GOVERNANCE STRUCTURES AND INNOVATIVE CAPABILITIES IN SMALL BRAZILIAN ROASTED & GROUND COFFEE INDUSTRIES

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Abstract

This work aims to find the combinations of governance structures (internal and external) that allow the greatest scope for developing the innovation capability of small firms. Going beyond Grandori and Furnari's approaches (2008, 2010), which demonstrate that a relationship exists between internal governance structures and a firm's innovation capacity, this paper also incorporates the external framework, insofar as it accepts that the innovation process also involves interactions between governance structures external to the firm. We draw on the literature of the New Institutional Economics to address these issues, and test them through a survey of 110 small Brazilian R&G coffee industries. To determine the combinations of elements we used the Qualitative Comparative Analysis (QCA) software fs/QCA, version 2.0 (*RAGIN*, 2008). It has been hypothesized that innovation capability is more present in firms that adopt a mix of governance structures (internal and external) than in those with single structures. In addition, we aim to analyze the influence of the complementarity between internal and external governance structures in the firm's innovation capacity. In allowing the identification of the organizational requirements that create greater opportunities for innovation, these results can help chart the actions of public and private policies which enable Brazilian companies to improve their rate of innovation and competitiveness in their markets.

Keywords: Governance structure, Innovative capabilities, Roast & ground coffee.

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1. Introduction

The motivation for this work is the lack of relevance generally ascribed by economic studies to the innovative ability of small and mid-sized firms. These firms represent the majority of Brazilian companies, accounting for over two-thirds of employment in the private sector (SEBRAE, 2006). Understanding of this issue is important, because innovation can enhance their competitiveness in the global and domestic market. Also, recent approaches from the Economics of Organizations associate innovations with the organizational structures of firms (Barbieri; Álvares, 2004; Coombs, Metcalfe, 2005; Grandori, Furnari, 2008, 2010). This work therefore aims to find the combinations of governance structures (internal and external) that allow the greatest scope for developing the innovation capability of small firms.

Grandori & Furnari (2008, 2010) showed that there is a relationship between the structures of internal governance and a firm's innovation capacity. The authors observed that Italy's most innovative firms combine different types of internal organizational forms, characterized by monetary, bureaucratic, and community incentives. Going beyond Grandori and Furnari's approach (2008, 2010), this paper also incorporates the external framework, insofar as it accepts that the innovation process also involves interactions between governance structures external to the firm (Barbieri & Alvares, 2004; Coombs & Metcalfe, 2005).

We draw on the literature of the New Institutional Economics to address these issues and test them through a survey of 110 small Brazilian R&G coffee industries. Two types of innovation are investigated: i. product; ii. method/process. To determine the combinations of elements we used the Qualitative Comparative Analysis (QCA) software fs/QCA, version 2.0 (Ragin, 2008). Our hypothesis is that the ability to innovate is more prevalent in firms that use a mix of governance structures (internal and external) than in those with a singular structure.

To achieve the goals stated above, this paper is structured as follows: following this introduction, Part 2 describes the governance structures—internal and external—that can influence the innovativeness of firms, and presents the main hypotheses of this study; Part 3 lays out the methodological procedures used to develop the field research, empirical model, and our sample characterization; Part 4 analyzes the empirical results of the survey conducted among small and medium Brazilian roast and ground coffee industries, which is followed by the main conclusions of this research.

2. Governance structures and innovation capability

Under the Theories of Organizations, the variables that make up the way firms organize and coordinate their information, activities, and resources, both internally and externally, have been deemed potential sources of innovation (Burns, Stalker, 1961; Mintzerg, 1998; Barbieri; Álvares, 2004; Grandori; Furnari, 2008, 2010; Swann, 2009).

This article, inspired by the work of Grandori and Furnari (2008, 2010), seeks to identify possible sets of **internal and external governance structures** with greater potential for innovation. It is worth noting that the term "governance structure" in this research includes not only the version defined in Transaction Cost Economics (Williamson, 1996), in which an order is established to reduce potential conflicts and opportunistic behavior, but also involves the mechanisms that enable the coordination of complex tasks (Mosque; Brush,

2008) as well as the transfer of knowledge and learning (Lorenzoni; Lipparini, 1999; Mosque, Anand, Brush, 2008). We also note that this work does not seek to analyze the determinants of governance structures given the characteristics of innovation, but to see which governance structures better define innovation capacities, as measured by product innovation.

2.1. Internal governance structures: Combinatorial Analysis of the Design

A few authors highlight the influence of internal structures in innovation, such as Burns and Stalker (1961), Mintzerg (1998), and Vasconcellos and Hemsley (2002), whose studies identify, based on a comparative descriptive assessment, organizational practices and respective structures that influence innovation (Grandori; Furnari, 2008). The practices they highlight in this type of structure are: greater flexibility, better coordination, cross-functional teams, horizontal and vertical communication, and decentralized and diffuse decision-making.

Despite the contributions of these works, they do not allow a predictive analysis that relates innovation capability with the governance structures adopted by the firm. An advance towards this direction is the research of Grandori and Furnari, whose articles "The chemistry of Organizations: combinatory analysis and design" (2008), and "Structural heterogeneity, and organizational robustness and innovation performance" (2010) describe not only those internal governance structures that enable better performance, but also predict how these structures can be combined to generate superior results in terms of innovation and productive efficiency.

To analyze the relationship between innovation and internal governance structures, these authors have developed a tool called "Combinatorial Approach to Design." Grandori and Furnari qualify the internal governance structures as organizational elements that include a collection of practices adopted by the firm. The market elements contain monetary and control incentives; the bureaucratic elements include rules and formal plans for labor division; and the community elements present knowledge, values, and common culture.

To better understand this approach it is important to highlight the origin of its main concepts, which are based on four approaches to organizational design: Transaction Cost Economics; Structural Contingency, Configurational, and Complementarity. Transaction Costs Economics makes two important contributions to the Combinatorial Approach. The first concerns the possibility of identifying the portfolio of elements adopted by the firm. The second provides reasons to separate them and categorize them as different types of governance mechanisms. The three main types, presented by Williamson and Oushi (1981 cited by Grandori; FURNARI, 2008), are markets, bureaucracies, and clans, which were refined by Grandori and Furnari (2008) to constitute the basic elements of their approach.

Firms may adopt different strategies to organize their internal production, either by combining the three elements: market, bureaucratic, and community (plural forms),[1] or by adopting a set of practices from only one of these categories (similar types). For example, similar types of bureaucratic organizational elements are a set of mechanisms composed solely of one of the governance structures—planning, command, and formalization (Grandori; Furnari, 2010). For their part, plural forms imply a combinations of structures, such as rules (bureaucratic elements) combined with training programs and teams (community elements), and with monetary incentives, such as pay for performance (market elements).

Grandori and Furnari (2008, 2010) point out, however, that in the case of plural forms, both **Transaction Cost Economics** and the **Theory of Structural Contingency** posit that this is not an efficient (coherent) architecture; they only consider combinations of similar practices to be appropriate, in other words claiming that the firm should choose only one

structure of governance, one that would minimize transaction costs. However, these approaches do not explain why, empirically, hybrid or combined organizational solutions are increasingly present in firms (Grandori; Furnari, 2008, 2010). Moreover, in the case of innovation, firms usually present plural internal relations: pay for performance (market structure) and authority through control mechanisms (bureaucratic structure).

Unlike the above-mentioned approaches, which argue that complementarity results from similarity and that a lower range of practice types in the same system would be the best (Williamson, 2004), Grandori and Furnari (2008, 2010) assert that what is most efficient is the combination of different types of practices. That does not mean a lack of consistent organizational strategies for the firms, but rather that heterogeneity between structures may lead to a combination that results in the desired performance. This occurs because the organizational forms, according to the authors, should be understood as interconnected systems of practices or attributes, adding weight to the notion that the plurality of governance structures would show better results for firms.

These considerations are based on the **Complementarity-based** and **Configurational approaches**, which correlate combinations from a wide collection of organizational attributes (formal rules and policies in the budget process or in personnel management, teamwork and committees, environmental monitoring procedures, central units of personnel, and use of own capital, among others) with performance indicators.

Moreover, the **Complementarity-based approach** departs from Organizational Economics and highlights the complementarity between organizational components, given that the application of a practice raises the value of other practices employed. This design criterion is complementary because it considers systemic adjustment, understood as the multivariate interaction of structural features and the multiple contexts of variables affecting the performance of firms, to be most important. It is noteworthy, however, that despite its theoretical contributions, this approach fails to explain and predict which organizational practices complement others.

The **Configurational approaches**, understood as a theoretical evolution of the Structural Contingency Approaches, admits that more than one combination of characteristics (attributes) can be effective under the same conditions, stressing the concept of equifinality. Moreover, it accepts the possibility of non-linear, non-monotomic relationships between the values of organizational characteristics. However, the downside of this approach is also its ability to predict which combinations are most effective and under which circumstances.

Arguing that plural forms trigger innovation and superior performance, the authors created laws to combine the organizational elements and predict *ex ante* the best combinations, namely:

Law of structural differentiation and variety of the organizational core: complementarity and the combination of three different governance structures tend to generate high performance (both for innovation and for efficiency) at any level and under any circumstance;

Law of equifinality and Law of structural heterogeneity: a result with the same efficacy can be achieved through different combinations of governance structures. In the case of innovation capability, combinations consisting primarily of both community and/or market structures also tend to have better results.

The body of empirical evidence presented by the authors corroborates their proposals about the combinatory laws, highlighting that combinations of market, bureaucratic, and community (plural) structures demonstrate high innovation performance and efficiency.

These results further suggest that market and community structures are neither mutually exclusive nor strictly complementary in the governance of innovation. In fact, these elements seem to behave more like fungible substitutes. In other words, formulas that generate high organizational capacity for innovation can be composed of market or community elements, or both, without altering the results. Thus, combinations rich in market or community structures or both could lead to greater innovation capacity. In contrast, bureaucratic structures would have greater relevance for results aimed at efficiency.

Furthermore, the authors found relevant combinations,[2] chief among which are the following:

i. The plural (bimodal) form characterized by market and community structures, effective in achieving both efficiency and innovation in large companies;

ii. The plural (bimodal) form composed of market and bureaucratic structures, able to generate high-performance innovation under low complexity and uncertainty. This result is interesting from the authors' point of view because it shows that innovation activities and an extensive community organization are more relevant under conditions of greater complexity and uncertainty. Such evidence may reflect when innovation begins to enter into the routine—for firms not operating in high-tech industries and with a large number of trained personnel to manage, the overall governing architecture should first be improved through rules and incentives, instead of teams and other community elements; and

iii. The **singular (unimodal) form** is effective depending on the context. It corroborates the prediction of most classical theories of contingency. Combinations more oriented towards a market structure are more suitable for achieving efficiency under conditions of complexity or uncertainty; community structures are most effective in achieving innovation under uncertainty and complexity; and bureaucratic structures provide better efficiency results under low-uncertainty conditions.

This theoretical discussion thus completes the organizational and economic approaches in that it highlights the importance of each organizational practice and notes the influence of each in the governance structure and how they contribute to the firms' results. Moreover, the combinatorial approach is consistent with the discussion of the innovation process, insofar as the key elements highlighted in the literature as being relevant to greater capability for innovation are present, such as greater incentives for members of the organization, flexibility, communication opportunities, teamwork, shared knowledge, and differentiated skills and resources (Barbeiri; Álvares, 2004; Coombs; Metcalfe, 2008; Swann, 2009).

These considerations allow us to formulate the first hypothesis of this study:

H1: Innovativeness occurs more consistently in firms that adopt a plural internal governance structure (market incentives and/or bureaucratic and/or community) than in those with a singular structure.

Based on the Combinatorial Approach presented above, this article adapts organizational practices for the Brazilian case in order to analyze the innovation capability present in small roast and ground coffee firms. The internal governance structures and prevailing practices adopted in the research are displayed in Table 1.

Picture 1: Internal governance structures and their variables

GOVERNANCE STRUCTURES	PRACTICES IN EACH TYPE OF STRUCTURE	
MARKET: MONETARY INCENTIVES	Payment according to individual performance	
	Payment according to team performance	
	Payment according to firm performance	
	Outsourcing	
BUREAUCRATIC	Career plan	
	Strategic planning	
	Quality control program and process	
	Performance evaluation system	
COMMUNITY	Shared information and values	- Shared rooms; - Socialization area; - Frequency of socialization .
	Communication channel	- Informative bulletin board, newspaper, radio etc; - Communication system for employees; clients to make suggestions or bring new ideas; - Professionalization incentives.
	Teamwork	- Frequency of board of director's meetings ; - Frequency of management or supervision meetings ; - Frequency of meetings of the production team; - Training and group dynamics.
	Shared decision making	- Who makes the planning for the following year; - Who participates in the choice/development of new brands, blends, packaging; - Agreements or partnerships with stakeholders to develop products or processes.

2.2. External governance structures: Transaction Cost Economics

Increasingly, innovations arise from collaboration between firms (Coombs; Metcalfe, 2005). Therefore, this research will also consider external governance structures, thereby expanding the initial approach by Grandori and Furnari (2008, 2010). The inclusion of this structure in our analysis is based on several studies (Barbieri; Alvares, 2004; Coombs, Metcalfe, 2005; Grandori, Soda, 2006; Arbix, 2007) which, in addition to stressing the importance of an internal environment conducive to innovation, also highlight the external one, due to various interactions with other organizations that provide information and knowledge exchanges in different forms (formal and informal contracts, partnerships, etc.). *"Thus, buyer and supplier may jointly develop a new product or adjust the attributes of existing products (the architecture of components, the functionality of the overall design, and so on."* (Mesquita; Lazzarini, 2008, p. 12).

Significant contributions on intersegment relations were observed in the studies of Oliver Williamson (1985). The author proposes three external governance structures that can be easily identified in the transactions: market; hybrid forms; hierarchy / vertical integration. These structures correspond to particular institutional forms, which differ in terms of mechanisms for behavior monitoring, incentives, and control, with different capabilities in terms of flexibility and adaptability (Pondé, Fagundes & Possas, 2009). These mechanisms are modified due to transaction costs,[3] which are related to the transaction attributes and

behavioral assumptions.[4]

The market is, according to Williamson (1985), the main governance structure for non-specialized transactions of casual contact. It is more appropriate for transactions with discontinuous relationships over time and impersonal relationships among agents, characterized only by the transfer of ownership of a good or service and low asset specificity. Thus, it includes incentive mechanisms provided by price and high flexibility, because one party can easily associate with other partners on similar terms.

Vertical integration occurs when "[...] *the transaction is removed from the market and organized within the firm subject to an authority relation vertical integration*." (Williamson, 1985, p. 76). This happens, according to the author, when asset specificity becomes higher and its transfer to other activities or business becomes costly due to the possibility of opportunistic behavior. With integration, economic transactions become subordinate to the hierarchy, consisting of bureaucratic mechanisms and internal stimuli associated with the organizational structure of the firm (Farina, 1997). Besides the minimization of transaction costs involved, the advantage of this structure is its ability to adapt quickly, as the firm does not need to consult, complete, and review the agreement between the firms (Williamson, 1985).

The hybrid forms lie between the extremes of market and hierarchy (Williamson, 1985). As the market moves toward hierarchy, incentive is lost and control is gained (Azevedo, 1996). Thus, the higher the asset specificity, the stronger the control required over the transaction to avoid opportunism, moving towards the adoption of an organizational form that tends to hierarchy. This structure allows the firm to decrease the risks of the transaction by formatting contractual safeguards, while maintaining the advantages of party autonomy (lower bureaucratic cost).

In this sense, in Williamson's view, asset specificity influences the governance structure, and therefore the configuration of the type of firm. The author pointed out that the most complex structures (from a market relationship to vertical integration) would be those with greater investments in specific assets, which would indicate a greater chance of creating value. However, he assumes that the relationship between the specific asset and an efficient organizational structure would occur through a singular form.

Empirical studies are beginning to find, however, that there are a variety of forms in between the market and the hierarchy governance structures (Menard, 2004), such as the almost vertical integration of a number of subcontractors; franchise networks; strategic alliances; production, technology, and business joint ventures; and consortia and contractual relationships (Menard, 1997 cited by Castro, 2004). This shows that firms can present combinations of plural governance structures, involving the simultaneous adoption of two or more organizational forms (Bradach, 1997), in order to merge incentive, control, monitoring, and flexibility mechanisms.

With respect to plural forms, such as the case of franchises, some authors (Saes et al., 2011) argue that these forms enable gains in the transfer of encoded knowledge and the development of tacit knowledge, fundamental to innovation. In the case of joint ventures, they can promote cooperation between two or more firms so that they assist in developing new products and processes (Coombs; Metcalfe, 2005).

It is worth mentioning, however, that the aim of this research is not to discuss the efficiency of the governance of a transaction as a function of a degree of asset specificity, as Williamson does, but to analyze which combinations of governance structures generate greater innovation. Such structures may involve a number of transactions of an input with different degrees of specificity. For example, a firm may acquire the raw material green

coffee with different specificities, according to its branding strategies (commodities, gourmet, origin, fair trade, etc.).

Therefore, this study considers that external plural governance structures can offer alternatives for firms to transfer, combine, and produce together resources that enable them to innovate. In this sense, we argue that each form has unique relevant characteristics which determine the capacity to innovate, according to the needs of a particular firm or industry, and that the combination of these external governance structures[5] can more consistently influence innovation.

The market structure, for example, has a lower level of relations between agents (weak ties), but allows interactions between different agents that enable information exchange (Granovetter, 2005). With regard to the hierarchy structure, there is a loss of information from the external environment, but if the firm integrates certain transactions it can better adapt to change. The hybrid forms, in turn, through formal or informal contracts, assist the firm to maintain its relationships with members of the supply chain and to present, in some cases, stronger ties, with exchanges of information, resources, and knowledge.

Based on these considerations, we present the second hypothesis of this article:

H2: Innovativeness occurs more consistently in companies that adopt an external plural governance structure (market and/or hybrid forms and/or vertical integration—M, H, V, respectively) than those with a single structure.

The study analyzes the three governance structures proposed by Williamson (1985) and a combination of these structures, both upstream and downstream, as shown in Table 2.

Picture 2 – External governance structures and their variables

Governance structures	Supply chain	
	Upstream	**Downstream**
Vertical integration /hierarchy	Produces inputs internally.	Sells products through own stores or direct sales.
Hybrid forms	Purchases inputs from different suppliers via contract.	Sells products to different customers via contract.
Market	Purchases inputs from different suppliers on the spot market.	Sells products to different customers via spot market.

2.3 Internal and external governance structures

If the internal and external governance structures can separately influence the innovation process, an interesting question that arises is whether the combinations of these structures can improve the ability to innovate. According Alvares et al. (2004, p. 155), the answer to this question would be positive, because the innovation process "involves different activities performed by different actors both inside and outside the company."

Thus we have as the main hypothesis:

H3: Innovativeness occurs consistently with the complementarity of the internal and external plural governance structures.

Two factors can be called complementary if the marginal benefit of each factor increases in the presence of another (Rothaermel; Hess, 2007). The following section presents the methodological procedures and proxies that have been used in this research to identify and

empirically analyze the relationship between the innovativeness of firms and their internal and external governance structures.

3. Methodology

The survey was conducted through telephone questionnaires with micro-, small, and medium Brazilian firms in the coffee roasting and grinding industry.[6] The choice of this means of data collection was due to the need to obtain information which couldn't be collected from secondary sources. In addition, the telephone interviews enabled the obtaining of information from a greater number of companies spread over a broader geographical area (Richardson, 1999).

The sample was constructed from the list of member companies of the Brazilian Coffee Industry (ABIC), which represents coffee roasting and grinding industries from all over the country, with 415 member companies. We extracted from this database, initially, an intentional or judgement sample, one of the methods of non-probability sampling (Rea; Parker, 2000; Richardson, 1999) of micro-, small, and medium enterprises, using as the main criterion number of employees. According to the classification criteria of number of employees for the industry used by IBGE and SEBRAE, microenterprises have up to 19 employees, small ones between 20 and 99 employees, and middle-sized ones 100 to 499 employees (SEBRAE, 2012).

After this procedure, firms were randomly distributed in the database, and 30% of the sample was chosen to respond to the questionnaire, totaling 110 firms. Some cases were eliminated due to missing and inconsistent configurations,[7] resulting in a final sample of 80 firms.[8] The questionnaire used in the study was structured in three main sections: characterization of respondents; innovation capacity; and internal governance structures. During the preparation of the questionnaire we consulted with industry experts to ascertain the correlation of the research to the reality of the sector, and also the respondents' understanding of the issues presented. Subsequent to the preparation of the questionnaire, it underwent pre-tests and any necessary adjustments were made.

With the completion of data collection, the data were tabulated and analyzed through the Qualitative Comparative Analysis (QCA) or Boolean Comparative Analysis methods, using fs/QCA version 2.0 software, inspired by the work of Grandori and Furnari (2008, 2010).

3.1. The variables and their proxies: the case of coffee

To evaluate firms' ease of product innovation, this paper bases its evaluation on the quantity of brands launched and the quantity of changes in products in terms of blend, roasting and grinding pattern, and packaging over the past 5 years that still remain on the market, as shown on Table 3.[9]

To measure the three internal governance structures (monetary, bureaucratic, and community incentives), we identified four predominant organizational practices, which result from a single question or more, depending on the level of complexity involved. Because of this, the intensity of adoption of each organizational practice was measured in three ways, inspired by studies conducted by Grandori and Furnari (2008, 2010). Some organizational practices were obtained directly ("yes" or "no" to whether, for example, the firm offers a career plan) and the responses were dichotomized into dummy variables, where "1" represents the presence of the practice and "0" its absence.

Picture 3 – Innovation capability

VARIABLES	PROXY
Product: brand, blend, grinding and roasting pattern, and packaging	PI: Number of new brands launched and /or brands with changes in blend, grinding and roasting pattern, and packaging in the past 5 years that are still on the market. IPM: Sum of the number of brands put on the market and/or changes in current brands divided by the quantity of firms studied. IPM: $\sum$ IP / n IC: IP compared with IPM. **IC = PI ≥ IPS (encoded as dummy variable: 1);** IP < IPM (encoded as dummy: 0);

Note: IP: Product Innovation; IPS: Innovation in the Product of the Sample; CI: Firms with Innovation Capability.

Other practices were questioned according to frequency (e.g. frequency of meetings) or number of people involved (e.g. who performs planning for the following year), and measured in percentages.[10] These scales were also dichotomized into dummy variables. The values for all firms were tallied and the result divided by the total number of respondents, assigning "1" to firms that had values greater than or equal to the average value of the sample for that practice. In the case of practices that already contained several sub-practices, the quantities of sub-practices of each firm were added; these values were also added and divided by the number of respondents, generating an average sample for each practice that contained sub-practices. Finally they were dichotomized, with "1" for firms with values higher or equal to the average value of the sample for that practice.

After these steps, it was necessary to identify the elements of coordination for each firm, namely the structures of internal governance. Thus, for each structure the following procedures took place: i. Measurement of the intensity of adoption of practices for each firm, (plus the amount of practices adopted); ii. Sum of the quantity of practices adopted by all firms, divided by the number of respondents; iii. Comparison between the practices of each firm and the sample average. Firms with values greater than or equal to the average of the sample were dichotomized into "1", because they presented that governance structure in a predominant manner (high intensity). For example, the bureaucratic structures have four prevailing practices (performance measurement, career planning, strategic planning, and quality programs and control), in which the sample mean was 2.14. Thus, firms with intensities 3 and 4 were considered as having a bureaucratic internal governance structure as one of its predominant structures.

Regarding external governance structures, the measurement was divided into upstream variables, focusing on two main inputs (green coffee and packaging), and downstream, with the sale of roasted and ground coffee. For each relationship, respondents provided the percentage of production, purchase, and sales that used every external governance structure - the spot market, hybrid forms, vertical. To be able to detect plural forms present in relationships, the variables were dichotomized not only as 0 or 1, but were divided by 100 to generate and transform into continuous Fuzzy set variables (any value ≥ 0 and ≤ 1), to be entered in the software.

With the treatment of variables related to governance structures, the analysis was performed using the Qualitative Comparative Analysis (QCA).

3.2. Small and medium Brazilian coffee roasting and grinding firms

3.2.1 Sample characterization

Of the companies surveyed, 52 are micro-enterprises, 22 are small, and 6 medium, and most are associated with the ABIC. Regarding location, 81% are in the southeast (39% in Sao Paulo and 29% in Minas Gerais). Firms have a strong presence in the regional market (77%), 13% of them are on the national market, 9% on the local, and only 1% sell on the international market. With respect to the length of time companies have operated in the marketplace, the sample average is 37 years, with 71% of firms having been in operation for more than 20 years. The oldest company was founded in 1915. Of the companies surveyed, 96% are family-owned, with the administration, in most cases, also centered on the family.

Most companies, 91%, produce 100% of their products in their own factory and have a single plant; another 7.5% produce a portion in their own factory and outsource the rest. The main types of coffee produced, in order of importance in terms of percentage of sales, are shown in Table 1. It is observed that traditional coffee accounts for the greatest sales percentage for approximately 90% of the firms, but gourmet and superior coffee (the second most important in terms of sales to 13% and 16% firms, respectively) also play an important role. Besides coffee, eight firms produce and/or sell other products, such as food in general, green coffee, filter coffee machines, and supplies.

Table 1 – Types of coffee produced and the order of importance in sales percentage

Order of importance – sales	Types of coffee					
	Traditional	Gourmet	Superior	Organic	Origin	Other
Does not produce	7.6%	73.4%	78.5%	94.9%	97.5%	94.9%
1	89.9%	6.3%	-	-	-	3.8%
2	1.3%	12.7%	16.5%	2.5%	-	-
3	1.3%	7.6%	5.1%	-	-	-
4	-	-	-	1.3%	1.3%	1.3%
5	-	-	-	1.3%	1.3%	-

With respect to the characteristics of the survey respondents' products, 68% have one or two brands; 83% have 1 to 4 types of blends; 76% have 1 to 3 coffee roasting and grinding coffee patterns; and 73% have 1 to 3 types of packaging. Regarding the launch of new brands in the past five years (Table 2), small businesses introduced these to the market in greater numbers, and microenterprises launched a larger number of blends and packaging. Other changes in packaging, such as design, color, and materials, were the characteristics that have the most significant changes, in larger quantity. This may have occurred because the costs of these changes are lower.

Table 2 – Characteristics of products launched in the past 5 years, per firm size

Firm size	Quantity of launches in the last 5 years				
	Brands	Blends	Packaging	Grinding & roasting pattern	Other alterations
Micro	3	9	7	6	73
Small	5	5	4	8	62
Middle	3	7	6	7	26

In the case of innovation in processes, 62% of firms surveyed made changes to their production process over the past five years. Of these changes, only 61% were considered by firms as new to their market. Some examples cited were: automated machines; anti-pollutant / eco-friendly roaster; reusable packaging; cold-powered grinder, etc.

Other features, such as the internal organization and external relations, will be discussed below.

4. Analysis and interpretation of empirical results

The presentation of the empirical results is divided into three parts in order to facilitate understanding: 1) internal governance structures; 2) external governance structures; 3) relationship between the two governance structures.

4.1 Internal governance structures

The three internal governance structures analyzed were: **i. Monetary incentives; ii. Bureaucratic; iii. Community.**

We begin with a general characterization of the practices adopted by the firms interviewed. Next, we analyze the relationship between internal governance structures and innovation.

4.1.1 Characterization of internal governance structures of the companies interviewed

With regard to monetary incentive structures, we found that of the four practices analyzed, individual performance pay was the most common one adopted by the firms studied, and the main area incentivized is the commercial (sales). Next comes the practice of performance pay, related to general positive results by the firm during the year (revenue, profit). In firms adopting this practice, usually 100% of employees receive a share of the profits, as stipulated by the firm. In contrast, team performance is little emphasized by the firms, occurring in only 2% of them. Hiring a third party to develop some activities is more common in the commercial or service areas (22%), or in the R&D department (7%). Such a department is present in 59% of the firms interviewed, mainly focused on developing new blends and roasting and grinding patterns.

Because the intensity of the practice of individual performance pay was higher, the form of measurement of this performance in this bureaucratic structure had greater relevance than other measures. Of the respondents, 53% indicated that the measurement of individual performance was the most relevant and the main form of measurement is the individual goal set for individual employees. Regarding firm performance, billing and the overall goals established were the measurements most cited by respondents, whereas career plans are present in only 27% of the firms interviewed. As most of them are small and family-run, many have flatter command structures (few hierarchical levels) and a lower level of formalization of jobs and salaries, hindering the establishment of career plans.

Asked about the formalization of production processes and activities undertaken by the company, 40% of respondents said they have defined processes. However, the programs related to quality developed by ABIC were the practices most commonly adopted in the bureaucratic structure, so that almost all respondents had some of the programs.[11] The Purity Label is used in 91% of the firms, but the Quality Control Program (QCP) in only 34%. According to some respondents, the cost to implement the QCP is too high for small and medium firms, which may be a major reason for the low level of adhesion. Other programs and certifications were highlighted by 14% of the respondents, such as Cafés do Brazil (ABIC for export), CODEAGRO, ISO 9000, ISO 22 000, Biodynamic Institute (IBD), UTZ Kapesh, Specialty Coffee Association, Certificaminas, Fair Trade, and Rainforest Alliance. Finally, 80% of the firms interviewed employ specialists in the production process, as tasters or consultants (making or maintaining blends) and roast masters.

The second practice with a high rate of adoption in the bureaucratic structure was the

planning of activities and strategies of the firm for the forthcoming year (89% of firms). In most cases, the family who owns the firm is in charge of planning strategies and activities.

Regarding the practice known as shared decision-making in the community structure, it is observed that many of the strategic decisions of firms are focused on the owners, which shows a low level of shared decision-making with other employees and stakeholders. This can also be seen in another question, when respondents were asked who participates in the selection and development of new products, brands, blends, and packages. Of the firms surveyed, 73% responded that decisions about new products are taken by the members of the family that owns the business.

Regarding the sharing of information and values, the proxies used to measure this practice and the results were:

- Rooms shared by 76% of companies surveyed;
- Social space in 35.4% of firms, such as: lounge, TV, leisure area (with barbecue, games), employee clubs (soccer field, fitness center), cafeteria;
- Social Gatherings: most companies surveyed held events involving the socialization of the staff once a year.

Another practice studied concerned communication channels existing in the firms. Of the firms surveyed, 52% have bulletin boards or an internal newsletter with news and relevant information, and 87% have some kind of system or form of communication with employees. In these systems, the employees present their suggestions for improvements and new ideas. In small-sized firms, informal daily conversations or direct contact with the board and meetings with the staff were cited as frequent, as the informality resulting from the size of the firm allows employees to present themselves and add their suggestions and ideas .

Regarding communication channels with customers, firms highlighted first the contact phone number provided by the company (0800 and SAC) or electronic means (email and website), and secondly, contacts between sales representatives and customers at points of sale and product tastings. With respect to professional incentives, these are only found in 49% of the firms interviewed, with technical courses geared to the production area being the most encouraged, and offered by institutions such as ABIC, Sindicafé (Coffee Industry Union) Senai (National Industrial Apprenticeship Service), and Sesi (Industry Social Service). Few respondents provide scholarships or stipends for colleges and MBAs, besides courses for the administrative areas.

Moreover, the aspect of teamwork is still undeveloped by respondents, as already seen through pay for team performance. Training sessions and group dynamics are offered by 34% of respondents, most of which invest in training for handling production machinery and equipment, mainly in the implementation of new machinery. Some respondents, however, cited seminars for employees about job security, integration, and dynamics offered by the human resources department, and organized visits to coffee farms.

Another proxy used to measure teamwork was the frequency of meetings between the board of directors, management, and the production area. Respondents stressed that these meetings take place almost daily in those three levels (33% in the board, 34% in management, and 28% in the production area), and often occur informally throughout the day. The monthly frequency of meetings was cited by 32% of respondents in the case of directors, and 28% in the case of the management. The production area presented once a week as the second highest frequency of meetings.

4.1.2 Analysis of the results of internal governance structures: Boolean logic

After characterization of the firms, the three governance structures analyzed (monetary incentives, bureaucratic, and community) were entered into the fs/QCA 2.0 software to identify which structure(s) of governance or their combination enabled greater capacity for innovation in firms. The Truth Table (Table 3) thus generated is shown next:

Table 3 – Truth Table: internal governance structure

Monetary incentives	Bureaucratic	Community	Frequency	IC	Consistency
1	1	1	11	1	1.000000
1	0	1	6	0	0.500000
0	0	1	9	0	0.444444
0	1	0	9	0	0.333333
1	0	0	17	0	0.117647
0	0	0	22	0	0.000000
0	1	1	33	0	0.0000000

Each row in the Truth Table indicates a combination of structures, where 1 means the presence of a particular governance structure in the combination and 0 indicates its absence. The Frequency column shows the number of firms that had combinations on each row, and the consistency related to innovation capability with the different combinations of governance structures, to indicate those with greater relevance. The column IC (innovation capacity) is completed only after the analysis of frequency and consistency to generate the final figure. It is noted that only one combination obtained consistency above 0.75, after the frequencies below three had been removed. The combinations obtained from each type of solution were:

Table 4 – Internal governance structure: complex solution

Combination	*Raw coverage*[12]	*Unique coverage*[13]	*Consistency*
Monetary incentives* Bureaucratic * Community	0.440000	0.440000	1.000000

Coverage solution: 0.440000
Consistency solution: 1.000000

Table 5 – Internal governance structure: partial solution

Combination	*Raw coverage*	*Unique coverage*	*Consistency*
Monetary incentives * Bureaucratic	0.520000	0.520000	1.000000

Coverage solution: 0.520000
Consistency solution: 1.000000

Based on Table 4, only one combination proved to be more consistent in generating high innovation capability. This combination indicates that: **Innovation capacity = *f* (monetary incentive + bureaucratic + community).**

This result corroborates the combinatorial laws of **structural differentiation and variety of organizational core** of the governance structures highlighted by Grandori and Furnari (2008, 2010). That is, innovation capacity occurs more consistently in firms that adopt an **internal plural governance structure, confirming H1**. This result corresponds to 14% of the total sample, but if we consider only firms with high innovation capacity, this combination would represent 44%, as highlighted by coverage solution. Firms with high innovation capability are those that demonstrated product innovation greater than the overall average of the sample, as shown on Table 3.

The partial solution (Table 5) shows which governance structures represented greater importance to innovation capacity, compared with the intermediate solution (Fiss, 2011). In this case, the result obtained for the intermediate solution was equal to the complex solution.

Thus, we note that the **monetary incentives and bureaucratic governance structures** were the elements that most influenced innovation. Grandori and Furnari (2010) pointed out that in firms with low complexity (small and medium) and in sectors with low uncertainty (traditional and not technology-intensive), as is the case of the firms surveyed, practices relating to performance rules and incentives are more important to innovation than those related to the team and other community elements.

Table 3 also shows other combinations of governance structures that caused a high innovation capability in some firms, but which did not provide consistency for this sample (consistency below 0.75). Such empirical evidence contributes to the discussion of the combinatorial laws of **equifinality and structural heterogeneity**, insofar as a result can be obtained by different combinations of governance structures. However, the combinations consisting principally of cash incentives and bureaucratic structures showed the best results for innovation.

Moreover, based on the data presented above, we note that community practices are used less by innovative small and medium coffee roasting and grinding firms. Although respondents emphasized the constant communication and interactions among employees, and opportunities for them to offer suggestions and new ideas, teamwork is barely present in these firms and the decisions are still centered on the owners. Capacity building and training of employees also occur less frequently.

Therefore, based on the method of analysis, which highlights the causal conditions attached to a particular outcome, we can infer that the combination of internal governance structures (monetary incentives, bureaucratic, and community) lead firms to have a greater capacity for innovation. Furthermore, it is observed that monetary incentives and bureaucratic governance structures show strong causal correlation with innovation in small businesses of the coffee industry. In contrast, the community structure showed a weak causal relationship with innovation.

4.2 External governance structures

The upstream transactions analyzed were the purchase of major inputs like green coffee and packaging, and downstream, the sale of roasted and ground coffee. The governance structures studied in these three transactions were: **i. Market; ii. Vertical integration; and iii. Hybrid forms**.

First, we will present the practices adopted by the companies interviewed. Next we present the analysis of the relationship between external governance structures and innovation.

4.2.1 Characterization of the external governance structures studied

Of all the respondents, 81% buy green coffee from individual producers, followed by cooperatives (64.5%), brokers (43%), exporters (35.4%), and other types of suppliers such as auctions and warehouses (8.8%). Concerning the number of different suppliers of this input, most of the responding firms (51%) have between 1 and 10 suppliers. Of these, 15% cited having 10 suppliers. Some roasting industries (7%) produce all the green coffee they process. However, the main governance structure cited was the market, because respondents can find raw quality coffee for a good price in the spot market. Furthermore, the price volatility of green coffee in the market often prevents the signing of contracts between producers and roasting firms, insofar as producers can get better prices for their product without them.

In the case of packaging, domestic firms (96%) are the main suppliers, with 58.2% of the firms interviewed relying on a single supplier, and 24% using two. The maximum number found in the sample was 6 suppliers, which paints a different picture than that of green coffee. The external governance structure adopted by 96% of respondents is the spot market. The most prominent reason for this structure is the possibility of choosing suppliers on the market, who offer packaging that meets the needs of the firm at suitable prices—it is more economical for the firm to buy than to produce its own packaging. Furthermore, respondents stated that there are great difficulties in switching suppliers if they do not meet the firm's needs.

The most important distribution channels for the firms interviewed are retail (supermarkets) or grocery stores and the food service or HoReCa (hotel and catering) industry. External governance structures via the spot market were again those most adopted by the respondents. The reasons for this choice are the same: economies of scale in using the market, namely the ease of finding raw material in any desired period.

The three transactions mentioned above were analyzed both separately and jointly, based on their governance structures: spot market, vertical integration, and a hybrid form. The solutions generated by the software, after the withdrawal of frequency combinations with a frequency below 3, were not consistent (ie, greater than 0.75). The combinations presented involved governance structures via market. Thus, it was found that the external governance structures showed no causal relationships with innovation.

This situation can be explained by low levels of asset specificity, because, as already emphasized by interviewees, both green coffee and packaging are assets easily found on the spot market with the attributes needed to develop the firms' innovative products. Moreover, both the green coffee and the packaging are assets with low measurement cost, so their quality and attributes are easily verified by buyers (Barzel, 2002).

Another point to be noted is that the relationship between the interviewed roasting firms and their suppliers and customers are impersonal, characterized more by the transfer of ownership of a good or service, encouraged by pricing mechanisms and high flexibility, because one party can easily join other partners on similar terms. These characteristics are typical of the market. Thus, the sharing of resources and knowledge, which would be the more specific assets, is not as valued by many respondents. This corroborates **H2**, given that **the innovation capability would occur more consistently in more complex and plural governance structures**.

The survey also questioned how companies updated their knowledge about the industry. In order of importance, 56% of firms highlighted the common media, such as television, internet, and radio as the main sources of information. In second place came the associations related to the sector, followed by suppliers and the monitoring of the competitors' strategies.

4.3 Interaction between internal and external governance structures

Aiming to relate the interaction between internal and external governance structures, we now analyze the relationship between the two.

Table 6 – Internal and external governance structures – complete solution

Combination	*Raw coverage*	*Unique coverage*	*Consistency*
Incentives * Bureaucratic * Community * ~Vertical packaging * Market packaging * ~Hybrid packaging * ~Vertical coffee * Market coffee * ~Hybrid coffee * ~Vertical client * Market Client * ~Hybrid client	0.295800	0.295800	1.000000

Coverage solution : 0.29580000
Consistency solution: 1.000000

Table 6 presents the most consistent single combination to generate high innovation capability. This combination represents 10% of the total sample and 30% of innovating firms, indicating that**: innovation capability = *f* (monetary incentive + bureaucratic + Community + packaging spot market + green coffee spot market + roasted and ground coffee spot market)**

The **H1** hypothesis is again confirmed, i.e. plural internal governance structures show the most consistent results for innovation. However, when the external governance structures represented by the spot market were added, it is observed that the coverage solution decreased from 0.44 with internal only to 0.2958. That is, the marginal benefit of the combination of internal structures decreases with the presence of external governance structures, indicating that the two structures in this case are not complementary (Rothaermel; Hess, 2007). Thus, **H3 was not confirmed for coffee roasting and grinding firms.**

This result is interesting because it indicates that, for roasting firms, the internal environment is more important for innovation capacity. This may also be related to the behavior of this sector; due to high competition and low trust in relationships, as highlighted in the context of the sector and external item governance structures, firms find it difficult to share information about their production process and products with other members of the chain. This fact can be discerned from another question posed to respondents. Only 11% of respondents say they have some kind of agreement with other organizations to develop new products and production processes—4 respondents have agreements with advertising agencies; 1 with suppliers of sachet; 1 with Universidade Federal de Lavras (UFLA), EMBRAPA, ABIC, EMATER; and the government PESQ program; 1 with Ital; and 1 with a research institute that analyzes their products.

Regarding the partial solution presented in Table 7, the monetary incentive and bureaucratic governance structures are again considered core. Conversely, the structures of community governance, the market for green coffee, and the market for packaging for roast and ground coffee would be peripheral structures.

Table 7 – Internal and external governance structures – partial solution

Combination	*Raw coverage*	*Unique coverage*	*Consistency*
Incentives * Bureaucratic	0.520000	0.520000	1.000000

Coverage solution: 0.520000
Consistency solution: 1.000000

Based on these analyses, the governance structures that must receive greater emphasis from firms are the internal structures, particularly monetary incentives and, at first, bureaucratic structures. Thus, coffee roasting and grinding firms would have to seek: to offer more encouragement to employees, especially regarding innovation issues; to increase the formalization of procedures; and to promote professionalization, both of the family and the employees, combining the above-mentioned practices with the implementation of quality

control programs.

In a second step, the development of community governance structures and a more lasting relationship with suppliers and customers could be interesting mechanisms for bringing new ideas and the possibility of further investments in specific assets that can give a more innovative character to the products being marketed.

Final Thoughts

This study aims to identify the combinations of internal and external governance structures that enable greater innovativeness in small firms. As a theoretical goal, this study seeks to integrate the internal and external governance structures, complementing the approaches developed by Grandori & Furnari and Williamson. Furthermore, it stresses the need for greater integration between the organizational and economic approaches.

The empirical results collected in the coffee roasting and grinding industry show that small firms also offer innovations, many of which are incremental in nature, particularly involving changes in the characteristics of the packaging and with regard to new blends. This empirical evidence is in line with the discussion in the literature that innovation capability is not restricted to a particular size of firm or type of market structure (Rumelt, 1987).

Moreover, the plural internal governance structures are those that influence the innovativeness of firms. This corroborates the theoretical discussion presented, which highlights that the governance structures chosen by firms can be sources of innovation. It is in this sense that firms are protagonists in the realization of this process.

Plural governance structures, combining monetary incentives, bureaucratic, and community practices, presented more consistent results for innovation capacity. This demonstrates that the capacity for innovation is developed in firms with greater flexibility, communication, and incentives to employees, but which also have practices that seek quality in processes and are able to filter new ideas and manage the long process that innovation demands, until the significant new changes generate positive outcomes for the firm.

However, the governance structures that present themselves as a differential for small coffee roasting firms were those of monetary incentives and the bureaucratic, because they stood out as core conditions for innovation. Thus, practices such as pay per performance achieved by employees, performance evaluation of this system, outsourcing, career planning, planning of activities and strategies, and quality process and control can positively influence the capacity for innovation. It is observed that such practices are focused on incentives, staff management, and quality process and control.

In the case of community structure, although small firms present a framework to allow greater contact between employees in order to facilitate the sharing of information, values, and work, these practices are still informal in the firms' routines. In addition, some practices such as the dissemination of decisions and the training of employees occur at a lower level. This can reduce the effect that these practices have on the innovation process, and cause them to become peripheral operations.

However, it is worth mentioning that the studied sector still has a low rate of innovation compared to other sectors, which may reflect the lack of emphasis placed by firms on community governance structures. Thus, although more empirical research on the topic is needed, it can be inferred that these companies' rate of innovation could be improved if they further develop community governance structures.

With regard to external governance structures, these do not appear consistent for the innovation capacity of roasting firms, since they usually have external relations focused on

price incentives and flexibilities achieved by market structures. This situation occurred both with suppliers and customers, demonstrating that vertical interactions have less impact on product innovations. This is due, to a great extent, to the characteristics of the inputs, coffee and packaging. In the case of the former, its quality can be easily observed by simple analysis tests, such as the sensory ones; besides that, there is a significant amount of this product available in the market. As for packaging, we noted that it presents innovations with no great sophistication. Additionally, there are several packaging firms that operate in this market. It is worth also noting that in the case of roasted and ground coffee, the brand is the primary variable of differentiation.

It was also found that the complementarity between the internal and external governance structures for coffee roasting and grinding firms was not significant for their innovation capacity.

These results are important for firms, insofar as they can target their efforts to improve the rate of innovation in the industry and make the companies more competitive in their markets. As a byproduct, the research enables the development of public and private policies to direct the choices of governance structures for these organizations. One such example would be the development of capacity-building and training courses that allow each organization to examine its context and optimally implement the elements of the structures, and thus stimulate greater innovation capacity.

Limitations and future studies

The empirical data analyzed in this study has limitations. Chief among them is that it is a static analysis of governance structures, and that the analysis focuses only on small firms in a single sector. Also, the analysis is not probabilistic, which limits its inference to the sector.

A suggestion for future research would be to expand this study to other sectors and sizes of firms, especially sectors with strong vertical relationships, in order to analyze the interactions among firms that are important to the innovation process. Another contribution could come from the construction of other indicators of innovation, besides the one addressed by our survey (number of brands launched).

Yet another suggestion would be to understand whether the governance structures that enable greater innovation capability are also more efficient in terms of production and transaction costs. That is, whether the improvement in the innovation capability with certain structures would also imply decreased or increased costs for firms.

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[1]These combinations were presented in a 2010 article in which Grandori and Furnari associate the organizational elements and their results (focused on efficiency and innovation) with the situational variables. The two situational variables studied were environmental uncertainty and activity complexity.

[2] Ex-ante costs of collecting and processing information, of negotiation and establishment of guarantees and safeguards, and the ex-post costs of renegotiation, monitoring, and adaptations to unforeseen situations.

[3]This research was funded by the Foundation for Research Support of the State of São Paulo (FAPESP).

[4] See Ragin and Rihoux (2009).

[5] The research adopted five years as an observation period for questions of innovation due to the long life cycle of the product studied can providepresent. This may lead firms to innovate less frequently (OECD, 2005).

[6] ABIC promotes continuous improvement of quality, educating consumers, and encouraging innovation and integration of the supply chain. Important initiatives are the Purity Seal and Quality Seal PQC (Program and Quality Control). About the purity label and its influence on the organization of the industry, please see ABIC Case Study (Saes: Farina, 2007).