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Call Center Key Performance Indicators and Customer Satisfaction

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ABSTRACT

This article purports to investigate the relationship – in an empirical way – between the various key performance indicators currently used for the management of call centers in Brazil and customer satisfaction. In this context, a set of call centers rendering services to a telecommunications company will be analyzed in order to verify which of their indicators are positively associated with customer satisfaction. A methodological approach based on surveys as well as stepwise multiple linear regressions is developed and applied in order to achieve the objective of this paper. It is seen that just the “First-Contact Resolution Rate” and the “Average Handle Time After the Call” indicators present a statistically significant relationship with customer satisfaction. Lastly, some alternative call center key performance indicators are proposed, in an exploratory way, so as to convey to an enhanced relationship between call center performance and customer satisfaction.

Keywords: Call Centers; Key Performance Indicators; Customer Satisfaction; Brazil

INTRODUCTION

Despite the relevance of the call center industry, there is a lacuna in academic literature in correlating the relationship between key performance indicators used by call centers and customer satisfaction.

In the United States, two studies conducted by Feinberg et al. in 2000 and 2002 attempted to pinpoint operational indicators which determine customer satisfaction. The results encountered were, however, divergent. In the first study in 2000, two indicators appeared to have some connection with the customer satisfaction level (Feinberg et al., 2000). In the second study, in 2002, with the focus of research directed at the call centers that served the financial market, no key performance indicator showed any correlation to customer satisfaction (Feinberg et al., 2002).

Thus, this article aims to contribute to the technical literature, seeking to answer the following research question: What call center key performance indicators have any bearing on customer satisfaction? This question is relevant as there is no consensus on this point in the academic world.

An attempt is also made to find empirical evidence to help company managers who either operate or hire the services of call center operations to develop strategies that improve customer satisfaction, thereby enhancing the competitiveness of these organizations, both in the domestic and international markets.

With this in mind, three operations of one of the leading companies in the Brazilian call center outsourcing market were analyzed. For reasons of confidentiality, this study will safeguard the identity of all the companies involved in the research.

This article is structured as follows. After the introduction, the literature review used is set forth. Then, the research method used in this investigation is presented. Based on the research method unveiled, the data collected is analyzed in an explanatory way, in order to test the relationship between the key performance indicators gathered and customer satisfaction.

Alternative call center key performance indicators are then proposed in an exploratory way. Lastly, some final remarks are presented as well as the managerial implications of this study for the call center industry.

THEORETICAL BACKGROUND

Call Center Key Performance Indicators

According to Bennigton et al. (2000) and Dean (2002), the efficiency of call centers is a critical aspect for the image of the organization. However, in the academic literature on call centers, there is no consensus on which key performance indicators are related to customer satisfaction. Therefore, following the research stream adopted by Feinberg et al. (2000, 2002), a number of indicators considered fundamental to the achievement of excellence in operating a call center, according to the vision of Anton (2000), Cleveland and Mayben (1997), Evensen et al. (1999), Grimm (2001), Miciak and Desmarais (2001), Rosati (2001), Sparrow (1991) and Tom et al. (1997) will be adopted.

Thirteen indicators selected from the reference sources mentioned above, with their respective meanings, are listed below:

- Service Level x Seconds – SL
 - Attempts to measure the total number of calls handled within x seconds; usually 20 or 30 seconds. It is calculated by dividing the total number of calls answered within x seconds by the total number of calls.
- Percentage of Call Block – PCB
 - Attempts to measure the availability of the call center. It is calculated by dividing the total number of calls with busy tone by the total number of calls made.
- Percentage of First-Call Resolution – FCR
 - Attempts to measure the internal efficiency. It is calculated by dividing the total number of calls that are resolved on first contact by the total number of calls made.
- Abandonment Rate – AbR
 - Attempts to measure the availability of the call center. It is calculated by dividing the total number of calls that were hanged up – or disconnected by the caller before being answered – by the total number of calls made.
- Adherence – AD
 - Attempts to measure the efficiency of the call center. It is calculated by dividing the total number of agents who were at the service post as scheduled by the total number of agents.
- Time before Abandoning – TBA
 - Attempts to measure the availability of the call center. It is calculated by dividing the total – in seconds – of calls that were abandoned before being attended, by the total of these calls.
- Talk Time – TT
 - This is calculated by dividing the total – in seconds – of all calls that were answered by the total of all these calls.
- Queue Time – QT
 - This is calculated by dividing the total – in seconds – of all the calls that remain on hold before being answered by the total of all these calls.
- Average Work Time after the Call – WTC
 - This is calculated by dividing the total – in seconds – of the time spent after the close of a call attended by the total of all calls attended.
- Average Training Time – TrT
 - This is calculated by dividing the total days of training received by agents by the total number of agents.
- Total Calls – ToC
 - This is the total of calls received or made by the agents.
- Total of Calls Attended per Shift – TCS
 - This is calculated by dividing the total number of calls received or made by the agents by the total number of agents per work shift.
- Agent Turnover – Tu
 - This is calculated by dividing the total number of agents who have left the company by the total number of workstation positions.

The data required for preparing these indicators, with the exception of the TrT (Average Training Time), are collected by the technological infrastructure that exists in the call centers.

The data for the TrT (Average Training Time), since they relate to training, are collected by ancillary systems and monitored closely by call center managers, given the importance of this item to the quality of service (Dalrymple and Phipps, 1999; Nix and Gabel, 1996).

RESEARCH METHOD

The research method adopted in this article is the cross-sectional survey (Malhotra, 2001), which involves information gathering from a one-time-only sample of representatives of a population.

Samples were collected from different groups of customers (business and corporate) of two different companies (Alpha and Beta). Alpha company is in the cell phone segment, whereas Beta company is an incumbent of the fixed-line segment, albeit both of them belong to the same controlling group. The company that operates the call centers (CC) of Alpha and Beta companies will be referred to as Gama company. Total Attendance Posts (AP) of each company is shown in Figure 1 below.

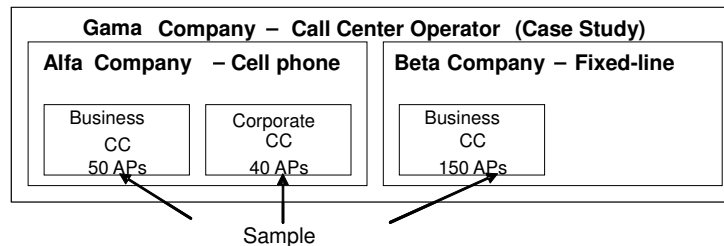


Figure 1 – Population Researched

Source: Authors

Although exploratory in nature, in the sense of attempting to identify a relationship between a call center's key performance indicators and customer satisfaction in operations of the Alpha and Beta companies in question, this study also has explanatory characteristics. Explanatory or causal studies are useful to assess how given practices are working and why.

In this article, the traditional method of telephone interview was used, in which the respondents answered a structured questionnaire with fixed alternative answers. The data regarding satisfaction were collected directly from customers in order to minimize the chances of misrepresentation. This differs from the approach adopted by Feinberg et al. (2000, 2002) in which the information was gathered from what was evaluated as customer satisfaction by the managers of the operations of the call centers studied.

Data Collection

Using the taxonomy of Matar (2002), primary data obtained from the electronic records of Gama company for the operations of Alpha and Beta companies were used for compilation of the thirteen key performance indicators of call centers.

Additionally, internal secondary data (Malhotra, 2001) arising from a survey conducted by Alpha and Beta companies were used in order to assess the satisfaction of a customer with respect to a given call.

The research database was assembled between June and September 2008 and was culled from an automatic process, in which each agent in each of the different operations received a reminder at intervals ranging from 15 to 20 minutes to fill out the contact data for the customer that he/she was handling at that time.

All of the above contacts constituted a daily research database. Seven days after a call was made to the call center, customers to be contacted by telephone were chosen at random from this daily research database. The period of seven days was considered the minimum time required for extraction and compilation of data, as well as submission to the independent research institute for compilation of the research questionnaires. This process was repeated over the course of a month for each of the operations that were studied.

With respect to the reliability of the data, they were appraised and collected by an independent research institute, unrelated to Alpha, Beta and Gamma companies, which was responsible for the selection of the sample, final contact the general tabulation of the research form.

According to Giese and Cote (2000), the expressions ‘customer satisfaction’, ‘consumer satisfaction’, or even ‘satisfaction’ on its own, are used without the necessary precision. Therefore, for the purpose of this work, it is important to note that customer satisfaction refers to the response of an end user, who may or may not be the actual purchaser of this service. Considering that the universe of this research covers B2B (business-to-business) operations, this situation is common as the person who contacts a call center is not always the one who effectively has the purchasing power for that service.

Thus, the survey contained the question: "What is your level of overall satisfaction with the call center you contacted?" in which the customer could award a number from 1 to 10. This number was used as the dependent variable in the multiple linear regression that was structured in relation to the operational performance indicators of call centers. This was the Satisfaction with the Call Center variable (represented as the SAT_CC variable) and is thus aligned with the approach of Giese and Cote (2000) and Gilmore (2001). A total of six thousand six hundred and sixteen responses were recorded during the survey period.

During the survey preparation period between June and September 2008, primary data on key performance indicators, based on the call details recorded in the databases of Gama company, were also collected.

In all, thirteen operational indicators were collected daily, which were the independent variables of the multiple linear regression used to verify the relationship between customer satisfaction and operational indicators. Daily collection was adopted as it is the shortest time interval possible to collect all thirteen indicators.

Figure 2 below schematically represents the various elements that were submitted to the multiple linear regression test in order to check the relationship between the operational performance indicators of call centers and customer satisfaction.

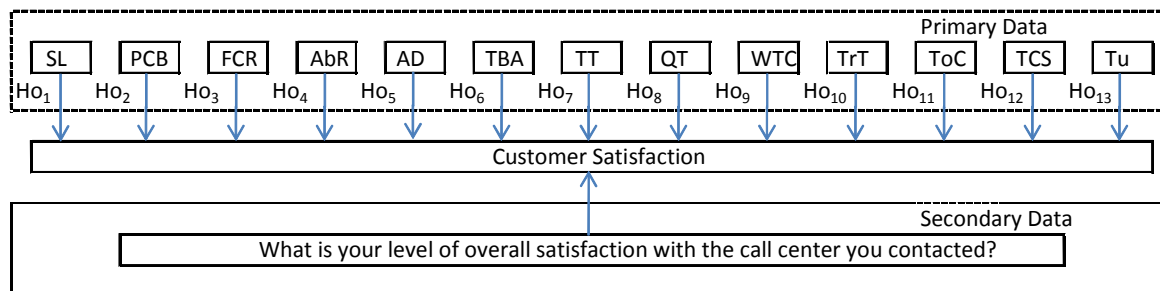


Figure 2 – Research Design

Source: Authors

For this work, the Ho hypothesis sought to test the relationship between a given call center indicator and customer satisfaction. Thus, the Ho_i sub-hypothesis means Ho_i: There is a relationship between the I_i call center indicator and customer satisfaction.

To implement the linear regression, a daily Customer Satisfaction indicator was generated, represented by the average of the SAT_CC variable of all cases collected on a given day, in order to represent the dependent variable of regression in a consolidated manner. The thirteen independent variables were represented by their daily averages, so that the regression could be operationalized. In total, 145 Customer Satisfaction (dependent variable) daily averages were generated from the 6,616 cases collected in the survey, as well as the respective 145 daily averages for each of the thirteen operational performance indicators (independent variables).

EXPLANATORY ANALYSIS OF THE INDICATORS

Hypothesis Test

The quantitative data collected were analyzed using SPSS statistical software (Release 12.0.0) for the purpose of testing the existence of relationships between call center key performance indicators and customer satisfaction. Multiple linear regression was used to achieve this.

Following the approach of Field (2005), multiple linear regression using the stepwise approach was then performed on the thirteen operational performance indicators of the call center versus customer satisfaction (SAT_CC) as per the model presented above in Figure 2.

The summary of the regression is shown in Table 1 below:

				Statistic Variations					
R	R ²	Adjusted R ²	Std. Error	R ² Variation	F Variation	df1	Df2	Sig F Variation	Durbin-Watson
0.317 ^a	0.100	0.094	0.524	0.100	15.952	1	143	0.000	
0.358 ^b	0.128	0.116	0.518	0.028	10.459	2	142	0.000	1.953

^aPredictor: (Constant), FCR

^bPredictor: (Constant), FCR, WTC

Dependent Variable: SAT_CC

Table 1 – Regression Model of the Operational Performance Indicators vs. Customer Satisfaction

Source: Authors

As can be seen, the R² is only 11.6% (significant to 1%). This variation is due to only two variables: the First Call Resolution (FCR) rate that accounted for 9.4% and the Average Work Time after the Call (WTC), which accounted for only 2.2%. This result partially confirms that obtained by Feinberg et al. (2000), who observed that the Abandonment Rate (AbR) and the First Call Resolution rate (FCR) were related to customer satisfaction. It is important to note that Feinberg et al. (2000) found a value of only 5% for R².

The Durbin-Watson statistical test provided a value close to 2, which indicates no problems with respect to the independence of error (Field, 2005).

The Variance Inflation Factor (VIF) was used for the evaluation of multicollinearity which, as can be seen in Table 2, fulfills the conditions of Field (2005), suggesting no multicollinearity problems with multiple linear regression.

The Cook distance of less than 1 did not suggest problems of influencing cases, either (Field, 2005).

The premises of normality, homoscedasticity, linearity and absence/independence of error were tested and dealt with using a graphic approach as suggested by Draper and Smith (1981) and Field (2005).

With respect to this point, it can be stated that, based on multiple linear regression analysis, it is not possible to support all Ho_i sub-hypotheses (Figure 2) to a level of significance of 1%, except for Ho₃, representing the First Call Resolution (FCR) rate and Ho₁₀, representing the Average Work Time after the Call (WTC).

Model	Non-standard Coefficient.		Std. Coef.	Collinearity			
	B	STD. Error	Beta	T	Sig.	Tolerance	VIF
(Constant)	7.885	0.202		39.113	0.000		
FCR	1.024	0.277	0.386	3.689	0.000	0.979	1.022
WTC	0.009	0.004	0.169	2.137	0.003	0.979	1.022

Dependent Variable: SAT_CC

Table 2 – Coefficients of Regression of the Traditional Operational Performance Indicators

Source: Author

EXPLORATORY ANALYSIS OF ALTERNATIVE INDICATORS

Some alternative indicators to the traditional key performance call center indicators were then proposed, in an exploratory way, seeking to meet the specific objective of formulating recommendations for improvements to ensure customer satisfaction in relation to call center services. This was done since the explanation level between the latter and customer satisfaction stood at a very low level, namely 11%, in which only the First Call Resolution (FCR) rate and the Average Work Time after the Call (WTC) were statistically significant.

Firstly, alternative indicators were proposed based on the literature review as well as the results already obtained. Subsequently, an exploratory analysis was conducted to verify if these indicators might contribute to an improved explanation level with regard to customer satisfaction in relation to the call center.

Alternative Indicators

A premise adopted in the choice of alternative indicators was the simplicity of obtaining data, such that they could be used in a wide range of call center operations, irrespective of their size.

The alternative indicators sought to cover three dimensions, namely the ability to resolve a problem, responsiveness and prior customer satisfaction. Two of these dimensions were covered by direct questions to the same customers of the survey used to assess call center satisfaction (SAT_CC). The third dimension was covered by means of an assessment made by the operators after each call answered, to evaluate the general level of customer satisfaction in relation to the company. The decision to opt for evaluation by the operator was taken due to the limitation on the maximum number of questions (limited to 3) that could be made in the survey.

The first of the dimensions chosen was the problem-solving capacity. This choice was made on the basis of the observation by Feinberg et al. (2000), which pointed to the First Call Resolution Capacity (FCR) indicator as being a significant factor for customer satisfaction.

In light of the foregoing, the problem-solving ability dimension was incorporated in the question: "What is the score (on a scale of 1 to 10) that you give to the Resolution/Forwarding of requests by the Call Center?"

The second dimension adopted was responsiveness. A point that motivated the choice of this dimension was the result obtained by Feinberg et al. (2000), which singled out the Abandonment Rate as also being one of the determinants of satisfaction with the call center, as this indicator is directly related to the waiting time online and/or total connection time (Feinberg et al. 2000; Anton, 2000).

Thus, the responsiveness dimension was incorporated in the question: "What is the score (on a scale of 1 to 10) that you give to the Total Handle Time (from the beginning to the end of the connection to the call center)?"

The third dimension aimed to assess the customer's prior satisfaction *vis-à-vis* the company, insofar as this is a response to an evaluation process (Giese and Cote, 2000; Gilmore, 2001), also incorporating the importance of the image of the company (Grönroos, 1984) and quality of the process (Lehtinen, 1983) for its formation.

Thus, the third dimension was incorporated through an evaluation on the part of the operator, with respect to the latter's perception in relation to the general satisfaction of the customer *vis-à-vis* the company. Using a Likert scale with 5 positions, where 1 means 'Very Dissatisfied' and 5 means 'Very Satisfied', at the end of each call the operator evaluated his/her perception on the level of the customer's satisfaction with the company.

Evaluations of the calls made by the agents were then associated with the answers to the survey taken by customers, to the extent that these evaluations were to be found in the same repository of data that formed the basis for the choice of sample researched, such that a biunivocal relationship could be created between them. In other words, for each customer contacted it was possible to link their responses with respect to satisfaction with the call center (used in the explanatory phase of this work), as well as the problem-solving capacity and responsiveness dimensions, with the score given by the agent to the prior satisfaction of the same customer *vis-à-vis* the company, which were used in the exploratory stage.

In accordance with the above considerations to date, Figure 3 provides a representation for the exploratory investigation of the alternative performance indicators of a call center, as well as the name given to each of the variables involved.

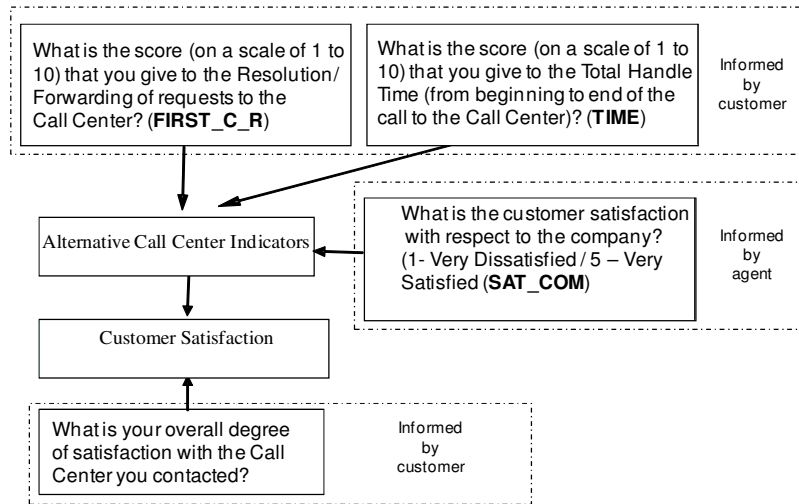


Figure 3 – Exploratory Investigation of the Alternative Call Center Indicators

Source: Authors

As stated earlier, the appraisal of the problem-solving capacity (FIRST_C_R) and responsiveness (TIME) occurred in the same survey used in the explanatory analysis of the relationship between the traditional operational call center indicators and customer satisfaction (SAT_CC). On the other hand, the SAT_COM variable given by the agent was assessed for each of the cases used in the survey.

In an analogous way to that performed in the first analysis, an average daily value was generated for each of the three alternative indicators (independent variables), so that multiple linear regression of same could be performed, together with the thirteen traditional indicators (independent variables), in relation to the SAT_CC dependent variable. Thus, in total, 145 daily averages for the variables involved were generated.

Statistical Analysis with Alternative Indicators

In order to verify the existence of a relationship between all of the indicators and customer satisfaction, multiple linear regression evaluation using the stepwise approach – with the thirteen traditional indicators plus three alternative indicators proposed earlier – was conducted, while also following the Field (2005) approach.

The summary of the model is presented in Table 3.

				Statistical Variations					
R	R ²	Adjusted R ²	Std. Error	R ² Variation	F Variation	df1	df2	Sig F Variation	Durbin-Watson
0.819 ^a	0.671	0.669	0.319	0.671	291.970	1	143	0.000	
0.846 ^b	0.639	0.716	0.295	0.045	22.667	1	142	0.000	
0.869 ^c	0.755	0.750	0.275	0.038	22.127	1	141	0.000	
0.873 ^d	0.762	0.755	0.273	0.007	3.929	1	140	0.049	2.190

a-Predictor:(Constant),TIME

Dependent Variable: SAT_CC

b-Predictor:(Constant),TIME,SAT_COM

c-Predictor:(Constant),TIME,SAT_COM,AbR

d-Predictor:(Constant),TIME,SAT_COM,AbR,FIRST_C_R

Table 3 – Regression Model with the Alternative Call Center Operational Performance Indicators

Source: Authors

As can be seen, R^2 had a score of 75.5%. This percentage is far higher than that found in the regression between the traditional operational performance indicators and customer satisfaction with the call center (11.6%).

The dimension with the greatest impact on R^2 was Responsiveness (TIME), representing almost 67% of the total. The dimension related to the user's general satisfaction *vis-à-vis* the company from the operator's standpoint (SAT_COM) represented approximately 5%, the Abandonment Rate (AbR) about 3%, and the ability to resolve the problem from the customer's standpoint (FIRST_C_R) only 0.5% of R^2 .

The Durbin-Watson statistical test produced a result close to 2, indicating that there were no problems with independence of error.

As shown in Table 4, the VIF values met the conditions of Field (2005), suggesting no multicollinearity problems with the multiple regression.

Cook's distance was less than 1, indicating no problems with influential cases (Field, 2005). The premises of normality, homoscedasticity, linearity and independence of error were tested and addressed using a graphical approach as suggested by Field (2005).

Consequently, it is seen how the alternative call center indicators, together with the Abandonment Rate (AbR), have a far higher explanation level *vis-à-vis* customer satisfaction exclusively in terms of the traditional indicators. Therefore, these new indicators can be used as an alternative to the traditional set of call center performance indicators, incorporating the customer's perspective more clearly and accurately to the way of measuring the global performance of a call center.

Model (Constant)	Non-standard Coefficient		Std. Coef.	T	Sig.	Collinearity	
	B	STD. Error	Beta			Tolerance	VIF
(Constant)	2.360	0.379		5.839	0.000		
TIME	0.446	0.029	0.648	11.730	0.000	0.557	1.794
SAT_COM	0.661	0.107	0.260	4.950	0.000	0.619	1.615
AbR	0.001	0.000	0.205	4.734	0.000	0.911	1.098
FIRST_C_R	0.096	0.048	0.119	1.982	0.049	0.496	2.132

Dependent variable: SAT_CC

Table 4 – Coefficients of the Regression of the Call Center Alternative Operational Indicators
Source: Authors

FINAL REMARKS

Firstly, the results of the adjusted R^2 of the regressions undertaken between the traditional call center operational performance indicators and customer satisfaction – as well as the alternative set proposed by the authors and customer satisfaction – are presented in a consolidated manner in Table 5. Based on this table, some conclusive remarks are presented.

		Adjusted R^2	
		Traditional Indicators	Alternative Set
FCR	First Call Resolution Rate	9.4%	-
WTC	Average Work Time after the Call	2.2%	-
AbR	Abandonment Rate	-	3.4%
TIME	Responsiveness	-	66.9%
SAT_COM	Satisfaction with the Company	-	4.7%
FIRST_C_R	Problem-Resolution Capacity	-	0.5%
Total Adjusted R^2		11.6%	75.5%

Table 5 – Consolidation of Multiple Linear Regressions
Source: Authors

Upon preliminary scrutiny of the traditional set of indicators, it becomes immediately clear that many call centers are adopting an array of indicators that indeed have no bearing on customer satisfaction, possibly due to the ease of obtaining these indicators from the ancillary technological apparatus.

It is important to note that this conclusion partly supports the results obtained by Feinberg et al. (2000), even considering the different ways of evaluating customer satisfaction.

While on the subject of the traditional indicators, it should be stressed that the value obtained for R^2 , located at a level of 11.6%, was a figure well above the R^2 obtained by Feinberg et al. (2000) which was 5%. A possible explanation for this fact would be that a barrier has been overcome in this work by obtaining a customer satisfaction parameter by means of a response given directly by the customers themselves, instead of getting it from a perception of satisfaction reported by the call center operations manager, as was the case in earlier work.

Another important aspect is that this study partially confirms the result obtained by Feinberg et al. (2000) with regard to the significance of the Abandonment Rate on customer satisfaction, as together with the alternative indicators it resulted in a far higher R^2 than previously found. This result deserves further research in order to identify why the Abandonment Rate (H_04) was not significant when taken in conjunction with the other traditional call center performance indicators, and was only significant when taken together with the alternative indicators.

On the other hand, the alternative set of call center operational performance indicators had a quite satisfactory adjusted R^2 (75.5% - Table 5), thereby making it an important proxy of the result of the customer satisfaction with the call center.

A point to be emphasized is the importance of the customer's perception of handle time, expressed in the TIME variable. As can be seen, it accounts for almost 67% of the explanation for the variation in customer satisfaction. This result may at first sight be considered contradictory, since the TT (Talk Time) was not identified as being significant in the first regression performed. However, it should be stressed that in this case there is a clearly different situation between perceived time, operationalized by the TIME variable, and real time, operationalized by TT (Talk Time).

It also transpires that the perception of customer satisfaction *vis-à-vis* the company, on the part of the operator, is also significant. This is positive to the extent that preliminary information can be given to the call center managers at the end of a call, so that they can take some action to reverse a customer's negative perception about the company that was perceived by the agent.

As seen above, there is still a long way to go with regard to the choice and proper use of key performance indicators for call center management. It is hoped that this work has contributed to a better understanding of this research issue.

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