reduction in the *direct costs per room*, and

therefore β_{OLDC} will have a negative value. This is due to the fact that, as sales increase — in this case the *level of occupancy* — the negotiation conditions with providers improve and labor costs per room decline due to the increase in productivity (Wheelwright 1981, Fine 1983).

Among the structural variables, the *number of employees per room* is especially relevant to the structure of the business' direct costs (Figuerola 1995). The effect of this variable is expressed by the parameter β_{ERDC}. This parameter should be negative and is especially important in the hospitality industry, because, as Mohanty and Rajput (1988) point out, labor productivity has an increasing effect on the *average direct costs* as they are used in the production process. This situation is typical in luxury hotels characterized by the use of intensive labor.

Equation [3] analyzes the determinants of the hotel's *market share*. The direct effect of *service quality* on this variable is shown by parameter α_{MS}. Its sign is positive, since an increase in quality will generate an increase in sales due to client loyalty and gaining new clients (Camisón 1996). Cronin and Taylor (1992) investigated this relationship via the increase in client satisfaction and their purchase intentions. Similarly, the works of Parasuraman et al. (1985, 1986), Bitner (1990), and Bolton and Drew (1991) estimate that service quality and client satisfaction has a positive effect on client purchase intentions, and so α_{MS} must have a positive value.

Besides *service quality*, other variables, such as the *size of the hotel*, *occupancy level*, and *price of the service*, will have an effect on *market share*. An increase in the *size of the hotel* will allow an increase in sales, as it will now have greater capacity, and so β_{SMS} must have positive values. The parameter β_{OLMS} will also have positive values, since the increase in sales associated with a greater occupancy level increases the *market share* of the hotel (Schlesinger and Heskett 1993). In the work of Buzzell and Wiersema (1981), the effect of the *price of the service* on the *market share* is less than the impact of *service quality* on *market share*. The expected value for the parameter β_{PMS} is positive or negative depending on whether the demand is inelastic or elastic, respectively, on the assumption that the price policy of a given hotel does not have an effect on total market volume sales.

Equation [4] allows us to estimate the direct effect of *service quality* on business competitiveness measured by the *returns per room*. According to Schlesinger and Heskett (1993), it must have a positive value, indicating that *service quality* is a way to increase business returns. These authors obtained these results from the implementation of quality systems in the Fairfield Inn hotel chain. Walker and Salameh (1990), Partlow (1993), and Simmons and Teare (1993), among others, obtained similar results.

The direct effect of *market share* on business returns is shown in the work of Buzzell et al. (1975). According to these authors an increase in *market share* generates an immediate positive effect on business returns, and β_{MSR} is positive. Normally, leading firms — i.e., those with a large market share— implement more efficient management systems, their degree of vertical integration tends to be very high, and their investments, including those in R&D, are also strong. On the other hand, the effect of *occupancy levels* on the *returns per room* in the hotel sector — whose demand is highly seasonal— is very important due to the excess of supply during low-season periods, which can decrease returns and cause important structural and financial problems (Bull 1995).

The effect of *price of the service* on *returns per room* is given by the parameter β_{PR}. The direct effect of price on business returns is due to its impact on total income. An increase in price causes an increase in total income, as long as the demand price elasticity is less than the unit in absolute terms, and so the parameter involved will have a positive value. The opposite takes place if the demand is elastic, in which case β_{PR} takes a negative value. If the increase in price is driven by an increase in *average direct costs*, this cost increase has a negative effect on *returns per room* since β_{DCR} has to be negative.

Finally, it is necessary to include in the analysis of returns the negative effect of average indirect costs on this variable ($\beta_{ICR}<0$). As we stated earlier, although these costs should not be taken into account for pricing, they are essential when the analysis focuses on business returns (A.E.C.A. 1993).

The theoretical model presented here will be used to test a series of hypotheses which are highly relevant to business and useful for designing new initiatives in tourism policy. Table 4 shows a summary of the hypotheses analyzed.

Table 4. Tested Hypotheses

Hypothesis 1	Direct and positive effect of service quality on the competitiveness of business.
Hypothesis 2	Direct and positive effect of service quality on the price of the service and on market share.
Hypothesis 3	Direct effect of service quality on average direct costs.
Hypothesis 4	Positive effect of average direct costs on the price of the service.
Hypothesis 5	Positive effect of the price of the service on the returns per room.
Hypothesis 6	Negative effect of occupancy level on average direct costs.
Hypothesis 7	Positive effect of the number of employees per room, and negative effect of hotel size on average direct costs.
Hypothesis 8	Positive effect of the occupancy level as indicator of demand seasonality on the price of the service.
Hypothesis 9	Negative effect of average indirect costs on returns per room.

III. DATA SOURCE AND DESIGN OF THE PERCEIVED QUALITY INDICATOR

The structural and the financial and economic variables of the model were created from the monthly data provided by 17 four- and five-star hotels —corresponding to 1997, 1998 and 1999—, and belonging to a large chain in Andalusia. The criteria described in Table 2 were used to this end. The perceived quality indicator was created from the information provided by the client surveys carried out by the hotels during the same period.

The concept of *perceived quality* has been intensively discussed in the literature. As Camisón and Bou (2000) point out, this term is usually defined as "A global evaluative opinion from the clients that reflect their attitude towards the excellence or the superiority of the product in relation to their needs." From this definition, it can be deduced that perceived quality is a highly subjective judgment (Holbrook and Corfman 1985, Carman 1990, Cronin and Taylor 1992). In addition, this concept has a global character, despite being defined by the characteristics of the service (Olshausky 1985). Finally, it is a relative indicator of quality, since it depends on the interaction between the client and the service received (Steenkamp 1990).

The client survey carried out by each hotel served to create the indicators of perceived quality as it provides information concerning the opinions of clients about the services received, especially room, food and beverages, and reception services as well as lounges and other communal areas services. The measurement for each of the service features was based on a scale of five: very satisfactory, satisfactory, acceptable, unsatisfactory, and very unsatisfactory. The most relevant aspects of the sample design are shown in Table 5.

Table 5. Technical file

Scope of the research	4- and 5-star hotels in Andalusia		
Population	Clients of hospitality services		
Period	1997	1998	1999
Size of the sample (1)	24,422	14,397	15,794
Sample error	10%	10%	10%
Level of confidence	95%	95%	95%

(1) Total number of surveys.

The construction of the perceived quality indicator (QI), uses the Lancaster model as the theoretical framework (Lancaster 1966). From this model Rosen (1974) developed a pricing model for differentiated markets and defined quality of service indicators (QI) from the set of characteristics the service includes (Z); thus QI=f(Z). The dimensions of such indicators are created by classifying the attributes into categories with the use of exploratory or confirmatory analysis techniques. Confirmatory analysis techniques allow the researcher to define *a priori* the dimensions of service quality, based on theoretical knowledge or on previous empirical research. Therefore, $QI=f(D_1, D_2,...D_j,....D_m)$, where "m" is the number of dimensions under consideration, and $D_j=g(Z_{ij})$, where Z_{ij} are the characteristics (Z_i) included in dimension "j". In this paper, the characteristics are grouped following Gundersen et al. (1996), and thus, we take into account the quality perceived by the client for each of the four services provided by the hotel, i.e., *room services* (D_1), *food and beverages services* (D_2), *reception/check-in services* (D_3), and *lounge and other communal areas services* (D_4).

The quality indicator is created using Structural Equation Modelling (S.E.M.). As Chin (1998) stated, S.E.M. models are second-generation multivariate analysis techniques since they involve

generalizations and extensions of first-generation techniques, and thus they allow the estimation and validation of models with both latent (i.e., unobserved) variables — such as service quality dimensions or the indicator of perceived quality — and measured (i.e., observed) variables — such as clients' opinions regarding the characteristics of the service. Using S.E.M. models, the relative weighs (α_{ij}) of the service characteristics (Z_{ij}) — included in each dimension (D_j) — can be quantified as well as the effect of each dimension on the indicator of perceived quality (β_j). In this way, the key aspects involved in client satisfaction can be elucidated in order to take the relevant steps to increase them.

Table 6. Perceived Quality Indicator

D_1: Room services; b_1 = 0.87 (18.02)			
α_{11} = 0.80 (11.55) Bed comfort	α_{21} = 0.89 (26.62) Quality of bathroom linen	α_{31} = 0.97 (30.29) Cleanliness of the room	α_{41} = 0.80 (22.85) Quietness during cleaning
D_2: Food and beverages services; b_2 = 0.77 (15.49)			
α_{12} = 0.89 (23.27) Friendliness of the staff	α_{22} = 0.81 (21.19) Speed of the service	α_{32} = 0.51 (12.39) Variety of products from the region	α_{42} = 0.78 (15.45) Breakfast time
D_3: Reception/check-in services; b_3 = 0.76 (16.99)			
α_{13} = 0.90 (20.45) Friendliness in the reception deck	α_{23} = 0.78 (24.87) Professionalism during booking	α_{33} = 0.92 (32.88) Speed of the check-in process	
D_4: Lounge and other communal areas services; b_4 = 0.99 (19.69)			
α_{14} = 0.84 (19.83) Level of quietness in the lounge	α_{24} = 0.91 (30.02) State/quality of furniture	α_{34} = 0.95 (32.37) Cleanliness of lounges and communal areas	
Goodness-of-fit of the model (1)			
NFI	0.754		
NNFI	0.705		
CFI	0.763		
RMSEA	0.22		
AIC (2)	2020.14		
CAIC (2)	1619.11		
CHI-SQUARE (2)	2168.10		

(1) The goodness-of-fit of the model is carried out with normed and non-normed measurements. Among the normed measurements, the statistics *Normed Fit Index (NFI), Non-Normed Fit Index (NNFI), Comparative Fit Index (CFI),* and *Root-Mean-Square Error Approximation (RMSEA)* were used, the latter being based on the residuals of the model. Among the non-normed measurements, the *AIC* and the *CAIC* statistics were used as well as *Chi-Square* with "df" degrees of freedom, where df= n(n-1)/2, with "n" being the number of observed variables.

(2) This statistic has the smallest value of all the models under analysis. t-ratios in parenthesis

The maximum likelihood method is used for the estimation, opting for the standardized solution of parameters α_{ij} and β_j. Before estimating the model, a preliminary study of the correlation

matrices for those characteristics belonging to the same dimension was carried out. This information was used to eliminate from the dimension those characteristics that caused high correlations (>0.85) with other characteristics — thus preventing possible multicolinearity problems. Similarly, those characteristics were eliminated that did not yield statistically significant differences in the perceived quality indicator. The attributes used for the final specification are listed in Table 6. The results from the estimation and the goodness-of-fit of the quality indicator are shown in Table 6.

The estimation of this model reveals the relative importance of each quality dimension linked to the four services provided by the hotel regarding the perceived quality indicator. The dimension that made the greatest contribution to client satisfaction was *lounge and other communal areas services* (0.99), followed by *room services* (0.87), *food and beverage services* (0.77), and *reception/check-in services* (0.76). The scores given to these coefficients should help the hotel management to reflect upon the core services they offer and therefore on which area improvement should be focussed.

IV. ESTIMATION AND ANALYSIS OF RESULTS

Before the estimation, the order and rank conditions needed to identify the parameters, used in the equations shown in Table 3, are verified. The estimation is calculated using the *3-Stage Least Squares Method* (3SLS). This is an instrumental variable method under *full information* and valid for identified and overidentified equations. It provides greater efficiency in the simultaneous estimation of equations, since it takes into account the existence of correlations between the error terms of each equation. The estimation is carried out as an *seemingly unrelated regression problem*, but in this instance some of the explanatory variables may be endogenous. The estimation of the covariance matrix, Σ, is obtained from the residues of the estimation of each equation by the *2-Stage Least Square Method* (2SLS). This matrix is finally used to simultaneously estimate all the equations of the model by the *generalized least square method* (GLS). Given that the 3SLS uses more information than the 2SLS, the estimation is more efficient, except in the case of equations which are not correlated by their error terms (Theil 1971). The results from the estimation are given in Table 7.

Table 7. Results from the estimation (1)

$P = 0.1016 \cdot QI + 0.4091 \cdot DC + 0.1541 \cdot MS + 0.0893 \cdot OL$ *(6.0889) (17.7893) (8.5229) (4.2152)*	*Adjusted* $R^2 = 0.85$
$DC = -0.0413 \cdot QI - 0.1869 \cdot S + 0.8141 \cdot ER + 0.1898 \cdot OL$ *(-2.0366) (-7.7990) (28.2326) (9.1546)*	*Adjusted* $R^2 = 0.82$
$MS = 0.1232 \cdot QI + 0.6131 \cdot P + 0.1984 \cdot OL + 0.6835 \cdot S$ *(4.9168) (20.0446) (7.2661) (28.6090)*	*Adjusted* $R^2 = 0.70$
$R = 0.2601 \cdot QI - 0.2369 \cdot DC + 0.0707 \cdot MS - 0.2591 \cdot P + 0.6307 \cdot OL - 0.0686 \cdot IC$ *(2.4149) (-5.3099) (1.8122) (-1.9884) (14.0192) (-2.8152)*	*Adjusted* $R^2 = 0.86$

(1) Standardised coefficients. The statistic "t" is given in parenthesis.

(2) The instruments used were the explanatory variables of the models and the *permanent/temporary employees* ratio (PT), *type of building* (TB), *location of the building* (L), and the *amount of complementary activities* (AC) offered by each hotel. *FT* is calculated by dividing the number of permanent workers by the number of temporary workers, *TE* is a dummy variable with three levels that establishes a difference between modern, regional or historical buildings (among the latter were included castles and Manor Houses), and *L* is a dummy variable that makes a distinction between beach destinations, natural environments, and destinations of historical interest.

(3) $\Re^2 = 0.9812$. Where $\Re^2 = 1 - [\det(E'E)/\det(y'y)]$; E being a matrix (612×4) made of four vectors of equation residuals that make up the system, and "y" is a matrix of similar dimensions made of four vectors that give value to the dependant variables of the system expressed as deviation from the mean.

(4) $LR = 2432.0258 \sim \chi^2$ with 5 g.l. Where $LR = -T \cdot \ln(1 - \Re^2)$, where T is the sample size and $\Re^2$ the generalized coefficient of determination. This statistic is distributed as a Chi-square with the number of degrees of freedom equal to the number of explanatory variables of the model, including endogenous variables. The null hypothesis for this verification is H_0: all coefficients are zero.

The partial goodness-of-fit of the equations has been measured by the *adjusted coefficient of determination* (adjusted R^2). However, as Berndt (1991) points out, the goodness-of-fit of individual equations is not suitable as a measurement of fit in a simultaneous equation system. Thus, a *generalized coefficient of determination* (generalized $\Re^2$) is defined to express the percentage of generalized variance of the dependent variables explained by the independent variables of the model. The value of this coefficient reveals that the model presents a good fit. Similarly, the *Likelihood Ratio Test* (LR) is used to verify the joint significance of the systems' coefficients. On the other hand, the individual significance of each coefficient is measured by a *Student's t-test*.

The economic interpretation of the results from the estimation allows us to empirically verify the theoretical hypotheses outlined in Table 4. Their verification throws light onto some important issues regarding improving the competitiveness of the hotels under study.

HYPOTHESIS 1: Direct and positive effect of service quality on the competitiveness of businesses. This is the core hypothesis in this research, since it allows us to empirically verify the direct impact of *service quality* on competitiveness, as measured by the *returns per room*. As expected at a theoretical level, an increase in *service quality* yields a statistically significant increase in returns (α_R=0.2601). The total effect of *service quality* on business competitiveness derives not only from the direct impact, but also from the indirect effects measured through the rest of variables included in the model.

HYPOTHESIS 2: Direct and positive effect of service quality on the price of the service and on market share. The first part of the hypothesis is verified by estimating the coefficient α_P, (α_P=0.1016). Its positive sign reveals that hotels are able to raise the *price of services* as their quality increases. This relationship is driven by the fact that clients are willing to pay more, if the services offered are well-differentiated and adapted to their ideal preferences. The α_{MS} coefficient shows that *service quality* has a positive effect on the *market share* (α_{MS}=0.1232), contrary to the results obtained by other authors such as Cronin and Taylor (1992). This relationship is driven by client loyalty, and by the increase in client purchase intentions, which facilitates the penetration of the hotel into new market segments and increases the number of visits by the habitual clientele.

HYPOTHESIS 3: Direct effect of service quality on average direct costs. One of the most important issues to check when implementing a quality system in a hotel are the repercussions such measures will have on *average direct costs.* Indeed, it has to be determined whether increasing the quality of the service will be expensive for the business. For the group of hotels under study, the analysis suggests that *service quality* reduces *average direct costs.* The coefficient α_{DC} has a negative value (α_{DC}=-0.0413). Thus, the implicit assumptions of models based on the *Learning Curve in Quality* or management systems based on *Quality Total Costs* are verified. Both models assert that increasing quality reduces *direct costs per room* by eliminating the need to repeat processes, reducing evaluation costs, and other costs arising from failure in the service provided.

HYPOTHESIS 4: Positive effect of average direct costs on the price of the service. The positive relationship existing between both variables, (β_{DCP} = 0.4091), corroborates the use of mark-up for

pricing the service. The positive value of this coefficient shows to some extent the hotels' market power when raising their *service quality* since, on the one hand, they raise the *price of the service*, and on the other, they reduce *direct costs per room* (hypothesis 3). Both outcomes demonstrate the increase in profit margins with improvement in *service quality.*

HYPOTHESIS 5: Positive effect of the price of the service on returns per room. This hypothesis is rejected since the coefficient β_{PR} has a negative value; (β_{PR}= -0.2591). This reveals the existence of clients especially sensitive to price, who react to a rise by decreasing the use of the services provided by the hotels. The fact that pricing has a negative effect on returns is due to the fact that the increase in price translates into a reduction in operating revenues.

HYPOTHESIS 6: Negative effect of occupancy level on average direct costs. The verification of this hypothesis is based on the sign of the coefficient β_{OLDC}. A negative sign in this coefficient means that as the *occupancy of the hotel* increases, the *direct costs per room* are reduced. However, this is not the case in this study, as β_{OLDC} has a positive sign (β_{GOCD}=0.1898), indicating that the technology used by the hotels under analysis is subject to a decreasing mean productivity. This is due to the fact that in most hotels workforce costs are much higher than the other current operation expenses, and so the evolution of *direct costs per room* is mainly driven by workforce productivity.

HYPOTHESIS 7. Positive effect of the number of employees per room and negative effect of hotel size on average direct costs. The coefficient β_{ERDC}, besides taking a positive value (β_{ERDC}=0.8141), is the highest coefficient of all those associated with the explanatory variables of *average direct costs.* In fact, for many authors, although the employees/room ratio is an indicator of quality and personal service, its control is essential in order to harness *direct costs per room*. In the hotels studied, this ratio reaches a value close to 1, which is considerably higher than the average in the hotel industry of Andalusia. Indeed, the *number of employees per room* in Andalusia was 0.138 in 1995, and by 2000 it had increased to 0.147. Nevertheless, these figures should be interpreted with caution since no category distinction is established for the hotels (S.A.E.T.A. Nº 22).

On the other hand, the *size of hotel* is also a significant variable, although its weight is considerably lower than the previous one (β_{SDC}=-0.1869). Despite *average direct costs* increasing with *occupancy level*, they decline as the *size of the hotel* increases. In fact, according to the estimation, as the *size of the hotel* increases, *direct costs per room* decrease. This is so because the size allows for the distribution of some fixed direct costs between a greater number of rooms, and so their mean value is reduced. It has to be borne in mind that in the case under study, the greatest proportion of direct costs refers to labor costs and where the percentage of permanent employment is superior to 95%. Therefore, it can be safely assumed that most direct costs have a fixed character.

HYPOTHESIS 8. Positive effect of the occupancy level as an indicator of the seasona demand on the price of the service. The positive sign of its corresponding coefficient (β_{OLP}=0.0893), shows the opportunity hotels have to raise prices in times of high demand. In short, it can be asserted that in the high seasons (high *occupancy level*), the *prices* are considerably higher than those during low seasons (low *occupancy level*) .

HYPOTHESIS 9. Negative effect of average indirect costs on returns per room. As suggested by the Spanish Association for Accounting and Business Administration (A.E.C.A. 1993) or by the work of Phillips et al. (1983), *indirect costs per room* should not be taken into account for pricing, but they should be included in the analysis of business returns. Indeed, *average indirect costs* are significant in the 4th equation of the model, as they have a negative effect on *returns per room* (β_{ICR}=-0.0686).

V. CONCLUSIONS

The main purpose of this research was to analyze the effects of *service quality* on the competitiveness of a group of hotels. To this end, a theoretical framework has been defined to verify empirically the direct and indirect relationships between both variables, which were categorized as external and internal effects. The external effects of the quality perceived by clients are evaluated according to customer satisfaction regarding the services provided, its influence on each hotel's volume sales, and the client's willingness to pay, measured by the *price of the service*. The estimation of the internal effects of quality on competitiveness is made

through *average direct costs*. The results of this estimation are compatible with the assumption implicit in management systems based on *Quality Total Costs* or on the *Learning Curve Model in Quality*, demonstrating that improvements in the quality perceived by clients should be considered an investment rather than a cost for the firm.

The sign and value of the coefficients estimated by the model presented lead to a series of conclusions regarding the complex sequence of direct and indirect causal relationships between quality and competitiveness of the hotels under study. To this end, a set of theoretical hypotheses of great importance, from a business point of view, were put to the test. The existence of a direct positive effect between *service quality* and *returns per room* was corroborated. This latter variable was used as a *proxy* to measure business competitiveness and had the greatest weight after *level of occupancy*. In addition, empirical evidence was found concerning the indirect positive effect of *service quality* on *returns per room*, through *average direct costs*. However, quality has a negative influence on *returns per room* when the *price of the service* is taken into account, because although quality permits price increases by enhancing differentiation levels, the effect of price on sales income is negative, as the hotels studied present elastic demand. This result suggests that price policies should not be the only competitive strategy used by the hotels analyzed.

The existence of a positive link between *quality* and *market share* is verified, and is driven by client loyalty and an increase in sales figures. However, *market share* is barely significant regarding *returns per room*. Similarly, the positive effect of the seasonality of demand — measured by monthly *occupancy levels* — on the *price of the service* was verified. On the other hand, *price of the service* has a negative impact on *market share*, and *average indirect costs* also have a negative effect on *returns per room*.

As a final conclusion, it is worth noting that *service quality* not only has a positive and direct effect on competitiveness, but also has an indirect effect on it via other variables such as the *price of service* or *average direct costs*. Second, it would be advisable to deepen the understanding — and quantification — of the relationships existing between *service quality* and business competitiveness, so the business industry can implement more efficient management systems. In

this sense, a future line of research aimed at expanding the work presented here would consist in defining a methodology able to evaluate the viability of policies for improvements suggested by hotels by estimating the returns increases such policies would have as a consequence of improving the quality of the services provided to their clients.

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