

A Pricing Tool Development For Soccer Tickets¹

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ABSTRACT

An organization's demand depends on the environment conditions and its competitiveness, and the measure that each one affects the company's demand is related to the market structure faced by the organization. In this article, it was analyzed the demand forecast for a soccer club's tickets and, in the researched literature, regression models seemed to be mainly used to explain the demand variation in this product. Usually, researches focused on soccer ticket's demand using databases with several clubs being simultaneously analyzed. However, each club is a monopolist of its own demand (due to high loyalty of fans/consumers) and knowing how demands respond in each club allows better price definition, extracting consumer surplus when necessary. The goal of this paper is to present a pricing tool development and demand forecast for a soccer club. High variability (elevated standard deviation) and relationship among variables bring a lot of challenges to pricing definition for soccer tickets, due to higher demand associated with higher prices, contradicting the expected demand function. Methodologically, generated regression model uses each match importance (i), estimated considering the best fit between price, importance and public for a database composed of 302 matches. Final model uses twelve (i) different values and ten other independent variables and its r^2 presented improvement compared to the researched literature. Contributions to management goes from better forecasting expenses related to match operation (employees and other services), better incentives to raise demand and higher assertiveness in transferring matches to other stadium or city.

Keywords: Demand Forecasting, Pricing, Soccer.

INTRODUCTION

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According to the Sports Ministry (2017), the most popular sport in Brazil is soccer and this national preference was originated in the decade of 1920 (Deloitte, 2011; Fujita, 2018). Several authors highlight the role of this sport in Brazilian culture, such as Damo (2018) and Damatta (1994). In addition to its cultural role, there is also the economic side of Brazilian soccer. Notorious exporter of players (Alvito, 2006; Rodrigues, 2010), the main clubs in the country have billings that would put them among big companies. According to the economic world perspective, the twenty biggest clubs in receipts have grown, from 97 to 2018, 9.6% in average in the total volume of their billings (Deloitte, 2019). The clubs with the highest billings in the world in 2018, for instance, have raised 8.3 billion Euros (Deloitte, 2019). In Brazil, the club with highest receipts in the year of 2017 - Clube de Regatas Flamengo – raised R\$ 595 millions (Itaú BBA, 2018), severely below the highest world revenue, of € 750.9 millions, obtained by the Spanish Real Madrid (Deloitte, 2019). Still in 2019, the club with highest revenue in Brazil has obtained billings of R\$ 841 millions (Itaú BBA, 2020), the values remain severely below the ones obtained in Europe.

To shake its receipts, clubs have some main sources of income: ticket office, games transmission rights, player selling and other receipts of exploration of products and services (Deloitte, 2019). In world level, discounted the receipts of player selling (less predictable) the income of ticket office are equal to 17% of the volume raised by clubs. Thus, in Brazil, the amount equivalent to ticket office corresponded to 15% in 2017 (Deloitte 2019; Itaú BBA, 2018).

According to Ekelund (1998), the representativeness of such receipts has altered throughout time, due to several aspects of macro-environment that have changed over time, making the importance of certain stakeholders would quite vary. Although these alterations, one can affirm that the billings acquired with sell of tickets will depend, in majorly, on some factors, such as:

- offer capacity of the club (stadium capacity where its games occur);



- number of games performed;
- size of its crowd;
- interest of the fans in following the games.

Such factors tend to vary very differently in short and long term. The offer capacity only alters in face of repairs in stadiums or construction of new equipment, with considerable investment in its construction. The amount of games in each season tends to be predictable, with the exception of championships with elimination phases. The fans of a club tends to vary little in short term, since it depends on the combination of social factors and performance of such clubs (Ribeiro, 2017).

To maximize public or income obtained in stadium, clubs should, therefore, know their demands for tickets. An assertive forecast of the demand and income brings several contributions to the club's management, such as reduction of the waste caused by over expected demand or capture of surpluses when the demand is raised considerably.

This article has the purpose of presenting the development of a pricing solution for tickets and forecast of the demand for a soccer club. This solution was developed during an intervention in a club whose scope involved the systematization of the ticket's price policy. The methodology used was of multiple regression, since the goal was understanding the behavior of a dependent variable (paying public) in face of independent variables (opponents, championship, price, schedule, etc). The main interests of the club involved a less subjective interpretation as how the price affects the paying public and the comprehension of the trade off between maximum occupation and maximum receipts for each game.

THEORETICAL REFERENCE

Given the purpose of this study, the fundamental concept which is involved is the demand law, which means, the smaller the price of a product, the higher the demand (Pindyck & Rubinfeld, 2002). Given the level of loyalty



observed in fans, defined as individuals with some psychological connection with a team (Hunt, Bristol & Barshaw, 1999), it is assumed that each club is a monopolist of its own demand in the short term. The size of the crowd tends to vary in a substantial way only in the long run, since its growth is sheltered in social and sports factors for the conversion of new individuals into fans (Ribeiro, 2017).

The demand forecast is one of the central points in a company's management (Sampron, 2005). This is because all direction of productive resources (raw materials and labor) depends on the quantity to be produced and, consequently, sold by the company. A poor sizing of the demand compromises, this way, all the direction of resources from the company, either in the case of excess of demand, or in the case of excess of capacity, generating loss by idleness (Slack; Chambers & Johnston, 2009). With this, the choice and use of a proper method of demand's forecast is one of the main points in business planning.

In general terms, one can comprehend the demand of a company as a consequence of two main factors: the environmental conditions and the attraction of its offer (Sampron, 2005). Several basic strategy and marketing materials, such as Porter (2004) and Kotler & Keller (2012) suggest that the environmental factors are out of the company's control, meanwhile there is a perspective that the environment can be influenced by the organization (Barney, Hesterly & Rosemberg, 2007). In short terms, though, the concern of the organization regarding the planning of the demand will be more related to the attraction of its offer.

Planning of the demand approaches in management books

During planning, therefore, an organization should choose between an appropriate method for forecast and demand to properly size its resources and minimize the risks of an overestimated or underestimated demand. The main books belonging to the bibliography of management courses in the country are less useful for the choice of an appropriate forecast method. The



work of Kotler & Keller (2012), for instance, always used in disciplines of marketing, is few specific in the choice of a method of projection of demand. The book mentions the importance of a marketing system that has internal information and from the environment. In addition, the authors quote the difference between demand as industry's investment fund and of the environmental conditions. As environmental conditions vary slowly, with long terms impacts, the short term demand tends to be of bigger control of the organization. The methods quoted by Kotler & Keller (2012) are: total potential of the market, potential of the market by area and multi-factorial indexation. These variables, though, are of difficult knowledge by part of the companies. In addition, small variations in the market's potential, for example, generate enormous differences in the final demand.

The work of Hisrich, Peters & Shepherd (2014), used in disciplines linked to entrepreneur and to general management, thus, does not clear the question of the choice of an appropriate method. The authors discuss that "to start, the entrepreneur must research everything possible regarding the other new companies in its area" and that "strategical changes also affect sales and need to be included in the estimation" (Hisrich, Peters & Shepherd, 2014, p.235-236).

This question of measuring the demand, a common text book that address in a more complex way the methods of forecast is the one used in disciplines of production and operations, such as Slack, Chambers & Johnston (2009). In addition to presenting different methods, whose approaches maybe qualitative (panel, delphi and planning sceneries) or quantitative (temporal series, mobile mean, exponential adjustment and causal modes), the authors discuss the adherence of such methods in short and long term.

One can assume, however, that the market demand or from a specific company is a function of cause-effect, in which the explanation variable involve not only the environment factors (power of buying, level of employment and income, etc.). as also factors of company (quality of offer,



competition, commercial incentives, etc.). As Slack, Chambers & Johnston (2009) suggest, in short term the inertia of environment variables is big, making the weight of specific factors of the company higher when the planning horizon is short.

Lemos (2006) divides the methods of projection of demand in two big groups: qualitative and quantitative. Qualitative methods are accustomed to using judgments based on the experiences of the professionals involved. The Delphi method, for instance, combine the opinion of several people involved in the process, stimulation a consensus in the forecast (Slack, Chambers & Johnston, 2009). On the other hand, quantitative methods adopt a mathematical formula for the forecast. These methods may use their own demand as a forecast factor (mobile mean, for example) or adopt casual approaches (regression models).

Another factor to be considered is the specificity of the object of interest in the measurement. Different products have very distinct variations in face of the specific characteristics of their demands (season, competition, elasticity and type of product – inferior or superior good, for example). Therefore, a planner may choose a more appropriate method analyzing in what conditions the object of planning is fit.

One material that approaches several questions in a way to help the interested in the choice of an appropriate method is the one elaborated by Farris et al (2012). The authors indicate that the best price to be defined is the one that maximizes billings, orientating the construction of a curve of demand that enables the calculus of price, which generates the desired result. However, the authors recognize that the best price determination requires the knowledge of elasticity and this is only possible through the structuring of a series of data (reserve price and/or market test results). Naturally, such data involve cost associated to gathering and, besides that, systems and qualified personnel to use them.



Pindyck & Rubinfeld (2012), approach the definition of prices according to the market structure, have also addressed the subject objectively. Therefore, the approach according to the structures requires the correct classification of the structure faced by the company and the appropriate treatment of variables, as highlighted by Farris et al (2012).

The next item on the theoretical reference brings contributions of studies performed with the purpose of interest of this subject, discussing its methodology and achieved results.

Measuring the demand by tickets from soccer games

Souza (2004) approached the public forecast in the Brazilian soccer championship with very satisfactory regression models. The author came up with very illustrative final models ($r^2 = 0.55$), however without the price as explainable variable of the public present in stadiums. However, the modeling developed did not involve a specific club, but any game of the main series of Brazil. For the explanation of the public from all clubs, variables such as income of the city, unemployment, attraction of the match and quality of the group has shown to be significant.

Benevides et al (2015) present a very extensive analysis of studies of demand related to soccer. The authors highlighted that most studies point out the relevance of “economical, structural factors and the quality of the match are common in studies about the demand for soccer” (Benevides et al, 2015, p.102).

Ribeiro et al (2015) approached not the demand itself, but the intention of buying by fans. Since it assumes that intention is a reasonable preceding of effective buying, the results suggest that rivalry, schedule and championship/phase, in addition to price, affect the demand of a game. Besides that, the authors evaluated that the perception of safety considerably moves the demand, increasing the consumption when the fan does not feel the perception of risk of violence in a certain game.



When analyzing these studies, it is noticed the concern of the authors was linked to the explanation of the demand as a whole, and not to a specific club. There are several studies in this line, with similar results to the ones already approached.

Analyzing each club individually, it is reasonable to suppose that the price is explainable variable from the public. There are several evidences that the match may not have its tickets sold out by very high prices, according to articles from Globo Esporte (2013, 2018). However, there are matches that, even though with cheap tickets, do not present the expected demand (Globo Esporte, 2018). It is reasonable to assume, therefore, that the ideal price varies according to the match, being possible that some games have a capacity of public below the capacity of the stadium.

METHODOLOGY OF THE RESEARCH

The purpose of this study – to present the development of a pricing solution of tickets and forecast of demand for a soccer club – has appeared from the need that the club has to define its prices in a systematic way, taking into consideration the multiple variables that compose a game, resolving with this a conflict of interests between the involved areas in pricing a game (finances, marketing and communication, mainly).

The methodological choices derived from this context have assumed that the demand for a game from a soccer team tends to be close to a demand faced by a monopolist. This is because fans from one team do not consider buying tickets to see other teams, given the level of loyalty with the team previously chosen. Which means, the definition of prices from a game from team A does not affect the demand for tickets for a game from team B, since there is no intersection between the interested in the matches.

The demand of a good may be also influenced by the effects of income and substitution, for instance (Pindyck & Rubinfeld, 2002). However, these factors do not tend to be representative from one game to another (the



mean interval between games in the analyzed period was of 9 days). According to McAfee (2002), there are two basic strategies of pricing: direct discrimination (to charge differently from each type of consumer, according to a specific characteristic) and indirect (make the offer available to any consumer). The definition of price for tickets, according to Brazilian law, prevents the practice of direct discrimination. In case the club chooses one offer, it should be available to all consumers.

It started with an analysis of previous games of the club, with a 5-year period of analysis. According to the direction of the club, in this period of time the club oscillated a lot in terms of sports performance, disputing matches of high interest and of very low interest by part of the fans. Table 1 exhibits a summary of the analyzed data.

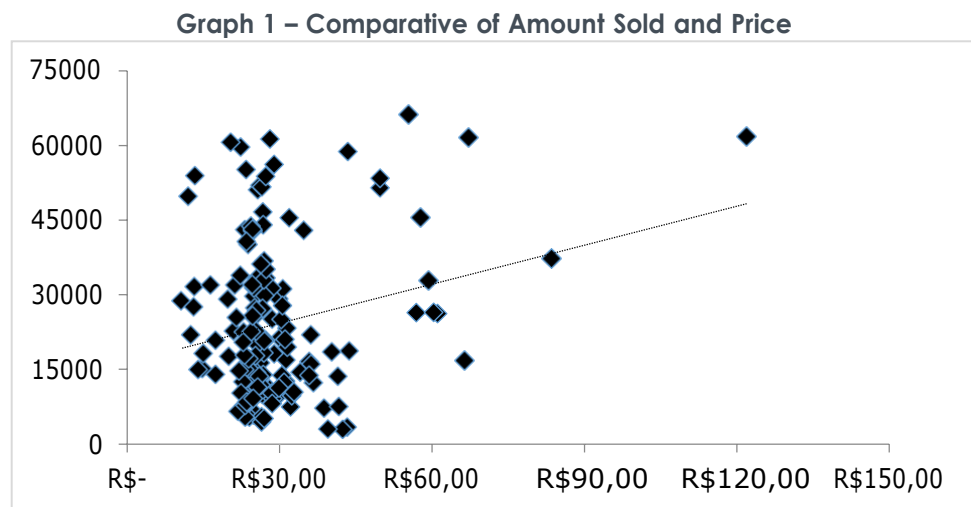
Table 1 – Analyzed Data For The Developing of the Model

Variable	Value	
Matches	302	
At home matches	151	
Matches out of home	151	
Public	Mean	24.192,2
	Standard deviation	15.512,3
	1° Quartile	12.408
	Median	19.987
	3° Quartile – Public	31.941,5
	Minimum – Public	3.013
	Maximum – Public	66.214
Ticket	Mean Ticket	29,6
	Standard Deviation – Ticket	13,3
	1° Quartile – Ticket	23,6
	3° Quartile – Ticket	30,8
	Minimum – Ticket	10,8
	Maximum – Ticket	121,9

By the exposed data in table 1, it is noticed the extreme variability of the demand (elevated standard deviation and 59% of the matches with value below the mean demand). Another particularity on the demand for matches is the relation between public and price. By the general law of demand (Ferguson, 1999), it is expected an inverse relation between price and amount sold of a good. A preliminary analysis of the paying public and ticket price, however, shows that matches with smaller public were, in mean



numbers, the ones with higher ticket price, according to what is exhibit in graph 1 ($r = 0.22$).



Assuming that the general law of demand can be applied in this case and that tickets of a match are not goods of Giffen, this relation suggests that each match is seen in a particular form by the interested public. Consequently, the matches have distinct subjective prices for the fan. Therefore, when a match with an “expensive” ticket (R\$ 121.85) has a public of 61.766 payers, it can be assumed that this game is cheaper, in relative terms, than a game with ticket at R\$ 42.34 with 3.013 payers. A data that supports this thought is the research of Ribeiro et al (2014), in which the fansatisfaction with the performance of the team depends on the variation of what it is conquered by the team, having competitions different importance in the composition of the fan’s satisfaction. In face of this data, the following theoretical-conceptual premises were assumed:

p1: a model of pricing definitions will have higher explanatory power when focusing on the demand of a specific club, since each club is a monopolist of its demand. This premise is supported by the particular characteristic of demand from the clubs, formed majoritarian by its fan public. Since the fan rarely exchanges its team (Damo, 2001; Hunt, Bristol &

Barshaw, 1999), a model of pricing analyzing a specific club tends to provide a bigger comprehension of the demand;

p2: prices chosen by a club should explore the potential of each match, allowing the club the extraction of the surplus of the demand when possible and intended. Which means, when comprehending the function of the demand of its public, the club may choose when to extract the surplus of the consumer, choosing strategies of maximum billings or maximum occupation of each match.

Given the variance of the data, techniques of extrapolation such as mobile mean and exponential softening were not recommended (Slack, Chambers & Johnston, 2009). Thus, a casual model was chosen, in which the bigger need was of interpretation of price as a variable component of the public forecast. According to graph 1 exhibits, an anterior step was necessary: the definition of a valuation factor for each match. The exposed premise in equation 1 was adopted:

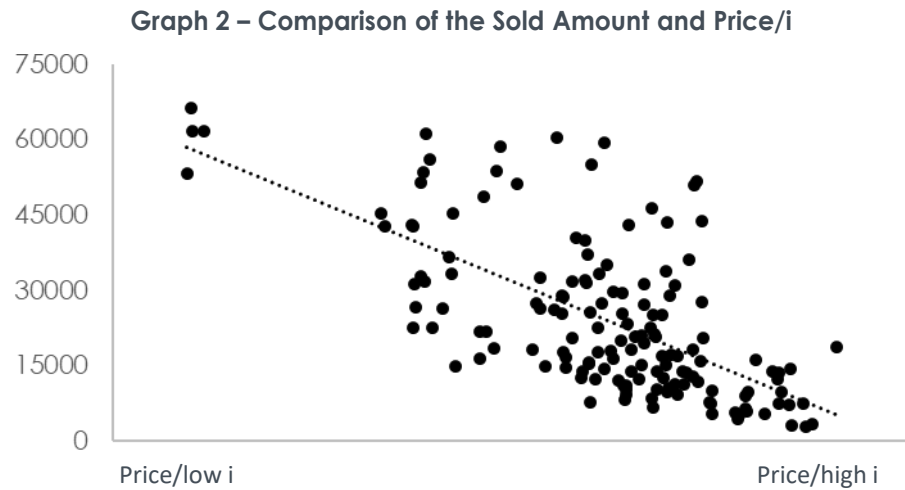
$$\text{Equation: } \textit{paying public} = \frac{-\textit{price}}{i}$$

In this equation, the paying public will depend on the relation between price and importance of the match. Therefore, for games with the same i , smaller prices diminish the public. In analogue form, for games with the same i , smaller prices increase the public.

The measurement of an appropriate i involved the definition of how i should vary according to the championship and phases. In a simple way, Brazilian teams dispute two types of competition: the ones that involve elimination matches and consecutive points. For the elimination competitions, it was adopted that each posterior phase is preferable than the anterior (i from a semifinal should be superior to an i of the quarter-final, for example). In the consecutive points competitions, the i of a match from a team in higher positions in the classification should have higher value than the i of a match



of a team fighting for intermediate positions. After the adjusting mechanism of price to the demand, the relation obtained between demand and price $/i$ has become similar to the exposed date in graph 2.



After obtaining an i that inverts the relation ticket and public previously observed, adjusting for a general law of the week, it started the elaboration of a multiple regression model. The variables for the composition of the model were:

- price/ i ;
- time of the match (categorized in eight different values);
- opponent (categorized in three distinct values);
- sports outcome (number of victories, goal balance) in an interval of matches varying from one to five;
- debut of a hired player;
- championship;
- need of victory in an elimination confrontation;
- stadium in which the match is played;
- weather conditions (rain in the city on the day of the event);



- time interval between matches as principal team;
- varied commercial action, such as uniform launch and player presentation.

These variables were generated combining two elements: previous studies on the object and meetings with the direction of the club, in which variables were discussed to have influence on the public. Some variables present difficult categorization, such as “style of the game” or “will power” of the team of the games. These variables, different from the outcome itself (victories, goal balance, etc), present difficulty in the creation of measurements and were excluded from the initial model produced.

ANALYSIS AND DISCUSSION OF THE RESULTS

Table 2 exhibits the generated model, with its final variables. For reason of confidentiality, it was omitted the name of the variable and the estimated parameters were divided by a constant, so that the privacy of the model would be maintained.

The obtained r^2 value presented quite satisfactory, with 72.3% of variance explained in face of the independent variables. According to the significance from the estimated parameters, it was adopted the criteria of tolerance for the acceptance of the parameter estimated by 0.1. This is because the result with tolerance of 0.1 was slightly superior to the obtained with tolerance of 0,05 and the parameters estimated possessed the expected sign.

Table 2 – Model of the Generated Demand

Variable	β	Sig.	% of Variation
(Constant)	6.044,2	,000	-
Price/i	-1.398,5	,000	20.1%
x2	1.799,4	,000	12.5%
x4	27,8	,033	8.9%
x5	-1.913,4	,031	13.2%
x6	697,2	,048	4.8%
x7	-543,5	,005	3.8%



x8	147,7	,000	8.2%
x9	2.348,7	,000	16.3%
Interaction between x2 and x3 (superior levels)	849,1	,000	5.9%
Interaction between x2 and x3 (inferior levels)	-501,7	,004	3.5%
Interaction between x3 and x7 (inferior levels)	-429,8	,074	3.0%
Dependent Variable – Paying Public Adjust in the model R ² = 0.723			

At total, eleven variables were considered significant for public forecast, being price/i the one with higher power of impact on the public. The interval of influence from this variable on the public is equivalent to 20.1% from the potential of the other mapped variables. Some variables have shown to be significant only in the interaction with other variables. A good example of this would be the time of the match. There is not an essentially “good” or “bad”, but its combination with a specific profile from the championship, by example, may diminish the potential public of a match.

Initially, twenty four categories of i were created, according to the competition and phase. The best model adjustment occurred with twelve final values of i. Which means, there are some competitions and phase which the relation with price influences in a similar way the demand of a game.

The obtained results show that the adopted premises were valid in the formulation of the pricing definition tool. The r^2 value obtained, essentially higher than the one on previously verified studies, such as the studies of Souza (2004) and Benevides et al (2015), has showed that price as dependent variable adds relevant explanation power in the interpretation of the demand of games. Therefore, the adoption of a perspective of monopolist demand has shown to be quite valid in this situation.

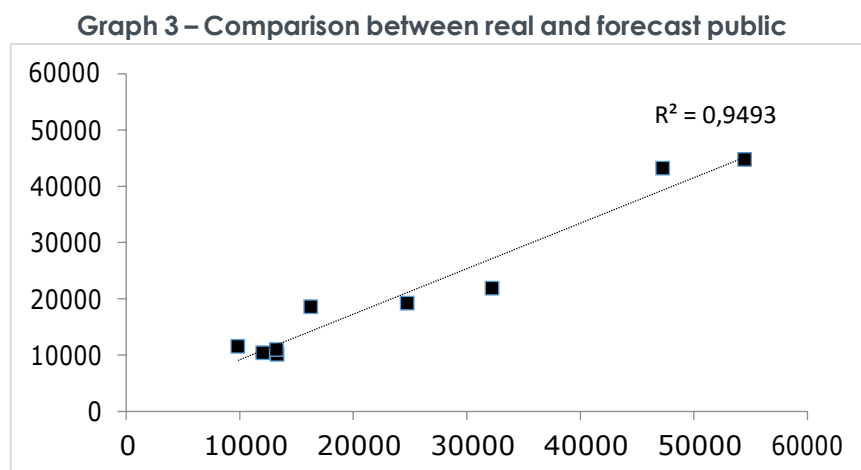
The second premises also allows, from the exploitation of a pricing policy, the practice of different strategies according to the moment of the club. For each condition of factors involved in a match, there are different prices that



result into the obtained maximum billings. This is the maximum billings obtained with different prices game by game. This suggests that clubs that wish to maximize public or income may adopt a dynamic pricing for their games.

Pindyck & Rubinfeld (2002) showed that the price that maximizes profit from a monopolist is the one in which the marginal income is equal to the marginal cost. In this specific case, it does not become necessary the marginal cost analysis for each level of price practiced. This particularity occurs due to the reason of variable cost being close to zero in the selling of tickets. Not even the printing of ticker is something representative, given the sales volume by the internet currently registered (more than 80% of the tickets in the analyzed club).

After obtaining the exposed model in table 2, a process of defining price of the ticket with the scenery of maximum billings for each match disputed by the team. In the eight subsequent games to the creation of the model, the results exposed in graph 3 were obtained.



The relation between forecast and observed public from the adoption of the pricing of tickets model shows that, with the implementation of an analytical tool, a better forecast of the expected public for a match was obtained. In addition, in this interval, the variation between minimum and

maximum price was of 284%, showing that the higher possible surplus can be captured with a price for each match.

The twelve different i values obtained, which generally mean that the club has twelve different products regarding the attraction of the public to the stadium according to the price established, allow the club the exploitation of a transparent price policy to the fan. This is, knowing how the demand varies according to the price of each match disputed, it is possible to communicate to the fan previously what maximum price will be charged for each game disputed by the club throughout the season. This practice may be an instrument of minimizing dissatisfaction with high ticket prices in specific matches, since the recurrent complaint is the sudden raise of prices.

There are several benefits from a better demand forecast in this case. The sizing of services of food and beverages, for example, is one of these benefits. With a public forecast more adherent to the observed reality, the partners involved in the stadium are able to establish with higher safety their storage, sizing products and labor according to the demand projected by the club. The previous knowledge of games with low demand, for example, facilitates the formatting of incentive programs without cannibalizing billings. In games with higher demand, a bigger surplus of public is extracted with higher ticket prices.

Another very practical application of this approach is the assertiveness of a choice of transferring home games. In games of low demand, the club may choose to transfer the game to a more repressed place. This has the potential of considerably raising the billings, although it may generate dissatisfaction in the local public of fans. It is up to the public the balance in the involved trade offs in a decision of this type. The previous knowledge of the potential public for each match in rate of the price also allows the creation of packages of tickets that do not cannibalize the individual income for each match. Which means, the pricing of tickets occurs with less asymmetry of information.



Another function of the approach is the correct interpretation of what the potential of revenue in face of a better sports performance. Being correctly estimated the billings revenue a priori, it is possible to understand what level of investment is acceptable in the cast of players to have a competitive team. It is notorious that the sports performance does not depend only on the quality of hired players, but also on the correct sizing of the extra income generated, which facilitates the decisions of investments in athletes.

Finally, it is able to see in the developed methodology a tool that gives the club the possibility of having a transparent relation with the fans in the communication of prices that will be disclosed throughout the season. When previously knowing the prices, the price variation tends to generate less dissatisfaction in games in which the price will be high. After all, there will be no surprises to the public when the team practices the established price in an anticipated form.

FINAL CONSIDERATIONS AND LIMITATIONS OF THE RESEARCH

From the obtained results in this research, an opportunity to improve the results with capture of subjective variables through technology is opened. The variables indicated by the board as “willpower” and “game style” may be categorized through some effort of analysis from big data, through interaction of fans from the club with the institutions in social media. Through the gathering of new information for the attempt to improve the explanation of the demand variable, it is also suggested the use of new forecast methods. The work of Lantz (2013), which exposes models of artificial intelligence, may inspire researchers and managers, even if some methods are not supported by statistical testing as the exposed regression model in this article.

When adopting the premise that the clubs are monopolists of their demands, one of the limitations from this study is in the restriction of the unit of analysis. However, the achieved results allow managers and researchers the application of similar methodology in other clubs, even if for the adherence



of the exposed methodology in this study in other institutions that fit into these characteristics.

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