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# QUALITY AND CUSTOMER SATISFACTION: RELATIONSHIPS AND DYNAMICS. A CASE STUDY

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## **Abstract**

Customer satisfaction is central to strategic management oriented to quality. The quality of products/services generates, in fact, the customer satisfaction. The aim of the research is to demonstrate the existence of a linear dependence between quality and customer satisfaction. The survey tool is the questionnaire and the analysis of the data was used: (1) factor analysis (with the aim of reducing the numerosity of variables without losing their significance), (2) multiple linear regression analysis (with the aim to analyze the relationships between quality and satisfaction), (3) analysis of the residue (with the aim to validate the results). Analysis of the data has proved the existence of a dependency link between quality and customer satisfaction. Quality-oriented firm generates, therefore, greater customer satisfaction. The paper demonstrate the existence of a construct that combines quality and customer satisfaction, widely debated in the scientific community, in relation to the specificity of services.

**Keywords:** Quality, Customer satisfaction, Customer loyalty, Multiple linear regression analysis, Retail, Service, Hypermarket.

## **1. INTRODUCTION**

The increased interest in the relationship with customers has been explained using the evidence of the increased technological, competitive and relational complexity (Busacca, 1994). Actually the evolution of competitive forms, the progressive saturation in many markets, and structural modification of the exchange processes, partly introduced by the emergence of digital economy networks, are common phenomena, which definitely make the market strategies more complex to manage, and force companies to adopt a perspective primarily oriented to development and consolidation of customer relationships (Costabile, 2001; Costabile *et al.* 2004). The continuous effort to increase customer satisfaction has led many companies to adopt the principles of total quality management. As shown in the first chapter the Total Quality Management is an approach applied to the entire organization that provides a continuous quality improvement of all processes, products or services of the company (Kotler and Kevin, 2007). If one of the aims of TQM is customer satisfaction, we can surely say that with dissatisfied customer quality does not exist, but the positive perception of the product or service cannot

ignore quality (Reed *et al.* 2000). It is quality itself that generates customer satisfaction that in turn leads to an increased competitive position (Reed *et. al* 2000).

A well planned marketing orientation is the first step for building a long term relationship with customers and it implies keeping customers informed and providing them with appropriate stimuli. Customer-focused companies are expert not only in supplying the product, but also in building the relationship with customers; in other words, they are expert not exclusively in the product definition, but also in the marketplace creation and development (Costabile, 2001; Kotler and Kevin, 2007). In an extremely dynamic context the skill to anticipate customers needs is the key point of marketing decisions (Kohli and Jaworski, 1990; Guatri, 1991, 1997; Webster Jr F.E., 1994; Valdani, 1995; Valdani and Busacca, 2000; Busacca *et al.* 2003, Cozzi and Ferrero, 2004). That new point of view defined as customer based view does not just deal with marketing policies and market analysis procedures, but it implies bringing all the business system into line with the stated customer needs (Aaker, 1991, 1996; Grönroos, 1994; Vicari, 1995; Schmitt, 1999; Busacca, 2000; Chaudhuri and Holbrook, 2001; Delgado *et al.*, 2003; Kapferer, 2004; Keller, 1993, Keller *et al.*, 2003, 2006). John Chambers, Cisco System's CEO, summarized the concept clearly and effectively: "Make your customer the center of your culture" (Kotler, 2007, p.169). Cultivating long term relationship with consumers, then, represents the winning strategy to face the difficulties coming from a highly competitive market. It follows that today trust and knowledge are considered by many experts as the two most intangible resources of a company for its success (Aaker, 1989; Amit and Shoemaker, 1993; Gale, 1994; Costabile, 2001; Ulaga, 2001; Bertuzzi 2003).

## 2. THEORY

### *Quality and customer satisfaction*

In 1970 gurus of quality claimed that quality is free. This means that a constant pursuit of improvement should allow the company to become more efficient and to increase customer satisfaction leading to costs reduction and generating new, suitable and repeated profits, so that the company can recover the investments in quality (Deming, 1982, 1986, 1991; Ishikawa, 1985, 1989, 1997; Juran, 1991, 1993, 1997; Feigenbaum, 1991; Feigenbaum *et al.*, 2004; Adam *et al.*, 1997; Choi and Behling, 1997; Adam and Foster, 2000; Adebajo, 2001) This concept was the basis for the success of many Japanese companies. Later, focusing the attention directly on customer satisfaction became the explicit objective of many experts. It was claimed that it was less expensive simply to satisfy and retain customers than to replace them constantly (Ford, 1980; Dwyer *et al.*, 1987; Fornell, 1992; Anderson *et al.*, 1994; Grönroos, 1994; Anderson *et al.* 1997). More recently, quality and satisfaction by themselves have been

considered not enough anymore. Nowadays, companies go above quality and satisfaction in order to focus on customer retention as if it was the key of increasing profits (Mohr and Spekman, 1994; Peppers and Rogers, 1999, 2001; Lanning, 1998; Fickel, 1999; Garbarino and Johnson, 1999; Eckerson and Watson, 2000; Swanson and Kelley, 2001; Sirdeshmukh *et al.*, 2002; Reichheld, 2006; Reid *et al.*, 2011; Ganiyu, 2012;). According to a systemic approach, quality, satisfaction and loyalty are, however, factors of a cause-effect chain. There is a real connection among those factors, and the increase in satisfaction and retention really raises profits (Jones and Sasser Jr., 1995; Oliver, 1999; Costabile, 2001; Agustin and Singh, 2002; Lemon *et al.*, 2002; Kotler and Keller, 2007).

Customer satisfaction results from the comparison between the performances of the purchased product and the expectations customer had before the purchase (confirmation-disconfirmation model) (Cardozo, 1965; Hunt, 1977; Olson and Dover, 1979, Oliver, 1980, 1997; Westbrook, 1981, Cadotte *et al.*, 1987; Hoyer and MacInnis, 2001; Kotler and Keller, 2007; Angelova and Zekiri, 2011; Rahman *et al.*, 2012). Generally, satisfaction – or on the contrary dissatisfaction – is a particular feeling of delight or disappointment deriving from the comparison between performances obtained with a product and personal expectations. When the product performances are poorer than expected, customer is unsatisfied; when performances meet customers' expectations, he is satisfied, when performances exceed expectations, customer is extremely satisfied. Only a very satisfied customer, however, shows repurchase intention and a strong inclination for positive word-of-mouth (Oliver, 1999; Anderson and Narus, 1990; Agustin and Singh, 2002; Lemon *et al.*, 2002; Reichheld, 2006). A very important aspect, then, is to surprise customer so that the perceived quality is enough to strengthen loyalty.

### 3. METHODOLOGY

The analysis model is based on the assumption that a quality-oriented approach helps to make the customer satisfied. Although the customer satisfaction and the quality of a product or service are often used as synonyms, actually there is a profound difference between the two, as the first is a direct function of the second. If the quality of a product/service is determined by its compliance with a whole series of parameters, customer satisfaction is given by the coincidence between the expectations of quality and its perception. Paradoxically, there may be a high quality product/service that does not satisfy the customer, because it did not meet his real needs. The variable of satisfaction is therefore proportional to the variable quality. For this purpose, a questionnaire has been prepared to investigate the relationship between quality and customer satisfaction in order to validate whether or not the hypothesis that a quality-oriented management has a significant impact on customer satisfaction. The goal is to demonstrate how the variables related to quality, put together as a system, determine

customer satisfaction. The research, developed over the years 2010, was carried out in the service sector and more precisely at a large retail hypermarket in Viterbo, Italy. The difficulty in clearly identifying the exact population of the hypermarket customers led, , to the adoption of a sampling scheme of non-probabilistic kind and in particular to a sampling of accidental type, as widely occurs in market research. The sample of respondents is composed of approximately 500 individuals for each analysed year. The data collection was carried out by means of the questionnaires, inside the hypermarket, and it was self-compiled or with direct interview. The entire phase of data collection was carried out within a week and in different time slots within the day, so to ensure, on the one hand, a uniform condition degree of the data collection (which instead could not be respected when data collection is extended over a long period of time) and, on the other, the best representation of the different type of customer of the hypermarket.

As mentioned above, the survey instrument was the questionnaire, where the following three main areas of analysis were identified: (1) Customer profile containing information on socio-demographic and customer behaviour necessary to identify the personal characteristics. In particular, the questions subjected to analysis for the cluster study, were on gender, age, profession and frequency to hypermarket, (2) Quality perceived by customers in relation to services offered by the hypermarket, with reference to the structure (logistics and the internal organization of departments, cleaning of departments ...), services (staff, the efficiency at checkout ...) and products (factors influencing the purchase, brand/product assortment...); (3) Customer Satisfaction concerning the satisfaction both in relation to the three quality factors (structure, services, products) and the relationship established by the customer with the hypermarket.

The answer to the questions related to the customer perception of quality have been structured on the basis of the Likert-type measurement scale, with a score, assigned by the respondents, between 1 and 6, where 6 expresses the maximum positive evaluation (fully satisfied) and 1 the negative (very little satisfied). For the aims of the survey it was decided to use an even scale instead of an odd scale since the objective was to sharply identify the satisfied (ie those who gave 4, 5 and 6 as score) from the not satisfied (those who gave 1, 2 and 3 as score), avoiding the respondent to locate on a central value that usually identifies those who are indifferent to the item. Regarding the perceived quality concerning the structure, some characteristic aspects of a large retail hypermarket have been investigated, such as the logistics, referred to as the customer ease to identify the products and the cleaning of single departments.

The perceived quality of services has been analysed by studying other variables, such as the waiting time at the checkout lane, and their efficiency, mainly for differentiated lanes, and the professionalism of frontline staff, ie those who are in direct contact with customers.

The questions on the perceived product quality refer to the factors that affect the purchase and quality/assortment of displayed products.

For customer satisfaction 7 questions were prepared; but only the question of concerning the level of customer satisfaction regarding the relationship established with the hypermarket in time was judged significant for the purposes of this study.

The processing of the collected data was carried out firstly with a descriptive purpose, by using statistical position and variability indicators, and successively, also by means of multivariate tool analysis and multiple linear regression models. The different elaborations were performed using the statistical program "STATA Statistics/Data Analysis."

In order to define business goals and prepare the relevant strategies, each company must know the characteristics, needs and likely customer behaviour. Since characteristics and behaviours are generally marked by a more or less heterogeneity degree different strategies will be required, specifically addressed to different types of customers. (Bracalente et al. 2009)

The objective of the analysis is to identify the socio-demographic and behavioural characteristics of satisfied and dissatisfied customers, to subsequently verify the existence of a dependency relation between quality and customer satisfaction; for the first purpose the classic a posteriori segmentation process involving the application of cluster analysis of techniques and preceded by the factor analysis has been used, in order to synthesize the variables observed in macro choice elements, while for the second objective the Multiple linear regression model has been applied.

Through the analysis by main components the dimensionality of the information from variables has been reduced. In market research, especially based on consumer surveys, as in this case, information regarding various characteristics of a product or service, are often collected with tens variables; they concern different topics but are conceptually related and overlapping; variables that sometimes provide information already included in other variables and partly, however, consist of an original explanatory contribution. That is why the factor analysis is of great help in these cases.

Once the explanatory quality variable have been summarized in macro elements, the cluster analysis allows studying the customer behaviour, segmenting satisfied and dissatisfied customers. The cluster

analysis is a technique that allows grouping similar individuals similar on the base of certain characteristics, so as to form groups or segments characterized by high homogeneity.

The cluster analysis, in fact, has allowed the identification of different customer groups based on their level of satisfaction/dissatisfaction. The level of customer satisfaction has been studied in relation to the quality variable.

When studied the behaviour and socio-demographic characteristics of customers, the research has hypothesized the existence of a linear function relation between satisfaction and quality variables. To this aim, the multiple regression analysis has allowed whether validating the hypothesis or not. Additional confirmatory testing, such as the study of residuals, has ensured that the assumed relation is actually linear and that the assumptions at the base of the model estimation, are met. Using the results of factor analysis has been helpful for the estimated regression model, in order to eliminate redundancies in the observed variables. As it often happens in market research, in fact, the undetected variables, do not represent a specific and distinct role in shaping the customer opinion; several factors which may appear disjoint, are plausibly interrelated and overlapping in the assessment made by the customer about satisfaction for a particular product or service. This situation negatively affects, however, the estimation of the parameters of a regression model due to the presence of multicollinearity between the different explanatory variables. Instead, the use of the main components as regressors eliminates this problem since the components are, by definition, uncorrelated between them.

Within the demand segmentation, the factor analysis is used to synthesize a series of importance evaluations provided on some specific characteristics of the product/service studied, in order to identify the milestone of customer opinions. The factor analysis is generally useful to provide a brief explanation of all relationships identified through the market investigation, namely when it is necessary to "condense" and "reduce" the data, trying to lose the least amount of relevant information.

#### *Factor Analysis*

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Table 1, exemplify a concise breakdown of the variables within the questionnaire.

TABLE 1 – VARIABLE

Variable	Dimension	Factor	
<b>Structure</b>	Logistics	Ease at finding products	
		Ease at finding special price products	
	Department cleaning	Fruit and vegetables	
		Meat	
		Fish	
		Grocery	
		House/person care	
		Technology	
	<b>Services</b>	Staff	Professional
			Courteous
Helpful			
Quick in answering			
Checkout		Capable of solving problems	
		Wait at the checkout	
		Dedicated checkout lanes efficiency	
<b>Products</b>	Products	Brand	
		Price	
		Origin	
		Assortment	
		Quality	
Customer satisfaction		Relationship with the hypermarket	

Source: our elaboration

The correlation between single variables has proved the existence of a strong link between the variables. There is, therefore, a problem of multicollinearity (see Annex I).

Through factor analysis, the number of variables in the regression model were reduced from 20 to 6. The new variables, as main components, are uncorrelated with each other, then carrying a different information content. They are the most relevant to represent the phenomenon observed since they are able to "explain" most of the variance (or the information content) of the variables themselves. Also for the following years the factor analysis of all variables was repeated (see Annex I).

TABLE 2 – THE NEW VARIABLES

THE NEW VARIABLES		
<b>STRUCTURE</b>	PC - 1	DEPARTMENTCLEANING
	PC - 2	LOGISTICS
<b>SERVICES</b>	PC - 3	PERSONNEL
	PC - 4	CHECKOUTS
<b>PRODUCTS</b>	PC - 5	QUALITY
	PC-6	PRICE/BRENDE

Source: elaborations on direct survey

#### 4. RESULTS

The research has aimed to verify the existence of a functional link between quality and satisfaction. In particular the goal is to understand whether or not the quality system has a significant impact on customer satisfaction.

In building up the multiple linear regression model the new 5 variables obtained from the factor analysis are the explanatory variables while satisfaction ("How satisfied are you with the relationship you have with this hypermarket?") is the dependent variable. For the estimation of the regression model, the variables obtained from the results of factor analysis were used, in order to eliminate redundancies in the observed variables. The analysis of the correlation matrices, in fact, has shown strong links between the variables and has put the problems of multicollinearity (the presence of perfect multicollinearity which occurs when one or more regressors are perfectly linearly linked prevents from estimating regression coefficients The crossed products matrix has not full RANGE and is not invertible); for this reason the main components have been chosen for the study.

The imperfect multicollinearity among some variables does not prevent the estimation of the regression model parameters, nor it involves a logical problem in the choice of regressors. However, it implies that one or more regression coefficients can be loosely estimated ie with very high standard error and/or with different sign from what expected. In different regression models on the original variables, problems in the estimation of the regression coefficients have been highlighted, in fact. Moreover, the choice of the main components is also based on another consideration. In market researches, especially those based on consumer surveys, many variables are noted, often with different topics but related or conceptually overlapping. Unlike the observed variables, each factor will contain an informative, not overlapping, and completely independent contribution from that provided by other factors.

TABLE 3– EVALUATION OF THE GOODNESS-OF-FIT - 2010

Number of obs =	436
R-squared	0.3561
<b>Adj R-squared</b>	<b>0.3471</b>
Root MSE	0.81158

Source: elaborations on direct survey

TABLE 4 – TABLE OF VARIANCE ANALYSIS - 2010

Source	SS	df	MS	F
<b>Model</b>	156.296646	6	<b>26.0494411</b>	<b>39.55 (0.000)</b>
<b>Residual</b>	282.565739	429	0.658661396	
<b>Total</b>	438.862385	435	1.00887905	

Source: elaborations on direct survey

TABLE 5 – REGRESSION MODEL - 2010

Dependent variable: Customer Satisfaction "Satisfaction capacity hyper to meet requirements"				
	Coef.	Significance	Std. Err	P> t
Cost.	4.791	***	0.039	0.000
pc1 – Departments	0.232	***	0.047	0.000
pc2 – Logistics	0.054	*	0.041	0.187
pc3 – Personnel	0.238	***	0.045	0.000
pc4 – Checkouts	-0.0005	*	0.071	0.995
pc5 – Quality	0.244	***	0.045	0.000
pc-6 – Price/Brand	-0.128	***	0.041	0.002

Source: elaborations on direct survey

\*\*\*99% Significance; \*\* 95% Significance; \* 90% Significance

The adjusted R2 index is an index that provides information on the goodness of the model as a whole and expresses the proportion of the total variability of the dependent variable that can be attributed to the linear relationship with the considered independent variables; having a considerable interpretative effectiveness it can be used to summarize the results of a regression model. The value of 'Adjusted R-Squared' ( $0 \leq R^2 \leq 1$ ) allows stating that 35% of the total variability of customer satisfaction is explained by the linear relationship with the quality variables introduced (Table 3).

The estimation data show the presence of a very high ratio between the quality variables as a whole and customer satisfaction and therefore they confirm the hypothesis according to which the satisfaction also depends on the perceived quality.

To verify, on the contrary, the significance of "global" model and test the hypothesis of joint significance of the regressors, the F test is used. The F value is given by the ratio between the average of the squares of the explained variation and the mean of the squares of the residual deviance. Because the two quantities which originate the ratio F are complementary, when one increases the other cannot but decrease. Observing table 4 it can be seen how the value of the explained sum of the squared is greater than the residual, this will lead to a high value of F such as to say that the whole model well fits to the data and that therefore the null hypothesis can be rejected in favour of the others.

To assess the significance of the single estimated coefficients, the t-test is used. As it can be seen the test is performed by comparing the value of the statistic test at null hypothesis with a suitable threshold value, defined by the adopted level of significance. This leads to decide whether or not reject the null hypothesis of the estimated parameter with no statistical significance. An alternative procedure to reach this conclusion is analysing the value of the p-value (or observed significance level), which expresses

the probability of observing a value of the statistic test equal to or greater than the value obtained using the sample data under the null hypothesis (Bracalente et al. 2009).

The lower its value, close to zero, the more the probability that the hypothesis  $H_0 : \beta_j = 0$  may be refused and then it is implicitly possible to accept the alternative hypothesis ( $H_1 : \beta_j \neq 0$ ), namely there is a statistically significant link between the dependent variable and the specific independent considered variable (*ceteri paribus*). In other words, the coefficient of the variable  $X_j$ , which expresses to what extent the dependent variable varies when the independent variable varies, is statistically different from 0.

With a detailed analysis of the regression model estimate results (Table 5) it can be observed that the variables pc1-Departments, pc3-Personnel, pc-5 Quality and pc-6, Prince/Brende are significantly in relation with satisfaction. However, in this model two are the variables that lose significance with respect to customer satisfaction, ie pc2-Logistics and pc4-Checkouts.

Finally, the evaluation of the assumptions underlying the regression model about the distribution of residues is verified on the basis of figures 1 and 2. It is a graphical method that allows evaluating the assumptions of the model and decide whether or not it is appropriate for the data under study (Berenson et al. 2010).

The residuals (specific statistics tests might be developed to verify the hypothesis of normality of residuals and the absence of correlation, but the graph analysis of residuals confirms these assumptions)  $e$  correspond to the difference between the observed values ( $Y_i$ ) and those estimated ( $\hat{Y}_i$ ) of the dependent variable  $Y$ , for given values of independent variables  $X_{i1} X_{i2}$ . Graphically it is possible to observe the residuals through a scatter diagram. Figure 1 shows the validation of assumptions of normality of residuals.

The residuals are normally distributed for each value of  $X$ , and this allows stating that the estimated parameters of model  $\beta_0, \beta_1, \beta_2, \beta_3 \dots$  are not seriously compromised. This assumption is validated by the graph shown in Figure 2, which again compares the distribution of residuals compared to normal. Although the extreme values deviate from the straight line, however, the assumption of normality is respected.

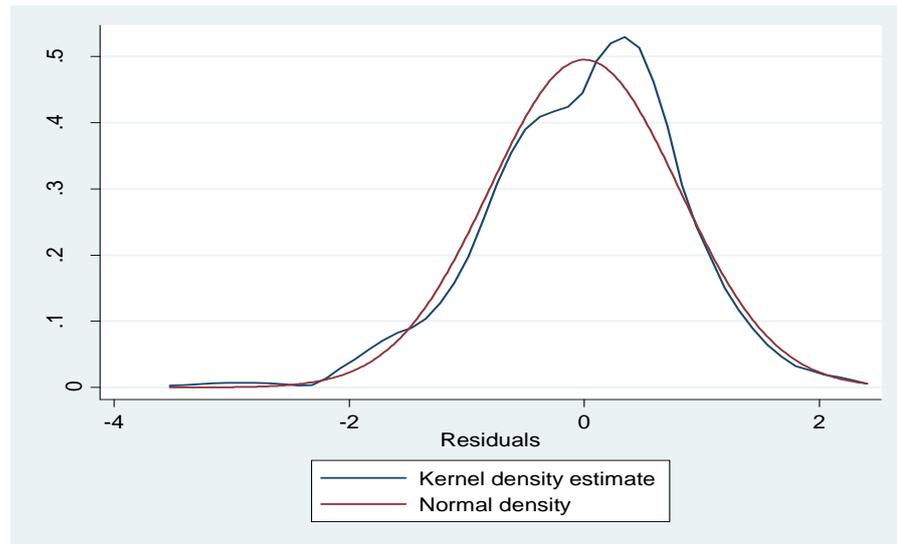


FIGURE 1 – RESIDUAL ANALYSIS - 2010  
Source: elaborations on direct survey

Figure 2 shows the distribution of residues with respect to their median and their performance confirms what assumed in Figure 3. The hypothesis is that the distribution of residues is symmetrical (and in particular around assumed 0, it is the mean). In a symmetrical distribution mean, mode and median overlap, then for residues not only the media must be equal to 0 but also the mode and the median. The distribution of residuals along the bisector proves their symmetrical distribution.

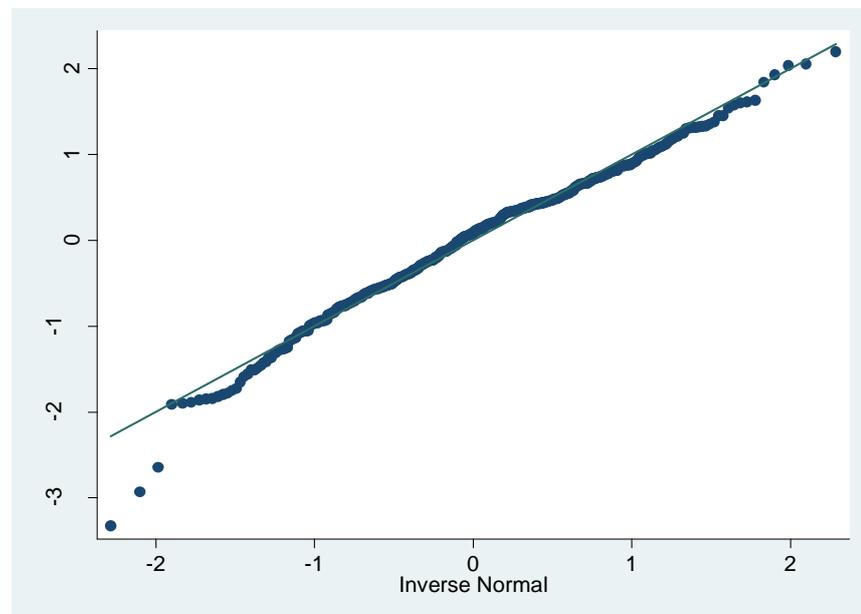


FIGURE 2 QQ-PLOT TO VERIFY THE RESIDUAL NORMALITY – 2010  
Source: elaborations on direct survey

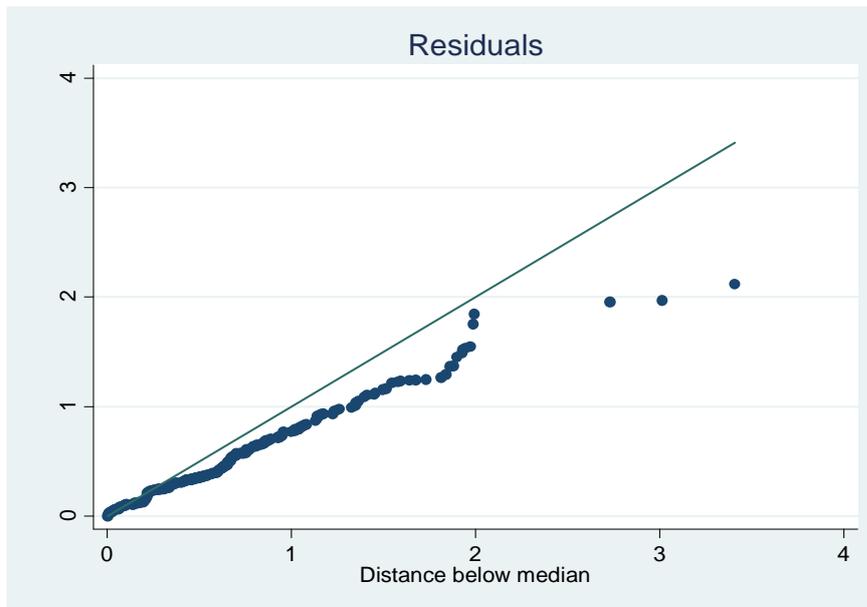


FIGURE 3 – RESIDUAL ANALYSIS– MEDIAN - 2010  
 Source: elaborations on direct survey

## 5. CONCLUSIONS

The relationship between quality and customer satisfaction is under a strong conceptual and management evolution. On the one hand quality is one of the antecedents of customer satisfaction, on the other hand, it is more and more frequently identified with the customer satisfaction itself, although a conceptual difference in the terms still remains. However, without the satisfied customer quality would not exist.

In fact we should start now from considering, as also empirically happened in the present work, the presence of an absolute integrated relationship. If customer satisfaction is mostly pursued within a quality-oriented approach, the chances to have a satisfied customer are greater.

The study and the analysis of the existence of a functional link between the dependent variable (customer satisfaction) and a series of other explanatory variables (quality variables) constitutes the aims of the research.

Research has demonstrated the relationship between quality and customer satisfaction thus empirically showing the existence of a dependency correlation as to validate the theory that customer satisfaction also depends on the perceived quality of the goods and services they receive. In particular, the study

shows how the variables related to the quality, put together in a system, can determine a significant impact on satisfaction.

It is the quality system that affects customer satisfaction; for this reason it should be searched and found in every area of business management because that is the only way to achieve excellence, full and complete customer satisfaction/loyalty.

In the case under study quality includes all the different aspects deemed important for a good perception of quality service by the consumer who, on this basis, expresses his final judgment. The total perceived quality is the synthesis of all these variables while the negative perception of one single factor inevitably affects the overall vision of quality, at the cost of customer satisfaction. To be truly satisfied the consumer must express positive judgments on each of the different areas. Research has shown, therefore, that customer satisfaction is determined not by a single variable, but rather by the aggregate set of the explanatory quality variables; linked together they positively and crucially impact on satisfaction.

The study also based its analysis on the perceived quality. The judgments of the surveyed consumers are expression of personal assessments made after direct experience and therefore on the basis of how the service rendered by the hypermarket is perceived in terms of matching of need and expectations, directly related to the value of the characteristics possessed by the product/service. The perceived quality depends, of course, directly on the producer's ability to correctly identify the expected quality, on his ability to transfer it properly through the various design, development, production and delivery processes of the product/service, but is also strongly related to the communication campaign the company uses to inform the customer on the important aspects of these processes.

Not always what a producer defines quality product/service is likewise evaluated by the consumer. More than ever in services, the quality of a particular product or service is what the customer perceives in it. Customers often have a very broad concept of quality, and aspects other than technical ones can prevail. It is necessary that inside the company quality is defined in the same way as it is by customers, otherwise the programs concerning quality run the risk of being wrong and not cost effective. It must be kept in mind that what matters is the quality, as it is perceived by customers.

The perceived quality may, therefore, differ from the offered quality and the empirical research has highlighted how the perceived quality can play a decisive role on customer satisfaction.

To capture the market then the company must primarily search for customer satisfaction, make every effort to preserve this satisfaction for long time and, above all, know its customers.

Research has thus shown that a corporate strategy quality customer oriented is winning and quality plays a fundamental role for the satisfaction because there is no customer satisfaction without quality.

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