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EMPIRICAL ARTICLES

Study on the characteristics of top managers and strategic options in different industries over a time period

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Abstract This research examines the effect of the characteristics of top managers on the strategic options of firms in different industries. The sample consists of 191 medium-sized industrial firms in the following industries: food, textiles and clothing, chemicals and plastics, and metallurgy and metallomechanics. Data refer to the beginning and end of the 1990s. The study was developed using upper echelon theory and demonstrates the existence of different relations between manager characteristics and strategic options, depending on the activity of firms. These relationships vary over time in association with the economic and social context.

Keywords Characteristics of top managers · Strategic decision · Strategic options · Upper echelon theory · Medium-sized industrial firms

Introduction

Top managers influence strategic decisions (Boeker 1997) and the way an organization conducts its strategy (Bantel and Jackson 1989), along with organizational activities (Rajagopalan and Datta 1996). Complex decisions arise largely from behavioural factors rather than rational analysis based on complete information (Cyert and March 1963; Williamson 1999). Managers' cognitive attributes and other characteristics, as well as the context in which they operate, affect their choices and the strategic orientation of their firms. The upper echelon theory (Hambrick and Mason 1984) suggests this connection by asserting that managers' backgrounds affect their cognitive bases and values, and consequently impact their strategic choices. Managers' perceptions and evaluations of situations depend on

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cognitive, demographic and other attributes, including experience in their role, age or communication attributes.

Numerous authors (Boeker 1997; Hambrick et al. 1993; Miller and Toulouse 1986; Rajagopalan and Datta 1996) have sought to identify the characteristics of top managers that influence strategic decision-making. Carpenter (2002) and Simsek et al. (2005) acknowledge the influence of managers' characteristics on performance but deal sparingly with the effects on strategy options. In addition, Rajagopalan and Datta (1996) suggest that top managers are selected for certain types of industries based on experience or certain cognitive orientations, which is another perspective that requires further research. Other authors (Carpenter and Fredrickson 2001; Haleblian and Finkelstein 1993; Keck 1997) focus on the influences of industry context on the mandate of managers and their characteristics, but do not explore the effects of industry on strategy options. This paper seeks to answer the question of whether the characteristics that influence managers' strategic choices are affected by the particular context of industry.

This study focuses on the relationship between the characteristics of top managers and strategic options, analyzing Portuguese medium-sized industrial firms and considering different industries over a certain period of time. For several reasons, but mostly due to the modernization of the Portuguese economy, this period was extremely interesting for the analysis of the strategic orientation of firms. The objectives are to analyze the type of relationships between the characteristics of top managers and the strategic options in different industries, and to verify whether the time period, reflecting the economic and social context, influences those relationships, depending on the different industries involved. The relevance of this study is associated with the power of the influence of top managers on the choices of business strategy as a result of their personality, behaviour or expertise, as well as their perceptions and values reflected through the way they take risks and aspects such as experience, seniority, age and other factors.

When the chosen strategy is based on product innovation, processes or other areas such as expansion or diversification of the firm's activities, it affects business development and is certainly related to the type of activity. According to Hambrick (2007), the multiple challenges that arise everyday determine the characteristics of the top manager and not the other way round.

The implications of these findings for scholars and practitioners are discussed, based on the findings of positive and negative relationships between the characteristics of the top manager and the strategic options of firms from different industries, observing that these relationships differ according to the industry and the time period associated with changes in the economic and social context. After the introduction, the literature review that frames the working hypotheses is presented, followed by the research model, variables and methods, including the sample selection and statistical methods used. The results for each industry are subsequently presented, as well as a discussion focusing on the contribution of the study for scholars and practical applications. The last section contains the limitations and future research directions.

Literature review and hypotheses

Entrepreneurs, managers and management teams, given that they establish the type and quality of the coordination and control mechanisms of organizations, help to differentiate the firm in the market and create competitive advantage through strategic options (Chandler 1992; Penrose 1980). The effectiveness of top managers depends on personality and other attributes beyond their control over bureaucratic structures (House et al. 1991). For Kotter (1990) the turbulence of the business world explains why "leadership qualities" are valued among the business elite. Wiersema and Bantel (1992) believe that managers' perceptions and interpretations reflect their own cognitive base, which is a position echoed by Finkelstein and Hambrick (1996), who claim that executives should make decisions consistent with their cognitive support or psychological characteristics, XXXbe there values, cognitive models or other factors of personality. A manager's knowledge base thus influences the perception process by limiting both the field of vision and context areas that receive attention, and the process is limited further because the manager only heeds some of the stimuli. Carpenter et al. (2004) note that perceptions and values affect strategic decisions and, consequently, the firm's strategic choices, highlighting the upper echelon perspective based on that premise.

Organizations depend on who their top managers are, insofar as they influence the firms' strategic orientation and options with significant impact on organizational activity and performance, as noted by Rajagopalan and Datta (1996). The upper echelon theory (Carpenter et al. 2004; Hambrick 2007; Hambrick et al. 2005; Hambrick and Mason 1984) suggests that managers' attributes influence strategic decision-making because those attributes affect managers' cognitive bases and values that, in turn, filter and interpret the perceptions that encourage managers, forming unobservable psychological constructs that are reflected by observable characteristics. Fittingly, Simsek et al. (2010) emphasize that "higher core self-evaluations are more apt to favour entrepreneurially oriented strategic choices".

Despite the fact that the concept of strategy has evolved over the years and the low consensus reported by Ronda-Pupo and Guerras-Martin (2012), it is noticeable that decision-making has gained importance in the definitions of strategy. Strategic options are positively or negatively influenced by professional groups, namely those that specialize in finance, production, marketing or R&D, as they consider their perspectives on strategic problems (Rajagopalan and Datta 1996). According to Hambrick (1983), professionals in production and finance tend to be cautious in defending strategic guidance, whereas those from marketing and R&D are more innovative and amenable to risk. Stalk et al. (1992) state that the skills of the manager are associated with the function or position on which they make the choice of strategy and the winning guidance given to the firm. This explains the influence that the perceptions and views of a few top people in the organization have on the strategic choices, according to Waalewijn and Segaar (1993), because they have a good knowledge of products, markets, competitors and cost structure.

Evidence suggests that the characteristics of top managers are related to a firm's options (Ben Amar et al. 2011; Lee and Park 2006), particularly in making technology choices (Carpenter et al. 2003; Dabholkar and Spaid 2012). Rajagopalan

and Datta (1996) consider the mandate of the manager, education level, knowledge and functional diversity as influential attributes for strategic choices. For Bantel and Jackson (1989) and Camelo-Ordaz et al. (2005) age, mandate and education are specifically associated with new products and services. However, Papadakis and Barwise (2002) suggest that the mandate is associated with more decentralized decision-making. Liu et al. (2012) verify the effect of managers' characteristics in strategic change towards internationalization (new markets). Thus, managers' complex behaviour reflects both their individual characteristics and their training and experience.

An approach that focuses on knowledge, experience and individual values was developed in an attempt to explain choices that stem from the way managers adjust and interpret the world (Kets de Vries and Miller 1986). This approach led to the identification of factors that conduct or guide executive attention (Finkelstein and Hambrick 1990), which are characteristics that reflect the type of strategic leadership (Thun and Kelloway 2011). For example, Miller et al. (1982) report that firms led by dynamic managers who are endowed with confidence and a strong desire for action are more oriented towards risky situations. These firms also tend to adopt more innovative initiatives (Dobón and Soriano 2008) and seek to develop proactive strategies that, according to Norburn (1986), support the idea that top managers are one of the biggest determinants of the success or failure of organizations. Miller and Toulouse (1986) show the propensity of dynamic managers to adopt proactive strategies for product-market innovation, instead of planning for the future, assuming attitudes of leadership and taking risks. Rajagopalan and Datta (1996) also examine manager behaviour and identify that frequent communication with employees, frequent communication with customers and delegation of authority are positively related to strategic choice. Similarly, Hambrick (1989) reveals the factors of demographics, such as mandate and age, functional practise and education, along with other factors, such as knowledge and expertise, skills, personality and cognitive style related to strategic options.

As mentioned above, previous studies have established that the characteristics of managers, including demographics, behaviour and functional specialization, influence decision-making and consequently the strategic options for firms, but little is known about the type of characteristics that influence strategic options. Drawing on the literature, the following working hypotheses are proposed:

Hypothesis 1 Different strategic options are positively or negatively associated with various characteristics of the manager.

According to Wiersema and Bird (1993), several studies have shown that the upper echelon model applies to different contexts and organizations, leading to the assumption that managers have distinct features and capabilities. Geletkanycz and Hambrick (1997) and Keck (1997) argue that mandates that managers exercise in complex and turbulent environments tend to be short to ensure effectiveness, whereas in stable environments they tend to be long, which is a situation that causes strategic decisions to be affected by the context in which firms operate. Reinforcing this idea, Papadakis and Barwise (2002) associate the long-term with a greater propensity for strategic decision-making because, according to Wu et al. (2005), the

executive mandate influences innovation in general and particularly affects product innovation.

The skills and expertise at many firms are industry characteristics, which leads to the conclusion that the managers who work in certain activities have acquired skills on the job or were chosen because they possess detailed knowledge and particular attributes associated with the firm's activities (Liu et al. 2012). Lo (2012) suggests that firms facing uncertain environments tend to use competition strategies. However, Kor (2003) reports that experiences in the industry are an essential asset for managers who contribute to increased competitiveness and seize new opportunities.

Although researchers know that firm strategies are affected by their operational context, they know little about the extent of the activity's influence on the relationship between managers' characteristics and strategy options, and whether the choices made are characteristic of the industry. In this framework of analysis, the following working hypothesis is thus proposed:

Hypothesis 2 The context of industry affects and differentiates the relationship between strategic options and the characteristics of the manager.

In the analysis of a particular industry, it is assumed that the economic and social context is associated with the period of time analyzed. Some literature (Papadakis and Barwise 2002; Wiersema and Bird 1993) notes the importance of the context and its effect on the strategic choices of firms. However, little is known about how firms in the same industry or activity in different time periods manage to fit their strategic options combined with the characteristics of the manager. Consequently, we present the following hypothesis:

Hypothesis 3 The time period associated with the specific economic and social context in the same industry affects the relationship between the different strategic options and the characteristics of the manager.

Research model, variables and methods

Research model

The research model, which focuses on medium-sized industrial firms belonging to different industries, relates characteristics of top managers with strategic options at different moments in time (Fig. 1).

Variables

The characteristics of top managers are identified by eight variables that are: age, seniority in the role, training and/or educational expertise, and education level (demographic and functional specialization), level of communication with employees, level of communication with customers, and delegation of authority (behaviour), and propensity to take risks (cognition). The strategic options are identified by

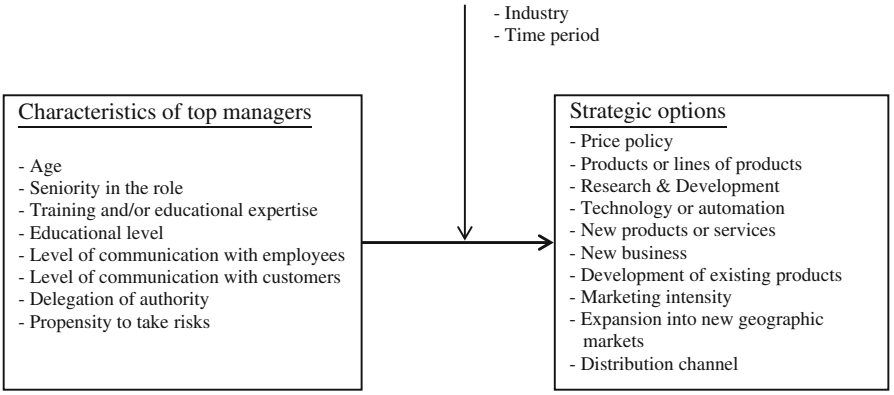

Fig. 1 Research model

ten variables that are: price policy, products or lines of products, research and development, technology or automation, new products or services, new business, development of existing products, marketing intensity, expansion into new geographic markets and distribution channels. Additional information regarding the variables and the scale that was used is presented in Table 1.

The context of the 1990s

The 1990s in Portugal was characterized by growth in GDP of around 30 % and in GDP per capita of around 27.6 %. The average inflation rate in 1990–92 was 11.7 % and in 1997–99 was down to 2.5 %. This evolution was a consequence of several factors but integration into the EU was one of the most important. Following the adhesion of Portugal in 1986, during the 1990s, the country began to receive considerable amounts of financial transfers from the EU that were devoted to important investments aimed at the modernization of the economy. The growth of Portuguese firms was clearly limited by the dimension of the country and the regulations and protectionism that were challenged by the European single market perspectives (Ribeiro 2002) leading to an increase in competition. In terms of the industries considered in this study, also according to Ribeiro (2002), the following elements are highlighted: (a) food industry—without major changes during the 1990s, maintaining its position in the second tier[1] of Portuguese export sectors; (b) textiles and clothing—there was an ascension in the value chain and textiles reached the top tier of Portuguese exports by the end of the decade; (c) chemicals and plastics—there was a strong reduction in the existing capacity leading to the third level on exports; (d) metallurgy and metallomechanics—given the international investment in Portugal, this became a dynamic source of industrial exports and led the industry to be considered among the top tier of Portuguese export sectors.

[1] Ribeiro (2002) organizes the industries into clusters according to their importance in volume of exports at the end of the 1990s. The top tier contains the most important sectors and the third, the least important.

Table 1 Variables

	Variables	Description
Characteristics of top managers	Age	The age in years of the manager. Initially five categories were considered (up to 35 years old; 36–45; 46–55; 56–65; more than 66 years old). In the subsequent analysis, the threshold for older or younger managers was set at 50 years old
	Seniority in the role	Number of years the manager has carried out the current role. Initially five categories were considered (up to 1 year; 1–3 years; 3–7 years; 7–10 years; more than 10 years). The information was then analyzed, considering those with 10 years of experience or more as having seniority in their role as managers
	Training and/or educational expertise	Areas of knowledge of the manager (training or education). Initially seven categories were considered (accounting/finance; marketing/sales; human resource management; production/operations; science/technology/R&D; information systems/computers; others). The information was analyzed considering administration/sales/management and technical/engineering/production training or education
	Educational level	Level of schooling attained at a recognized teaching institution. Seven categories were considered (basic education—4 years; high-school—6 years—or equivalent; high-school—9 years—or equivalent; bachelor's degree or equivalent; masters or post-graduate; PhD). The results did not provide any evidence of the importance of this variable
	Level of communication with employees	Amount of time spent communicating (meetings, phone calls, written, etc.) with employees (1—low to 5—high)
	Level of communication with customers	Amount of time spent communicating (meetings, phone calls, written, etc.) with customers (1—low to 5—high)
	Delegation of authority	Level of delegation of authority to subordinates (1—no delegation to 5—extensive delegation)
	Propensity to risk	Behaviour in a situation of strategic decision-making involving growth and risk (1—maintaining activities with low risk to 5—preference for high growth and high risk)
Strategic options	Price policy	Price policy followed in the firm (1—price well below that of competitors to 5—price well above that of competitors)
	Products or lines of products	Number of products or lines of products, considering the competitors (1—few products or lines to 5—many products or lines)
	Research & Development	Investment in research and development of new products, considering the potential and needs of the firm (1—very low to 5—very high)
	Technology or automation	Production technology used by the firm, considering the competitors and the activity sector (1—low technological level to 5—high technological level)
	New products or services	Number of new products or services that the firm has developed (1—one product to 5—many products)
	New business	Number of new businesses developed beyond the primary activity (1—one business to 5—many businesses). The results did not provide evidence of the importance of this variable
	Development of existing products	Product improvement based on the firm's capabilities (1—few to 5—many)
	Marketing intensity	Marketing expenses aiming at achieving a greater volume of sales or to increase activity (1—low to 5—high)
	Expansion into new geographic markets	Expansion to different geographic markets for growth purposes (1—low to 5—very strong)
	Distribution channel	Dependence on the distribution channels to sell the products, achieve activity level or promote expansion (1—low intensity to 5—very intense)

In short, the 1990s is for several reasons, but mostly due to the modernization of Portuguese economy supported by EU financial transfers, an interesting period for the analysis of the strategic orientation of firms. In addition, as presented herein, besides the usual differences in industries (for instance, in terms of investments, risk, etc.) there were different dynamics during this period among the sectors chosen here for analysis. As such, the study of the evolution of the strategic choices during the period in the different industries is also of major interest.

Methods

The study population was made up of 1,288 medium-sized (EU criteria) Portuguese industrial firms. The final sample of 191 medium-sized firms was grouped according to activity and consisted of 23 in the food industry, 79 in textiles and clothing, 37 firms in chemicals and plastics and 52 in metallurgy and metallomechanics. Crossland and Hambrick (2007) and Nielsen (2010) point out that most of the studies on upper echelons theory used samples from North America, thus limiting the generalization of the results to other contexts. Besides other differences, the Portuguese firms—especially small and medium-sized ones—are typically family-owned which reinforces the role of the top manager.

The study period included both the beginning and end of the decade. The data were collected through a questionnaire that was mailed to the top manager of the firms in the population. Data collection was completed by the start of 2001. In the questionnaire, top managers provided information on their characteristics at the end of the decade and about the strategic options adopted by the firm at the beginning of the decade, as well as at the end of the 1990s. The analysis of nonlinear canonical correlation was used to study the relationship between two sets of non-metric independent variables. The canonical correlation analysis is a multivariate statistical model (Hair et al. 2010) that allows the use of metric and non-metric data and is suitable when the focus is on the relationships between sets of variables instead of having a single-dependent variable. According to the same authors, 'in situations with multiple-dependent and independent variables, canonical correlation is the most appropriate and powerful multivariate technique'. An additional feature of the variant of canonical correlation used in this research is that it does not assume that those relationships are linear. Luijtens et al. (1994) present an analysis of the nonlinear canonical correlation analysis versus its linear form. Another characteristic highlighted by Hair et al. (2010) is that multiple canonical functions are developed, and that they are independent from one another.

The variables of the characterization of the manager correspond to the linear combination of variables X_1, X_2,…, X_8, corresponding to the following canonical function *(U)*:

$$f(U) = a_1X_1 + a_2X_2 + \ldots + a_8X_8$$

where U measures the difference between variables X.

The variables of strategy option correspond to a linear combination of the variables Y_1, Y_2,…, Y_{10}, corresponding to the following canonical function *(V)*:

$$f(V) = b_1Y_1 + b_2Y_2 + \ldots + b_{10}Y_{10}$$

where, similarly, V measures the difference between the Y variables.

The 'optimal scaling' of $f(U)$ and $f(V)$ occurs when the variables X and Y are standardized and the variance is unitary. The loadings have been calculated from the eigenvalues, measuring the individual correlation of each variable with each function to reflect the variance that each variable shares with the linear combination of variables. In addition, the relationship between each pair of variables was tested using the contingency analysis (t test) and Chi square test (χ^2) to reinforce the results obtained.

Results

The results were established for each industry. In addition, biplots (not reported here) were used to support the interpretation of the relations of the model based on the component loadings. To analyze the similarity (ϕ = eigenvalue/fit) between the dimensions (d1, d2) that determine the component (set1, set2) loadings of the variables that constitute the model at the beginning and end of the period, for each activity, the variances of the components (eigenvalues) and their fit were calculated. Results indicated that all the relationships showed a good fit. The main results, covering all industries are presented in Table 2.

Food industry

At the beginning of the 1990s (fit = 1.676), the first dimension (the first independent canonical function) ($\phi 1 = 0.54$) emerged with an association between the variables of communication with customers (−0.418), communication with employees (−0.539), and training and/or educational experience (−0.409) and the variable products or product lines (−0.756), and a negative association with price policy (0.622). Another positive association is between the variables of managers of over 50 years old (0.469) and delegation of authority (0.450) and the variable pricing policy (0.622) and negative association with production technology (−0.756). The second dimension (the second independent canonical function) ($\phi 2 = 0.46$) revealed a positive association between the propensity to risk variable (0.422) and the technology or automation variable (0.742).

Using the contingency analysis and the Chi square test, we observed that the relationship between each of the variables of the characterization of managers and each of the variables pertaining to strategy option does not appear to be sufficiently significant ($p > 0.05$). Despite this limitation, the relationships closer to statistical significance were those of the negative relation between communication with employees and pricing policy ($\chi^2 = 3.72$; $p = 0.054$) and the positive relation between managers of over 50 years of age and production technology ($\chi^2 = 3.2$; $p = 0.074$). The positive nature of the 'relationship' between managers of 50 years old or more and production technology was confirmed. Among managers who took a low or no stake in production technology in the early 1990s, 68.8 % were less than

Table 2 'Loadings' of variables in beginning and end of the 1990s time period

Time period			Beginning of the 1990s							
Sector			Food		Tex & Clo		Chem & Plas		Met & Met	
Dimensions			1	2	1	2	1	2	1	2
Set	1	Price policy	0.622		−0.682	0.674		−0.927	0.722	
		Products or lines of products	−0.756		0.479	0.508	0.921			0.783
		Research & development								
		Technology or automation		0.742	0.477	0.738			−0.489	−0.462
		New products or services								
		Development of existing products								
		Marketing intensity								
		Expansion into new geographic markets								
		Distribution channel								
	2	Training and/or educational expertise	−0.409		−0.476	0.418				
		Level of communication with employees	−0.539		−0.459			−0.552		
		Level of communication with customers	−0.418							
		Delegation of authority	0.450						0.492	
		Propensity to risk		0.422						
		More than 50 years old	0.469			0.406		0.484		−0.489
		10+ years on the job					−0.580	0.418		
ϕ			0.54	0.46	0.52	0.48	0.53	0.47	0.52	0.48

Table 2 continued

Time period			End of the 1990s							
Sector			Food		Tex & Clo		Chem & Plas		Met & Met	
Dimensions			1	2	1	2	1	2	1	2
Set	1	Price policy		0.448	−0.681					
		Products or lines of products	−0.424		−0.482				0.507	0.795
		Research & development	−0.565	0.552	−0.553			−0.594		
		Technology or automation		0.705	−0.403	0.502		−0.760	−0.802	
		New products or services			−0.509			−0.790		
		Development of existing products		0.597			−0.459	−0.663		
		Marketing intensity		0.649	−0.466	−0.580	−0.441			−0.485
		Expansion into new geographic markets	0.539	0.434						
		Distribution channel			−0.707					
	2	Training and/or educational expertise		−0.460	−0.484				0.610	
		Level of communication with employees								
		Level of communication with customers						−0.739		
		Delegation of authority		0.667	−0.618		−0.424	−0.417		0.424
		Propensity to risk	0.462							
		More than 50 years old							−0.468	0.485
		10+ years on the job							−0.400	
ϕ			0.51	0.49	0.53	0.47	0.51	0.49	0.52	0.48

Only loadings ≥ 0.400; ϕ = eigenvalue/fit

50 years old, whereas 71.4 % of managers who take such a line were over 50 years old.

In the late 1990s (fit = 1.938), the first dimension ($\phi 1 = 0.51$) highlights the positive association of the variable strategic decision-making (0.462) with the variable new geographical markets (0.539) and negative association with the variables products or product lines (−0.424) and R&D (−0.565). In the second dimension ($\phi 2 = 0.49$), a positive association was seen between the variables pricing policy (0.448), production technology (0.705), existing products (0.597), marketing expenses (0.649), research and development (0.552), and new geographic markets (0.434) with the variable delegation of authority (0.667) and negative association with technical training (0.460). Managers with no technical training were those who delegated authority most often, relied on pricing policy and who concurrently invested more in production technology, existing products, marketing expenses and new markets.

Managers with a greater propensity for strategic decision-making tended to invest in new geographic markets and less in R&D and products or product lines.

In the food industry, in the late 1990s, the contingency analysis and the Chi square test did not provide additional support to the nonlinear canonical correlation results.

Textiles and clothing industry

At the beginning of the1990 s (fit = 1.533), the first dimension ($\phi 1 = 0.52$) emerged with two different relations. The variables technical training (−0.476), communication with employees (−0.459), and communication with customers (−0.397) revealed a positive association with the variable pricing policy (−0.682), and a negative one with the variables products or product lines (0.479) and production technology (0.477). The second dimension ($\phi 2 = 0.48$) revealed a positive association between the variables of technical training (0.418), managers of 50 years old or more (0.406) and seniority of more than 10 years (0.370) and the variables pricing policy (0.674), products or product lines (0.508) and production technology (0.738) (Table 2).

Contingency analysis and the Chi square test showed that 76.2 % of managers with technical training invest in pricing policy ($\chi^2 = 10.42$; $p = 0.001$). The managers who chose to communicate with customers invested less in products or product lines ($\chi^2 = 4.59$; $p = 0.032$). Managers aged 50 or over in 75.0 % of the investments made use of products or product lines ($\chi^2 = 5.14$; $\alpha = 0.023$) and in 72.2 % of production technology ($\chi^2 = 4.74$; $\alpha = 0.029$). Among the investments in production technology, 85.0 % were made by managers with over 10 years seniority ($\chi^2 = 4.66$; $\alpha = 0.031$).

In the late 1990s (fit = 1.571), the first dimension ($\phi 1 = 0.53$) revealed a positive association between the variables delegation of authority (−0484) and technical training (−0.618) with variables pricing policy (−0.681), products or lines of products (−0.482), R&D (−0.553), production technology (−0.403), new products or services (−0.509), marketing expenses (−0.466) and channels of distribution (−0.707). The second dimension ($\phi 2 = 0.47$) emerged with two different relations.

The variables strategic decision-making (−0.392) and communication with employees (−0.371) revealed a negative association with production technology (0.502) and a negative association with the variables marketing expenses (−0.580) and R&D (−0.275).

Using the contingency analysis and the Chi square test, we found that managers with technical education in 70.8 % were those who most frequently invested in pricing policies ($\chi^2 = 8.5$, $p = 0.004$), 59.0 % invested in products or product lines ($\chi^2 = 5.16$, $p = 0.029$) and 65.4 % invested in distribution channels ($\chi^2 = 5.16$; $p = 0.029$). Managers who adopted a high level of communication with employees were responsible for 64.0 % of large investments in research and development ($\chi^2 = 5.91$; $p = 0.015$). The managers who had delegated more authority (68.4 %) were those who invested in price policy ($\chi^2 = 7.71$; $p = 0.005$), 51.3 % invested in products or product lines ($\chi^2 = 5.50$; $p = 0.019$), 67.1 % invested in R&D ($\chi^2 = 6.42$; $p = 0.011$), 68.4 % invested in production technology ($\chi^2 = 7.28$; $p = 0.07$), 60.5 % invested in new products or services ($\chi^2 = 8.00$; $p = 0.05$), 88.2 % invested in new business ($\chi^2 = 4.90$; $p = 0.027$), 75.0 % invested in marketing expenses ($\chi^2 = 4.01$; $p = 0.045$) and 67.1 % invested in distribution channels ($\chi^2 = 9.16$; $p = 0.02$). The managers who made strategic decisions were those of the 51.3 % who most invested in products or product lines ($\chi^2 = 8.35$; $p = 0.04$), 67.1 % who invested in R&D ($\chi^2 = 5.02$; $p = 0.025$) and 73.7 % who invested in marketing expenses ($\chi^2 = 5.48$; $p = 0.019$).

Chemicals and plastics industry

At the beginning of the 1990s (fit = 1.520), the first dimension ($\phi 1 = 0.53$) revealed a negative association between the variable seniority of more than 10 years (−0.580) with the variable products or product lines (0.921). In the second dimension ($\phi 1 = 0.47$), the variable pricing policy (−0.927) revealed a negative association with managers of 50 years of age or older (0.418) and seniority of more than 10 years (0.484) and a positive relation with the variable communication with employees (−0.552) (Table 2).

Contingency analysis and the Chi square test indicated a positive relationship between communication with employees in 75.0 % of managers and the pricing policy, although with reduced significance ($\chi^2 = 3.10$; $p = 0.078$). However, managers with seniority in their role of over 10 years showed a negative trend in terms of investing in products or product line ($\chi^2 = 6.53$; $p = 0.010$).

In the late 1990s (fit = 1.571), the first dimension ($\phi 1 = 0.51$) revealed the positive association of the variable delegation of authority (−0.424) with the variables existing products (−0.459) and marketing expenses (−0.441). In the second dimension ($\phi 2 = 0.49$), a positive association emerged between communication with customers (−0.739) and delegation of authority (−0.417) with the variables R&D (−0.594), production technology (−0.760) new products or services (−0.790) and existing products (−0.663).

Using the contingency analysis and the Chi square test, we found that 84.2 % of managers who delegated authority invested in products or product lines ($\chi^2 = 6.13$; $p = 0.023$) and on the development of existing products ($\chi^2 = 11.65$; $p = 0.001$).

Among managers who were likely to communicate with customers, 83.3 % invested in R&D ($\chi^2 = 5.598$; $p = 0.018$), 70.4 % in production technologies ($\chi^2 = 8.610$; $p = 0.003$), 78.9 % in new products or services ($\chi^2 = 8.622$; $p = 0.003$) and 68.2 % in existing products ($\chi^2 = 3.527$; $p = 0.060$).

Metallurgy and metallomechanics industry

At the beginning of the 1990s (fit = 1.688), the first dimension ($\phi 1 = 0.52$) shows that the variable delegation of authority (0.492) has a positive association with the variable price policy (0.722) and a negative one with production technology (−0.489). In the second dimension ($\phi 2 = 0.48$), two different relations emerged. The variable referring to managers of 50 years of age or older (−0.489) revealed a negative association with the variable products or product lines (−0.783) and a positive association with production technology (−0.462) and the variable technical training (0.397) shows a positive relation with products or product lines (−0.783) and a negative relation with production technology (−0.462) (Table 2).

Contingency analysis and the Chi square test established that 83.3 % of managers with technical training invested in products or product lines ($\chi^2 = 5.53$; $p = 0.019$) and that 79.6 % of managers of 50 years old or more invested in production technologies ($\chi^2 = 7.14$; $p = 0.008$).

In the late 1990s (fit = 1.765), the first dimension ($\phi 1 = 0.52$) shows that the variable technical training (0.610) has a positive association with the variable products or product lines (0.507) and a negative relation with production technology (−0.802). In turn, the variables managers of 50 years of age or older (−0.468) and seniority of more than 10 years (−0.400) showed a negative association with the variable products or product lines (0.507) and a positive relation with production technology (−0.802). In the second dimension ($\phi 1 = 0.48$), the variables delegation of authority (0.424), managers of 500 years of age or older (0.485) and technical training (0.399) revealed a positive association with products or product lines (0.795) and a negative one with marketing expenses (−0.485).

The contingency analysis and the Chi square test revealed that 78.1 % of managers with technical training invested in products or product lines ($\chi^2 = 9.67$; $p = 0.002$), and 81.0 % of those managers invested more in new products or services ($\chi^2 = 5.61$; $p = 0.018$). Among managers of 50 years of age or older, 95.2 % invested in production technologies ($\chi^2 = 7.14$; $p = 0.008$).

Discussion

Summary

The purpose of this study was to explore the effect of top manager characteristics on the strategic options of firms in different industries at distinct moments in time. Specifically, we found that the characteristics that are associated with strategic options depend on the industry and the moment in time (associated with the conditions of economic and social context). These results are important to both

practitioners and researchers because they confirm that strategic options change during the time period, which allows managers to structure the organization and to think about the appropriate characteristics of managers and options within the context.

Contributions to scholarship

This study contributes to the literature by reinforcing the importance of the upper echelon theory, which suggests that the values and perceptions of managers influence their choices regarding business strategy. The intensity and type of the relationship seems to vary depending on the specific industry and the temporal context, meaning that the time period associated with the economic and social conditions affects the relationship between manager characteristics and strategic options.

The characteristics of managers, including behaviours such as increased workplace communication and delegation of authority, as well as their technical expertise and risk capacity, exert different influences depending on the industry.

This research is important because it presents innovative and relevant contributions to the literature and implications for practitioners. The innovation relates to the evidence of changes in the relationships between the characteristics of top managers and strategic options, in the same industry, due to the time period in consequence with the economic and social context. It is thus possible to identify how those changes influence the strategic options. For instance, in the Portuguese context, between the beginning and the end of the decade important economic and social changes have occurred. At the beginning of the decade, in the chemicals and plastics industry, strategic decisions were based on pricing policy and a reduced number of products or product lines. At the end of the decade, given the competitive pressure, strategic options focused strongly on production technology or automation and new products and services, besides the focus on the development of existing products, R&D and marketing.

In the textile and clothing industry, at the start of the decade, results show that strategic options were based on price policy and little importance was attributed to production technologies and to the development of existing products. By the end of the decade, in the face of strong competition, managers decided to invest in R&D, new technologies and automation, new products or services and, more importantly, in distribution channels and marketing intensity. This means that managers understood the changes in the context and acted accordingly. Any research that had focused on only one moment or on a period with less profound changes in the business context would not capture that difference.

Another contribution relates to the positive or negative differences in the relationships between the characteristics of top managers and strategic options in different industries, which is extremely relevant because it highlights the different conditions according to each industry, thus allowing us to conclude—assuming that the industry is important to the economy—that different combinations exist at the model level, depending on the industry. Yet another contribution, related to the period of time analyzed, shows that, at different moments, the industry presents

different positive or negative relationships between strategic options and top manager characteristics, in relation to the economic and social context.

Overall, the results indicate that managers in the industries of food, textiles and clothing and chemicals and plastics are more communicative with employees and differentiated themselves by adopting a price policy and investing in technologies and products or existing product lines. In food industries, greater attention was given to communication with employees; a circumstance that was associated with lower pricing, whereas for firms in textile and clothing and those in chemicals and plastics, this attention to employee communication corresponded to an increased attention to pricing policy.

For firms in the textile and clothing industries, higher technical expertise among managers led to an increase in attention to price policy, whereas in metallurgy and metallomechanics, this expertise was associated with greater investment in products or product lines, a trend that seems natural given the industry's characteristics. In the case of textiles and clothing, the factor of market price is seen as relevant to competitive success. However, in metallurgy and metallomechanics, managers are generally more concerned with products, to the extent that production is tailored by orders from specific customers.

Managers in the textile and clothing industries with more seniority usually concentrated on production technologies, but older managers invested more in products or product lines. In chemicals and plastics, greater seniority typically entailed a smaller investment in products or product lines.

In the early 1990s, managers' demographic factors, in the cases of both age and seniority, guided them towards the production and development of product lines or production technologies. In turn, stronger communication behaviours among managers influenced interest in pricing policy or investment in products or product lines. However, in the late 1990s, managers' technical expertise was a decisive factor in the strategy options followed by firms in various activities. In the case of the food industry, managers with less specialization increased attention to pricing policy, distribution channels and production technologies, whereas in textiles and clothing, managers with more expertise are the ones who support these investments. For chemicals and plastics firms, managers with greater technical specialization invested more in research and development and in new geographic markets, but in metallurgy and metallomechanics, managers with similar characteristics invested in products or product lines or in new products. Therefore, a difference in the choice of strategy followed by managers with greater specialization emerges based upon industry; managers in some fields focused on prices and distribution channels, whereas managers in other industries opted for research, product lines or new products.

Managers with a predisposition towards risk stand out in the food and textile and clothing industry. In this case, they invested particularly in the development of existing products, new geographic markets and distribution channels. Also in this industry, managers focused their investments on products or product lines, research and marketing.

The younger managers in the food industry displayed a greater propensity to invest in products or product lines, much as managers with less seniority tend to

invest more in new products. In the case of metallurgy and metallomechanics, older managers invested in production technologies. Greater propensity towards communication and delegation of authority has a different influence on the behaviour of managers in the industries of food, textiles and clothing and chemicals and plastics. In the textiles and clothing industries, managers with a propensity to delegate authority clearly and positively determined the options for innovation (R&D, production technology, new products), expansion (marketing expenses, distribution channels), diversification (product lines, new businesses) and transaction (price policy). In food industries, managers show an affinity for production technologies and distribution channels, but in chemicals and plastics, managers who favour the delegation of authority show a propensity for options for expansion strategy (existing products) and diversification (product lines). In addition, food industry managers who communicate with customers tend to focus on product development. However, in textiles and clothing, managers who lend importance to communication, in this case with employees, are more likely to invest in research and development. In chemical and plastics firms, innovation (R&D, production technologies, new products and services) and expansion (existing products) are the usual strategy options.

In essence, the analysis for each group establishes that, at the beginning of the 1990s, older managers in the food industry who used expertise and increased focus on price policy changed their behaviour by the end of the decade. Their actions at the end of the 1990s were marked by a greater delegation of authority and differed at the cognitive level with decision-making and investment was aimed at expansion into new geographic markets as well as at marketing actions and innovation in products or services.

At the beginning of the decade in the textiles and clothing industry, the older managers, not those who were technically skilled, invested in innovation using production technology and invested in diversification of products and did not generally focus on pricing policies. By the end of the decade, these same managers did not use strategic decisions and failed to invest in technological innovation.

In the chemical and plastics industry in the early 1990s, managers with more seniority usually did not invest in product diversification. However, by the late 1990s, older managers and those predisposed to communication with customers invested in research and expansion using, in this case, the distribution channels, but they stopped investing in existing products.

At the beginning of the decade in the metallurgy and metallomechanic industries, technically skilled managers were unlikely to communicate with customers, but they did invest in production technologies. By the end of the decade, younger managers with low seniority who were technically experts opted to invest in product diversification instead of production technology.

In general, in the 1990s, older, technically skilled managers chose to invest in production technologies in the industries of food, textiles and clothing, metallurgy and metallomechanics, which is in line with the upper echelon perspective. However, in the chemicals and plastics industries, such managers did not invest in diversification and expansion of its products, preferring to focus on innovation and distribution channels.

Rajagopalan and Datta (1996) stated that strategic options are influenced by the type of leader. Similarly, Boeker (1997), Ginsberg (1988) and Virany et al. (1992)argue that the characteristics of top managers influence changes in products or firm markets. In this research, strong evidence supports the influence of managers' attributes in the strategic choices followed by firms, whatever the industry.

The data indicate that strategic options differ depending on the industry, as Finkelstein and Hambrick (1990), Wiersema and Bantel (1992) and Zahra and Pearce II (1989) argue. Strategy options are influenced by factors such as the manager's level of training or seniority. If different attributes of managers are identified, these should be reflected in choices that are based on managers' different perceptions and values, according to the upper echelon theory. This perspective is reinforced by Miller et al. (1982) and Miller and Toulouse (1986), who showed that the characteristics of a manager's personality have a greater impact in small and medium-sized organizations where managers' activities have more direct consequences for the firm's strategy options. Wissema et al. (1980) argue that top managers with a propensity for achievement make firms grow more rapidly by adopting riskier, more aggressive strategies and by using marketing. The different effect becomes clear in the approach adopted by organizations based on the characteristics of their managers. This finding highlights the role and importance of the cognitive aspects and demography. Hypothesis 1 is thus confirmed.

In relation to the question of whether the relationship between the manager's characteristics and strategy options are affected by the context of activities or industry, the results show that the managerial attributes associated with different strategic options vary by industry. In textile and clothing firms, managers are generally older and possess more technical expertise, and they tend to invest in the delegation of authority as a way to ensure conditions for the research and development of new products and product lines, simultaneously demonstrating their readiness to take risks. In the chemicals and plastics industries, managers demonstrate a great ability to communicate with customers, technical expertise and a trend towards the delegation of authority, all of which lead to options for applied research, especially in the development of existing products. For firms in the metallurgy and metallomechanics industry, managers are characterized by their technical expertise, which leads them to opt for new products and product lines. In different industries, the characteristics of managers affecting strategic choices are diverse. Wiersema and Bird (1993) admit that the various contexts in which organizations operate attract individuals with different characteristics and skills that consequently influence the strategic options adopted. In turn, Keck (1997) refers to the complex and turbulent context of the firms to demonstrate their influence on the effectiveness of managers' tenure and on their strategic decisions. Meanwhile, Miller and Toulouse (1986) argue that mature organizations normally seek leaders with characteristics that determine their willingness to challenge the firm's culture and strategic options. More mature firms are associated with certain industry characteristics that convey an attitude and a particular way of perceiving the activity and relating to competitors, with repercussions on the choice and technical expertise

of top managers, as essential aptitudes for the protection of their development. The results, which are in line with previous literature, thus confirm hypothesis 2.

Another perspective considers the strategic options of firms in the same activity over time associated with the context. Studies generally do not evaluate whether these firms maintain or modify their options. Firms vary in this sense, regardless of industry or activity. For example, managers from textile and clothing firms in the early 1990s, who were older and technically skilled, tended to invest in price policy and technology as a way to develop the business. At the end of the decade, they demonstrated stronger commitment to risk-taking and communication with employees and a greater propensity to delegate authority, which are all attributes with obvious implications for the development of existing products and new products and research. Hypothesis 3 is thus confirmed.

In short, for all activities at the beginning and at the end of the decade, variables characterizing the manager are the same, but, at the end of the decade, the strategic options increased in number; a fact that is associated with the economic and social context and an increasingly competitive Portuguese society in the 90 s. From another perspective, data from the early 1990s clearly reveal that the age and seniority of managers influenced the orientation of firms towards investment, usually in production or technology, just as the expertise and communication proclivities of managers influenced the adoption of pricing policies and product diversification. By the end of the decade, the dynamics had changed: many of the attributes of managers, such as technical expertise, risk capacity, delegation of authority and a propensity towards communication, affected different strategy options without regard to industry. In the food industry, the characteristics of managers typically influenced strategic options for innovation and expansion. In the textiles and clothing industry, the expertise of managers, their behaviour and personality tended to influence the choices of strategy innovation, expansion, diversification and transaction. In the chemicals and plastics industry, manager specialization and behaviour influenced strategy options for innovation and expansion. In the metallurgy and metallomechanics industry, demographics and expertise of managers tended to affect the choice of innovation strategy.

Applied implications

The research contributes to a better understanding of the influence of the economic and social context, considering different industries, and providing clear indications of the fact that top managers changed the strategic options adopted by firms during the time period analyzed, during which large changes occurred in competitive conditions. The research presents evidence of the trend towards the selection of top managers in firms in an industry according to the industry characteristics, in line with the study by Hambrick (2007).

To extend these prior findings, our research suggests that modern firms exploit capabilities based on the comprehension and knowledge regarding the association between industry, context and managers' characteristics and the consequent effect on strategic options.

Limitations and future research directions

The major limitation relates to the size of the sample in each industry. Future research may examine the relationships between the characteristics of managers and strategic options in different economic and social contexts and may extend the analysis to other industries and allow for other variables. However, it is possible to generalize the results of this study to other activities or industries and for different contexts. For researchers, it opens up new paths and reinforces the need continue to investigate this topic with different managerial characteristics and strategic options. The study of the influence of the time period—associated with the economic and social context—in the model should continue to focus on specific industries.

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