



The employee-customer satisfaction chain in the ECSI model

Employee-customer satisfaction

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Abstract *Among the large number of currently available approaches for studying customer satisfaction, a very promising one is that adopted in the European customer satisfaction index (ECSI) model. Yet, in spite of its various contributions to customer satisfaction research, this approach exhibits certain limitations, of which we will emphasise one: contrary to compelling evidence, the model does not consider the service climate or, more specifically, the cause and effect relationship between employee behaviour and customer satisfaction. The main goal of the present paper is to contribute to counteracting such a limitation. A reformulation of the ECSI model is suggested, integrating it into key components of employee satisfaction models (employee satisfaction, loyalty and commitment) as they are perceived by customers. Both the ECSI model and the ECSI revised model are estimated with data from a survey carried out among supermarket customers. The results show that some variables such as perceived quality, customer satisfaction and loyalty are better explained by the ECSI revised model. Also, statistically significant interactions between the new variables (with the exception of employee loyalty) and some of the ECSI model variables (perceived product quality and perceived service quality) were discovered.*

Introduction

In the 1990s, customer satisfaction had a significant impact on management thinking. In fact, the realisation that understanding, meeting, and anticipating customer needs was probably the most important source of sustained and competitive advantage for a company had a decisive effect on the setting of corporate priorities and practices.

Among the large number of currently available approaches for studying customer satisfaction, a very promising one appears in the Swedish barometer in 1989 (Fornell, 1992). It was followed, in 1994, by the start-up of the American customer satisfaction index (Fornell *et al.*, 1996) and more recently with the preparation of the European customer satisfaction index (ECSI) (ECSI Technical Committee, 1998). This approach computes a customer satisfaction index using an econometric model that, in terms of a causal relationship, ties a set of latent variables (like customer expectations and customer perceptions of quality and value) to a customer satisfaction index. The model then ties this index to customer loyalty and other performance indicators.



However, this approach exhibits certain limitations, of which we will emphasise one: the model does not consider the service climate or, more specifically, the cause and effect relationship between employee behaviour and customer satisfaction. As will be emphasized, the fact that the ECSI model does not consider employee satisfaction and behaviour represents a limitation. The main goal of the present paper is to contribute to counteracting such a limitation.

The paper is organised as follows. The next section surveys previous work regarding the employee-customer link. In the following section, a reformulation of the ECSI model is proposed, integrating some of the components of the employee satisfaction models as they are perceived by customers. The next section deals with methodological questions on measuring customer and employee satisfaction and with the modelling approaches adopted to overcome such difficulties. The estimation method of this revised ECSI model is presented in the following section, while, in the penultimate section, there is an analysis of the results of the estimation of the model, with data from a survey carried out among supermarket customers. The main conclusions are presented in the final section.

Employee-customer links

Several empirical studies (see a survey in Schmit and Allscheid (1995)) show that it is impossible to maintain a satisfied and loyal customer base without satisfied and loyal employees. The studies show a significant impact on customer satisfaction following an improvement in employee attitudes.

The linkage between customer and employee variables has also been depicted by Heskett *et al.* (1997) within a framework termed the service profit chain or employee-customer profit chain. According to this framework, the elements of the chain are interdependent and complex and the size and strength of their influence varies by industry, market segment and even organizational function. Nevertheless, the basic links can be described as follows:

- employee variables like employee satisfaction, commitment and loyalty influence customer perception of the value of the product and service, which in turn influences customer satisfaction;
- customer satisfaction influences customer loyalty; and
- corporate financial results are directly influenced by customer loyalty.

Following this approach[1], Rucci *et al.* (1998) analysed the employee-customer profit chain at the company Sears Roebuck and Co. In their model, employee behaviour is explained by three variables: attitude about the job, attitude about the company and employee retention. They have estimated that a five-point improvement in employee attitudes drives a 1.3 point rise in customer satisfaction, which in turn will drive a 0.5 per cent improvement in revenue growth. As is explicitly emphasised (Rucci *et al.*, 1998, p. 91): “These numbers

are as rigorous as any other numbers we work at Sears. Every year, our accounting firm audits them as closely as it audits our financials.”

More recently, Brooks (2000) overviews the research on the relationships between financial success and customer and employee variables. According to this research, between 40 and 80 per cent of customer satisfaction and loyalty is determined by the customer-employee relationship, depending on the industry and market segment that is being considered.

On the other hand, as Crosby *et al.* (1994, p. 21) point out: “If employees are truly motivated by a desire to do quality work that meets customer needs, then achievement of that outcome (customer satisfaction) should contribute to their own satisfaction as well.”

So, compelling evidence shows that there is a strong linkage between employee and customer satisfactions.

Employee-customer links in the ECSI model

This section proposes an extension of the ECSI model[2], resulting from the inclusion of three new latent variables (perceived employee satisfaction, perceived employee loyalty and perceived employee commitment)[3] that represent employee satisfaction and behaviour as perceived by the customer[4]. This choice is based on two kinds of assumptions: on the one hand, these are the variables, regarding employee satisfaction and behaviour, that are likely to explain customer satisfaction, and on the other hand, these are the variables that can be most easily perceived by the customers. Nevertheless, these customer perceptions about employee satisfaction, loyalty and commitment are not necessarily correct. However, they can be good proxies for the “true” employee variables, particularly in companies where there are close and regular contacts between customers and employees. In the final section, we will go further on this point.

The extended model is shown in Figure 1[5]. The rectangles represent latent variables, which are associated with a number of manifest variables not shown in the figure. The lines represent casual relationships. The model includes nine interrelated latent variables with two exogenous variables: image and perceived employee satisfaction.

Perceived employee satisfaction

This variable represents the way customers perceive employees’ satisfaction. This satisfaction represents feelings of the employee about the job, defined as the overall evaluation of working for the company. Supposing that customer perceptions are not excessively wrong, then one can admit that these perceptions have a positive impact on customer satisfaction and loyalty. This impact is supposed to act indirectly through the impact on perceived quality (particularly on the service component).

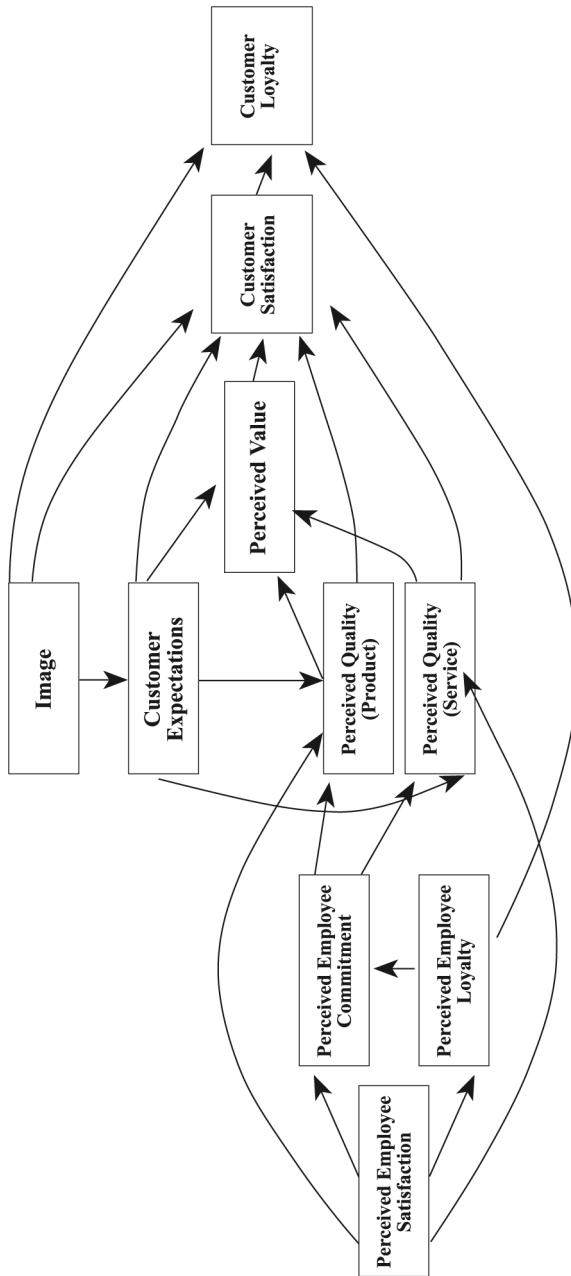


Figure 1.
Extended customer
satisfaction model

We have also considered impacts from perceived employee satisfaction on perceived employee loyalty and commitment in conformity with employee satisfaction models.

Perceived employee loyalty

This variable represents the way customers perceive employee loyalty. This loyalty means the employee's intention to remain with the company and willingness to recommend the company as a good place to work.

We have admitted a possible direct impact from perceived employee loyalty on customer loyalty. This impact may exist, mainly in companies where there is personal contact between customers and employees.

In fact, it is well known that employee loyalty may have a positive effect on customer loyalty, which, in turn, is a key determinant of profitability in companies (Reichheld and Sasser, 1990). As Syrett (1997, p. 49) points out "Staff loyalty is not a new business concern. What makes the current debate different is that in the age of stakeholder management and total quality management, companies have started to make links between the loyalty of their staff and the corresponding loyalty of their customers and investors."

In conformity with employee satisfaction models, an impact from perceived employee loyalty on perceived employee commitment is also considered.

Perceived employee commitment

This variable represents the way customers perceive employee commitment. It is well known that business success requires more than just satisfied and loyal employees. Instead, it demands the kind of employees who are willing to serve as advocates for the organisation, i.e. committed employees. So, employee commitment represents employee dedication to help the company to achieve its goals. It includes manifests like dedication to doing work of high quality, commitment to resolving customers' problems, the investment of adequate time and effort in the work and the will to recommend the company's products and services.

Though related, employment commitment and loyalty are different and distinct constructs, with different implications following a change in a company's focus[6]. Also, customers' perceptions about employee loyalty and commitment may be, in some companies, quite different. The effects produced by these two constructs are expected to be of a different nature. In fact, while perceived employee commitment will have its main influence on perceived quality (product and service), in the case of perceived employee loyalty this effect is not expected, but rather a possible direct impact on customer loyalty. For this reason, the proposed model includes perceived employee loyalty and perceived employee commitment as two different latent variables, and considers direct impacts from perceived employee commitment on perceived product quality and perceived service quality.

Methodological issues and modelling approaches

The measurement of customer and employee satisfaction and the modelling of their determinants give rise to a significant number of methodological issues:

- Unlike income and profits, satisfaction is viewed as a latent construct that is not observed directly and can only be estimated through indicators. Moreover, there is no single concept of satisfaction. In fact, according to Anderson *et al.* (1994), at least two different conceptualisations can be distinguished: transaction specific and cumulative. From a transaction specific perspective, customer satisfaction is viewed as a post-choice evaluative judgement of a specific purchase occasion (Oliver and Swan, 1989). In contrast, cumulative customer satisfaction is an overall evaluation based on the total purchase and consumption of a product or service over time (Fornell, 1992). Nevertheless, much work has been done in trying to adequately measure customer satisfaction[7]. In particular, the indicators adopted in the ECSI model to measure customer satisfaction were those recommended by Ryan *et al.* (1995): overall satisfaction, fulfilment of expectations and distance to the customer's ideal company.
- These indicators may correspond to questionnaire items (manifest or measurement variables) or they may themselves be latent constructs, like expectations and perceived quality. In both cases, the indicators depend on the area of application and it is not an easy task to set up a general framework that encompasses the companies in all sectors. For instance, customer repurchasing has a quite different meaning when it is used with a company in a competitive market than when it is used with a company or public administration producing a public good or service in a monopolistic situation.
- The questionnaire items are difficult to define and they are usually measured in terms of rating scales that try to capture the strength of an attitude (in the ECSI approach a ten-point numerical rating scale is used). On the other hand, the questionnaire-item responses usually have skewed and non-normal distributions.
- The relationships between questionnaire items, on the one hand, and satisfaction and other latent constructs (such as attitudes, expectations and perceived performances), on the other, are not straightforward and they have to be specified with an error term.
- The questionnaires used to estimate employee satisfaction gather information from surveys of the employees/managers of the companies analysed, while the customer satisfaction models use customer surveys. So, when analysing the employee-customer satisfaction chain, one should pay attention to the fact that the entities observed in the two cases are different.

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- There is a time lag between a change in the climate in the organisation (particularly in employee satisfaction) and its effect on customer satisfaction, and another before customers start to affect employees. Such time lags are not observed.
 - Data on employees obtained from customer surveys can only include customer perceptions about employees' attitudes and behaviours. In our model, it is suggested to capture perceived employee satisfaction, loyalty and commitment by only asking customers.

Resolving these methodological questions led naturally to different modelling approaches to employee and customer satisfaction.

An important classification of these approaches distinguishes between structural equation models and unstructured approaches.

The second approach is probably the more commonly used. It is widely adopted in different studies (see various references in the work of Schmit and Allscheid (1995)). This type of unstructured approach is only descriptive and involves no proper structure or parameter estimates. The correlation between the different questionnaire items and dimensions is estimated through factor or cluster analysis. In this approach there is no causal relationship, or any other kind, between these different items and dimensions. It is not possible to analyse interaction and derive any cause and effect relationships and, consequently, it will not be followed in the present research.

The structural equation models presuppose a set of assumptions about the customer or employee decision process that are expressed through the number and specification of the equations and through the estimates for the parameters. If a probabilistic component is integrated in the model, it is possible to give precision measurements of the parameter estimates and of the quality of the results obtained.

These models are, however, complex and difficult to estimate, especially when a simultaneous system approach is adopted. Moreover, given the skew and non-normality of the variables stated earlier, the conventional maximum likelihood estimators are not to be suggested.

In an attempt to keep things simple, at least initially, some authors estimate single equation models. Given the complex structure of the decision-making process of both employees and customers, a preliminary factor analysis is carried out before the estimation of the single equation model. This analysis allows us to select and investigate manifest variables (i.e. questionnaire items) in some detail before any consideration of latent constructs. There are three direct indicators of employee satisfaction (job satisfaction, own morale and colleagues' morale) that are considered as depending on a certain number of questionnaire items. Given the large number of these items, the authors carry out a preliminary factor analysis in order to reduce their number and to choose those that are relatively unrelated.

However, this approach does not apply in the present study since the ECSI model has several structural equations. So, in spite of the difficulties of estimation, our analysis is restricted to the structural simultaneous equation models. The estimation method for the extended structural model is analysed in the next section.

The estimation method

The complete model, which includes an inner structural model and measurement model, is formally presented in the Appendix. The structural model is composed of nine latent variables, as shown in Figure 1. The measurement model relates latent variables to the manifest variables.

For the supermarket application in the following section, the manifest variables used with perceived employee satisfaction, loyalty and commitment are, respectively:

- x_{21} – perceived overall employee satisfaction;
- x_{22} – distance to ideal place to work;
- y_{21} – perceived employees' intentions to stay in the company;
- y_{22} – perceived employees' intentions to plan a career in the company;
- y_{31} – perceived employees' effort put into the job;
- y_{32} – perceived employees' willingness to solve customers' problems;
- y_{33} – perceived quality of employees' work; and
- y_{34} – perceived employees' willingness to recommend the products of their company.

Some of the major difficulties in estimating this model are:

- the presence of latent variables that are not observable; and
- the fact of measuring categorical variables with an unknown non-normal frequency distribution, which is usually negatively skewed (Fornell, 1992).

Consequently, a maximum likelihood approach (like LISREL) may not be appropriate for the problem. Some authors have proposed partial least squares (PLS), which is already being used in the ESCI project (see a comparison between maximum likelihood and PLS estimator properties in Dijkstra (1983)). PLS was used to estimate the ECSI model and the revised ECSI model.

An application to the case of supermarkets

Data

The data used in the estimation come from a representative survey of supermarket customers. In the following, we will use data from two supermarkets that we will refer to as Company A and Company B. The first comprises a number of big stores and the second small and medium stores. The

selection of the respondents follows the criteria defined in ECSI Technical Committee (1998)[8]. The questionnaire used in the survey regards the overall experience of the respondent with the supermarket, and is also based on the one adopted in the ECSI pilot project with the integration of the manifests for the three new latent variables (see subsection "Perceived employee satisfaction"). So, besides questions regarding the seven constructs of the ECSI model (image, expectations, perceived product quality, perceived service quality, perceived value, customer satisfaction and customer loyalty) the questionnaire includes a set of questions regarding customer perceptions of employee satisfaction, loyalty and commitment. The sample size is 298 for Company A and 249 for Company B.

Results

The results presented in this section come from the estimation of two models: the ECSI model and the ECSI revised model, given by equations (A3) and (A2) in the Appendix.

Tables I-IV and Figures 2 and 3 show the main results. Table I shows the values of the determination coefficient (R^2) for the estimation of the equations explaining the latent variables η_4 (perceived product quality), η_5 (perceived service quality), η_6 (perceived value), η_7 (customer satisfaction) and η_8 (customer loyalty). Results show that, for both companies, all the latent variables tend to be better explained by the ECSI revised model than by the ECSI model. This is particularly evident, in both cases, for perceived product quality and perceived service quality, which show very important increases in R^2 . Also, the explanatory power of equations explaining customer satisfaction and customer loyalty show an improvement that is significant for Company B. For Company A, we can still observe a small increase in customer loyalty

Equation	Company A		Company B	
	ECSI	ECSI revised	ECSI	ECSI revised
η_4 (Perceived product quality)	23.4	39.5	20.5	30.3
η_5 (Perceived service quality)	30.4	58.3	34.3	44.9
η_6 (Perceived value)	59.9	61.2	44.4	44.4
η_7 (Customer satisfaction)	60.0	59.1	33.9	39.3
η_8 (Customer loyalty)	51.4	53.5	40.1	45.0

Table I.
Determination
coefficients

Variable	Company A		Company B	
	H^2	F^2	H^2	F^2
ξ_2 (Perceived employee satisfaction)	0.50	0.00	0.80	0.00
η_2 (Perceived employee loyalty)	0.75	0.23	0.72	0.27
η_3 (Perceived employee commitment)	0.62	0.08	0.75	0.27

Table II.
Communalities and
redundancy

Table III.
Total effects
(Company A)

Variable	Perceived employee satisfaction	Perceived employee loyalty	Perceived employee commitment	Image	Expectations	Perceived product quality	Perceived service quality	Perceived value	Satisfaction
Perceived employee satisfaction	-	-	-	-	-	-	-	-	-
Perceived employee loyalty	0.69	-	-	-	-	-	-	-	-
Perceived employee commitment	0.62	0.28	-	-	-	-	-	-	-
Image	0.00	0.00	0.00	-	-	-	-	-	-
Expectations	0.00	0.00	0.00	0.53	-	-	-	-	-
Perceived product quality	0.35	0.08	0.29	0.20	0.37	-	-	-	-
Perceived service quality	0.51	0.09	0.33	0.20	0.38	0.00	-	-	-
Perceived value	0.30	0.06	0.21	0.25	0.48	0.22	0.45	-	-
Satisfaction	0.22	0.04	0.16	0.39	0.29	0.28	0.24	0.28	-
Loyalty	0.17	0.06	0.11	0.32	0.20	0.19	0.16	0.19	0.67

Variable	Perceived employee satisfaction	Perceived employee loyalty	Perceived employee commitment	Image	Expectations	Perceived product quality	Perceived service quality	Perceived value	Satisfaction
Perceived employee satisfaction	-	-	-	-	-	-	-	-	-
Perceived employee loyalty	0.64	-	-	-	-	-	-	-	-
Perceived employee commitment	0.43	0.14	-	-	-	-	-	-	-
Image	0.00	0.00	0.00	-	-	-	-	-	-
Expectations	0.00	0.00	0.00	0.42	-	-	-	-	-
Perceived product quality	0.21	0.04	0.28	0.14	0.34	-	-	-	-
Perceived service quality	0.25	0.04	0.31	0.19	0.44	0.00	-	-	-
Perceived value	0.14	0.02	0.17	0.18	0.42	0.02	0.54	-	-
Satisfaction	0.09	0.02	0.12	0.41	0.20	0.19	0.21	0.10	-
Loyalty	0.02	-0.06	0.08	0.28	0.14	0.13	0.15	0.07	0.70

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Table IV.
Total effects
(Company B)

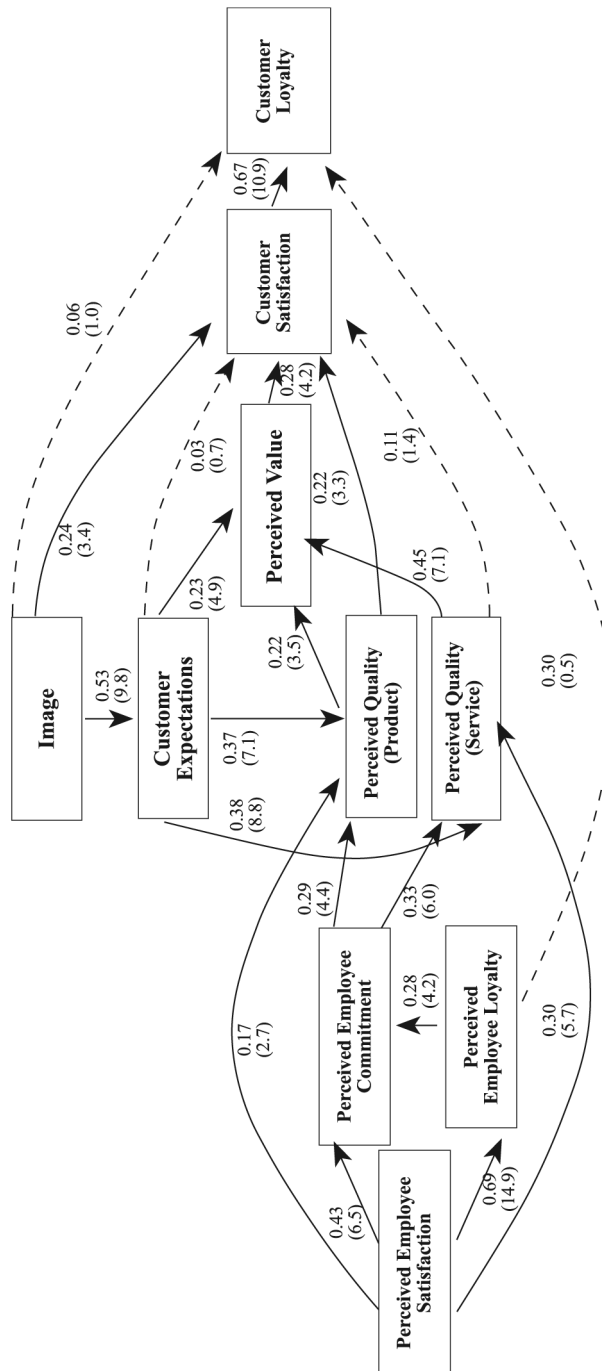
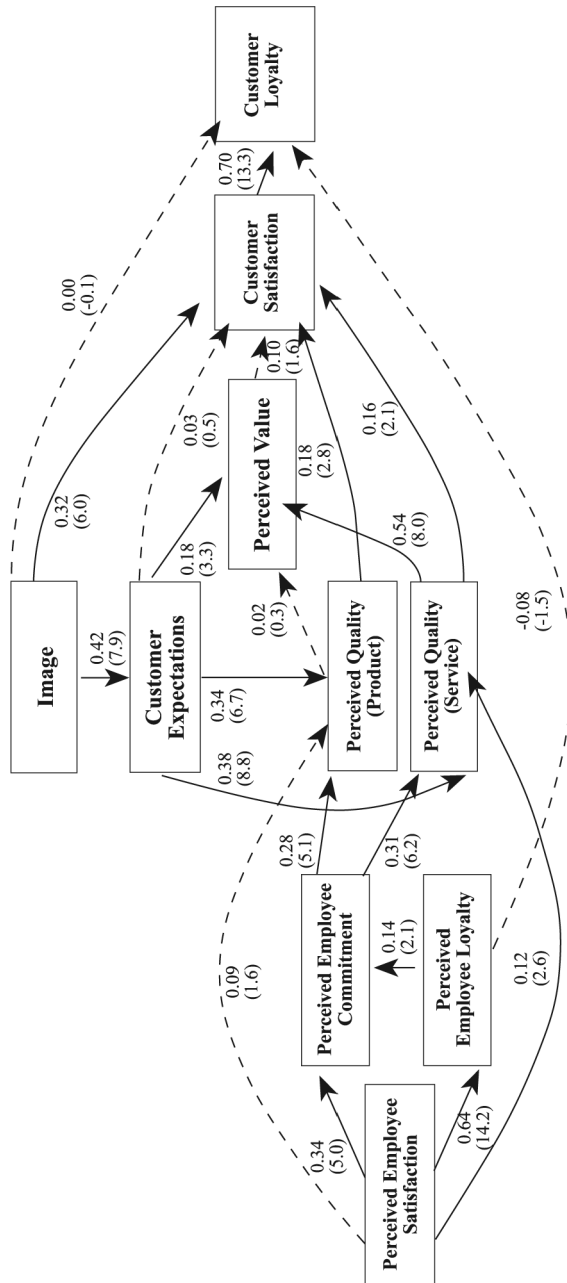


Figure 2.
Model parameter estimates and *t* values (Company A)

Note: Lines associated with non-significant parameters at a 5% significance level are dashed



Note: Lines associated with non-significant parameters at a 5% significance level are dashed

Figure 3. Model parameter estimates and *t* values (Company B)

explanatory power, but the explanatory power of customer satisfaction remains almost unchanged (there is even a negligible decrease).

Table II shows the communalities (H^2) and redundancy coefficients (F^2) for the three employee variables included[9]. These measures can be used as indicators for the validity and reliability of the measurement model. It can be seen that communalities for the three new variables are always significantly higher than 0.5, indicating that the variance captured by each latent variable is larger than variance due to measurement error and thus demonstrating a high reliability of the construct. The only exception is related to perceived employee satisfaction in Company A where the communality is equal to 0.5. This is due to the fact that the variable is almost completely determined by the indicator distance to ideal place to work. Nevertheless, considered globally, results show a high reliability for the indicators and constructs. It can also be seen that redundancy coefficients are always significantly smaller than communalities. Values are never higher than 0.27, indicating a low redundancy among the three proposed variables. Consequently, they tend to confirm the discriminant validity of the constructs. Also note that the squared correlations between the three variables are always smaller than 0.32 for Company A and 0.4 for Company B. The comparison of those values with communalities also satisfies the requirements for discriminant validity as proposed by Fornell and Larcker (1981).

Figures 2 and 3 show the estimates and t values for the model parameters for both companies.

Regarding the parameters that are common to the ECSI model and to the ECSI revised model, it can be observed that the interpretation of estimates is quite similar for both companies. They show the following in both cases:

- Image has no direct impact on customer loyalty. The impact is only indirect through customer satisfaction.
- Customer expectations have no direct impact on customer satisfaction. It is only indirect through perceived quality and perceived value.
- Perceived service quality, although contributing to the explanation of perceived value, seems to have no direct impact on customer satisfaction. Nevertheless, for Company B, the introduction of employee variables generates a statistically significant impact from perceived service quality on customer satisfaction. This result shows that the consideration of employee variables may even contribute to a better estimation of the relationships between customer variables.

Regarding the estimation of parameters specific to the ECSI revised model, results are also highly consistent for both companies:

- Perceived employee satisfaction has important direct impact on perceived service quality for both companies; the impact on perceived product quality is always weaker, and even non-significant for one company.

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- Perceived employee commitment has important direct impact on perceived product quality and perceived service quality for both companies; also, in this case, the impact on perceived service quality is stronger, although the difference between the two impacts is non-significant.
 - Globally it can be seen that employee variables significantly contribute to explain perceived quality.
 - Effects of perceived employee commitment on perceived quality (product and service) are always stronger than those originated by perceived employee satisfaction; it should be noted that perceived employee commitment seems to have, in both cases, a very important explanatory capacity for perceived quality, almost of the same magnitude as expectations.
 - The effect of perceived employee loyalty on customer loyalty is non-significant for both companies; thus results show no empirical evidence to sustain the assumption that there is a potential direct effect between these two variables for the companies studied.

Tables III and IV show the total model effects (direct plus indirect effects) for each company (origins of the effects in columns and destinations in rows). Results show the following:

- Perceived employee satisfaction and perceived employee commitment confirm very important explanatory capacity for perceived quality (both product and service but mainly for the latter); for Company A the total impact originated by perceived employee satisfaction on perceived service quality is even stronger than that originated by expectations; also these impacts are always stronger than that originated by image.
- The total impacts of perceived employee satisfaction and perceived employee commitment on customer satisfaction and loyalty, although less strong, are still significant; it should be noted that they tend to show magnitudes very similar to those produced by perceived value.
- Perceived employee loyalty always shows very weak total effects both on customer satisfaction and customer loyalty; the result is that for these two companies this variable does not bring significant explanatory power for the whole model.

Conclusions

The goal of this paper was to include the cause and effect relationship between employee and customer satisfaction in the ECSI model.

In this context, we propose an ECSI revised model, that is, the ECSI model with customer perceptions on employee satisfaction, loyalty and commitment integrated into it.

The results of the estimation with data from surveys conducted among supermarket customers show that these latent variables have significant

impacts on perceived quality (product and service) and significantly contribute to explaining their variance. Despite adding significant explanatory power for perceived quality, their contribution to explaining customer satisfaction and loyalty is somewhat lower. This is not surprising, since their effect on customer satisfaction and loyalty is mainly indirect (through perceived quality) and consequently, the increase in the explanatory power is only achieved by their contribution to a better estimation of other customer variables. Nevertheless, these new variables still show some significant effects on customer satisfaction and loyalty. In addition, the inclusion of these employee variables showed that it is possible to:

- (1) put in evidence the existence of an employee-customer chain;
- (2) quantify the effects of changes in employee attitudes and behaviours on customer satisfaction and loyalty (on the assumption that those changes are well perceived by customers); and
- (3) improve the estimation of some ESCI model parameters and thus contribute to a better understanding of satisfaction and loyalty determinants.

This research, however, is not complete since it is still necessary to analyse the relationship between employees' perceptions of customer satisfaction and loyalty, on the one hand, and employee satisfaction, loyalty and commitment, on the other. Such analysis would require the specification and estimation of an employee satisfaction model (with data from employee surveys).

In the context of two models (an employee model and a customer model), the key question would then be to know if employees perceive customer satisfaction and loyalty properly and if customers, for their part, perceive employee satisfaction, loyalty and commitment properly. It would also be interesting to understand how long it takes to form correct perceptions. Thus, the appropriate approach would be to estimate both models simultaneously (the customer model and the employee model), to compare the "real" values with the perceived values and to estimate the time lag involved in such relationships. In a certain way, it would be following a similar approach to that of Schneider *et al.* (1998) and it would require cross-lagged panel analysis relating the "real" with the perceived values of the variables. Consequently, it would require, for a whole set of periods, both data from customer surveys (for estimating the equations of the customer model) and similar data from employee surveys (for the employee model). Having no data available on employee surveys, we have restricted the estimation, in this paper, to the customer satisfaction model, i.e. the reformulated ECSI model, using customer perceptions about employee variables. This obviously constitutes a major limitation of the study.

Notes

1. Sergeant and Frenkel (2000) also focus on some aspects of the service-profit chain, exploring the relationships between a number of variables. Using a structural equation modelling

- methodology, the authors found that in terms of direct effects on employees' capacity to satisfy customers, some variables (e.g. other department support) were more important than others (e.g. technology).
2. This is the model adopted in the 1999 ECSI wave.
 3. These variables are very close to the concepts of employee satisfaction, loyalty and commitment proposed by Crosby *et al.* (1994).
 4. Gremier and Gwinner (2000) also examine the customer-employee relationship, from the perspective of the customer. In fact, they study the customer-employee rapport, which is defined as a customer's perception of having an enjoyable interaction with a service provider employee, characterized by a personnel connection between the two interactants. Their results show that both rapport components (enjoyable interaction and personnel connection) are significantly related to customer satisfaction with the service and customer loyalty intention as well as to the likelihood of positive customer communication about the firm.
 5. Vilares and Coelho (1999) survey the employee satisfaction structural equation models and propose an employee satisfaction model, which adopts a similar framework to ECSI. Some of the components of this model are integrated into the proposed reformulation of the ECSI model.
 6. Crosby *et al.* (1994) show that a change in a company's employee focus has a larger impact on loyalty than on commitment. They have also pointed out that a change in a company's quality or customer focus has a larger impact on commitment than on loyalty.
 7. A comprehensive book on customer satisfaction measurement appeared in the publication of Vavra (1997).
 8. The sampling design is based on the random selection of households using random digit dialling (RDD). In each household, the selection of a resident is also made randomly. The first set of questions in the questionnaire is used to qualify the potential respondent as a client of the sector (supermarkets) and of a particular supermarket chain. All the other questions in the questionnaire refer to the identified supermarket. The response rate was about 40 per cent.
 9. Communality for a manifest variable may be interpreted as the proportion of its variance which is reproduced by the directly connected latent variable. The redundancy coefficient for a manifest variable is the proportion of its variance which is reproduced by the predictors of its own latent variable. Communalities and redundancy coefficients for latent variables are averages of the communalities and redundancy of their manifests.

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Appendix. The complete satisfaction model

The general form of the inner structural model is:

$$\eta = \beta\eta + \gamma\xi + v \quad E(v|\xi) = 0 \quad (A1)$$

where $\eta' = (\eta_1, \eta_2, \dots, \eta_7)$ represents the vector of endogenous latent variables, $\xi' = (\xi_1, \xi_2)$ the vector of exogenous latent variables, β and γ are parameter matrices of suitable order and v is the error term.

The equations of the model represented in Figure 1 are:

$$\begin{bmatrix} \eta_1 \\ \eta_2 \\ \eta_3 \\ \eta_4 \\ \eta_5 \\ \eta_6 \\ \eta_7 \\ \eta_8 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \beta_{32} & 0 & 0 & 0 & 0 & 0 & 0 \\ \beta_{41} & 0 & \beta_{43} & 0 & 0 & 0 & 0 & 0 \\ \beta_{51} & 0 & \beta_{53} & 0 & 0 & 0 & 0 & 0 \\ \beta_{61} & 0 & 0 & \beta_{64} & \beta_{65} & 0 & 0 & 0 \\ \beta_{71} & 0 & 0 & \beta_{74} & \beta_{75} & \beta_{76} & 0 & 0 \\ 0 & \beta_{82} & 0 & 0 & 0 & 0 & \beta_{87} & 0 \end{bmatrix} \begin{bmatrix} \eta_1 \\ \eta_2 \\ \eta_3 \\ \eta_4 \\ \eta_5 \\ \eta_6 \\ \eta_7 \\ \eta_8 \end{bmatrix} + \begin{bmatrix} \gamma_{11} & 0 \\ 0 & \gamma_{22} \\ 0 & \gamma_{32} \\ 0 & \gamma_{42} \\ 0 & \gamma_{52} \\ 0 & 0 \\ \gamma_{71} & 0 \\ \gamma_{81} & 0 \end{bmatrix} \begin{bmatrix} \xi_1 \\ \xi_2 \end{bmatrix} + \begin{bmatrix} v_1 \\ v_2 \\ v_3 \\ v_4 \\ v_5 \\ v_6 \\ v_7 \\ v_8 \end{bmatrix} \quad (A2)$$

where ξ_1 – image; ξ_2 – perceived employee satisfaction; η_1 – customer expectations; η_2 – perceived employee loyalty; η_3 – perceived employee commitment; η_4 – perceived product quality; η_5 – perceived service quality; η_6 – perceived value; η_7 – customer satisfaction; η_8 – customer loyalty.

It should be noted that the ECSI model can easily be derived from equation (2) if we exclude the impacts of the three new latent variables ξ_2 , η_2 and η_3 , i.e.:

$$\begin{bmatrix} \eta_1 \\ \eta_2 \\ \eta_3 \\ \eta_4 \\ \eta_5 \\ \eta_6 \\ \eta_7 \\ \eta_8 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \beta_{41} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \beta_{51} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \beta_{61} & 0 & 0 & \beta_{64} & \beta_{65} & 0 & 0 & 0 \\ \beta_{71} & 0 & 0 & \beta_{74} & \beta_{75} & \beta_{76} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \beta_{87} & 0 \end{bmatrix} \begin{bmatrix} \eta_1 \\ \eta_2 \\ \eta_3 \\ \eta_4 \\ \eta_5 \\ \eta_6 \\ \eta_7 \\ \eta_8 \end{bmatrix} + \begin{bmatrix} \gamma_{11} & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ \gamma_{71} & 0 \\ \gamma_{81} & 0 \end{bmatrix} \begin{bmatrix} \xi_1 \\ \xi_2 \end{bmatrix} + \begin{bmatrix} v_1 \\ v_2 \\ v_3 \\ v_4 \\ v_5 \\ v_6 \\ v_7 \\ v_8 \end{bmatrix} \quad (A3)$$

The measurement model, relating the latent variables to the manifest variables, has the general form:

$$\mathbf{y} = \Lambda_y \boldsymbol{\eta} + \boldsymbol{\varepsilon} \quad \mathbf{x} = \Lambda_x \boldsymbol{\xi} + \boldsymbol{\delta} \quad E(\boldsymbol{\varepsilon}) = E(\boldsymbol{\delta}) = E(\boldsymbol{\varepsilon}|\boldsymbol{\eta}) = E(\boldsymbol{\delta}|\boldsymbol{\xi}) = 0 \quad (A4)$$

where $\mathbf{y}' = (y_1, y_2, \dots, y_p)$ and $\mathbf{x}' = (x_1, x_2, \dots, x_q)$ are the manifest endogenous and exogenous variables, respectively; Λ_y and Λ_x are the corresponding parameter matrices.

Representing by $\mathbf{y}'_i = (y_{i1}, \dots, y_{iH_i})$ the vector of manifest variables related to the latent endogenous variable η_i , and by $\mathbf{x}'_i = (x_{i1}, \dots, x_{iG_i})$ the vector of manifest variables related to the latent exogenous variable ξ_i , we can also write the model in the form:

$$y_{ij} = \lambda_{yij}\eta_i + \varepsilon_{ij}, \quad i = 1, \dots, 7; \quad j = 1, \dots, H_i \quad x_{ij} = \lambda_{xij}\xi_i + \delta_{ij}, \quad i = 1, \dots, 2; \\ j = 1, \dots, G_i \quad (\text{A5})$$

where H_i is the number of manifest variables associated with variable η_i and G_i is the number of manifest variables associated with variable ξ_i .