

# The social construction of quality in a Brazilian Classical Music market

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## 1 Introduction

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In order for the final product of an orchestra, the concert, to come into existence and reach its destination, the public, a number of actors engage in multiple cooperation processes and mobilize multiple resources building a production network system, or what Howard Becker would call an “Art World”. To Becker (2008, p. 1), “the existence of art worlds, as well as the way their existence affects both the production and consumption of art works, suggests a sociological approach to the arts”.

On the other hand, if we pay attention to the common market dynamics, what we can easily perceive is a highly competitive environment. The mentioned phenomenon is approached by Lazega (2009) from a different perspective: in the competitive world, actors constantly see themselves in situations where they seek market’s stability. This does not happen simply because of the law of supply and demand but from producers positioning in a quality scale that differentiates their products. For this to be possible, full competition is not viable since there is some interdependence between producers. This vision is anchored on the relational perspective which conceives markets as social structures and enterprises, states, etc. as network structures (WHITE, 2008; WHITE, 2002; LAZEGA; HIGGINS, 2014).

The main goal of this investigation is to uncover classical music market. This market still remains out of the common sense interest of economists, sociologists and other market scholars, maybe by chance, maybe by its high complexity and specificity. Before presenting our research questions and our goals, it is necessary to do an immersion in the specific literature in order to make a theoretical review as deep as possible. Afterwards, we will try to extract from the observation of the literature (considering what is already postulate and, above all, the identified gaps) the direction of our investigation.

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<sup>1</sup> The appendix is still missing.

Therefore, we will begin our work presenting the results of our bibliographic research. It was made in two of the main abstract bases in sociology and economics<sup>2</sup>.

## 2 Results of the Bibliographic Investigation

In order to investigate the “state of the art” in the research field that involves music market and music economics, we searched for abstracts of published works between 1983 and 2014 ( $n = 44$ ). To do that, we used seven keywords<sup>3</sup> in Sociological Abstracts and Econlit. 86.36% of the work found are research articles, four are doctoral dissertations and two are published books. Table 1 lists the types of study found. Table 2 lists the research methods used.

Table 1 – Type of Study

|                                     |   |
|-------------------------------------|---|
| Case Study                          | 6 |
| Experimental Study                  | 2 |
| Exploratory Study                   | 1 |
| Historical Study                    | 6 |
| Qualitative                         | 1 |
| Quantitative                        | 5 |
| Economic Sociology                  | 1 |
| Institutionalist Economic Sociology | 1 |

Source: Elaborated by the authors.

Table 2 – Research Method used

|  |   |
|--|---|
| Multivariate Regression Analysis                     | 1 |
| Big Data   | 1 |
| Big Data + Word Count                                | 1 |
| Comparative Analysis                                 | 1 |
| Comparative Historical Analysis                      | 1 |
| Discourse Analysis                                   | 1 |
| Economic Method                                      | 1 |
| Field Theory / Organizational Theory                 | 1 |
| Documental Research                                  | 1 |
| Rationalization                                      | 1 |
| Social Network Analysis                              | 3 |
| Survey   | 1 |
| Web-based Experiment                                 | 2 |
| Interviews + Documentation Analysis + Statistics     | 1 |
| Interviews + Music Journals + Promotional Literature | 1 |

Source: Elaborated by the author.

The investigation themes appear on the revised works on a very diffuse way. We found some publications approaching cultural aspects that influence music market, musicians labor market, gender relations and labor division, financing and patronage, music consumption and the variable that explain it, musical taste, aesthetic standards, cultural identity and national/folk

<sup>2</sup> Sociological Abstracts and Econlit.

<sup>3</sup> Music Market, Classical Music Market, Symphony Orchestras, Orchestra Market, Classical Music Economics, Classical Music Production and Music.

music, social history of musicians, the musical repertoire canon, conductor's leadership and participation/satisfaction of musicians, ancient music, digital revolution and music industry.

### 3 Cultural goods

Our first challenge lies in the fact that we are dealing with an object that defies the majority of economic theory assumptions. Let us begin establishing some fundamental differences between common goods and cultural goods. According to Tolila (2007), goods are understood by four objective criteria, namely, its physical properties (which, in this case are directly related to the quality of the product), date and local where it is available and what conditions its delivery in a certain universe, i.e., without uncertainties. The quality of a good, in this perspective, can be decomposed in a bundle of objective elements, i.e., clearly measurable and hierarchical. Moreover, in neoclassical economic theory every good is considered a "private good" and, therefore, "exclusive and rival" in consumption. For instance, "a coffee, a sandwich, a shirt, a pair of shoes, a chair, etc., are exclusive because it is possible to stop me from getting them (...); on the other hand, each of these goods is exclusive because in the moment I enjoy it, no other person can enjoy it as well" (TOLILA, 2007, p. 29). Cultural products in general are not exclusive; one can, for instance, admire a beautiful historic building without having to pay for it. Neither they are rivals in consumption; the pleasure of attending a concert is not diminished by the presence of other people.

This sector of the economy is defined by its logic towards production, unlike market of consumer goods. States and public collectives has shown growing interest on cultural industry. This can be verified by policy making, by specialized administrations, allocation of resources directed specifically to this sector and the emergence of a whole network of institutions and professionals acting in this sector, most of them financed by public resources (TOLILA, 2007).

Musical performances have also another peculiarity regarding the nature of its existence in which resides a large part of the methodological difficulties that surround them. Tolila (2007) explains it: "What is music? The score? No. The orchestra musicians? No. The conductor? Neither. In fact, it is almost impossible to define music as a "thing" because it only exists in fact in the very moment it is heard, in a relation with the listener" (TOLILA, 2007, p. 109).

Thus, music (as well as dance and theater) assumes a special mode of existence that involves the participation of all the elements of actors mentioned, i.e., the score, the musicians, the conductor, etc., in the construction of its materiality which only exists (and can only be consumed) in the listening moment. According to Benhamou (2007, p. 54), "competition takes a paradoxical form of a competition between institutions that offer unique and ephemeral goods" where economic actors behavior tend to discriminatory monopolies. According to the author, the sector is characterized by a constant fragility because of periodic cost increases and the nearly absence of productivity reserves. In fact, as we will see, the current paradigm, regarding the economic theory of live performances, points to an inevitable deficit.

## 4 Baumol and Bowen's model – The Cost Disease

Baumol and Bowen did, under a Ford Foundation's demand in 1965, a research aiming to diagnose the economic situation of Broadway theaters (BENHAMOU, 2007). Their findings are considered valid to this day. To Baumol & Bowen (1966 apud BENHAMOU, 2007) economy is divided in two sector, (1) archaic and (2) progressive. Archaic sector does not have the possibility of generating productivity gains while progressive sector generates productivity gains from innovations, from scale economy and accumulation of capital. Live performances are part of the archaic sector because of the position that labour has on it.

Baumol and Bowen's model is based on three hypotheses:

1. Economy is divided in two sectors, archaic and progressive. In archaic sector, where live performance lies, work productivity is constant or has little increases and the amount of work cannot be diminished without denaturing the product. Be  $L_{1,t}$  the volume of work employed in archaic sector in moment  $t$  and  $a$  a constant value, the quantity of product in the archaic sector in moment  $t$  ( $Y_{1,t}$ ) is obtained by

$$Y_{1,t} = aL_{1,t}$$

.

Be  $Y_{2,t}$  and  $L_{2,t}$  respectively the quantity of product in the progressive sector in moment  $t$  and the amount of work employed on progressive sector in moment  $t$ , be  $r$  the rate of increase in labor productivity and  $b$  a constant, the quantity of product in the progressive sector is obtained by

$$Y_{2,t} = bL_{2,t}[1 + r]^t$$

2. Production costs, compared only to wage costs ( $W$ ), evolve in the same pace and direction that productivity in the progressive sector, that is,  $W_{1,t} = W_{2,t} = W_t = W[1 + r]^t$ . The relative costs of each sector are, therefore, given by

$$C_1 = \frac{W_t L_{1,t}}{Y_{1,t}} = \frac{W(1 + r)^t L_{1,t}}{aL_{1,t}} = \frac{W(1 + r)^t}{a}$$

$$C_2 = \frac{W_t L_{2,t}}{Y_{2,t}} = \frac{W(1 + r)^t L_{2,t}}{bL_{2,t}(1 + r)^t} = \frac{W}{b}$$

Thus, the cost by product unit obtained increases indefinitely in the archaic sector and remains constant in the progressive sector.

3. "The demand of live shows is elastic; any price increase leads to a public reduction" (BENHAMOU, 2007, p. 56). If the prices are proportional to the relative costs in both sectors,  $P_1 = \alpha C_1$  and  $P_2 = \beta C_2$ , then

$$\frac{P_1 Y_1}{P_2 Y_2} = \frac{\alpha C_1 Y_1}{\beta C_2 Y_2} = Cte$$

or

$$\frac{C_1 Y_1}{C_2 Y_2} = \frac{W(1+r)^t \cdot L_{1,t}}{W(1+r)^t \cdot L_{2,t}} = \frac{L_{1,t}}{L_{2,t}} = K_0$$

and

$$\frac{Y_1}{Y_2} = \frac{a L_{1,t}}{b L_{2,t} (1+r)^t} = \frac{a K_0}{b (1+r)^t}$$

“When  $t$  increases,  $\frac{Y_1}{Y_2}$  decreases and when  $t \rightarrow \infty$ ,  $\frac{Y_1}{Y_2} \rightarrow 0$ ” (BENHAMOU, 2007, p. 57). Thus, production in the archaic sector fatally decreases.

Complementarily to Baumol’s law, Throsby (1994) develops a function of live performance production which can be synthesized in this way:

The number of presentations in a given season must be fixed taking into account the capacity of the auditorium  $v$ . Be  $L^s$  and  $K^s$  the necessary work and capital to a production, be  $L^r$  and  $K^r$  the work and capital required by each performance of the production, the number of spectators of the performance  $i$  of the production  $j$ ,  $y_{ij}$ , such that  $y_{ij} \leq v$ , is given by

$$y_j = \sum_i y_{ij} = y_i(L_j^s, K_j^s, m_j, q_j)$$

where

the number of performances of the production  $j$

$$m_j = m_j(L_j^r, K_j^r)$$

and  $q_j$  summarizes the qualities of the production  $j$  which, in this context, can be measured by the lavishness of the production. In this case,  $q_j$  is not independent of  $L^s$  and  $K^s$ . It is expected that

$$\frac{\partial y_j}{\partial m_j} > 0 \quad , \quad \frac{\partial^2 y_j}{\partial m_j^2} < 0,$$

that is, extend the season can decrease the spectators number in the margin.

According to Benhamou (2007, p. 59) “the conclusion of Baumol’s model is the ineluctability of the increase on deficit of live performance”. This model has been corroborated by many researches (THROSBY; WITHERS, 1979; LEROY, 1980; PEACOCK; SHOESMITH; MILLNER, 1983; BAUMOL; BAUMOL, 1984; DIAS, 2011, e.g.) and, to Benhamou (2007, p. 54), this sector characteristic is sufficient to justify the increase of public subsidies and the practice of patronage even in view of the fact that “this massive intervention, distributed in a very unequal way, is not enough to ensure to the sector a lasting financial equilibrium”. To Baumol & Bowen (1966 apud LUKSETICH, 2011, p. 320), “if one agrees that the performing arts confer general benefits on the community as a whole... the arts are public goods whose benefits demonstrably exceed the receipts one can hope to collect at the box office”.

Baumol’s analysis pointing the specificities of the sector contributed to both the development of the research program that we know today as economy of culture and the recognition of the necessity of binding live performances to the subsidized non-commercial sphere.

## 5 The Social Construction of Markets

To Harrison White (2002), markets are not given but they are social structures that emerge from complex interactions between its components. This interactions can occur competitively and, we argue, cooperatively aiming the stabilization of the market and the reduction of what White calls “knightian uncertainty”<sup>4</sup>

White’s theory aims to explain “how firms minimize uncertainty by forming a market as a collection of niches based on signals observed in their commitments” (WHITE, 2002, p. xiii). What is a production market? The answer to this question goes through two dimensions. The first relates to the independent nature of its structure, that is, an emergence from dependencies on its own flows. The second concerns its operation mechanism which consists of commits by several firms in product flows in which the demand of the aggregate buyer was incorporated. To White (2002, p. 1) “Resulting streams of differentiated goods or services from the market get split among diverse buyers as equally good options: The market discipline centers on product quality”. This is a central point in our study object’s description. But first, what would be market disciplines?

White (2008, p. 63) indicates that “Disciplines offer rules of the games that yield coordination in tasks in an otherwise messy world”. Disciplines allow joint action giving order to ties between identities in a network. Each discipline has a type of process that aggregates joint action. They have also an order of a specifical value by which the struture is hierarchically organized (therefore, we can also understand disciplines as a local status system). Among ideal types of disciplines, the one which applies the best to markets is called *interface*. Its typical process is the *commit* that generates productive flows. The typical distinctive value of this discipline is *quality*.

How, then, can we undestand the statiblization of a markets interface? Which of its properties can collapse to the “knightian uncertainty”?

### 5.1 Stabilizing the knightian uncertainty

Market transactions have more to do with repetitive interactions than with unique moments. Thus, the volume of product flows in a market can function as a signal to producers about commits. White states that

Each can orient to a niche by the size that is appropriate to the market’s assessment of its quality compared to that of its fellows, who also are orienting to niches: the market as a joint social construction. (WHITE, 2002, p. 10)

Attached to market’s interface is the notion of *quality*. Although it is commonly taken by an inherent characteristic of the products, it emerges from interactions between producers and buyers judgements. Thus,

(...) it is dual notions of differential quality, referent both to product and to producer, that become established as the core around which a set of market

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<sup>4</sup> In reference to the american economist Frank H. Knight.

footings for producers can reproduce itself as footings in a joint market profile. The two sides, buyers and producers, exert contending pressures on the shape of this profile, pressures that correlate with their respective discriminations of quality. (WHITE, 2002, p. 10)

Each producer seeks to differentiate his product and, at the same time, he recognizes the differentiation system – the quality index – to his version of a market product. In this context, choices interact with influence and calibrate the repeated commits of production flows and payments. This interactions between choices pressuposes a minimum of comparability which is obtained in a much simpler way in a linear order of precedence.

## 5.2 The mechanism behind production

According to White (2002, p. 12), flow commits are related to various phenomena, some of them specially interesting to our modelling rationale:

1. a *small number* of recognized firms that constitute a business line;
2. an unequal ranking between firms including their profit distribution and product commits in the market;
3. firms aim *profit* and do not commit, as orthodox economic theory states, to a *zero sum system*;
4. if conditions allow the production raise, one would expect that unitary cost diminishes generating (bigger return);
5. in some business lines, the recognition of a superior quality product demands smaller structural costs than other products with acknowledged inferior quality;
6. *monopolies* are extremely *rare*;

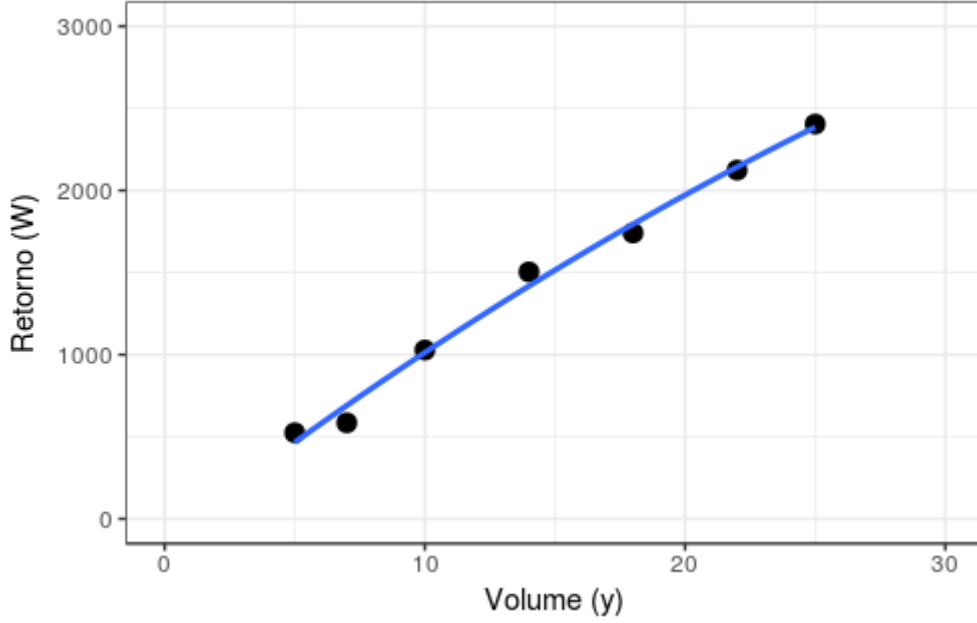
These phenomena are crossed by an operationalized model which we will present now. The model makes a fundamental assumption that quality and identity are not build one from the other but produce each other inside firm interaction in a market. Quality is understood here as a social construction, not like an evident attribute.

## 5.3 Whites production model

Let us call *worth* the total revenue  $W(y(k))$  of the *volume*  $y(k)$  sold by each firm  $k$ . This can be approximated in a continuous function  $W(y)$ . Basically, the market profile – or Market Schedule to Favereau, Biencourt & Eymard-Duvernay (2002) – can be inferred from the observation of pairs volume-worth behaviour (cf. Figure 1).

Each firm  $k$  tries to select the optimum  $y(k)$  and also adjust its *price* strategy  $W(y(k))/y(k) = p(y(k))$  to maximize *profit*  $W(y) - C(y(k), k)$ . Therefore, White (2002, p. 36) states the cost schedule for the variation of a producer's cost with volume as

Figure 1 – A profile market



Source: Adapted from White (2002, p. 15)

$$C(y, n) = q \cdot y^c \cdot n^d \quad (1)$$

where the two main parameters are the exponents  $c$  and  $d$ , expressions of elasticities. In this formula,  $q$  is a numerical scaling factor across all the firms, a constant,  $y$  represents the volume of product commitment and  $n$  is a quality component, the very identity of the product of that firm. The  $d$  parameter is specially interesting in this case. It will be analysed in more depth later.

On the consumer's side, the aggregate buyer's *satisfaction*  $S(y, n)$  is defined by

$$S(y, n) = r \cdot y^a \cdot n^b \quad (2)$$

and it relies both on the number of units bought  $y$  and on a *qualitative component*,  $n$ . According to Favereau, Biencourt & Eymard-Duvernay (2002), since “buyers in aggregate make a ‘yes or no’ decision when offered a volume/price pair by a producer”, the only producers who stand out are those whose offer satisfies the following constraint:

$$S(y[n], n) = \theta \cdot W(y[n]) \quad (3)$$

“The parameter  $\theta$  is a sort of mark-up of satisfaction (...) over the overall buying cost of a given production” (FAVEREAU; BIENCOURT; EYMARD-DUVERNAY, 2002, p. 217). It is a ratio that functions as a “deal criterion” (WHITE, 2002, p. 39). The cost  $C$  and the market schedule  $W(y)$  are known by the producer but not the satisfaction function  $S$  which are constructs of the observer.

The efforts of a firm embedded in its cost structure tend to be reflected in the aggregate buyer evaluations. This correlation provides a base for the perceived quality ranking, namely,



a linear ordering sufficient to base market's profile. But what is the relations between commit volumes and the perceived quality? To White, that depends on the business line. White (2002) explains that

Sometimes, a large  $y$  connotes higher quality, as in the soda pop industry, but at other times, lower quality, as in the wine industry. So the frequency with which buyers encounter a producer's output (...) can signal different things across different shapes of profile. As some goods monopolize shelf space, wealthier suburban mothers, like wealthy East Siders in Manhattan, shy away from them, since they are what the average person is buying. For other goods that receive high exposure in advertising, that's precisely what these shoppers buy. After all, the fact that everyone else is buying it confirms that it's the best. (WHITE, 2002, p. 15)

In this sense, the quality ranking involves, therefore, a social context where firms have a previous prestige distribution that mixes their reputation with the reputation of their products. "When it is possible for actors to make use of information read from the doings of others, let's call this information a *signal*. Fulfilled prior commitments are themselves the signals read off as profile by the producers" (WHITE, 2002, p. 16). Thus, the author defines market production mechanism in this way:

A production market forms around and thus consists in a joint interface between producers confronting uncertainty from the other side of the interface. This interface is energized by rivalry among its peer producers, all seeking buyers for their continuing streams of production in amounts optimal for their individual cost structures. The producers have come to signal each other through a profile across their production commitments. (WHITE, 2002, p. 27)

Let us now take a closer look to the elasticities parameters, the exponents  $a$ ,  $b$ ,  $c$  and  $d$ , to understand how the market can be understood in terms of these variables.

## 5.4 The topology of markets – elasticities parameters

To White (2002), the four elasticities parameters, saturation terms that shape the market curves, when analyzed jointly allow for the investigation of the viability of the market. Parameters  $b$  and  $d$  are measures of dispersion across quality, "the exponents of discount of valuation with declining quality by, respectively, taste of consumers and cost of producers" (WHITE, 2002, p. 50). The same way,  $a$  and  $c$  are saturation parameters for volume produced. These parameters relate themselves as we describe in table 3.

Table 3 – Tabulation of parameters

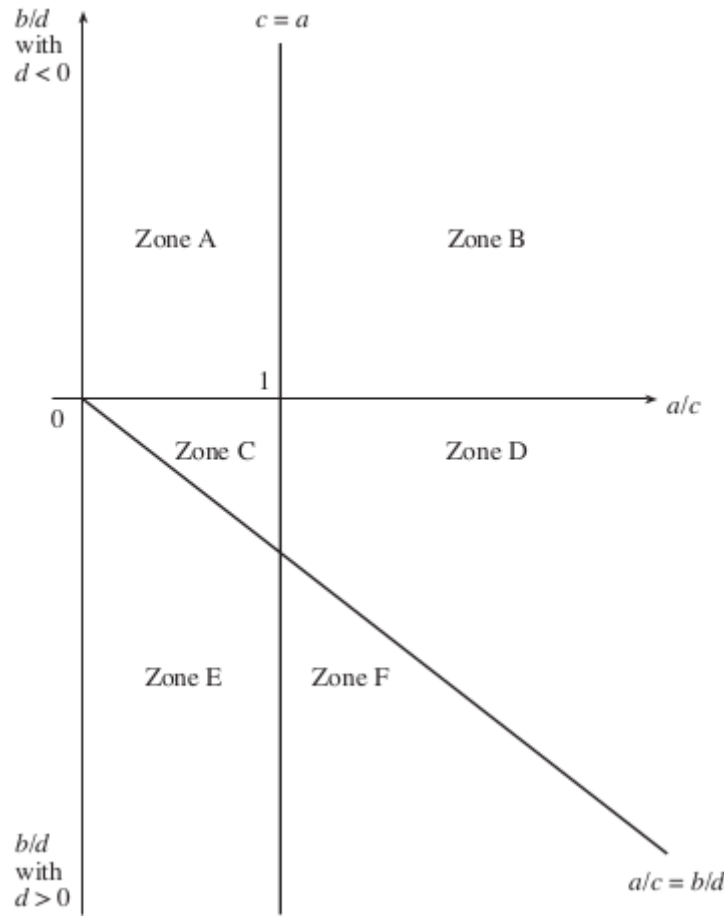
|                     | <i>Buyer Need</i> | <i>Producer Cost</i> |
|---------------------|-------------------|----------------------|
| Volume sensitivity  | $a$               | $c$                  |
| Quality sensitivity | $b$               | $d$                  |

Source: (WHITE, 2002, p. 51)

According to White (2002), we should combine the parameters in ratios in a way that each ratio with buyer side in the numerator and producer side on the denominator makes an axis

of the market plane. This allows for a simplified representation of the possible market profiles despite of the complexity of the  $W(y)$  model (cf. FIG. 2).

Figure 2 – Market plane, designating four regions, three locations



Source: (FAVEREAU; BIENCOURT; EYMARD-DUVERNAY, 2002, p. 229)

To Éloire (2009), the main goal of White's model is to show the structure of the market. The market plane shows six zones; four of them are zones that demarcate viable market, the other two, non-viable or unraveling. They can be described in a simplified way<sup>5</sup> like this:

Zone C is labelled **ordinary**. In this zone, revenues decrease to scale ( $a/c < 1$ ) since cost increases with quality ( $d > 0$ ). This is the 'ordinary' that we think about quality. Also, returns are decreasing to quality to a more severe degree than to scale ( $a/c > b/d$ ). Zones D and F are labelled **advanced**. In this zone higher quality is more expensive to produce ( $d > 0$ ) and revenues increase to scale ( $a/c > 1$ ). Zone A is labelled **paradox**. In this zone, in contrast with the ordinary thinking, higher quality is less costly to produce than lower quality ( $d < 0$ ) although there are decreasing returns to scale ( $a/c < 1$ ). B and E are non-viable market zones.

## 5.5 Measurements

In the  $W(y)$  model, measurements are an issue to be solved in a creative way because White does not close the scope of the variables to be chosen. The review of two important studies

<sup>5</sup> A mathematical development of this plane is described in Appendix 1.

gives us a basis to decide on this measurement issue.

Biencourt & Urrutiaguer (2002) studied the theatrical institutions markets. They argue that the main advantage of White's model is related to the interdependence of the market structure and individual decisions through niches. This is particularly interesting to this specific case because

Theatrical organizations base their construction of niches on the competencies of their administrative, technical and artistic teams, the public's former experiences and the programming policy that orients choices of repertoires and directors. The concept of a niche is suited to the uniqueness of performances. Their quality is the result of a combination of the quality of actors' and technicians' individual work on a project, under the control of the director. (BIENCOURT; URRUTIAGUER, 2002, p. 255)

If we retake the functions of satisfaction (2) and cost (1), the variables were chosen in this manner:

- **Volume of production**  $Y$  – estimated by number of performances listed in the theaters' annual report.

The authors show that for Throsby & Withers (1993 apud BIENCOURT; URRUTIAGUER, 2002) the number of tickets sold is a better suited indicator for  $Y$ . However, “the determination of  $S$  would then require one to know the degree of audience satisfaction after each performance, something that is impossible” (BIENCOURT; URRUTIAGUER, 2002, p. 264). The number of seats available for each performance would also have been a good indicator if the authors had access to this data.

- **The satisfaction of consumers**  $S$  – measured by the number of paid visitors to the institution market.

The authors justify this choice showing data from previous research on theatre audiences' habits and representations. Also, they divided the performances on four repertoire categories, namely, “classical”, “20th century”, “contemporary French” and “contemporary foreign” plays. They also make a correction for the repertoire effect by “multiplying the number of paying visitors observed in each of the four categories by the average ratio  $\bar{x}_i$  between the share of performances and that of the number of visitors in a given genre  $i$  for all the institution markets” (BIENCOURT; URRUTIAGUER, 2002, p. 265). Let  $\tilde{P}_i$  be the number of performances and  $\tilde{V}_i$  be the number of paying visitors to all theatres in category  $i$ . The average can be defined by

$$\bar{x}_i = \frac{\tilde{P}_i / \sum_{i=1}^4 \tilde{P}_i}{\tilde{V}_i / \sum_{i=1}^4 \tilde{V}_i} \quad (4)$$

If  $v_i$  represents the number of paying visitors in category  $i$  of repertoire, the public satisfaction can be estimated by

$$S = \sum_{i=1}^4 \bar{x}_i v_i \quad (5)$$

- **The aggregated cost  $C$**  – this variable was obtained by adding up theatrical artistic expenses (differentiated from fixed costs).
- **scale  $r$**  – equal the inverse of the average price of seats  $\bar{p}$  in all theatres.
- **scale  $q$**  – considered equal to 1.

To deal with quality index  $N$ , the authors elaborate a sophisticated construct to explain how various actors have a different influence on quality. To them,

$$N_l^{b_l} = N_{1l}^{b_{1l}} N_{2l}^{b_{2l}} N_{3l}^{b_{3l}} N_{4l}^{b_{4l}} \quad (6)$$

that is, the *overall quality*  $N$  in the year  $l$  is constructed aggregating the judgements of *drama critics*  $N_1$ , the judgements of *programme planners*  $N_2$ , the judgement of the *public authorities*  $N_3$  and the influence of *previous consumption*  $N_4$ . Now, each of these parts of the overall quality were measured in this manner:

- **Judgements of drama critics  $N_1$**  – measured recording all reviews of shows scheduled in the theatres in *Le Monde* and *Libération* newspapers and *Télérama* magazine, opinion leaders among drama critics.
- **Judgements of programme planners  $N_2$**  – the normed “indegree” centrality of the theatre; in that case, this means the number of performances of shows produced by other theatrical institutions, scheduled by the theatre divided by the maximum centrality of the network.
- **Judgement of public authorities  $N_3$**  – measured by the amount of state subsidies. To Biencourt & Urrutiaguer (2002, p. 267), “this choice is justified by the weight of the state, which is greater than that of local authorities in the political recognition of an institution’s artistic reputation”.
- **Influence of previous consumption  $N_4$**  – measured by the number of paying visitors in the preceding period.

The overall quality perceived by the public is constructed by aggregating these four variables in the form of a Cobb-Douglas function (cf. equation 6). To measure the weight of each one of these variables on the overall quality, they estimated a linear model that had the number of paying visitors per performance as the dependent variable. Knowing that  $r = 1/\bar{p}$  and taking into account equations (2) and (6), we can derive

$$[S\bar{p}/Y]_l = Y_l^{\hat{a}_l} N_l^{\hat{b}_l} \varepsilon_l = Y_l^{\hat{a}_l} N_{1l}^{\hat{b}_{1l}} N_{2l}^{\hat{b}_{2l}} N_{3l}^{\hat{b}_{3l}} N_{4l}^{\hat{b}_{4l}} \varepsilon_l \quad (7)$$

where  $l$  is the year under investigation. This leads to the linear model

$$\log([S\bar{p}/Y]_l) = \hat{a}_l \log Y_l + \hat{b}_{1l} \log N_{1l} + \hat{b}_{2l} \log N_{2l} + \hat{b}_{3l} \log N_{3l} + \hat{b}_{4l} \log N_{4l} + \hat{\varepsilon}_l \quad (8)$$

From this, it is possible to deduce, without a constant,

$$\log N_l = \hat{b}_{1l} \log N_{1l} + \hat{b}_{2l} \log N_{2l} + \hat{b}_{3l} \log N_{3l} + \hat{b}_{4l} \log N_{4l} + e_l \hat{\varepsilon}_l \quad (9)$$

with  $0 \leq e_l \leq 1$  assuming  $\hat{b}_l = 1$ .

Then, the four elasticities exponents were deduced as solutions of a system of two equations to two unknowns. As the authors were studying two years seasons, by posing  $\Delta = \log Y_l \cdot \log N_{l+1} - \log Y_{l+1} \cdot \log N_l$ , they obtain:

$$\begin{aligned} a &= \frac{\log([S\bar{p}]_l) \cdot \log N_{l+1} - \log([S\bar{p}]_{l+1}) \cdot \log N_l}{\Delta} \\ b &= \frac{\log([S\bar{p}]_{l+1}) \cdot \log Y_l - \log([S\bar{p}]_l) \cdot \log Y_{l+1}}{\Delta} \\ c &= \frac{\log C_l \cdot \log N_{l+1} - \log C_{l+1} \cdot \log N_l}{\Delta} \\ d &= \frac{\log C_l \cdot \log Y_{l+1} - \log C_{l+1} \cdot \log Y_l}{\Delta} \end{aligned} \quad (10)$$

On the other hand, Éloire (2009) chose a different set of variables to measure the inputs of the  $W(y)$  model. In his PhD thesis, he studied the market of restaurants in Lille.

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## 5.6 The problem of defining quality

Although White's model represents a big step in the construction of knowledge about the markets, it has an issue related to its very core, the quality ranking. To him, quality is given in a predetermined social space. In fact, Favereau, Biencourt & Eymard-Duvernay (2002) states that to agree on price is not a big deal but to agree on quality is intrinsically a problem. We shall argue, however, that quality is not predefined but actors struggle and negotiate on a daily basis for its definition.

Biencourt & Urrutiaguer (2002) present a clever approach to this problem regarding theatres' market as we saw in the last section. We shall depart from their rationale to build the quality index  $n$  we will use in this investigation. The author's idea of the judgement of public authorities is similar to our conception on how the variable should be measured. Indeed, the relation of each orchestra with the State is related to one of our main hypotheses.

On the other hand, judgement of orchestral music critics is not something trivial because in Belo Horizonte's scenario, music critics' acting is not something so well defined as movie critics or theatre critics. Orchestral performances do not always get a critic on the main newspapers and there is not such a well structured platform for it as Rotten Tomatoes<sup>6</sup> or *Adoro Cinema*<sup>7</sup>. This will lead to one of our main contributions with this investigation, the creation of an online

<sup>6</sup> <https://www.rottentomatoes.com>.

<sup>7</sup> A famous Brazilian movie critics website. Available in <http://www.adorocinema.com>.

platform for the evaluation of concerts by critics and the public. This will be discussed in further detail in the methodology section.

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We will present next the second piece of our theoretical approach, Fligstein's theory.

## 6 Fligstein's model

Neil Fligstein (2002) builds a theory on the emergence and functioning of markets slightly different from White. Fligstein also takes into account a relational structure where firms interact with each other and with the generalized buyer seeking the stability of the market (and consequent subsistence of all). The main difference is about the role of the State. While White does not make major considerations on the role of the State on the emergence and regular functioning of production markets, Fligstein elaborates his theoretical scheme identifying the State structure as central to market development. Why States? - asks Fligstein. His answer is "as the possibility for complex patterns of interaction in the sphere of economic exchange has expanded, actors have proven incapable of providing rules for themselves" (FLIGSTEIN, 2002, p. 27-8) and therefore, they appeal to the State as a rule provider so the economic game can happen fairly.

Fligstein (2002) conceives markets as "fields", social arenas where sellers and buyers meet. These arenas obey four pure types of rules for the production and reproduction of its structure:

1. property rights;
2. governance structures;
3. rules of exchange and
4. conceptions of control.

These forms of regulation are inclusive; the higher level necessarily contains the lower. Property rights are, according to Fligstein, rules that define who has rights over firms income. Common forms of property rights are patents and credentials. These rules are *sine qua non* conditions of existence for markets since they define the relations between who has possession of some good and all the others. This stabilize markets. "Property rights thus function to produce two forms of stability: defining the power relationships between constituencies in and around firms, and signaling to other firms who firms are" (FLIGSTEIN, 2002, p. 34).

Governance structures are general rules on society level that define competitive and cooperative relations between firms and also their internal organizations. These rules define legal and illegal forms of competition control in the market. They can be laws or social norms although they can assume great variability.

Exchange rules define who can engage in business transactions with whom as well as its conditions. Rules also apply to weights, common patterns, delivery, billing, insurance, finan-

cial trade and contract signing. “Rules of exchange help stabilize markets by ensuring that exchanges occur under conditions that apply to everyone” (FLIGSTEIN, 2002, p. 35).

“Conceptions of control reflect market-specific agreements between actors in firms on principles of internal organization (...), tactics for competition or cooperation (...), and the hierarchy or status ordering of firms in a given market” (FLIGSTEIN, 2002, p. 35). They are, in their essence, cultural-historical byproducts.

A stable market is a social field in which a conception of control defines the social relations between incumbent and challenger seller firms such that the incumbent firms reproduce those relations on a period-to-period basis. The purpose of action in a given market is to create and maintain stable worlds within and across firms that allow dominant seller firms to survive. (FLIGSTEIN, 2002, p. 35)

Conceptions of control evidence also a political element in markets regarding the maintenance of the current hierarchical order, its reproduction and its manifestation on the process of defining quality standards and certification. Conceptions of control lead to questions like “who controls entrance and exit of a competitive system?” or “how challengers and dominants relate”?

To Fligstein (2002), in a market, the price is a reliable quality index. Enterprises are impelled by price competition to differentiate their products forming niches as a form of protection against instability. Diversification of the product catalog is also a dominant strategy to decrease risk. “A firm can produce multiple products that reduce their dependence on any one product and, hence, increase the likelihood that the firm will survive” (KAY, 1997 apud FLIGSTEIN, 2002, p. 74).

We still need a deeper investigation on the the acting processes of firms on a daily basis committing in movements of competition and cooperation at the same time. Organizational isomorphisms is a concept that seems to throw light on these processes.

## 7 The search for market’s stability

To Lazega (2009), firms’ search for stability in a market goes through a quality concept that was collectively constructed from relations between firms. When acting, firms engage in processes of competition and cooperation at the same time – what is known in economic sociology as *coopetition*. Organizations do not conduct their business in isolation but they are necessarily dependent of some resources that forces them to make cooperation ties to other organizations. This relations may manifest in a legal and social framework more or less defined. According to Lazega (2009, p. 568), “Ces ressources interorganisationnelles, échangées à travers des liens multiplexes, et pouvant consister en de l’apprentissage, des biens, des services, ne sont pas forcément de nature monétaire ou purement fonctionnelle”.

When acting, the entrepreneur seeks structuration of his interaction and business context aiming his own safety and the safety of his relational investments in the market. This process,

which has a strong capacity for politicization, leads the entrepreneur to a contextual auto-restriction regarding his commercial partners selection. To Lazega

L'échange social conduit ainsi l'entrepreneur à une forme d'autodiscipline sociale qui s'appuie en fait sur une endogénéisation (...) des structures relationnelles. Cette endogénéisation prend la forme de l'entretien ou de la construction de niches sociales ainsi que celle d'une entrée dans la concurrence de statut social. (LAZEGA, 2009, p. 572)

The search for social niches, therefore, is a first means of mobilization of an opportunity structure. The social niche can be thus defined as "(...) le sous-ensemble de collègues-concurrents avec lesquels il/elle a des relations spécialement denses, multifonctionnelles, durables et liées, directement ou indirectement, à ses activités de production" (LAZEGA, 2009, p. 575).

In the structuration of the social ties that composes the market, social processes articulate with emerging social disciplines providing a cognitive structure through which one can guide economic action. In this articulation, four social processes engage with disciplines:

1. Collective learning;
2. Solidarity phenomena;
3. Social control and
4. Regulation and institutionalization.

Collective learning occur from information flows, from resources (human or material) and through tacit knowledge exchanges. Solidarity phenomena can occur in the presence of threats of instability in the market. Commercial agreements, collectives, associations between enterprises that, although competitors, cooperate, emerge as a space conquest strategy in social field. Social control is facilitated by social niches and by recognizing a status structure between organizations. Finally, regulation and institutionalization processes consist of the redefinition of the rules of the game. In this process, organizations compete and cooperate to establish a reference language, a common normative body.

In addressing the same phenomenon, DiMaggio & Powell (1983) mobilize the *isomorphism* concept to give account for the competition-cooperation processes in which organizations engage. This authors part from a broad diagnosis attributed to the weberian sociology regarding the increasing rationalization of industrial world. If the rational action in markets is competitive, we would expect greater diversification of organizational forms, each one seeking different means of subsistence. This is not what the authors perceive.

Once diverse organizations engage in the same market line forming a structure (a field), the processes that lead to similarities start emerging robustly. However, what are we talking about when we talk about isomorphisms? DiMaggio & Powell (1983, p. 149) define the term as "a constraining process that forces one unit in a population to resemble other units that face the same set of environmental conditions".



DiMaggio & Powell (1983) cite three isomorphism mechanisms: (1) coercive isomorphisms, (2) mimetic isomorphisms and (3) normative isomorphisms. Coercive isomorphisms result from formal and informal pressures on enterprises. Expectations related to social norms or cultural standards are also triggers to this mechanism. Sometimes, the State can also boost this kind of isomorphism establishing new control policies.

Mimetic isomorphisms arise in response to market uncertainty. When facing a scenario of uncertainties, a firm can imitate the model adopted by a successful firm in the market. Normative isomorphisms come from regulations and traditions as well as growing professionalization. A professional collective can, for instance, undertake efforts to define conditions and methods of its professional stratum, establish control criteria or establish a cognitive and legitimating basis for occupational autonomy.

Isomorphism processes shed light on the observed behavior of the orchestras in general (although it is difficult to explain how the three pure types operate simultaneously). We argued that all orchestral groups are committed to a common quality standard. This quality standard is the basis by which they are positioned in a hierarchical structure perceived by themselves and the public. Attempts of replacement inside the hierarchy, for instance, can be undertaken through internal reformulation aiming to get closer of the dominant group's characteristics in that scenario. In order to do that, the orchestra will use cooperation mechanisms (with several identities that integrate the market) where it will learn processes, get resources, etc.

At this point, the various theoretical frameworks seem to converge in a complementary way. One of our efforts in this work is to build a theoretical synthesis that is comprehensive enough to account for such a specific object. Next, we present the analysis model by which we will conduct the research.

## 8 Analysis

### 8.1 Theoretical synthesis

In this work, we seek to understand how the market for orchestral music production works, as well as its operational bases. Here, markets will be analyzed as network structures (WHITE, 2002). The discipline which makes orchestral music market work is an *interface* and its value order is given by **quality** (WHITE, 2002). Quality is the regulator of joint action because all market participants regardless of their nature (individual or organization) get their basic social life normative from it as it is embedded in the structure. Put another way, it is from perceived quality and from orchestras *ranking* on a quality scale as a regulatory framework (market's interface) that agents (identities) act on this structure. Quality, however, is not something inherent in organizations but it is an attribute that emerges from multiple interactions on organizational level and also on individual level. *To explain how quality emerges in orchestras market is the main goal of this investigation.*

Beyond the disciplines, orchestral music market finds in the State its second most important articulator. According to Fligstein (2002), State has a fundamental hole in regulation and,

consequently, in stabilizing markets. In Brazilian context, State is the main funder of the orchestras even if it is indirect funding (through laws to encourage culture). Laws to encourage culture work as catalysts of cultural production in the country (whether at federal, state or municipal level) and there are only a few productions out of its scope. The only productions that are capable of subsisting without this financing mechanism are, usually, big concerts or big spectacles promoted by big companies.

At the organization level, it is possible to point out some attributes that exert influence on the construction of its identity and, therefore, its positioning in market structure. These are the *financial incentives*, the *non-financial incentives*, and the *management capacity* of the organization or its institutional maintainer. We suspect that there is a strong correlation between orchestras musicians salary and the perception of the orchestras positioning in quality ranking. In the same way, orchestras can create incentive systems to musicians where the musicians best interest can be the prestige of his position or his personal fulfillment. An internal audition to choose a soloist to one of the season's concert or a picture of a musician stamped in the orchestras brochure are examples of non-financial incentives. Finally, when we refer to an institution management capacity, we are looking at its formal structure. It is reasonable to think that an organization that has a more complex formal structure would be better evaluated in quality ranking than an organization that has a simpler formal structure. The common statement in the field is that "more organized orchestras are better".

According to DiMaggio & Powell (1983), organizations engage themselves in processes that lead them to become more and more alike. These isomorphisms happen as a strategy for stabilization and safety against market uncertainties. In the case of the orchestras, that seems like a strategy for differentiation in market niches clearly noticeable, specially regarding orchestras style or specialty. Today, there are orchestras specialized on ancient music, on contemporary music, on pop music, etc.

We saw that in everyday activities, although they are competing, organizations enter into supra-intentional cooperation processes as a strategy to stabilize markets. This is known as *coopetition* (LAZEGA, 2009). In orchestras' market, this process can happen by resources exchange (scores, equipment, financial help) and by information and knowledge exchange. Musicians that play in more than one orchestra, invited conductors and soloists can be triggers for exchanging knowledge.

At the individual level, we can identify some attributes that may have influence on quality attributed to an orchestra. These attributes pass through skills acquired by musicians to which both the training environment and the teacher are important – the construction of artistic skills, we argue, has a technical dimension related to his ability to play the instrument and a symbolic dimension related to the prestige of his teacher and his training institution. Furthermore, at the interaction level we can verify a status system between musicians and a system of collaboration and learning.

Given these brief initial definitions, we can make explicit some central propositions that will guide our reasoning: (1) orchestral music production markets operate and stabilize anchored

in a shared quality standard to which everyone takes commitment. This quality standard also gives rise to an interorganizational order that reflects market's interface and that is widely recognized. (2) Quality, the main articulator of this structure, emerges from market itself in the flow of interactions between organizations and agents. The agents with the greatest weight in the emergence of quality are teachers and *hubs*, musicians with large centrality in the structure.

We shall present now our main hypotheses.

## 8.2 Hypotheses

We depart from the central assumption that the quality standard, the gravity center of orchestras' market, emerges from its own structure. At the individual level, we argue that the concepts of a "good orchestra", a "good performance", a "good instrumental technique", emerge from the bottom up and not from top to bottom. Also, that seems to be a struggle for the "right" to the definition of quality. This leads us to hypotheses regarding individuals, orchestral organizations and their relation with the State.

**Hypothesis 1** *The greater a musician's importance in the interindividual network (in terms of popularity, activity and freedom of action), the bigger his influence shaping the quality standard.*

**Hypothesis 2** *The more an orchestra provides structural incentives for the musicians, the better it will be positioned in quality ranking.*

**Hypothesis 3** *The more complex the organizational structure of an orchestra or its maintainer and the more complex its business network, the better it will be positioned in quality ranking.*

Finally,

**Hypothesis 4** *The closest the relationship of an orchestra with the State, the better it will be positioned in quality ranking.*

Our study object, therefore, presents itself in three levels: the structural level represented by market as a whole and its relationship with the State, the meso level represented by social groupings, in this case, orchestras and organizations, and the micro, individual level. This perception of our object suggests a multilevel approach. In sociology, multilevel statistical models are already robust in research groups. Recently, scholars that work with network analysis have made efforts to merge multilevel analysis to relational data with great success. We will explain now the main analysis strategies coming from this new methodological framework.

## 8.3 The multilevel approach

Brailly et al. (2016) studied an international organizations market. According to the authors, behind the interorganizational relations there are always individual ties. Some organizations need interpersonal meeting to initiate joint actions or partnerships. As the partnerships repeat,

the relation becomes more and more interorganizational and less interpersonal until they do not need meetings of specific members. The authors argue that for a better understanding of a mercantile phenomenon, one should study the complex articulations between these two levels of action.

In network studies, both levels have been taken into account although one at a time. Either authors concentrate on organizational level (and pay attention to ties such as commercial alliances, exchanges, partnerships that affect performance and enterprises' chances of survival) or they concentrate on individual level (identifying informal networks as friendship networks, advising, collaboration, resources and information exchange, etc.). Brailly et al. (2016) argue that economic activities and markets are shaped by the two levels that operate interdependently. "A deal between two companies, which is an inter-organizational tie, depends on inter-individual relationships and *vice versa*. Economic relationships such as deals between two organizations and informal relationships between their members are interdependent" (BRAILLY et al., 2016, p. 246). Both levels are, therefore, overlapping and partially nested.

To consider mercantile trade as multilevel phenomena implies two hypotheses: (1) the *horizontal structural dependence hypothesis* inside both levels and (2) the *vertical structural dependence hypothesis* between levels. The former states that actors in both levels act in social context. The latter states that an individual's network depends on his company's network and vice versa.

Two analysis strategies are mobilized in this perspective. To analyze horizontal dependence in both levels, the authors propose using ERGM because this model contextualizes internodal ties in their immediate neighborhood (e.g., centrality, diads, triads, and other more complex structures). To analyze vertical dependence, the authors retake as intuition common to SNA that consists of transforming 2-mode networks to 1-mode networks. This transformation allocates a tie between organizations that have a member in common and allocates a tie between individuals who participate in a same organization. The authors propose, therefore, an articulation of these techniques as a new approach that can give account of both dependences.

## 8.4 Proposed indicators

In order to operationalize the research design described above, we will look for the following indicators: to verify the current quality standard, we will check musicians' representation of the ranking, the average ticket price, the number of concerts in a season and total investment. The average ticket price is adopted here as a quality proxy based on the finding of Throsby (1983) (the demand is inelastic in relation to the price but highly correlated in relation to perceived quality). We argue that this is a good proxy because people would be willing to pay more for a concert they see as high quality. The number of concerts and total budget seem, at first sight, not so good proxies as the other one for there is a risk of falling into a tautology. Orchestras are good because they have more money or they have more money because they are good? They play more because they are good or they are considered good because they play a lot? However, we argue that, if we adopt these indicators with parsimony and always conjugated

with other variables, these indicators can give valuable insights on the field. We intend to test a quality index that will be created from the agglutination of these variables through a factor analysis<sup>8</sup>.

To capture interactions at the individual level, we will build musicians networks from sociometric surveys. We will adopt degree centrality, betweenness centrality and constraint as indicators for finding *hubs*. The attributes of the individuals will be measured by the country of origin, the city of origin, training institution and teacher. This indicators show us a little of the musicians' context and how he can be situated *a priori* in a prestige scale within the field.

The incentive structure offered by the orchestra will be measured through average salary and salaries of musicians<sup>9</sup>. The non-financial incentives will be measured by the number of times an orchestra member played as a soloist or in a chamber music concert in the orchestras' season<sup>10</sup>. The management complexity will be measured by the quantity of sections and boards that the orchestra/maintainer have and by the amount of hierarchical levels between the instrumentalist and the CEO.

The indicators chosen to measure the level of interaction with State are the amount of investment from the State itself and the existence/quantity of contracts, covenants and partnerships signed. The concepts mobilized and the proposed indicators are summarized in Table 4.

Table 4 – Proposed Indicators

| Concept                    | Indicator  |
|----------------------------|--|
| Quality                    | Musicians perception<br>Average ticket price<br>Number of concerts in a season<br>Total financing<br>Quality index (new) |
| Individual interaction     | Networks<br>Centrality measures<br>Constraint  |
| Individual Context         | Country of origin<br>City of origin<br>Formation institution<br>Professor  |
| Incentive Structure        | Average income<br>Income by specific function<br>Presentation as a soloist or in selected chamber groups                 |
| Management Complexity      | Number of boards/sections<br>Level-distance from the musician to the CEO   |
| Interaction with the State | Total financing from the State<br>Number of partnership contracts  |

Source: Elaborated by the author.

<sup>8</sup> In very general terms, factor analysis is a multivariate analysis technique that aims to reduce complexity by decreasing the number of dimensions to be analyzed in indexes or scores (MINGOTI, 2005).

<sup>9</sup> We intend to compare both the average salary and specific salary by function, e.g., concertmaster and other leaders inside the orchestra that commonly earn more money than the other section musicians.

<sup>10</sup> It is common to professional orchestras to organize concerts with smaller ensembles as string quartets or brass quintets with selected musicians.

## 9 Data and Methods

We identified five professional orchestras in Belo Horizonte: Minas Gerais Philharmonic<sup>11</sup>, Minas Gerais Symphony Orchestra<sup>12</sup>, Sesiminas Chamber Orchestra<sup>13</sup>, Ouro Preto Orchestra<sup>14</sup>, Military Police Symphony Orchestra<sup>15</sup> and Opus Orchestra<sup>16</sup>. We chose Belo Horizonte because of its recognized expressiveness in the national cultural field.

In light of the relational perspective, we will seek to understand resources and information flows in this structure which allow orchestral music production. This part of our research will be made through preliminary investigations on orchestras' content available online, interviews with organizations' managers and *in loco* visits.

To investigate the social construction of the current quality standard within market structure, we will adopt two research strategies. The first is anchored on the assumption that part of cognitive mechanisms and quality control happen in the socialization carried out in musicians academic education period. Put another way, musicians learn with their undergraduate teachers what is a good performance and a bad one, what is a good orchestra and a bad one, what are the criteria in the evaluation of a musician's artistic quality, etc. Although this conception may (and probably will) change throughout a musician's career in his coupling/decoupling movements from various netdoms, the conceptual basis build with the teacher tends to create strong roots. Therefore, the first strategy consists on interviewing undergraduate music professors in Belo Horizonte's universities. We will not do any statistical sampling procedure due to the qualitative character of this research stage. We will adopt, therefore, a sampling by judgement taking into account the author's previous knowledge on the city's professors. The goal of the interviews is to verify convergences in professors' discourse regarding a good performance and a quality orchestra. The second strategy is anchored on the assumption that the quality standard emerges from a status system present in the hierarchical structure of musicians. In any network, the various individuals stratify themselves in a prestige and status hierarchy. The most prestigious individuals usually mobilize quality criteria. Therefore, we will investigate the relational structure between musicians on the various orchestras identifying the most central nodes. Considering the large number of professional musicians in Belo Horizonte, we find that the most appropriate approach and the one that has the biggest return chances consists of an online sociometric survey. During the visits to the orchestras, this author intend to have a brief moment with musicians to explain this investigation as well as the importance of their collaboration. Then, the online survey will be sent by e-mail. After identifying the most central individuals, we will interview them in the same way as the professors.

After the attribute collection of the interviewed, we will identify advisement networks (aim-

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<sup>11</sup> <http://www.filarmonica.art.br>

<sup>12</sup> [http://www.fcs.mg.gov.br/index.php?option=com\\_gmg&view=page&id=2631&controller=page&Itemid=1281](http://www.fcs.mg.gov.br/index.php?option=com_gmg&view=page&id=2631&controller=page&Itemid=1281)

<sup>13</sup> <http://www7.fiemg.com.br/sesi/centro-de-cultura/belo-horizonte/produtos/detalhe/orquestra-de-camara-sesiminas>

<sup>14</sup> <http://www.orquestraouropreto.com.br>

<sup>15</sup> <https://www.policiamilitar.mg.gov.br/portal-pm/orquestra/principal.action>

<sup>16</sup> <https://www.facebook.com/OrquestraOpus/>

ing to capture artistic prestige), friendship networks and job indication networks. We will exclude here performance coparticipation networks because we believe that they will result in a too redundant data.

## 10 Relational analytical models

We will analyze the collected data with two kinds of network modeling: blockmodels and ERGM (P\* models). We will briefly explain the rationale of the models and how they will be useful for the analysis.

### 10.1 Blockmodeling

Blockmodels are an operationalization of one the most central concepts in networks analysis, which is, structural equivalence. This concept is based on the idea that individuals can play social roles in a network structure from specific positions (LAZEGA; HIGGINS, 2014). Blockmodels utilize, most of the time, iterated correlations on the rows and columns of a relational matrix or euclidean distance to separate structurally equivalent nodes. To Lazega (2009), blockmodels are the best available tool nowadays to investigate market niches.

In this research we will use a stochastic frequentist version of the model elaborated by Daudin, Picard & Robin (2008) and a stochastic bayesian version elaborated by Latouche, Birmele & Ambroise (2012).

### 10.2 ERGM

ERGM or P\* models (ROBINS et al., 2007; LUSHER; KOSKINEN; ROBINS, 2013; LAZEGA; HIGGINS, 2014; BRAILLY et al., 2017) are statistical models developed specifically to deal with relational data. A relations structure postulates interdependence between identities. This goes against one of the assumptions of conventional statistical modeling, the independence of information. “The fact that I choose Peter as my friend is not necessarily independent of the fact that I also choose Paul because they can be friends with each other” (LAZEGA; HIGGINS, 2014, p. 76).

P\* model can be defined by

$$Pr(Y = y) = \left(\frac{1}{k}\right) \exp\left\{\sum_A \eta_A g_A(\mathbf{y})\right\}$$

where  $Y$  is the theoretical estimated graph,  $y$  is the observed graph,  $\sum_A$  is the sum of all configurations  $A$ ,  $\eta_A$  is the estimated parameter corresponding to configuration  $A$ ,  $g_A(\mathbf{y})$  is the network statistic corresponding to configuration  $A$  of graph  $\mathbf{y}$  and  $k$  is a constant that ensures an adequate probabilities distribution (ROBINS et al., 2007).

In this research we will use a variation of the P\* models known as “Social Selection Models”. These models were proposed by Robins, Elliott & Pattison (2001) aiming to take account of the existing heterogeneity inside social structures using nodal attributes as exogenous covariables.

Therefore, besides network's own configurations, we will analyze how exogenous variables shape the emergence of the structure (WANG et al., 2016).

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## Appendix 1 – The Market Plane

Here is a space for the beautiful intention of deriving the much very complicated White mathematical models. . .