

## MANAGEMENT CAPABILITY AND INNOVATION: WHAT IS THE RELATIONSHIP?

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### ABSTRACT

Management capability may be understood as the responsible for coordinating all other capabilities-related activities – development, operations and transaction – and, mostly, for aligning them with the company's strategy. However, management capability lives a paradox between the need to establish operational routines in order to maintain control and, at the same time, deal with dynamic nature of technology and the market, in other words, to innovate. This paper aims to identify the relationship between management capability and innovation. An extensive survey has been conducted with 1331 Brazilian firms from different industrial sectors. Since management capability can be divided into two different models – family and professional –, we identified their characteristics to better understand the relationship between management capability and innovation within companies. The results indicate that professional companies have a more developed set of capabilities, which brings them better performance than to the family companies. However, management capability is not the key factor. While professional companies do not have their innovative performance influenced by interventions on their management activities, improvements on the management activities of family companies promote positive impacts on their performances. The present research sheds light on actions that can improve the innovative performance of the companies.

**Key words:** Management capability; family management; professional management; innovative performance; innovation.

## INTRODUCTION

Management continuously faces a dilemma of stability and change that emerges from the need to organize the firm (Pufal *et al.*, 2015). While a straightforward definition of the essential functions of the firm is to develop, produce and sell specific solutions to the market, management plays a key role in orchestrating resources and capabilities to achieve the desired outcome. In this sense, any company should be understood both as a firm (the economic agent) and as an organization (the coordination effort) divided into four essential capabilities: development, operations, management and transaction capabilities, which must find internal coherence (Zawislak *et al.*, 2012).

Therefore, in order to understand why some firms succeed, it is necessary to explore how management is able to find the right balance of internal capabilities. Innovation, in this setting, is not solely the outcome of technological capabilities, but also, the result of internal managerial decisions on how to allocate resources and capabilities effectively to obtain economic performance.

The challenge for management, however, is that it seems to live in a constant paradox in search of the proper organization to the firm. While one of the purpose of management may be to create systems, techniques and tools that guarantee the essential function of every business is achieved and the 'job gets done', whenever firms are subjected to change due to internal or external factors, management has to step in again to find new levels of efficiency and stability. At the same time, changes are fundamental to ensure competitive advantages to the company and, consequently, positive economic performance (Tsai, 2004; Reichert & Zawislak). When changes lead the company to reach extraordinary profits, we have innovation (Schumpeter, 1911).

How then, management varies in face of this paradox, and what is the influence of management capabilities on the innovative economic performance of different firms?

Firm strategy varies according to industry, size, position in the value chain and market characteristics and, therefore, it is possible to list different models by which the management capability is conducted. One way to classify the management model is according to the type of power relations within organizations (Patel, Cooper, 2014). Considering the company's governance structure, we analyze here the combination of both ownership and structural powers, which can involve family and non-family members (Finkelstein, 1992). Management capability is, thus, divided into two different business models, family management and professional management (Heck, Danes, Fitzgerald, Haynes, Jasper, Schrank, Satfford, & Winter, 2006; Uhlaner, 2006; Hall & Nordqvist, 2008; Zawislak *et al.*, 2013; Pufal *et al.*, 2015).

Companies managed by family members have most of the business capital property owned by that family (Uhlaner, 2006). As other employees and professional managers are integrated to a firm's governance structure, it undergoes the so-called professionalization process (Lodi, 1993). Once it has fully professional management, its governance is under a corporate committee with formal qualification (Hall & Nordqvist, 2008; Sandig *et al.*, 2008).

Considering the importance of management capability in the proper conduct of business processes as well as in coordinating changes that can take it to the range of innovation, the aim of this paper is to *identify the relationship between the management capability and the innovative performance of firms.*

Following this introduction, studies on management, capabilities and innovation are reviewed. Then, we explain the research method. Next, we present and discuss the results of the research. Finally, we present the final remarks and suggestions for future studies.

## **MANAGEMENT CAPABILITY BACKGROUND**

Although management as the 'practice of organizing' has always existed within society, management as consolidated discipline or field of studies comes with the modernization process of society (Weber, 1978) and the modern M-Form organization (Chandler, 1977). Since then, business dynamics have changed gradually, according to technological and social advances, in a way that the concept of the 'invisible hand of the market' (Smith, 1776) faces limits when explaining the economic organization of the firm.

The evolutionary movement that followed the Second Industrial Revolution changed companies' operations from mass production focused on localized markets to production according to expanding market demands. Telecommunications and distribution channels created by railroads allowed firms to exploit mass markets in a completely new level, which required a new organizational form (Chandler, 1977). This movement has greatly increased the role of management in business organization (Lazonick, 1992). Firms went from a 'one best way' to perform given work which, once discovered, would maximize its efficiency and ensure profit (Taylor, 1911), to management intervention in manufacturing production by planning and coordinating their operations through the integration of the entire supply chain. In the words of Chandler (1977), the invisible hand of the market had been replaced by the visible hand of management.

Simon (1947) argues that managers never reach the definition of perfect solutions, since the business organization needs to adapt to changes. With this change in structure, companies had to organize themselves considering the division of labor (Chandler, 1977). In this sense, Management has a key role in reaching for the boundaries of the firm (Penrose, 1959).

As the division of labor and knowledge increases and expands its frontiers, managerial services establish or change the administrative structure of the company, setting general policies whenever necessary. Through management coordination, companies became able to jointly develop their productive capacities of physical and human resources. By increasing management's ability to plan and coordinate the specialized division of labor, an organization with multiple divisions enabled the company to develop its organizational capability to have a wider range of products and to achieve more distant markets (Lazonick, 1992). In that sense, companies must develop management systems for the functions of coordinating and ensuring identity and legitimacy (Beer, 1981).

Management capabilities emerge from the natural need of the business firm to achieve organization. Management are responsible for the matching and constantly fine-tuning between internal resources and goals with the external market environment and expectations. Successful innovative performance is achieved as management is able to find the right matching between the firm and its organization. This requires complementary capabilities.

### **The Firm, the Organization and Innovation Capabilities**

A company is an existing technological set of products and process transformed by internal and external business activities (Pufal *et al.*, 2015). Any company is both a firm (an economic agent) and

an organization (a governance structure). Moreover, it is an agent of knowledge with external economic value, and a coordination effort of internal resources and capabilities to allow that value is actually captured. From that point of view, a company is the result of four essential capabilities: development, operations, management and transactions (Zawislak et al., 2012, 2013).

In 1972, Richardson coined the concept of capabilities as knowledge, experience and business skills of the firms. Nelson and Winter (1982) understand that being capable means to gather the necessary requirements for the execution of routines. Routines therefore constitute the building blocks of capabilities (Dosi, Nelson, & Winter, 2000) and thus, knowledge, experience and skill are only valuable once they can actually be applied into the firms' routines (Alves, Zen, & Padula, 2011). Nonetheless, routines lose value overtime because of market forces and environmental selection. In this sense, innovation is a cost of simply staying the market (Kline, Rosenberg, 1986). The need to constantly seek new ways to deliver value derives precisely from the quest for competitive advantage.

However, as much as a company is an agent of applied knowledge (technology) with economic value, it is also a coordination effort followed by an organization or governance structure, which must be efficient and reduce transactions costs (Coase, 1937; Williamson, 1985). The firm must change overtime, in other words, must innovate in order to perpetuate itself – and the organization must follow.

Innovation is the stimulus for economic development (Schumpeter, 1911, 1942). It relates to "new products, new methods of production or transportation, new markets and new forms of industrial organization" (Schumpeter, 1942: 83). In this context, Bessant, Lamming, Noke, & Phillips (2005) present innovation as the fundamental process of renewal in the organization.

The literature on innovation agrees that, to be innovative, companies must establish a set of complementary capabilities (Burgelman, 1994; Christensen, 1995; Guan & Ma, 2003; Yam, Lo, Tang, & Lau, 2011). Zawislak et al. (2012) argue that innovation capabilities are specific capabilities that the company creates and strategically uses to identify market gaps to be filled with new value offers.

In this context, Zawislak *et al.* (2012, 2013, 2014) present an innovation capabilities model, divided into two drivers: technological and business (Figure 1), which lead the company to an innovative performance. The first driver is the accumulated experience of the company in technical changes and production processes, referring respectively to the development capability and the operations capability. The second driver denotes the set of organizational and transactional routines, referring, respectively, to the management capability and the transaction capability.

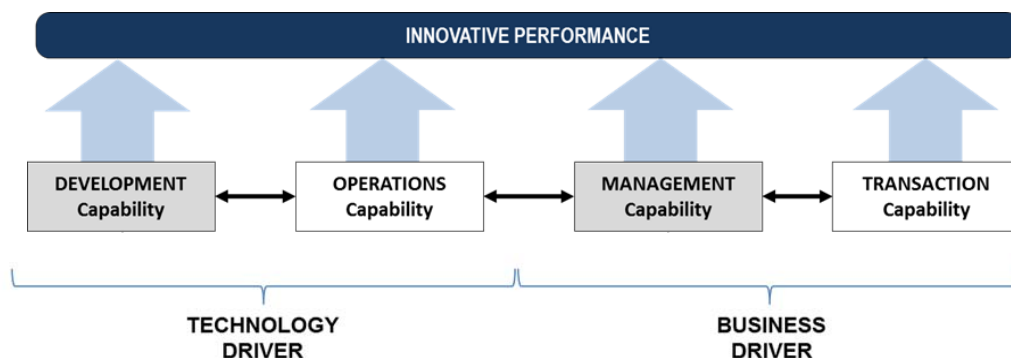


Figure 1: Innovation capability of the firm, Source: Adapted from Zawislak et al. (2012, 2013, 2014)

Contrary to the idea that innovation arises solely from products and processes, the authors argue that both technological capabilities - development and operations - are not enough to ensure high performance in a competitive market. The business driver capabilities - management and transaction - are the elements that finally provide the company with the appearance of an organized innovative firm (Zawislak et al., 2013).

While the transaction capability is responsible for decoding the signals of the market and minimizing transaction costs, management capability gives rise to a specific architecture that enables the integration of all areas, seeking efficiency and stability, and thus improving the performance of the firm (Zawislak *et al.*, 2013). According to Whitley (1989), management capability allows firms to find their way and their competitive attribute, combining continuity with innovation.

### **Paradox of the Organized Firm: Coping with Stability and Innovation**

The main goal of any company is to be economically feasible by obtaining positive results. While routines, procedures and stability may be desirable for effective coordination, changes are constant, technology never reaches its limit and novelties are inherent to the economic activity, therefore, achieving perfect efficiency and stability is impossible. At the same time, changes are fundamental for firm competitiveness and positive economic performance (Tsai, 2004; Reichert & Zawislak, 2014).

For Schumpeter (1934), innovations emerge when the economic agent discovers new combinations of factors to produce solutions that, once transacted in the market, bring extraordinary profits to the innovator. When other competitors learn and develop similar projects or even equal, the profit becomes widespread, emerging, then, the need for further innovation. When companies effectively use their knowledge to respond to a society that faces increasing challenges, they are working to achieve positive economic performance (Reichert & Zawislak, 2014).

Innovation has two main expressions associated to it, 'change' and 'profits'. Based on Schumpeterian extraordinary profits, an invention may only be considered innovation once it has been accepted in the market and generated profits to the firm. How may a firm go through all environmental and internal changes and still succeed?

Management is necessary to mitigate uncertainties and deal with this dynamic environment (Langlois, 2003). Penrose (1959) have already pointed out that the company is more than a simple administrative unit; it is also the collection of productive resources, on which management's decisions reflect. But what does management need to be able to do it? What does a company need to achieve positive performance? Capabilities may explain why there are performance differences across firms (Madhok, 2002).

The essential role of management is to define how the company can use its resources more efficiently and anticipate shortages (Lazonick, 1992). Management capability refers therefore to the ability that the company has to gather, integrate, coordinate and allocate a set of resources, to meet the requirements of consumers (Whitley, 1989; Lahiri & Kedia, 2009; Lahiri, Kedia, & Mukherjee, 2012).

Desarbo, Benedetto, Song and Sinha (2005) argue that companies that present developed management capability can integrate and support a set of skills related to logistics, marketing, cost control, human and financial resources, and therefore anticipate revenue and profitability. To deal with varied and frequent unforeseen circumstances, the management capability needs a wide range

of skills that can be easily applied to solve problems (Langlois, 2003). Similarly, Zawislak *et al.* (2012, 2013, 2014) understand that management capability is related to skills, knowledge, experience and routines that the company uses to efficiently coordinate other firm capabilities - development, operations and transaction.

Management capability represents to the company's structure what the transaction capability represents to the market relations of the company Zawislak *et al.* (2014). According to them, management capability is always seeking to reduce firm internal friction. By doing so, companies are able to achieve the three main objectives of any business: profitability, growth and perpetuity.

In this sense, it is suggested that there is a relationship between management capability and the innovative performance of firms. The changing nature of various factors of economic activity leads management to face a paradox of stability and change in order to achieve economic performance (Pufal *et al.*, 2015). The way management finds to deal with the aforementioned dilemma necessarily determines future success or failure.

### **Balancing the Equation and Patterns of Management**

The fact that companies need to constantly adapt the use of their resources in order to meet the requirements of a market in constant transition (Whitley, 1989) creates a challenge for the management capability: dealing with stability and change to restore the balance of the company. For Schumpeter (1911), the neoclassical notion of balance, based on the circular flow, would only be true as the ideal state of a non-evolutionary economic system. It is therefore the optimal scenario where efficiency and routines would be adequately established by rules and management procedures, having technology reached its apex. If this not evolutionary, perfectly standardized and stable state was possible, all problems would be solved and the management would no longer be necessary. However, as long as there are changes, either as a result of the development process, or because of external events, the balance of the company is disturbed and activates regulatory mechanisms (Heck *et al.*, 2006).

The management must therefore deal with the limits of the company, which are constantly expanding (Penrose, 1959). As the company internalizes an extra unit of knowledge and technology as a way to deal with change, the management capability has to restart the search for a new standard of efficiency and stability. According to Baecker (2006), the business of a company consists in its efforts to produce profitably as well as in its attempts to reproduce itself.

The goal of management capability lies beyond the simple planning and control; its key role is to handle the paradox of stability and change in order to allow innovation (Pufal *et al.*, 2015). It does not mean that management necessarily leads to innovation. According to Pufal *et al.* (2015), management itself does not have sufficient technical knowledge to support the firm. However, whenever innovation occurs, management needs to arrange a new way to allocate resources, which may lead to organizational innovation (Pufal *et al.*, 2015). That is, as the internal and external conditions change to the company, management must seek new ways of achieving efficiency and stability again.

The literature divides the exercise of management capability into two different models that can be found in businesses, family and professional (Heck *et al.*, 2006; Hall & Nordqvist, 2008; Uhlaner, 2006; Zawislak *et al.*, 2013; Pufal *et al.*, 2015).

A family model company has, regardless of size, industry or legal structure, most of the business capital property owned by a family (Uhlener, 2006). The family model has the decision making process centralized in the family owners; informal norms and procedures; definition of business' strategy through informal meetings; financial control carried out by one or more owning members; development based on tacit knowledge transmitted by generations; and allocation of resources according to customer specification (Heck et al., 2006; Uhlener, 2006; Pufal et al., 2015.).

Lopez (1999) also states that a family business is characterized by the desire of its founders and successors that the property and the management remain in the family's hands. The company undergoes the professionalization process when employed and salaried managers are integrated to the governance structure (Lodi, 1993). The professionalization of a company is the process in which a family organization assumes more rational, modern and less customized administrative practices; it is the replacement of intuitive methods by rational methods (Lodi, 1993).

Conversely, a professional model company has its governance centered on a board of directors with formal qualification. The professional model is characterized by decentralization of functions, with defined hierarchical levels and formal governance mechanisms. It also has formalization of rules and procedures; strategic planning that guides the decisions of the corporate committee; specific department of financial control; strategies development aiming at the company's growth; quantitative control systems which aid decisions in a rational and objective manner; and development and allocation of resources according to specific internal departments (Hall & Nordqvist, 2008; Sandig et al., 2008; Pufal et al., 2015).

These two different management models will be relevant to the analyses of the research data, because they will guide the relations to be established between management capability and the innovative performance of the firms.

## RESEARCH METHOD

To verify the relationship between management capability and innovative performance a survey study was conducted with 1331 companies with more than five employees randomly selected from a database (FIERGS, 2010) containing 10930 Brazilian manufacturing companies.

Data were collected through a questionnaire containing different measurement types and scales: simple multiple choice, Likert-type scale from 1 (strongly disagree) to 5 (strongly agree) and open questions. The questionnaire is divided into three parts with questions related to (i) the four innovation capabilities; (ii) the firm performance and (iii) general information. Table 1 presents how many companies from the sample belong to which sector.

*Table 1: Analyzed companies grouped by sectors*

Sectors	Amount of companies	% of the total surveyed
Metal Products	171	12.8%
Machinery & Equipment	159	11.9%
Footwear and Leather	133	10.0%
Food	120	9%

Furniture	110	8.3%
Plastic and Rubber	106	8.0%
Textile Products	92	6.9%
Automotive	58	4.4%
Wood	52	3.9%
Nonmetal Products	50	3.8%
Chemicals	49	3.7%
Other manufacturing Products	36	2.7%
Electric	34	2.6%
Pulp and Paper	32	2.4%
Metallurgy	29	2.2%
Printing	23	1.7%
Electronics	18	1.4%
Textiles	15	1.1%
Machinery Maintenance	12	0.9%
Beverage	10	0.8%
Tobacco	7	0.5%
Transportation Equipment	6	0.5%
Petroleum Refining	2	0.2%
Pharmaceuticals	1	0.1%
Missing	6	0.5%
<b>Total</b>	<b>1331</b>	<b>100%</b>

Data analysis was carried out in three steps, involving the three parts of the survey instrument . First, considering that management capability can be divided into two different models – family and professional –, we aimed at identifying the characteristics of each one of them through descriptive analysis. Descriptive studies can provide a description of elements at a given point in time by cross-sectional data, which are statistically summarized (Hair et al., 2003).

Second, based on the existence of two management models, we used the t-test with confidence interval (CI) of 95% to evaluate statistical differences between their averages, as suggested by Hair et al. (2003).

Finally, to understand the relationship between management capability and innovation within companies, we used Pearson Correlation. The correlation coefficient measures the strength of the relationship between variables (Pestana & Gageiro, 2003). It ranges from -1.00 to +1.00, and zero represents absolutely no association between the two metrics variables (Hair et al., 2005). For Hair et al. (2005), this strength of association is divided into five levels: mild, almost imperceptible (0.01



to 0.20); small (0.21 to 0.40); moderate (0.41 to 0.70); high (0.71 to 0.90) and very strong (0.91 to 1). These levels were considered to identify the intensity of relationships among the questions.

Based on the three methodological steps, it was possible to characterize both family and professional management models. In addition to differences in their characteristics, the two models also present different relationships regarding firm performance. The results are described and analyzed in the following sections.

## RESULT ANALYSIS

From the 1,331 respondents to the questionnaire, 1327 answers were considered valid, based on the question about the management model. From these 1327 companies, 865 feature the family management model and 462 present the professional management model.

### Characteristics of Family and Professional Management Models

There are three special concepts in the questionnaire related to the management capability: decision making, most recent improvements and management main focus. Decision making is directly related to the strategy of the companies, since the latter refers to the pattern of decisions that guide the policies and actions for the company achieves its goals (Andrews, 1997). Strategy is the continuous and systematic process of defining priorities (Drucker, 1946). From this perspective, in order to check consistency between the management processes, we also examined the focus of management capability and the improvements made. Table 2 shows the comparison between the answers according to each model.

Table 2: Questions related to management capability

QUESTIONS			
MANAGEMENT MODEL	Decision making is based on:	The most recent improvements related to management have occurred in:	The main focus of management is:
FAMILY	Tradition (35.7%)	The administrative infrastructure (43%)	Continuous improvement (48%)
	Recent performance (35.4%)	The systems, techniques and tools used (29%)	Cost reductions (17.7%)
	Information provided by customers (15.4%)	The corporate strategy (14.2%)	Efficiency gains (17.7%)
	Information obtained by observing competitors (2.4%)	The organizational chart (5.8%)	Achieving aims and goals (12.6%)
	New internally developed knowledge (9.2%)	The salary and staff structure (4.8%)	Integrating the areas (0.9%)
	Information obtained	The board of directors and management	Investing in changes (3,1%)

QUESTIONS			
	from suppliers (1.9%)	(3.2%)	
<b>PROFESSIONAL</b>	<p>Recent performance (33%)</p> <p>Tradition (24.4%)</p> <p>Information provided by customers (24.4%)</p> <p>Information obtained by observing competitors (2.2%)</p> <p>New internally developed knowledge (14.6%)</p> <p>Information obtained from suppliers (1.4%)</p>	<p>The systems, techniques and tools (29.7%)</p> <p>The corporative strategy (26.6%)</p> <p>The organizational chart (10.8%)</p> <p>The salary and staff structure (6.5%)</p> <p>The board of directors and management (5.1%)</p> <p>The administrative infrastructure (21.3%)</p>	<p>Continuous improvement (39.2%)</p> <p>Cost reductions (19%)</p> <p>Efficiency gains (24.7%)</p> <p>Achieving aims and goals (10.7%)</p> <p>Integrating the areas (2.7%)</p> <p>Investing in changes (3.7%)</p>

Before entering a discussion on the differences between the two models of management, it is relevant to make some considerations on their similarities. With reference to 'decision making', a large part of the sample (65,8% of the total sample) are based on recent performance and tradition. Another 18,4% based on information that has been provided by clients. This implies that, management decisions are highly related to routine 'day-to-day' activities and the maintenance of current patterns of activities and not in formal planning.

As evolutionary agents, firms attempt to reduce uncertainty though stabilizing routines. Change, according to the sample comes mostly from a reaction to customers' request rather from an internal process of deliberated decision to change. The increasing use of Systems, Techniques and tools and the reorganization of Administrative Infrastructure reflects this search to new and modern ways to stabilize and control the system. However, when companies were asked about what is the main role of management, 64,5% of the sample replied continuous improvement (44,5%) and efficiency gains (20%). These patterns of reply could be read as contradictory, nonetheless, they express the continuous paradox lived by management between the search for stability and the imperative of change. Change is inherent to any economic activity and firms must accompany as the process of natural selection (Nelson & Winter, 1982; Dosi, 1982). While management seeks some degree of maintenance of current routines, management capability also serves as a 'cushion' to buffer uncertainty (Langlois, 2003) when change comes, easing the transition to a new level.

Moving to the differences between types of management. In family companies, decision making is largely conditioned to tradition, whereas in professional companies, is the recent performance history that guides it. The latest improvements related to management, in family companies,

occurred with regard to administrative infrastructure. In professional companies, on the other hand, improvements have focused mainly on systems, management techniques and tools.

These differences reflect the characteristics of each management model. While family companies seek to improve their physical infrastructure, adapting it to the routines of the firm, professional companies focus on improving the organization. Improvements in systems, techniques and tools are related to the use of control systems to guide decision making more rational and objectively (Hall & Nordqvist, 2008). Based on a planned coordination, aligned with the company's strategy, guiding thus its decisions, the company is more capable to better achieve resource allocation levels and to predict the occurrence of scarcity (Lazonick, 1992).

In both models of management, the main focus of this capability is continuous improvement. The constant development of management capability allows companies to extend their range of skills, which are applied in problems solving, and to run their processes efficiently.

In order to deepen the characterization of the management models, the characteristics of development, operations and transaction capabilities of companies of each model were also analyzed. Table 3 shows the answers related to these capabilities according to the management model.

Table 3: Questions related to the development, operations and transaction capabilities

QUESTIONS							
	DEVELOPMENT		OPERATIONS		TRANSACTION		
<b>MANAGEMENT MODEL</b>	What triggers the development?	How does the development process occur?	Production is programmed according to:	The most recent improvements in production were in:	Which distribution channel is more used?	How is the price determined?	Where do the main changes related to the commercial area occur?
<b>FAMILY</b>	Customer requests (37.3%)	Constantly, by specialized staff exclusively dedicated to that activity (48.7%)	The installed capacity (45.1%)	Machinery and equipment (41.6%)	Direct sales to other industrial companies (37.2%)	Costs (83.7%)	Customer service (40.5%)
<b>PROFESSIONAL</b>	Customer requests (39.2%)	Constantly, by specialized staff exclusively dedicated to this activity (32.8%)	The orders placed (41.9%)	Processes (39.3%)	Direct sales to other industrial companies (46%)	Costs (76.9%)	Negotiation (40.4)

Regarding the development capability in both models, the development of new products is based on customer's requests. Likewise, the development is continuously carried out in both cases by specialized personnel exclusively dedicated to this task. These similarities on the two different models may be justified by the fact that these companies operate in an industrial sector, which institutionally requires them to stipulate development procedures based on customer's specifications and with specialized technicians.

We emphasize the link between the focus of the improvements in the operations capability of each management model and how the production is coordinated. Family companies, by determining their production processes based on installed capacity, turn out to precisely focus on improvements in machinery and equipment in order to gain in efficiency. Professional companies figure in other level. Having a physical structure already suited to their production system, they focus, then, on improving processes in order to efficiently produce according to the placed orders.

Regarding the transaction capability, the most used distribution channel by both family and professional companies is the direct sales to other manufacturing companies. Not surprisingly, the prices of family and professional companies are defined according to their costs. Regarding the main changes related to the commercial area, in family companies, they occur with greater intensity in customer service, while in the professionals, they happen in the negotiations.

Based on the characteristics of these three capabilities of family and professional companies, it is possible to see that, although they are structured in a similar way regarding development and transaction, it is in operations that they differ greatly. The fact that both have direct sales to other manufacturing companies as the main distribution channel reflects their development process based on customers' request. Thus, it can be suggested that this fact is due to the industrial dynamics in which these companies operate. To better understand the differences between the levels of capabilities and performance in the family and professional management models, we present, next, the means comparison of the two models.

### **Comparison between Family and Professional Management Models**

The t-test indicated that there are significant differences in mean (less than 0.05, with a 95% confidence level) between family and professional management models.

We compared means of the four innovation capabilities (development, operations, management and transaction), of the firm performance, and of information related to research and development (R&D) intensity, which are relevant to identify the influence of management in firm innovative performance.

Lazonick (1992) states that the more professional the company, the greater the level of organization it presents; an organization based on formal processes and strategic planning. Since professional management models exist in more structured firms, we expect to find different levels of innovation capabilities between professional and family management models.

Table 4 details the Likert-type scale questions of each capability, presenting the means in each management model.

Table 4: Mean comparison (t-test\*) between professional and family management models based on each innovation capability

CAPAB.	QUESTIONS	MANAGEMENT MODEL	N	Mean	Std. Deviation	Std. Error Mean
DEVELOPMENT	Designs its own products	FAMILY	863	3.63	1.115	.038
		PROFESSIONAL	462	3.87	1.014	.047
	Monitors the latest technological trends in the sector	FAMILY	858	3.70	.931	.032
		PROFESSIONAL	458	4.15	.881	.041
	Uses formal project management methods (Stage-gate, PMBOK, Innovation Funnel)	FAMILY	861	3.13	1.136	.039
		PROFESSIONAL	459	3.62	1.032	.048
	Adapts the technologies in use to its own needs	FAMILY	852	3.68	.854	.029
		PROFESSIONAL	455	4.01	.824	.039
Prototypes its own products	FAMILY	863	3.45	1.332	.045	
	PROFESSIONAL	460	3.92	1.155	.054	
Launches its own products	FAMILY	860	3.65	1.360	.046	
	PROFESSIONAL	457	3.96	1.266	.059	
OPERATIONS	Formalizes the PPC procedures	FAMILY	860	3.38	1.040	.035
		PROFESSIONAL	460	3.84	1.014	.047
	Keeps statistical control of the process	FAMILY	861	3.69	.912	.031
		PROFESSIONAL	461	4.03	.961	.045
	Uses leading edge technology in the sector	FAMILY	858	3.61	.855	.029
		PROFESSIONAL	461	3.99	.802	.037
	Maintains adequate stock levels of materials for the process	FAMILY	861	3.97	.816	.028
		PROFESSIONAL	459	4.19	.840	.039
	Carries out the productive process as programmed	FAMILY	860	3.93	.739	.025
		PROFESSIONAL	459	4.17	.712	.033
	Establishes a productive routine that does not generate rework	FAMILY	858	3.90	.761	.026
		PROFESSIONAL	459	4.09	.717	.033
Delivers the product promptly	FAMILY	856	3.91	.800	.027	
	PROFESSIONAL	460	4.11	.841	.039	
Manages to expand the installed capacity whenever necessary	FAMILY	862	3.76	.895	.030	
	PROFESSIONAL	460	4.05	.837	.039	
Manages to ensure the process does not lead to products being returned	FAMILY	852	4.10	.661	.023	
	PROFESSIONAL	459	4.21	.678	.032	
MANAGEMENT	Formally defines its strategic objectives	FAMILY	857	3.66	.918	.031
		PROFESSIONAL	460	3.94	.881	.041
	Uses technology to integrate all its sectors	FAMILY	858	3.25	1.047	.036
		PROFESSIONAL	459	3.71	.923	.043
	Standardizes and documents the work procedures	FAMILY	858	3.61	.832	.028
		PROFESSIONAL	459	4.00	.756	.035
	Updates its management tools and techniques	FAMILY	858	3.54	.889	.030
		PROFESSIONAL	461	3.89	.817	.038
Maintains the personnel adequately trained for the company functions	FAMILY	859	3.88	.831	.028	
	PROFESSIONAL	460	4.11	.801	.037	
Uses modern financial management practices	FAMILY	856	3.64	.876	.030	
	PROFESSIONAL	455	3.94	.856	.040	
TRANSACTION	Conducts formal research to monitor the market	FAMILY	860	3.09	1.197	.041
		PROFESSIONAL	456	3.45	1.178	.055
	Imposes its negotiating terms on its customers	FAMILY	862	3.36	.956	.033
		PROFESSIONAL	461	3.54	.922	.043
Conducts research to measure its customers' satisfaction	FAMILY	863	3.25	1.117	.038	
	PROFESSIONAL	460	3.49	1.133	.053	

CAPAB.	QUESTIONS	MANAGEMENT MODEL	N	Mean	Std. Deviation	Std. Error Mean
	Uses formal criteria to select its suppliers	FAMILY	859	3.65	.930	.032
		PROFESSIONAL	455	3.79	.949	.044

\* $p < 0.05$

Regarding the development capability, professional companies are more likely to perform prototyping, original design and launch of its products. Even though in both models the development of new products is based on customers' requests, professional companies have more developed processes for their creation. In parallel, higher scores on the ability to adapt technologies in use according to firm needs, as well as to formalize the project management, show that professional companies deal with more complex processes in its development capability than the family ones.

Related to this increased complexity of the development capability of professional companies is the occurrence of higher mean also in the standardization and documentation of the different working procedures of these companies. As expected, as companies professionalize their management models, the administrative practices become more rational, modern and less personalized (Lodi, 2003; Hall & Nordqvist, 2008; Sandig et al., 2008; Pufal et al., 2015). Professional companies have higher means related to the integration of sectors through the computer, the use of modern financial management practices, as well as the updating of technical and management tools. In order to ensure an adequate level of training of hand labor in their different sectors, professional companies provide more training to their staff than family companies.

Companies have greater organization and planning of production processes, through a higher control of production, planning and control (PPC) procedures, the maintenance of statistical control and the establishment of productive routines that avoid rework. In other words, it is extremely important that management establish routines to be followed by employees in order to prevent the transfer of obligations in terms of design for the execution of tasks. By doing so, management avoids inappropriate interventions in the production process and is able to anticipate and mitigate uncertainties, to, whenever necessary, deals with change (Langlois, 2003).

Transaction capability is superior in the professional management model. Companies of both management models sell directly to other companies of industries, defining their prices according to their costs. However, as a result of descriptive analysis, it was observed that the most recent changes in family companies were in customer services, while in professional companies they occurred in negotiation. In accordance to these results, the highest mean of professional companies at the ability to impose trading conditions to customers, and the use of formal criteria of supplier selection, show the superiority of the transaction capability of professional companies compared to family companies.

After analyzing differences in the arrangement of the four capabilities level, we examined whether the application of knowledge of the companies brought them positive economic performance, as suggested by the literature (Reichert & Zawislak, 2013). Table 5 details the Likert-type scale questions on firm performance, highlighting the means of each management model.

Table 5: Mean comparison (t-test\*) between professional and family management models based on firm performance

QUESTIONS	MANAGEMENT MODEL	N	Mean	Std. Deviation	Std. Error Mean
The net profit has grown continuously over the last 3 years	FAMILY	863	3.35	.958	.033
	PROFESSIONAL	460	3.55	.924	.043
The company's market share has continuously grown over the last 3 years	FAMILY	861	3.57	.861	.029
	PROFESSIONAL	458	3.72	.909	.042
The company's revenue has continuously grown over the last 3 years	FAMILY	861	3.43	.863	.029
	PROFESSIONAL	459	3.69	.878	.041

\* $p < 0.05$

Both family and professional companies showed an increasing economic performance in the last three years, from 2011 to 2013. It can be seen, therefore, that the application of knowledge of these companies, in both management models and in distinctly organized structures, has conferred them increase in revenues, net profit and market share. Alike the previous presented answers, the means related to economic performance were higher in professional companies than in family businesses.

Table 6 presents two open questions relating to traditional innovation indicators. The importance of analyzing the investment in research and development (R&D) and the representativeness in the revenue of new products launched stems from the fact that these are related to what Schumpeter (1911, 1942) considers the drivers of innovation.

These questions are described on Table 6, along with the means of each management model, to complement the analysis of the performance of the surveyed companies.

Table 6: Mean comparison (t-test\*) with general information, according to the management model

QUESTIONS	MANAGEMENT MODEL	N	Mean	Std. Deviation	Std. Error Mean
What percentage of your company's gross revenue is invested in research and development (R&D) in the company's gross revenue?	FAMILY	839	3.74	7.119	.246
	PROFESSIONAL	429	4.65	5.181	.250
What percentage of the revenue came from new products launched in 2013?	FAMILY	816	10.69	28.983	1.015
	PROFESSIONAL	412	16.64	19.789	.975

\* $p < 0.05$

Innovation emerges when the economic agent, in the figure of the entrepreneur or a specific organizational unit, such as the R&D department, discovers new combinations of production factors that, once the market, bring extraordinary profits to the innovator (Schumpeter, 1934). Thus, the

highest means of professional companies on both questions, as well as on questions related to performance, raise the idea that there is a greater trend to innovation in this type of management model. As the owner is replaced by a R&D department, decisions become fragmented in different managerial functions of the company, influencing also the product development. From the formalization of this activity through specific department, professional companies incorporate innovation processes into their routine. Meanwhile, in family companies, innovation arises as a result of external intervention, for example, customers' requests, or also by changes in processes, which result in firm positive performance.

Once we identified the characteristics of management capability in each management model as well as the differences between them; we evaluate the relationship of management capability and firm innovative performance.

### The Relationship between Management Capability and Innovative Performance

We sought to observe the existence of a relationship between the management capability models and the innovative performance of companies. As shown on Table 7, the management capability of both family and professional companies are positively related to firm performance with a range from mild to small associations. For analysis purposes, small relations are highlighted in bold. In general, the family-run companies have a higher relationship of their management activities and their performance than the professional companies.

Table 7: Correlation between management capability of family and professional management models and performance

		MANAGEMENT CAPABILITY					
		Formally defines its strategic objectives	Uses technology to integrate all its sectors	Standardizes and documents the work procedures	Updates its management tools and techniques	Maintains the personnel adequately trained for the company functions	Uses modern financial management practices
PERFORMANCE		FAMILY					
The net profit has grown continuously over the last 3 years	<b>Pearson Correlation*</b>	<b>0.28</b>	<b>0.30</b>	<b>0.23</b>	<b>0.3</b>	0.14	<b>0.29</b>
	N	856	856	856	856	857	854
The company's market share has continuously grown over the last 3 years	<b>Pearson Correlation*</b>	<b>0.30</b>	<b>0.27</b>	<b>0.22</b>	<b>0.34</b>	<b>0.22</b>	<b>0.37</b>
	N	853	854	854	854	855	852



The company's revenue has continuously grown over the last 3 years	<b>Pearson Correlation*</b>	<b>0.28</b>	<b>0.32</b>	<b>0.25</b>	<b>0.35</b>	0.185	<b>0.34</b>
	N	853	854	854	854	855	852
<b>PERFORMANCE</b>		<b>PROFESSIONAL</b>					
The net profit has grown continuously over the last 3 years	<b>Pearson Correlation*</b>	<b>0.21</b>	0.11	0.12	0.17	0.20	0.15
	N	458	457	457	459	458	453
The company's market share has continuously grown over the last 3 years	<b>Pearson Correlation*</b>	0.20	0.14	0.19	0.20	0.12	0.17
	N	456	455	455	457	456	451
The company's revenue has continuously grown over the last 3 years	<b>Pearson Correlation*</b>	0.19	0.15	0.14	0.17	0.12	0.16
	N	457	456	456	458	457	452

\*  $p < 0.05$

Except for the positive, small and significant relationship between the formal definition of strategic objectives and the net profit growth, professional companies showed positive, significant, yet mild relations, almost imperceptible, between all other management activities and performance. Family companies, however, presented positive, significant and small relationships between all their business activities and performance, except in terms of personnel training.

The results suggest that companies with professional management, due to their more developed level of capabilities, have already attained full adequacy of organization and regulation, in which interventions in their management activities do not cause significant impacts on performance. In family businesses, on the other hand, as the level of capabilities is lower, increases in management activities positively influence their performance.

One possible conclusion of these results is that, as firms go through their evolutionary path by learning and acquiring new capabilities, thus, expanding their boundaries, they professionalize and are able to stabilize certain routines. With relatively stable routines, like in an airplane in a cruise mode, management's role becomes to set the right coordinates and, eventually, corrects alignment and direction whenever the firm faces some kind of turbulence. Even innovation becomes part of the routine (Schumpeter, 1942). The paradox of stability and change are dealt with in a smoother manner.

Family business (on this sample), on the other hand, due to a lesser level of capabilities and even the nature of family owned businesses and their own peculiarities and (why not say, internal conflicts) face a higher level of uncertainty which requires management capability to keep buffering more unpredictable circumstances to keep the firm on the right track. Like a car on a bumpy road, family businesses require attention of the driver at all times.

## **DISCUSSION**

To be competitive, companies must pursue innovation in order to remain on the market (Kline & Rosenberg, 1986). Therefore, it is necessary to constantly seek new ways to deliver value. The positive answers of family and professional companies regarding the monitoring of market trends, the processes updates, as well as the resources spent on research and development show their concern with novelties.

But simply achieving innovation is not enough. It is essential that the company handles changes that arise concurrently, whether in their development, operations, management or transaction capabilities - or even in more than one. In that sense, management, be it family or professional, must be properly structured for efficient progress of the company's dynamic. Management must create conditions for systemic change without losing the capacity to coordinate and reach for the expanding boundaries of the firm.

It was verified that the firms' capabilities of family and professional management models have similar characteristics related to new products development, product distribution channel, price setting and the focus of management. However, these and other issues are worked with different intensities between family and professional businesses. Professional companies had higher averages in all answers in the Likert-type scale questions, emphasizing the superiority of the capabilities level of professional companies compared with the family ones.

In this sense, the means difference between the two management models show the consequences of the professionalization of business structure presented by Lodi (1993). When there is a higher incidence of formalized and documented processes, planned objectives and structured routines, companies become closer to what the author calls as the replacement of intuitive methods by rational methods.

By a larger division of labor, through different hierarchical functions and different departments, professional companies require a higher level of management to coordinate activities. Consequently, they develop their organizational capacity, which allows them to expand the focus of their activities, increasing the volume and scope of product offering.

Although in both models of management, the development of new products is according to customers' requests, professional companies have more developed processes for their creation. The fact that they have greater capacity to adapt technologies in use according to their needs and formalize project management demonstrates that professional companies deal with more complex processes in their development capability.

This greater complexity of development capability of professional firms is related to the greater standardization and documentation of the different working procedures of these companies. In addition, to ensure an adequate level of training of hand labor in their different sectors, professional

companies provide more training to their staff than family businesses. The higher the level of development that the company works, the greater the need to formalize their production processes.

The dynamic of professional companies supports the idea that in order to enable profit to the company, management should focus on efficiency and stability. However, to grow and perpetuate, the company must develop new solutions and enhance its borders, so that the management must then find a new level of efficiency and stability.

Higher investments of professional companies in R&D, compared to family companies, raise the idea that, in those, there is a greater trend to innovation. From the greater formalization of R&D activities through specific department, professional businesses incorporate innovation processes into their routine. Meanwhile, in family businesses, innovations arise as a result of external interventions, which culminate in positive results for the company.

As previously discussed, professional management companies have a higher level of capabilities than the family companies. However, this fact does not extend to the relationship between the management capability and the innovative performance. The establishment of relations between the management capability from the perspective of the family companies and their performance was significantly positive, with small relationships. So, we conclude that, in fact, the management capability influences the innovative performance of the family business. On the other hand, the analysis of management capability from the perspective of professional companies, which presented almost imperceptible relationships, shows that their innovative performance is not primarily influenced by the management capability.

Professional companies, having reached a level of organization and appropriate regulation to their processes, do not have their performance impacted by interventions in their management activities. In family businesses, where capabilities' level is lower, increases in management activities - especially regarding the formal definition of strategic objectives, the integration of sectors through informatics, the standardization of work procedures, the use of modern management techniques and modern financial management practices - promote more positive reactions in their performances.

That said, we conclude that the marginal benefit of management capability on family company's performance is higher than on a professional company. Professional companies present arrangements of more developed capabilities that give them higher performance than family businesses; however, management capability is not a determining factor for that to happen

## **FINAL REMARKS**

This study aimed at identifying the relationship between management capability and firm innovative performance. The results indicate that professional companies present more developed levels of capabilities, compared to family businesses. Consequently, they present a more structured organizational capability through formalized procedures, defined hierarchies and more consolidated development activities into formal departments. According to Weber (1978), the larger the organization, the greater the bureaucracy it involves. This fact is precisely illustrated by the dynamic of companies with the professional management model.

Despite having more developed capabilities, professional companies have less influence of their management capability on the innovative performance. That is, increases in the management capability shall affect more the innovative performance of family businesses.

Based on the results of this study, possibilities of future studies and actions to be put into practice emerge. Identifying the existence of relationship between technological content and organizational capability from the perspective of family and professional management models appears as a study opportunity to be exploited. Regarding practical actions, the identification of the management capability activities that have greater influence on family companies' performances can guide restructuration of this type of company. Thus, managers of family businesses should pay attention to issues related to formal definition of strategic objectives, integration of sectors through informatics, standardization of work procedures, use of modern management techniques and modern financial management practices.

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