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WHAT ARE THE FACTORS THAT MOST AFFECT SERVICE QUALITY IN FAST-FOOD RESTAURANTS?

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Service quality management; Fast-food restaurants; Servicescapes; Customer satisfaction; Customer behavior.

A B S T R A C T

This paper aims to identify the factors that most affect service quality in fast-food restaurants (FFR) from the Brazilian customers' perspective. Factor analysis was used to verify the items of the DINESERV scale. Cronbach's α and item-total correlations were used to measure the reliability of the questionnaire; linear regression was conducted to identify the factors that most affect the service quality and, Quartiles analysis was used to determine the most critical items in service provision. The study was conducted at eight FFRs located in malls. Reliability, physical facilities and empathy are the factors that most affect the service quality. The most critical items are related to empathy, i.e., the employees need to be more sympathetic, sensitive and interested in anticipating the customers' needs and wants. The necessity of improvement of service quality on empathy issues confirms the challenge of FFRs in making services "warmer".

1. INTRODUCTION

Due to the increasing globalization, the world has become ever more multicultural and streamlined. The growth of the economy and rising income levels of the people have contributed to the sheer variety of gastronomic preferences across the regions all over the world. In this context, fast-food, the food that is prepared and served very quickly (Srivastava, 2015), appears to be a solution to the shortage of time, presenting a reduced preparation time and greater practicality.

The concept of fast-food was first introduced in the USA in the early 1950s, and internationally, Brazil is the fourth largest consumer of fast-food, only behind the USA, Japan and China (EAE Business School, 2016). In Brazil,

many of the fast-food restaurants (ffr) lie in the franchise category. As a franchisee, the restaurant owner has the right to use the brand and the operating system of the franchisor; in addition, the franchisee will have support from this (IFA, 2010).

The quality of fast food restaurant services is perceived by customers, and each culture tends to value more or less certain factors (Goyal & Singh, 2007). In very populous cities, the fast-food chains are very popular because of its characteristics such as fast delivery, great taste and relatively low price. Such characteristics are also perceived in street food vendors, i.e., vans or kiosks that serve food and are usually located in shopping streets and at festivities (Morano et al., 2018).

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However, the fast-food chain stores confront the challenge of offering certain qualities to the customer at competitive costs, such that their profits are preserved. This statement means offering food security (Chua Chow & Luk, 2005), sensory experience (Ramseook-Munhurrun, 2012), diversity of menus (Min & Min, 2013), good hygienic-sanitary (Gorris, 2005), environment (Freitas & Barros, 2016), and prompt (Reynoso & Moores, 1995) and friendly service (Chua Chow & Luk, 2005) at market prices (Han & Ryu, 2009). The restaurant that offers great service and perceived value gains a competitive advantage over others (Stevens et al., 1995).

Several studies have been conducted to identify and analyze the factors that influence the quality in fast food restaurants for the following purposes: understanding the critical factors that influence the frequency of fast-food consumption such that improvements can be made (Akbay et al., 2007); examining the differences between markets to improve the transfer of the fast-food restaurant service quality model (Qin et al., 2009); exploring the differences in fast-food preferences, perceptions and condescension among consumers living in high and low income neighborhoods (Aloia et al., 2013); identifying the most important factors that could create a positive experience and the elements that influence the customer's journey to the restaurant (Azila et al., 2014); and helping fast food restaurants enter foreign markets successfully (Min & Min, 2013).

Most studies consider different dimensions and attributes (e.g., nationality, gender and age of the respondents), focusing on establishments with specific characteristics (e.g., full-service, fast-food, ethnic and self-service restaurants, and more recently, street food vendors); this makes the comparison of these studies' results difficult and ambiguous. Specifically, these studies' findings must be carefully analyzed and interpreted when applied to different types of restaurants (Freitas & Barros, 2016).

To contribute to addressing the problem in question, a methodological approach was conducted to assess the service quality in eight Brazilian fast food restaurants from the customers' perspective and to identify the most critical factors and items that should be prioritized to improve the quality of services.

2. LITERATURE REVIEW

Four well-documented characteristics of services, namely, intangibility, heterogeneity, inseparability and perishability, must be acknowledged for a full understanding of service quality. The services cannot be counted, measured, inventoried, tested, and verified in advance of sale to assure quality (intangibility). The services, especially those with high work content, are heterogeneous; their performance usually varies from producer to producer, from client to client and from day to day (heterogeneity). Because many services are inseparable (inseparability), quality in services is not engineered at the manufacturing plant and then delivered intact to the client. In addition, since services cannot be saved to be performed at another time (perishability), they are perishable (Parasuraman et al., 1985).

The intangibility characteristic has an intense effect on the marketing of services, which leads to quality control problems for the producer and assessment problems for the consumer (Pleger Bebko, 2000). Policy heterogeneity has many dimensions and does not easily present itself for a quantitative analysis (Kox & Lejour, 2005). Inseparability produces customer perceptions of shared responsibility for service outcomes, resulting in greater emotions. When emotions are positive, there should be increased loyalty to the service provider (Sierra & McQuitty, 2005).

All these characteristics are present in the services performed in fast food restaurants, and suggested marketing strategies for problems in this establishments are as follows: create a strong organizational image (intangibility), emphasize selection and training of public contact personnel (inseparability), customize service (heterogeneity) and use strategies to cope with fluctuating demand (perishability) (Zeithaml et al., 1985).

There are activities that are typically performed in most fast food restaurants. First, the customer enters a line to choose his food/drink and pay for it. Nowadays, the request and the payment can be made to an attendant, through an automatic machine or by using an app; hence, an order number is generated. Thereafter, the customer waits for the order to be picked up at the counter. The customer receives his order on a tray and carries it to one of the restaurant tables. It is important to note that, with the exception of food preparation, the customer participates in several stages of the service that is delivered. Thus, two concepts are very important in the assessment and management of the quality of services: moments of truth and servicescapes.

Whenever a customer comes into contact with any aspect of the company; from this, an opinion can be generated regarding the quality of service, and it is defined as a moment of truth. A service cycle is composed of a continuous chain of moments of truth that the customer experiences as the service provided by a company. This experience is generally unconscious "in the customer's head," and may have nothing to do with the technical approach set by the company (Albrecht, 1999).

The ambient conditions (e.g., temperature, air quality, noise, music, lighting and odor), spatial layout and functionality (e.g., layout, equipment and furnishing), and signals, symbols and artifacts (e.g., no smoking sign and style of décor) are environmental dimensions of servicescapes, and they influence the behavior and

perception of the service for both customers and workers in the holistic environment (Bitner, 1992).

Because of the increasing importance of service in the world economy, several studies (e.g., Campos & Nóbrega, 2009; Lee & Hing, 1995; Omar et al., 2016; Sumaedi & Yarmen, 2015; Tan et al., 2014; Tzeng & Chang, 2011) have been conducted to measure service quality regarding customers' perceptions. The only existing consensus is that service quality remains an abstract construct that is not easy to define and evaluate (Cronin & Taylor, 1992; Parasuraman et al., 1985, 1988).

SERVQUAL (Parasuraman et al., 1988) has been the most used scale to evaluate services of various characteristics (Freitas & Barros, 2016), and several studies (e.g., Burböck, 2014; Min & Min, 2013; Mittal & Lassar, 1996; Quester & Romaniuk, 1997; Ryan & Cliff, 1997; Wal et al., 2002) have been conducted to measure service quality regarding customers' perceptions. Conceptually, the SERVQUAL scale suggests that service quality can be defined as the gap between customers' expectations of service (E) and their perceptions of actual service performance (P) regarding five dimensions of quality (tangibles, reliability, responsiveness, assurance and empathy) that are distributed in 22 items in its original version.

However, SERVQUAL has been the subject of criticism in many scientific studies (e.g., Babakus & Mangold, 1992; Brown et al., 1993; Lee et al., 2000; Teas, 1993) that concluded that the SERVPERF scale (Cronin & Taylor, 1992), based only on measures of service performance, would be more adequate to evaluate service quality. SERVPERF has been applied in other studies (e.g., Babakus & Boller, 1992; Jain & Gupta, 2004; Freitas and Barros, 2016). Therefore, this work suggests that the expectations scale (SERVQUAL) and the performance-only measure of service quality (SERVPERF) should be discarded in favor of the use of the DINESERV instrument, which is specifically designed to measure restaurant services.

DINESERV (Stevens et al., 1995) is an adaptation of the SERVQUAL scale (Parasuraman et al., 1988) for restaurant industries using the knowledge learned in the development and refinement of LODGSERV, which has previously been successfully applied in other studies (Crompton & MacKay, 1989; Fick & Brent Ritchie, 1991; Getty & Thompson, 1994; Ryan & Cliff, 1997). This work proposes a DINESERV-based approach to assess service quality provided by fast food restaurants.

3. THE METHODOLOGICAL APPROACH

The research was accomplished in national (Bob's, Giraffas, Vivenda do Camarão, Spoleto and Koni Store) and multinational fast-food franchise restaurants (McDonald's, Subway, and Burger King) that are located in malls in the municipality of Campos dos Goytacazes.

The municipality has approximately 503,424 inhabitants and is located 275 km from Rio de Janeiro, Brazil (IBGE, 2018).

Based on the DINESERV (Stevens et al., 1995) scale, a questionnaire was designed to assess the quality of service of fast food restaurants. To ensure the content validity of the questionnaire, the recommendations of two experts on service quality management were considered. During a restaurant customer approach, the researcher explained the purpose of the survey and asked if he/she was interested in participating in the study.

In the first part of the instrument, some questions were defined to identify the socioeconomic profile of the respondents, their motivations, schedules and frequency of use of fast food restaurants. In the second part, 28 items were used to measure the quality of services in fast food restaurants concerning the consumers' perceptions. More specifically, each respondent was invited to evaluate the quality of service provided by the fast-food chain that he/she most frequent. The respondents should establish their degree of agreement with the representative statements of the 28 items using the five-point Likert scale (Likert, 1932), ranging from 1 (strongly disagree) to 5 (strongly agree). This scale purports to measure direction (by 'agree/disagree') and intensity (by 'strongly' or not) of attitude (Albaum, 1997). The DINESERV dimensions are briefly below described:

- **Tangibles** is composed of 10 items, where each item contains an affirmative that allows the evaluation of equipment, physical facilities, personnel and materials used in the restaurant.
- **Reliability** is composed of 4 items, where each item contains an affirmative that allows the evaluation of the ability of the fast-food chain to perform the promised service dependably and accurately. The item "the restaurant provides an accurate guest check" was not included in the questionnaire because it is not adherent to the services provided in fast food restaurants.
- **Responsiveness** is composed of 3 items, where each item contains an affirmative that allows the evaluation of the waiting times and the availability of the resources offered in the restaurant service.
- **Assurance** is composed of 5 items, where each item contains an affirmative that allows one to evaluate the trademark's and collaborators' capacity through knowledge associated with the sympathy and ability to inspire credibility and trust from the restaurant's customers.
- **Empathy** is composed of 6 items, where each item contains an affirmative that allows the evaluation of the care and attention offered to consumers who are seeking to answer their specific needs.

Finally, in the third part of the questionnaire the respondent was requested to assign a grade of 0 to 10 for the general performance of the restaurant that represents his/her general perception regarding the services that the restaurant provides.

Convenience sampling was used to collect data and judgments from the customers. Component factor analysis was used to summarize the information contained in the original items and dimensions of the DINESERV into a resulting set of new composite dimensions (factors) and items. The items were regrouped into the new factors (dimensions), and the Cronbach's alpha (Cronbach, 1951) was used to measure the internal consistency of the new questionnaire. An analysis with the alpha coefficient and item-total correlations was also conducted to identify items that could be eliminated to increase the questionnaire's reliability.

Given the mean score of service quality for each item, quartiles analysis (Freitas et al., 2006) was used to classify the items in critical regions, identifying the items that must have priority of corrective and preventive actions to improve the quality of services. Mean scores lower than the first quartile correspond to 25% of the total items and they correspond to critical priority items. High priority items have mean scores of service quality assigned between the first and second quartiles. Moderate priority items have mean scores between the second and third quartile, and finally, low priority items have mean value of service quality between the third and fourth quartiles. Linear regression analysis was conducted to identify the dimensions that most influence the service quality provided by fast food restaurants.

4. DATA ANALYSIS AND RESULTS

Of the 200 questionnaires distributed, 190 were received completed. Table 1 shows that 70% of respondents are no more than 30 years old, and the majority are female (60%). Regarding the monthly income, approximately 60% of respondents receive less than US$ 800.00. In terms of school background, 65.42% of the respondents had at most a high school degree. In terms of the habit of eating at fast food restaurants, 53.68% of respondents reported that they do this as many as 3 times a month, and 33.69% do this 4-8 times a month. The main periods for visiting fast food restaurants are between lunch and dinner (47.47%) and at dinner (31.31%). In total, 63% of respondents reported that they visit fast food restaurants in malls when they shop, go for a walk in the mall or go to the movies.

The groups of variables (factors), which are by definition highly intercorrelated, are assumed to represent dimensions within the data (Hair et al., 2010). An exploratory factor analysis was conducted on the 28 items extracted from the questionnaire to verify if the resulting factorial solution confirms the 5 DINESERV

dimensions. In this context, tests were preliminarily conducted to verify the feasibility of factor analysis.

Table 1. Characteristics of respondents

Gender	%
Male	39.89
Female	60.11
Age group (years)	%
Less than 20	29.00
20-30	40.90
31-40	18.30
41-50	9.10
More than 50	2.70
Monthly income (US$)	%
Less than 400.00	21.05
400.00 - 800.00	38.42
801.00 - 1775.00	24.74
More than 1775.00	15.79
Education Level	%
Graduate	8.98
Undergraduate	26.60
High School/Technician	51.06
Elementary School	14.36
Frequency (times a month)	%
0-3	53.68
4-8	33.69
9-12	5.79
More than 12	6.84
Timetable	%
Before lunch	2.53
At lunch	13.64
Between lunch and dinner	47.47
At dinner	31.31
After dinner	5.05
Reason	%
I work at the mall or nearby	6.62
I'll take a walk and enjoy the *fast-food*	34.70
I go to the bank/service and I enjoy the *fast-food*	2.21
I have little time to feed myself	5.05
Foods are nutritious	1.26
I go shopping and enjoy the *fast-food*	11.99
I go to the movies and enjoy the *fast-food*	16.40
I go exclusively to feed myself	4.73
The food is tasty	6.62
Another reason	10.41

First, there are nearly seven observations for each question (variable). According to Hair et al. (2010), this sample size provides an admissible basis for the calculation of correlations between variables. Second, 76% of the correlations between the variables are

significant at the 0.001 level. Third, the Bartlett's test of sphericity shows that nonzero correlations exist at a significance level of 0.0001. Finally, the KMO test (Kaiser–Meyer–Olkin) resulted in the measure of sampling adequacy (MSA) with a value of 0.918. All those tests indicate that the set of variables is suitable to proceed to factor analysis.

The factor solution was derived from the principal component analysis with varimax rotation of 5 DINESERV dimensions. The latent root criterion of retaining factors with eigenvalues greater than 1.0 was applied, and six factors were extracted. Factor loadings $\pm$ 0.35 or above were considered, and the factorial solution explained 63.05% of the total variance.

Table 2 shows the final solution, with factors/dimensions (F_1, F_2, …, F_6) and variables/items, factor loadings and percentages of explained variance by each factor. Consequently, the 10 items of the DINESERV tangibles dimension (Stevens et al., 1995) were split into two new factors that appear to better represent the physical facilities (6 items) and the issues related to the menu, decoration of the environment and appearance of employees (4 items). The other factors include items representing reliability (5 items), responsiveness (3 items), assurance (5 items) and empathy (5 items).

Table 2. Factorial solution

Factor Interpretation (% variance explained)	Variables (items) included in the factor	Loading Variables
F_1 Tangibles: Physical Facilities (12.19)	I_1. The FFR has visually attractive parking areas and building exteriors.	0.387
	I_2. The FFR has a visually attractive dining area.	0.634
	I_3. The FFR has a dining area that is comfortable and easy to move around in.	0.720
	I_4. The FFR has restrooms that are thoroughly clean.	0.694
	I_5. The FFR has a dining area that is thoroughly clean.	0.788
	I_6. The FFR has comfortable seats in the dining room.	0.673
F_2 Empathy (11.52)	I_7. The FFR has employees who are sensitive to your individual needs and wants, rather than always relying on policies and procedures.	0.544
	I_8. The FFR makes you feel special.	0.756
	I_9. The FFR anticipates your individual needs and wants.	0.751
	I_{10}. The FFR has employees who are sympathetic and reassuring if something is wrong.	0.638
	I_{11}. The FFR seems to have the customers' best interests at heart.	0.636
F_3 Assurance (11.19)	I_{12}. The FFR has employees who can answer your questions completely.	0.532
	I_{13}. The FFR makes you feel comfortable and confident in your dealings with them.	0.553
	I_{14}. The FFR has personnel who are both able and willing to give you information about menu items, their ingredients, and methods of preparation.	0.718
	I_{15}. The FFR makes you feel personally safe.	0.734
	I_{16}. The FFR has personnel who seem to be well-trained, competent, and experienced.	0.635
	I_{17}. The FFR seems to give employees support so that they can do their jobs well.	0.426
F_4 Reliability (10.42)	I_{18}. The FFR serves you in the time promised.	0.567
	I_{19}. The FFR quickly corrects anything that is wrong.	0.728
	I_{20}. The FFR is dependable and consistent.	0.690
	I_{21}. The FFR serves your food exactly as you ordered it.	0.545
F_5 Tangibles: Menu, decoration of the environment and appearance of employees (9.16)	I_{22}. The FFR has staff members who are clean, neat, and appropriately dressed.	0.487
	I_{23}. The FFR has a decor in keeping with its image and price range.	0.613
	I_{24}. The FFR has a menu that is easily readable.	0.798
	I_{25}. The FFR has a visually attractive menu that reflects the restaurant's image.	0.635
F_6 Responsiveness (8.57)	I_{26}. The FFR during busy times has employees shift to help each other maintain speed and quality of service.	0.700
	I_{27}. The FFR provides prompt and quick service.	0.722
	I_{28}. The FFR gives extra effort to handle your special requests.	0.702

Table 3 shows the average performance for each item ($\overline{P}_j$), the item-total correlations (ITC), the Cronbach's alpha related to each dimension (αd), the Cronbach's alpha of each dimension if a particular item of such dimension is excluded from the questionnaire (αIE) and the standard deviation (SD_j). Since $\alpha_d \geq 0.60$, the questionnaire was reliable in the context of exploratory studies. Note that items I_1 ($\alpha IE = 0.850$; ITC = 0.383) and

I_{21} ($\alpha IE = 0.782$; ITC = 0.449) are not highly correlated with a composite of the remaining items of their dimension, and if they were excluded from the questionnaire, the reliability of the dimension to which they belong is increased. The overall performance of restaurants was 6.82, which means that there are many aspects to be improved.

Table 3. Cronbach's alpha, item-total correlations and average performances($\bar{P}$).

Factor	Items	ITC	α_d	α_{IE}	$(\bar{P})_j$	SD_j
F$_1$	I$_1$	0.383		0.850	3.20	1.25
	I$_2$.	0.599		0.806	3.74	1.12
	I$_3$	0.673	0.832	0.791	3.40	1.19
	I$_4$	0.621		0.802	3.36	1.26
	I$_5$	0.678		0.790	3.61	1.20
	I$_6$	0.693		0.786	3.43	1.21
F$_2$	I$_7$	0.532		0.823	3.15	1.12
	I$_8$	0.655		0.790	2.99	1.13
	I$_9$	0.668	0.831	0.787	3.03	1.11
	I$_{10}$	0.646		0.793	3.23	1.18
	I$_{11}$	0.650		0.792	3.16	1.24
F$_3$	I$_{12}$	0.696		0.814	3.46	1.09
	I$_{13}$	0.677		0.819	3.51	1.01
	I$_{14}$	0.629	0.851	0.827	3.45	1.08
	I$_{15}$	0.550		0.841	3.37	1.07
	I$_{16}$	0.637		0.825	3.41	1.11
	I$_{17}$	0.624		0.828	3.30	1.14
F$_4$	I$_{18}$.	0.545		0.741	3.34	1.24
	I$_{19}$	0.650	0.773	0.678	3.51	1.12
	I$_{20}$	0.693		0.668	3.48	0.97
	I$_{21}$	0.449		0.782	3.68	1.08
F$_5$	I$_{22}$	0.581		0.725	3.64	1.17
	I$_{23}$	0.587	0.778	0.722	3.79	1.11
	I$_{24}$.	0.601		0.715	3.79	1.13
	I$_{25}$	0.560		0.736	3.66	1.08
F$_6$	I$_{26}$	0.564		0.710	3.40	1.13
	I$_{27}$	0.633	0.761	0.636	3.27	1.06
	I$_{28}$	0.581		0.693	3.24	1.17

The quartile analysis (Figure 1) shows that the most critical items are related to the empathy dimension. This result means that the employees need to be more sympathetic (I$_{10}$), sensitive and interested in anticipating the customers' individual needs and wants, instead of always relying on policies and procedures (I$_7$, I$_9$, I$_{11}$) to make them feel special (I$_8$). Furthermore, restaurants need to accord extra effort to address customers' special requests (I$_{28}$).

Those results corroborate with Fitzsimons and Fitzsimons (2005), since, in fact, the operational processes in the fast food restaurants are characterized by the low interaction between the customers and the service providers and by the low customization. In such situations, the customers interact with the attendants only at the time of requesting and picking-up the meals, which are available only in standardized options. Thus, one of the major challenges for fast food restaurant managers is to address concerns regarding the perceived service quality associated with the need to make the service "warm".

The results also reveal that the parking areas and the building exteriors needing to be more visually attractive (I$_1$) is also a critical item. Regarding item I$_1$, in terms of

parking, management interventions are limited in this study, since parking is an item more conveniently related to the malls in which restaurants are located. However, the outdoor environment of the restaurant should be properly planned and maintained to attract customers.

Conversely, the majority of the low priority items are of the tangibles dimension. Regarding those items, the results reflect that the dining area of the restaurant appears to be visually attractive (I$_2$), and it is clean (I$_5$); the food is served exactly as it was ordered (I$_{21}$). In addition, the staff members are clean, neat, and appropriately dressed (I$_{22}$); the restaurant decor is adequate for the image and price range (I$_{23}$), and the menu is easily readable (I$_{24}$) and visually attractive, which reflects the restaurant's image (I$_{25}$). Thus, fast food restaurants should not consider such items a priority for the implementation of improvement actions.

Critical priority	Item	I$_8$	I$_9$	I$_7$	I$_{11}$	I$_1$	I$_{10}$	I$_{28}$
	$(\bar{P})_j$	2.994	3.033	3.153	3.156	3.202	3.231	3.237
	1st Quartile: 3.263							
High priority	Item	I$_{27}$	I$_{17}$	I$_{18}$	I$_4$	I$_{15}$	I$_{26}$	I$_3$
	$(\bar{P})_j$	3.272	3.303	3.337	3.358	3.368	3.397	3.404
	2nd Quartile: 3.406							
Moderate priority	Item	I$_{16}$	I$_6$	I$_{14}$	I$_{12}$	I$_{20}$	I$_{13}$	I$_{19}$
	$(\bar{P})_j$	3.408	3.429	3.451	3.457	3.483	3.507	3.511
	3rd Quartile: 3.536							
Low priority	Item	I$_5$	I$_{22}$	I$_{25}$	I$_{21}$	I$_2$	I$_{24}$	I$_{23}$
	$(\bar{P})_j$	3.612	3.642	3.663	3.683	3.736	3.786	3.788

Figure 1. Quartiles Analysis

A linear regression analysis was conducted considering the evaluations of each respondent i, regarding the valued general performance (P_G) of the fast food restaurant he/she used (dependent variable) and the average performance ($\bar{P}_1$) of the restaurant (independent variable), which was calculated from the restaurant performance score on each item. The larger the absolute value of r, the stronger the linear association between P_G and $\bar{P}_1$. The higher the value of r^2, the greater the explanatory power of the linear regression analysis and, consequently, the better the prediction of P_G. The overall performance of the fast food restaurants (when the perception of all respondents is considered simultaneously) was 3.41. The coefficient of regression (r) and the coefficient of determination (r^2) were 0.591 and 0.349, respectively.

Using the formula $4/(n – k – 1)$, where n is the number of respondents (clients) and k is the number of independent variables, problematic cases that have a score larger than the criteria computed can be identified (Hair et al., 2010). In that case, which has 179 respondents and one independent variable, the formula equates to $4/(179 – 1 – 1) = 0.02259$. Cook's distance and the 95% confidence interval for the overall performance in Figure 2a-b show that the ordered pairs corresponding to the evaluation of the respondents 8, 16, 40, 48, 54, 100, 137, 147 and 177 are very far from the others, meaning that those respondents influenced the overall evaluation of the service quality (performance) in fast food restaurants. Therefore, these results could be considered outliers. If

such ordered pairs were excluded from the data, the new r and r^2 would be 0.704 and 0.496, respectively. On such pairs, $\overline{P}_I$ appears to not be a suitable prediction of P_G. The ordered pairs 3, 49 and 121 are influential points because they are based on extremely low values of $\overline{P}_I$ and P_G. Such values do not affect the regression estimates, and they could not necessarily be excluded from the data unless it is deemed that the respondents purposely evaluated the restaurants' performance poorly. Accordingly to Freitas and Barros (2016), if those pairs are preserved in the data, it is supposed that the fast food restaurants really provided poor service.
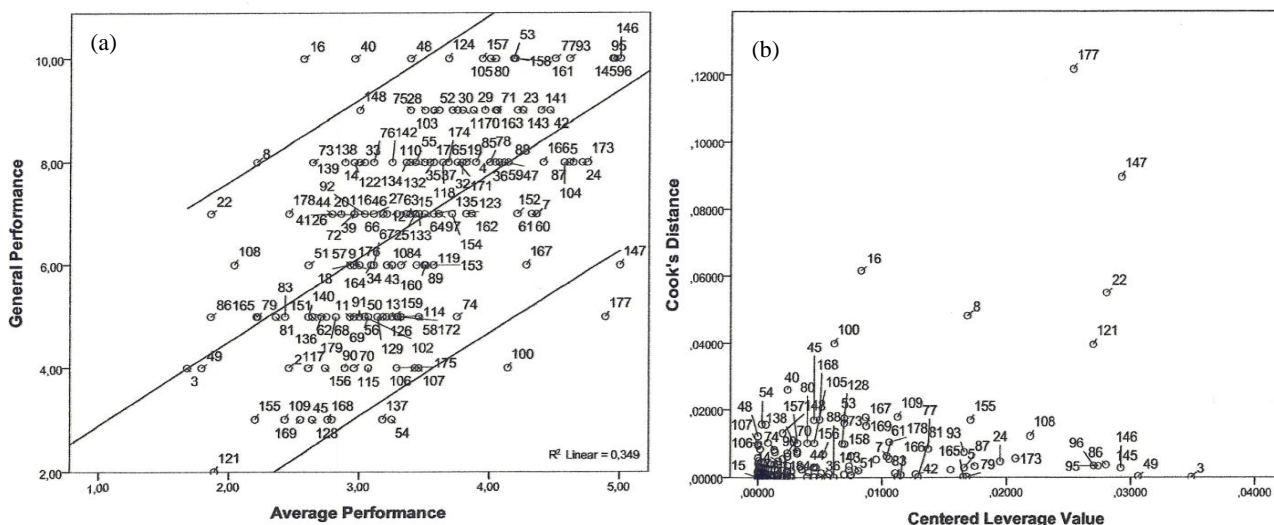

Figure 2. Cook's distance analysis

In Table 4, the Pearson correlation coefficients show that D_3 (assurance) and D_4 (reliability) are the dimensions best related to P_G when the predictive effects of other dimensions are removed. D_6 (responsiveness) has the lowest Pearson value. Conversely, the highest partial correlation coefficients indicate that reliability (D_4), physical facilities (D_1) and empathy (D_2) most influenced the service quality (P_G) while controlling or adjusting the

effects of the other dimensions (independent variables). Responsiveness (D_6) least affected the service quality. Partial correlations tend to be more significant than the Pearson correlations, as independent variables also have correlations with each other, which interferes with the results; this often leads to misunderstanding (Hair et al., 2010).

Table 4. Regression Analysis

Var	Mean	SD	Pearson Corr.	Partial Corr.	b_i	VIF	Std Error	t	Sig.
Constant	6.829	1.853	-	-	0.314	-	0.528	0.595	0.553
D_1	3.443	0.885	0.574	0.227	0.465	1.850	0.156	2.976	0.003
D_2	3.123	0.873	0.561	0.213	0.477	2.167	0.172	2.779	0.006
D_3	3.405	0.812	0.591	0.123	0.322	2.619	0.203	1.588	0.114
D_4	3.497	0.846	0.586	0.229	0.514	2.031	0.171	2.999	0.003
D_5	3.709	0.857	0.517	0.087	0.182	1.893	0.163	1.115	0.266
D_6	3.312	0.904	0.480	-0.022	-0.044	1.940	0.157	-0.280	0.780
	Sum of Squares	**df**	**Mean Square**	**R**	**R^2**	**Adjusted R^2**	**Std. Error**	**F**	**Sig.**
Regression	294.677	6	49.113	0.713	0.508	0.496	1.323	28.052	0.000
Residual	285.376	163	1.751						
Total	580.053	169							

The variance inflation factor (VIF) provides an item correlation with each other model dimension. Thus, assurance (D_3) best relates to all other dimensions; the one that least related to the others was physical facilities (D_1). ANOVA test with the F-statistic of $F= 28.052$ and a significance of $p \leq 0.001$ indicated that the regression variables were significant.

The partial regression coefficients (b_i) show that reliability (D_4), empathy (D_2,) and physical facilities (D_1), are the most important dimensions, while responsiveness (D_6) is the least important dimension.

5. DISCUSSION

In recent decades, the expansion of fast food restaurants chains in Brazil and the consequent competition among them are notorious. In particular, this aspect motivates studies to measure the quality of the services provided in these establishments and to identify the most relevant and critical factors that must be improved to enhance the quality of services provided. The current article sought to contribute to the treatment of these subjects.

According to the sample of respondents, it was also found that fast food restaurants are more frequented by customers less than 40 years old and who attend (or have attended) high school/technical or higher. The most frequent times of consumption are between lunch and dinner and at dinner time. This result indicates that cultural aspects influence the fact that Brazilian consumers generally do not have fast-food at lunch, as consumers from other countries often do. The restaurants are primarily frequented by people who work at the malls, are shopping at the malls and/or have been watching movies in the malls' theatres. Thus, these results may have been influenced by the place where the research was conducted (restaurants located in malls).

The results also support the hypothesis that consumer fast-food consumption is not related to only socioeconomic/demographic characteristics of consumers, and it confirms the findings of previous studies (e.g., Akbay et al., 2007; Campos & Nóbrega, 2009). The impact of aging also has significant implications for the frequency of household fast-food consumption. Households with older meal planners and young children appear to display reduced levels of eating out; these results were also obtained in previous studies (e.g., Akbay et al., 2007; Azila et al., 2014; Campos & Nóbrega, 2009). In their study, Aloia et al. (2013) confirm social enjoyment as a reason for visiting the fast-food establishments by those participants who have patronized them.

The result of the principal components analysis suggested a rearrangement of the questionnaire items in six dimensions. These results reveal that the original dimensions (factors), reliability, responsiveness, security and empathy, are maintained, and the original dimension,

tangibility, was divided into two parts: tangibles (physical facilities) and tangibles (menu, decoration of the environment and appearance of employees). Cronbach alpha analysis showed that there is no possibility of excluding any item for reduction and summary of the data.

The Quartile analysis demonstrated that the most critical items are related to the empathy dimension. This result is in agreement with the results obtained in a previous study (Azila et al., 2014) in which it is proposed that restaurant management should train their front employees in soft skills to enhance communication with the customers.

Our study reveals that reliability has the most influence on the service quality in fast food restaurant when other dimensions have their influences controlled. This result contradicts the findings of Tan et al. (2014); such authors proposed the Chinese fast food restaurants service quality scale (CFFRSERV) which also employed a modified DINESERV scale and it contained 28 items across six factors.

5.1 Managerial implications

Greater focus should be accorded to the items classified as critical by the quartiles analysis, which is predominantly associated with the empathy dimension. This result is in accordance with the scientific literature on service quality, which considers that, in service companies characterized by low interaction and low customization (in which fast food restaurants exist due to low customization), one of the main challenges is to make service "warmer".

The attendance to customer special requests (I_{28}) also requires managerial analysis in terms of production flexibility, as fast food restaurants rigorously follow standardized processes and products that are nearly entirely standardized.

The results obtained through the use of the proposed methodology can be extracted for each of the fast food restaurants participating in the study. That is, the quality of services, the most critical items and dimensions that most impact the quality of services according to the perception of the customers of each restaurant, are easily obtained and may be of particular interest to restaurant managers and owners.

5.2 Limitations and future research

Currently, analyses are being conducted to verify the quality of services and identify the most critical items according to the customer's perceptions of each of the eight restaurants participating in the study. It is believed that these results will contribute to researchers and managers in the fast food restaurant business.

The study was conducted at fast food restaurants located in malls. Thus, the features and facilities of the parking areas, dining area and restrooms are the same for all fast food restaurants in the malls in which they were located. Thus, interpretations and comparisons of results should be carefully conducted because ultimately the results may have been influenced by this aspect.

Moreover, it is necessary to conduct studies at fast food restaurants not located in malls and compare those results with the results of this study. This necessity is the main strand for continuity of this study.

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