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On the relation between organizational culture and leadership: An empirical analysis

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Abstract: Leadership and organizational culture are considered to be two of the most crucial organizational elements in order for firms to compete successfully and to gain sustainable advantage. We examine the interconnection between the aforementioned elements and create an empirical link based on data drawn from a competitive industry. The results indicate a strong relationship between these two operational factors, while factors' coordination (identical cultural type and leadership style) enforces this relationship. Moreover, it is investigated whether market conditions, such as strength of competition and "operational age and size," can determine the extent and the direction of the relationship. Market competition seems to affect the direction of the relationship, while operational age and size affect the relevant extent.

Subjects: Leadership; Research Methods in Management; Strategic Management

Keywords: leadership; organizational culture; telecommunication industry; competing values framework; OCAI

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PUBLIC INTEREST STATEMENT

Leadership and organizational culture are considered to be two of the most crucial organizational elements in order for firms to compete successfully and to gain sustainable advantage. We examine the interconnection between the aforementioned elements and create an empirical link based on data drawn from a competitive industry. The results indicate a strong relationship between these two operational factors, while factors' coordination (identical cultural type and leadership style) enforces this relationship. Moreover, it is investigated whether market conditions, such as strength of competition and "operational age and size," can determine the extent and the direction of the relationship. Market competition seems to affect the direction of the relationship, while operational age and size affect the relevant extent.

1. Introduction

Globalization of economies and cultural complexity affected the research interest on leadership. A growing interest in research and theory that focuses on the role of leadership across cultural contexts has arisen (Avolio, Walumbwa, & Weber, 2009). This interest has generated an increased focus on cross-cultural leadership research (Gelfand, Erez, & Aycan, 2007; House, Hanges, Javidan, Dorfman, & Gupta, 2004). Extensive reviews also exist for cross-cultural research that is more tangentially linked to leadership (Hofstede, 2001; Kirkman, Lowe, & Gibson, 2006; Leung, Bhagat, Buchan, Erez, & Gibson, 2005). Tsui, Zhang, Wang, Xin, and Wu (2006) investigated the relationship between CEO leadership behavior and organizational culture in China. Their results pointed that researchers should not take for granted that leaders play a dominant role in organizational culture's cultivation.

Moreover, globalization revealed that most leadership models have been designed for the past century to accommodate traditional hierarchical structures of organizations (Uhl-Bien, Marion, & McKelvey, 2007). Yet, there is a growing sense of tension that these models may not fully capture the leadership dynamic of organizations operating in today's complex economy (Lichtenstein et al., 2007) and that led to complexity leadership's development (Uhl-Bien & Marion, 2008). One of the core propositions of complexity leadership theory is that "much of leadership thinking has failed to recognize that leadership is not merely the influential act of an individual or individuals but rather is embedded in a complex interplay of numerous interacting forces" (Uhl-Bien et al., 2007, p. 302).

According to complex systems leadership theory, leadership is an emergent phenomenon within complex systems (Hazy, Goldstein, & Lichtenstein, 2007, p. 2), which interacts with elements such as culture, norms, trends, etc. Despite the ongoing debate about the relationship between leadership and organizational culture, the systematic research conducted in order to define the extent and the depth of this relationship is limited (Ogbonna & Harris, 2000). The interconnection between these constructs lacks sufficient empirical findings (Block, 2003), at least in order to cover most aspects of this multifunctional relationship. The leadership literature on the whole has not addressed organizational culture more than marginally (Jackson & Parry, 2008), while some of the published work is highly leader centric (Alvesson, 2011) and rather limited to aspects others than the impact of the leadership of the founder of the firm (Jones, 2005). Moreover, according to Iszatt-White (2010), the grounding of existing leadership theories in the practical doing of day-to-–day leadership work is a vital aspect of research. The paper aims on moving the research from leaders and managerial patterns to the conditions under which leadership, as a cultural element, is developed and to provide supplementary evidence on the existence of a statistically significant relationship between cultural type and leadership style using empirical data.

The rest of the paper is organized as follows. Section 2 analyzes the theoretical framework and the relationship between leadership and organizational culture, while the paper's contribution and the research hypotheses are presented. In Section 3, the model which has been used in order to identify organizational culture and leadership style and the procedure and the participants are presented. Section 4, Hypotheses' validation, presents the validation of hypotheses, while the empirical results are discussed in Section 5. Section 6, Synopsis and Implications, presents the main research findings, while the Section 7 aims to describe research limitations and directions.

2. Leadership and organizational culture

Over the last thirty years, organizations and institutions around the world have invested in leadership and organizational culture, leading to a continuous debate about their relationship. The process of identifying and developing future leaders has traditionally evolved around the characteristics of the potential leader. Porras and Hoffer (1986) pointed out the effect of culture on leadership, by giving emphasis on the fact that cultural values, trends, and rules are shaping a unique leadership style. Schein (1990) supported the idea that leaders must evaluate and respect cultural elements, while they should try to promote an appropriate and strategically suitable culture. He claimed that leaders are shaping culture during the first stages of business creation, but later, when the business matures, it is culture that shapes leadership characteristics. In addition, Ogbonna and Harris (2000) revealed

that the impact of leadership on a firm's performance is mediated by organizational culture. Many researchers (Shipper & Manz, 1992; Tichy & Cohen, 1997) implied that the initially shaped culture will develop the next generation of corporate leaders, while others (Vardiman, Houghton, & Jinkerson, 2006) supported the idea of a culture that facilitates the development of effective leaders on every organizational level.

From a different perspective, there are researchers that give emphasis on the importance of leaders' role on cultural development. Brooks (1996) claimed that leaders use their knowledge of organizational culture to affect change, while Chodkowski (1999) concluded that leaders' behavior influences the perception of organizational culture among followers. Block (2003) concluded that the leadership of immediate supervisors is strongly associated with the cultural perceptions of employees, but failed to link transformational and transactional leadership with distinct cultural elements. In addition, Torpman (2004) recognized that leadership becomes a factor of organizational culture and is incorporated into the daily organizational routine, while Taormina (2008) explored whether leadership behaviors are predictors of organizational culture.

Further research on the relationship between these two elements can provide empirical data and new insights to emerging leadership theories, such as complexity leadership. This is rather important as it is recognized that although organizational culture's researchers have suggested an interactive relationship between an organization's top leaders and organizational culture in fact exists, the empirical data remain scant (Huang, Cheng, & Chou, 2005). Therefore, we hypothesize:

H1: There is an empirically detected relationship between organizational culture and leadership.

H1S1: Each cultural type is strongly and positively affected by the equivalent leadership style.

H1S1: Greek telecommunication industry is leader-centric, with leadership playing a dominant role on cultural type.

More recently, an argument began concerning the bilateral relationship between leadership and culture. A number of researchers (e.g. Chang & Lee, 2007; Nam Nguyen & Mohamed, 2011; Xenikou & Simosi, 2006) concentrated on the joint effects of culture and leadership on organizational factors such as performance, knowledge management, continuous learning, and job satisfaction. Li (2004) studied the relationship between transactional and transformational leadership styles and job outcomes in bureaucratic, innovative, and supportive cultures, while Kwantes and Boglarsky (2007) related organizational culture with leadership and personal effectiveness in eight countries, revealing strong and statistically significant relationships. In many cases, existing research implies coordination between leadership style and cultural type, giving no further evidence whether this coordination is a random effect or not. A non-random effect would imply an unconscious procedure or a business strategy for alignment between what leaders and employees evaluate as corporate valuable. As a result, the following research hypothesis is investigated:

H2: There is an empirical detected coordination between leadership style and cultural type, as a non-random effect.

Finally, an empirical investigation is conducted in order to explore the way leadership and culture are directly affected by factors such as market competition, firm's size, and firm's age. As far as firms' size is concerned, Cameron and Quinn (1999) related the internal process model to large organizational size, while many scholars reported that larger organizations are characterized by standardized procedures, limited flexibility, and bureaucratic control (Child, 1973; Keats & Hitt, 1988; Lawler, 1997). As regards firms' age, the results are consistent with organizational life cycle theories where it is proposed that more hierarchical structures emerge as organizations grow and age (Greiner, 1998; Kriesi, 1996) since the growing firms might develop more complex management systems (Birley & Westhead, 1990). As a result, the following research hypothesis is investigated:

H3: The interrelationship between leadership and culture is influenced by factors such as market competition, firm's age and firm's size.

H3S1: Market competition is negatively connected with internal oriented cultural types (clan and hierarchy culture) and positively connected with market oriented culture.

H3S1: Firm's age and size are negatively connected with both external oriented (adhocracy and market oriented) cultural types and leadership styles, while they are positively related with both hierarchy cultural type and leadership style.

H3S2: Leadership is less affected than culture from factors such as market competition, firm's age and firm's size.

The whole research has been conducted under Greek telecommunication industry's business environment. The industry has grown considerably since 2001, after fixed telephony's deregulation and new market players gained market share and an intense competition arise. The Greek market moved from a monopolistic condition with relatively poor telecommunication infrastructure to competition and technological development. Nowadays, according to National Telecommunications and Post Commission (EETT, 2013), after a period of mergers and acquisitions as a consequence of economic crisis, market is stabilized and new prospects arise. Telecommunication sector continued to shrink in 2013, in financial and players' terms. Telecommunication's contribution to Greece's GDP fell by 35% (it is approximately 2.9% of the country's GDP), while firms' turnover decreased by 12% (as a consequence of consumers' purchasing power reduction), gross profit by 22%, and assets by 7.5%. Telephony lines amounted to 43.3 lines per 100 residents and traffic amounted to 18.3 billion minutes, while revenues from fixed telephony services reached 1.55 billion euro in 2013. At the same time, mobile telephony penetration reached 123% with more than 132 million active connections and revenues amounted 2.5 billion euro.

The specific industry has been chosen because of its dynamic and fast changing nature, following Avolio et al. (2009) arguments that substantive research is needed in order to advance the area beyond conceptual discussions. They claimed that there is a lack of empirical research on the field of leadership as a result of the difficulties in assessing the field within a dynamically changing context. The paper contributes to that by exploring a rapidly changing industry (fully deregulated, globally operating, and over-competing), aiming to identify and discuss leadership's characteristics and cultural behavior, while providing empirical evidence on the extent of the relationship between them. Moreover, the telecommunication industry has been selected as an indicative sample of high technology, culture-based competitive industry with personnel mobility and organizational heterogeneity. The specific industry is characterized as challenging and competitive and in such industries, no organization can maintain a long-term competitive advantage, according to D'Aveni (1994). The importance of conducting a leadership–cultural research, on such an environment, lies on the fact that these characteristics can become a non-imitable business asset, while technology, business models, and new products/services are easily duplicated, outweighed, or substituted.

The results provided are of both theoretical and practical value: (a) for existing firms, as benchmarks in their efforts to achieve superior/optimal performance; (b) for any firm which tries to develop a non-imitable competitive advantage through culture or leadership, and (c) for researchers on organizational culture's or leadership's field, who need to validate their own results or perform an international comparison.

3. Method

Assessment Instrument (OCAI) created by Cameron and Quinn (1999) to create the theoretical framework used so as to conduct the study is presented hereafter. This instrument recognizes leadership as one out of the six cultural dimensions: dominant characteristics, leadership style, employees' management, organizational glue, strategy, and criteria of success. This permits the measurement of both, leadership style and cultural type, by using a single instrument and also facilitates the understanding how leadership and culture are interconnected.

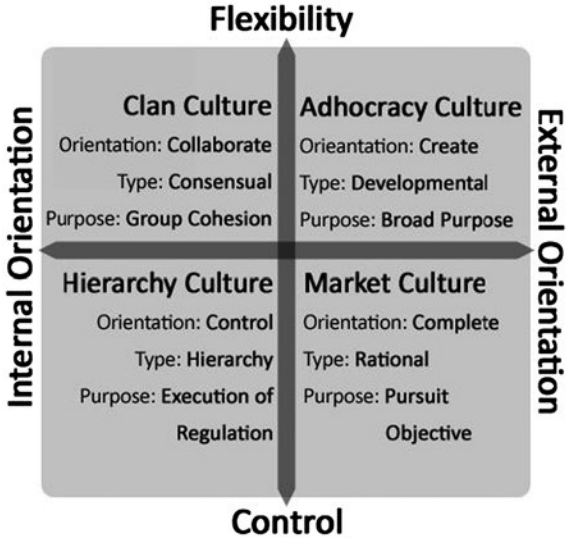
The model has two dimensions (flexibility and orientation), which create four types of culture (Figure 1). The two dimensions create four distinct quadrants, each one representing a different type of organizational culture. Each type of organizational culture has its own characteristics and its own strengths and weaknesses:

- Clan culture supports an open and friendly place to work where people share a lot of themselves. Group loyalty and a sense of tradition are strong. There is an emphasis on long-term benefits of development and great importance is given to group cohesion. There is a strong concern for people and the organization places a premium on teamwork, participation, and consensus.
- Adhocracy culture supports a dynamic, entrepreneurial, and creative place to work. Innovation and risk-taking are embraced. A commitment to experimentation and thinking differently are what unify the organization. Long-term emphasis is on growth and acquiring new resources. Success means gaining unique and new products or services.
- Market culture supports a results-driven organization focused on job completion. People are competent and goal orientated. Leaders are demanding, hard-driving, and productive. The emphasis is on winning which unites the group. Long-term focus is on competitive action and achievement of measurable goals and targets. Success means market share and penetration.
- Hierarchy culture supports a highly structured and formal place to work. Rules and procedures govern behavior. Leaders strive to be good coordinators and organizers who are efficiency minded. Stability, performance, and efficient operations are the long-term goals. Success means dependable delivery, smooth scheduling, and low cost.

Authors selected a quantitative approach, instead of a qualitative one, taking into account the nature of research and the strengths—both approaches have limitations. The non-experimental, quantitative approach selected gives: (a) precision through quantitative and reliable measurement, (b) statistical techniques for sophisticated analyses, and (c) replicable results. This approach permits to apply conventional standards of reliability and validity, while the results are open to criticism. Moreover, according to Creswell (2003), a non-experimental, quantitative approach for research is suitable for generalizing the findings from a sample population, permitting global comparisons and result validation.

Moreover, the quantitative approach is conducted in an attempt to answer certain questions and to test hypotheses. It represents an attempt to identify why something happens, what causes some event, or under what conditions an event does occur. To answer such questions, researchers have to

Figure 1. Quinn and Cameron's model.



eliminate the simultaneous influence of many variables to isolate the cause of an effect. Controlled inquiry is absolutely essential to this because without it the cause of an effect could not be isolated. Qualitative approaches for example appear to be subject of anonymity and confidentiality which have a profound effect in the subjects of study, while the viewpoints of both researcher and participants have to be identified and elucidated because of issues of bias.

Table 1. Sample's main characteristics

	Number	%	χ^2	Sig.
Firms' characteristics (N = 8)				
Fixed operators	5	62.50	–	–
Mobile operators	3	37.50	–	–
Firm's age > 25 years	1	12.50	–	–
Firm's age 10–25 years	3	37.50	–	–
Firm's age < 10	4	50.00	–	–
(age starting point 1/1/2001)				
Firm's size = large (over 3,000 employees)	1	12.50	–	–
Firm's size = medium (up to 3,000 employees)	3	37.50	–	–
Firm's size = small (up to 1,500 employees)	2	25.00	–	–
Firm's size = very small (under 500 employees)	2	25.00	–	–
(based on 2010's data)				
Employees' main characteristics (N = 222)				
Gender				
Male	108	48.64	0.54	0.00
Female	114	51.36		
Respondents' age				
20–29	47	21.18	2.93	0.00
30–39	64	28.82		
40–49	59	26.58		
50 and above	52	23.42		
Respondents' education				
Secondary Education Degree	26	11.71	2.38	0.00
Bachelor	127	57.21		
Master	69	31.08		
Managers' main characteristics (N = 80)				
Gender				
Male	51	63.75	1.90	0.00
Female	29	36.25		
Respondents' age				
< 39	26	32.50	2.30	0.00
40–49	41	51.25		
> 50	13	16.25		
Respondents' education				
Bachelor	26	32.50	2.14	0.00
Master	49	61.25		
PhD	5	6.25		

Data regarding organizational culture and leadership in the Greek telecommunication industry were collected by interviews and mails. No judgmental criteria have been used because of the relatively small number of telecommunication companies operating in the Greek market. The questionnaire comprised of 21 closed-type multiple choice questions. A trial survey was conducted in the last trimester of 2008 to establish if the answering procedure could be easily understood and complied with, while the research questionnaires were made available a few months later, during 2009. Three hundred and two employees and middle line managers from five fixed operators and three mobile operators participated in the research. Employees were asked to fill out the questionnaires and return them, while firms' managers were interviewed. The purpose of the interviews was to achieve a profound understanding of the framework under which each company operates (in top management level) and to measure its overall organizational culture and its leadership style. Interviews were conducted in order to persuade managers to participate in the research and to save time from exploring and trying to understand the questionnaire. Moreover, interviews provided important qualitative characteristics about the structures and the operational management of each firm.

At the end, 80 questionnaires from managerial representatives were collected by interviews and 222 questionnaires from employees were sent back (out of 374 totally sent to employees—response rate of 59.36%). The survey only includes companies that achieved predetermined limit of 25 questionnaires in order to gain a statistically significant view for each firm. Although the analysis conducted in the paper was at firm level, the characteristics of respondents were also provided (Table 1) in order to achieve higher comprehension of the participants in the research. Firms' age was measured by years since the founding date and data revealed that the majority of companies are relatively new (less than 10 years old). Firms' size was measured according to the current number of employees and revealed that the vast majority of firms (62.50%) can be characterized as medium- or small-sized enterprises (until 250 employees).

The sample is divided in two parts: (a) employees and (b) managers. Almost 64% of managers are male against 36% of women, revealing a tendency in Greek telecommunication market to entrust mainly males for managerial positions. The majority of manager respondents are between 40 and 49 years of age (51.25%), holding a master's degree at a level of 61.25%. The majority of employees holds a bachelor degree (57.21%) and is aged from 30 to 49 (55.40%). Female employees are slightly more than males in contrast to the results in top management level.

The sample was randomly chosen in both employees' and managers' level. Even though there have been efforts to include representatives from every business department, this was not possible for all companies. We overcome this limitation by including business departments, which could cover both internal and external orientation, as well as procedures, strategies, and innovations. The departments selected were: (a) the financial department (responsible for the economic handling and of company's internal processes and structures), (b) the technical department (responsible for after sale service and technological development), and (c) the marketing department (responsible for companies' external strategy in regard to the market and the competition).

4. Hypotheses' validation

In all companies included in the present study, the dominant cultural type is identical with the dominant leadership style. Since no major change has taken place in the market during the last five years (in terms of deregulation or privatization), it is most likely that leadership and culture have aligned through an unconscious procedure. Leaders are affected by cultural type so as to serve the organizational strategy, but they also transform culture by imposing new values, trends, and behavioral norms. Hypothesis H1 is being accepted, while the revealed relationship was tested to explore its statistical significance. The results reveal that in all cases, leadership affects culture more than it is affected, leading to a leader-centric profile for the Greek telecommunication industry, while the existence of coordination between leadership and culture in the Greek telecommunication industry proved to be a well-established and statistically significant phenomenon (acceptance of hypothesis H2).

Internal and external factors, such as market competition, firms' age, and size, are influencing the interrelationship between leadership and culture, leading to hypothesis H3's acceptance. Cultural type is affected by the degree competition, with internal-oriented cultures being negatively affected and external-oriented cultures being positively affected, while the exactly opposite results are revealed to the relationship between leadership and market competition. Furthermore, the operational age and size affect the relationship between the two elements in a similar way. Firm's age and size are negatively (when statistically significant) connected with external orientation cultural types, while there is a positive (and statistically significant) relationship with hierarchical culture.

5. Empirical results

Descriptive statistics are presented in Table 2. Cronbach's α has been used to measure the questionnaire's reliability and in most cases, it exceeds the 0.7 level as researchers recommend (Kurtinaitiene, 2005). The results reveal a reliable questionnaire, while each cultural type is described by six parameters, including leadership. Telecommunication industry gives emphasis mainly on "control" rather than "flexibility," while no result can be extracted about its internal or external orientation. "Hierarchical" and "Market" cultures dominate the industry with mean scores much higher than "Clan" and "Adhocracy" cultures. The results are in coordination with Hofstede's (1980) implications about the high tendency of Greek managers to avoid uncertainty. Moreover, this finding supports Gray, Densen, and Sarros (2003), who found that organizations with more than 100 employees are significantly less innovative (adhocracy culture) than smaller ones and consistent with the assumptions of Al-Khalifa and Aspinwall (2001) that business organizations tend to be more market oriented in response to dynamic, complex, and challenging environments.

Clan culture (which usually appears in recently founded companies) emphasizes on human resource management and dominant characteristics; adhocracy culture (which dominates innovation-oriented firms) on success criteria; market culture (which characterize firms operating in competitive markets) on strategic emphasis and leadership; and finally, hierarchical culture (which dominates mainly public administration firms) gives emphasis on human resource management and leadership. Cultures with tendency to "control" evaluate leadership highly, independent of their internal or external orientation.

Regardless the cultural type, leadership is expected to play a dominant role in competitive industries, by coordinating with the dominant culture. This coordination should facilitate companies' effective operation and strategy implementation. It is generally accepted that companies must align organizational culture with strategy or unavoidably face strategic failure (Gupta, 2011). A similar alignment between leadership and culture appears in Table 3, where leadership style and cultural type,

Table 2. Main statistics

Item statistics (N = 302)		Dominant characteristics	Leadership style	Human resource management	Organizational glue	Strategy	Success criteria	Total
Clan culture (CC)	Mean	21.821	16.788	24.205	19.603	18.113	15.828	116.689
	Std. deviation	16.46	15.056	14.434	13.792	12.962	11.505	53.118
	Cronbach's α	**0.721**						
Adhocracy culture (AC)	Mean	19.152	19.675	17.517	18.079	19.252	23.642	116.391
	Std. deviation	11.984	10.357	11.425	11.811	11.859	13.029	38.953
	Cronbach's α	**0.691**						
Market culture (MC)	Mean	28.497	32.583	23.815	33.775	36.689	31.06	185.556
	Std. deviation	17.237	17.213	16.392	17.234	19.494	19.026	73.522
	Cronbach's α	**0.778**						
Hierarchy culture (HC)	Mean	30.53	30.821	34.596	28.675	26.013	29.536	180.636
	Std. deviation	18.337	17.148	18.006	18.096	17.362	18.056	67.494
	Cronbach's α	**0.723**						

Table 3. Leadership's and culture's means

N = 80	Leadership style				Cultural type			
	Clan	Adhocracy	Market	Hierarchy	Clan	Adhocracy	Market	Hierarchy
Company 1	20.33	15.75	29.57	*34.35*	20.49	17.64	26.18	*35.69*
Company 2	17.35	20.00	*32.94*	29.71	21.98	19.44	*33.18*	25.40
Company 3	19.32	23.40	*30.23*	27.05	18.53	22.50	*31.14*	27.83
Company 4	14.17	19.22	*35.00*	31.61	13.35	17.27	*38.37*	31.01
Company 5	16.00	20.00	*37.00*	27.00	25.33	23.67	*28.17*	22.83
Company 6	18.33	22.22	*36.67*	22.78	20.74	21.02	*32.87*	25.37
Company 7	9.44	21.11	*47.23*	22.22	17.13	18.15	*39.72*	25.00
Company 8	21.67	21.67	*30.00*	26.66	22.22	22.92	*28.83*	26.03

as perceived by managers, are compared. The presented coordination gives first evidence that there is a relationship between cultural type and leadership style.

The results were tested so as to determine whether they have occurred accidently or not. Kruskal–Wallis test (Kruskal & Wallis, 1952) was conducted in order to check significant differences between the various samples (the samples of the different companies). Kruskal–Wallis χ^2 variable was used to explore differences and the results revealed the existence of statistically significant differences between the various companies' samples (probabilities below 0.05), indicating that results have not occurred accidently and are thus able to describe the examined industry (research hypothesis H2). Specifically:

- Clan culture's χ^2 is "31.218" ($p = 0.0001$),
- Adhocracy culture's χ^2 is "28.319" ($p = 0.0002$),
- Market culture's χ^2 is "28.806" ($p = 0.0002$) and
- Hierarchy culture's χ^2 is "43.377" ($p = 0.0001$).

This coordination is a signal that dominant cultural types lead to homogenous dominant leadership styles and vice versa. It is rather interesting to reveal how this relationship is formed under specific organizational factors such as market competition, firm's age, and firm's size, but moreover it would be beneficial to understand under which circumstances leadership leads to cultural formatting and vice versa (research hypothesis H3). Table 4 presents the inter-correlations of firms' culture, firms' leadership style, and control variables. The results give evidence that there is a direct relationship between market competition and the two examined variables. In particular, market competition is

- Negatively connected with clan culture (−0.114 and $p < 0.05$),
- Negatively connected with hierarchical culture (−0.149 and $p < 0.05$), and
- Positively connected with market culture (0.179 and $p < 0.05$).

Results indicate that the more intense the competition in the market, the more the market-oriented culture is cultivated, while internal-oriented cultures (clan and hierarch cultures) are limited. As far as leadership is concerned, market competition is statistically significant and correlated only with adhocracy's leadership (0.178 and $p < 0.05$), indicating that intense competition is definitely related with innovativeness leadership, while no conclusion can be extracted for any other leadership style.

As far as operational age is concerned, the results (Table 4) indicate it affects both culture and leadership. Firm's age is negatively and statistically significant and connected with both external orientation cultural types and leadership styles (adhocracy and hierarchical), while there is a positive and statistically significant relationship with both hierarchical culture and leadership. Specifically, firm's age is

Table 4. Mean, SD, and inter-correlations of outcome variables, firms' culture, firms' leadership style, and control variables

Variables	Mean	Std. deviation	1	2	3	4	5	6	7	8	9	10	11
Firms' culture													
Clan culture	116.689	53.118	1										
Adhocracy culture	116.391	38.953	0.313**	1									
Market culture	185.556	73.522	−0.599**	−0.303**	1								
Hierarchical culture	180.636	67.494	−0.308**	−0.485**	−0.439**	1							
Firms' leadership													
Clan's leadership	16.788	15.056	0.527**	−0.161**	−0.353**	0.103	1						
Adhocracy's leadership	19.675	10.357	0.302**	0.561**	−0.141*	−0.408**	−0.022	1					
Market's leadership	32.583	17.213	−0.399**	−0.214**	0.618**	−0.211**	−0.483**	−0.215**	1				
Hierarchical leadership	30.821	17.148	−0.160**	−0.064	−0.254**	0.494**	−0.377**	−0.369**	−0.445**	1			
Control variables													
Firm's size	3.020	0.874	−0.049	−0.215**	−0.139*	0.302**	0.124*	−0.157*	−0.116*	0.121*	1		
Firm's age	2.093	0.732	0.002	−0.204**	−0.189**	0.309**	0.139*	−0.167*	−0.135*	0.126*	0.963**	1	
Market's competition	1.457	0.499	−0.114*	0.092	0.179*	−0.149*	−0.052	0.178*	−0.022	−0.033	−0.021	−0.016*	1

*Correlation is significant at the 0.05 level (two-tailed).

**Correlation is significant at the 0.01 level (two-tailed).

- Negatively connected with adhocracy culture (−0.204 and $p < 0.01$) and adhocracy's leadership style (−0.167 and $p < 0.05$),
- Negatively connected with market culture (−0.189 and $p < 0.01$) and market's leadership style (−0.135 and $p < 0.05$), and
- Positively connected with hierarchy culture (0.309 and $p < 0.01$) and hierarchy's leadership style (0.126 and $p < 0.05$), but, moreover, with clan's leadership style (0.139 and $p < 0.05$).

Companies operating for a significantly long period of time are based more on their structured rules, norms, and trends than on their leaders. In their earlier stages, telecom companies have more flexible structures and are more dependent of their leaders, while in later stages, they are more structured and they are based on their cultures. The results support the idea that the older a company becomes, the more internal oriented it will become in both culture and leadership.

An interesting point is that the exact same results are presented for the relationship of firm's size with cultural type and leadership style. Since companies have the tendency to grow in terms of employees' number, (firms' size) by the time (firms' age) a link is created which implicates that during their life cycle, companies have the tendency to pass from external-oriented cultural types and leadership styles to more internal oriented ones. Specifically, firm's size is

- Negatively connected with adhocracy culture (−0.215 and $p < 0.01$) and adhocracy's leadership style (−0.157 and $p < 0.05$),
- Negatively connected with market culture (−0.139 and $p < 0.05$) and market's leadership style (−0.116 and $p < 0.05$), and
- Positively connected with hierarchy culture (0.302 and $p < 0.01$) and hierarchy's leadership style (0.121 and $p < 0.05$), but, moreover, with clan's leadership style (0.124 and $p < 0.05$).

These results indicate a direct, and in most cases, statistically significant relationship between: (a) market competition, (b) firm's age, and (c) size with both: (a) leadership and (b) organizational culture, leading to H3 research hypothesis' acceptance. Exploring the path through which this interaction is formed will enrich our understanding about both leadership and culture, while it will reveal a least investigated aspect of their interaction.

The results in Table 4 reveal that culture and leadership are correlated in a statistically significant manner (with the exception of the correlation between Adhocracy Culture and Hierarchical Leadership) negatively or positively (*H1S1*). When differentiations exist between culture and leadership (correlations between heterogeneous cultural type and leadership style), the inter-correlation results are negative. In contrast, homogeneity between leadership and culture provide positive results:

- 0.527 and $p < 0.01$ for clan culture and leadership's homogeneity,
- 0.561 and $p < 0.01$ for adhocracy culture and leadership's homogeneity,
- 0.618 and $p < 0.01$ for market culture and leadership's homogeneity, and
- 0.494 and $p < 0.01$ for hierarchy culture and leadership's homogeneity.

The results reveal that each type of culture is strongly and positively affected by the equivalent type of leadership. In order to further examine the extent of the relationship between the analyzed factors, separate path analyses were carried out. Table 5 presents the results of path analyses. The methodology (Pendhazur, 1982) involves conducting multiple regression analysis in order to construct a model connecting predictors and the criterion. The results reveal which relationships are statistically significant (ns stands for not significant relationship) and the model's degree of predictability (R^2). In all cases, this degree exceeds 0.5 which is an acceptable score.

Previous analysis and the investigated research hypotheses are confirmed. Each cultural type is connected in a statistically significant and positive manner with its corresponding leadership style and vice versa. As far as market competition is concerned, it has a significant role only in the case of:

- Market culture that is positively affected (23.74 and $p < 0.001$) and market leadership that is negatively affected (−5.06 and $p < 0.01$),
- Hierarchy culture that is negatively affected (−17.16 and $p < 0.01$), and
- Adhocracy leadership that is positively affected (2.44 and $p < 0.05$).

Firm's size has a significant role only in the case of culture, while leadership seems unaffected. Specifically, firm's size has a statistically significant role on:

- Adhocracy culture that is negatively affected (−12.73 and $p < 0.05$),
- Market culture that is negatively affected (−21.70 and $p < 0.01$), and
- Hierarchy culture that is positively affected (17.88 and $p < 0.01$).

Similarly, firm's age plays a significant role only on organizational culture. Specifically on:

- Market culture that is negatively affected (−32.99 and $p < 0.05$),
- Hierarchy culture that is positively affected (1.83 and $p < 0.001$), and
- Clan culture that is positively affected (35.19 and $p < 0.05$).

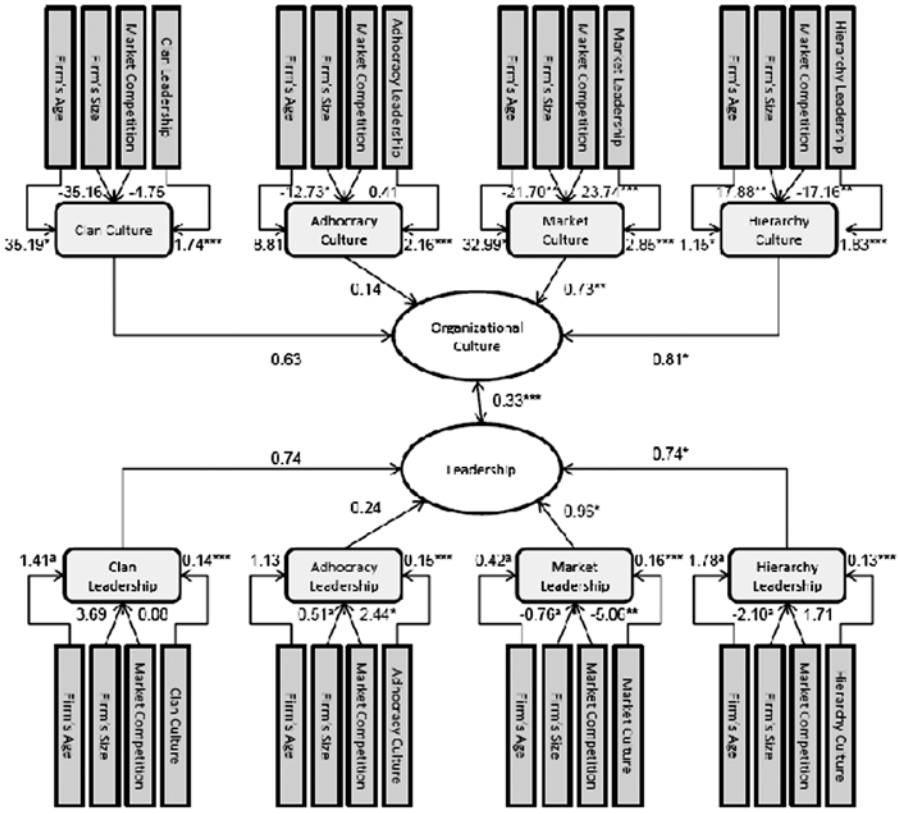
The overall results indicate that leadership is less affected, from internal and external factors, than culture. The overall culture in Greek telecommunication industry is developed as a result of the market (0.73 and $p < 0.01$) and hierarchical (0.71 and $p < 0.05$) cultures' dominance, as well as by the market-oriented (0.96 and $p < 0.05$) and hierarchy-oriented (0.74 and $p < 0.05$) leadership styles.

Table 5. Hierarchical regression analyses

Criterion	Predictors	R^2	β	p
Clan culture	Clan leadership	0.527	**1.743**	**0.000**
	Market competition		−4.746	ns
	Firm's size		−35.155	ns
	Firm's age		**35.188**	**0.014**
Adhocracy culture	Adhocracy leadership	0.595	**2.115**	**0.000**
	Market competition		0.409	ns
	Firm's size		**−12.731**	**0.021**
	Firm's age		8.814	ns
Market culture	Market leadership	0.713	**2.850**	**0.000**
	Market competition		**23.743**	**0.000**
	Firm's size		**−21.703**	**0.009**
	Firm's age		**−32.999**	**0.043**
Hierarchy culture	Hierarchy leadership	0.569	**1.827**	**0.000**
	Market competition		**−17.162**	**0.014**
	Firm's size		**17.881**	**0.018**
	Firm's age		**1.147**	**0.047**
Total culture	Clan culture	0.611	0.628	ns
	Adhocracy culture		0.144	ns
	Market culture		**0.733**	**0.005**
	Hierarchy culture		**0.805**	**0.015**
Clan leadership	Clan culture	0.514	**0.143**	**0.000**
	Market competition		0.075	0.963
	Firm's size		3.693	0.080
	Firm's age		−1.407	0.731
Adhocracy leadership	Adhocracy culture	0.595	**0.150**	**0.000**
	Market competition		**2.444**	**0.020**
	Firm's size		0.513	0.085
	Firm's age		−1.134	0.664
Market leadership	Market culture	0.694	**0.164**	**0.000**
	Market competition		**−5.058**	**0.001**
	Firm's size		−0.756	0.086
	Firm's age		0.418	0.095
Hierarchy leadership	Hierarchy culture	0.501	**0.131**	**0.000**
	Market competition		1.714	0.359
	Firm's size		−2.095	0.090
	Firm's age		1.782	0.072
Total leadership	Clan leadership	0.527	0.735	0.114
	Adhocracy leadership		0.239	0.610
	Market leadership		**0.955**	**0.045**
	Hierarchy leadership		**0.742**	**0.011**

In order to investigate research hypothesis H1, multiple regression was used to examine the degree leadership affects culture and vice versa. The results reveal that in all cases, leadership affects culture more than it is affected, leading to a leader-centric profile for the Greek telecommunication industry, where leadership plays a more significant role to cultural formatting, than the opposite (*H1S2*):

Figure 2. The path analysis model.



Notes: $^{\cdot}p \le 0.10$; $*p \le 0.05$; $**p \le 0.01$; $***p \le 0.001$

- When market orientation exists, leadership affects culture more (2.85 and $p < 0.001$) than it is affected (0.16 and $p < 0.001$),
- When hierarchy orientation exists, leadership affects culture more (1.83 and $p < 0.001$) than it is affected (0.13 and $p < 0.001$),
- When adhocracy orientation exists, leadership affects culture more (2.16 and $p < 0.001$) than it is affected (0.15 and $p < 0.001$), and
- When clan orientation exists, leadership affects culture more (1.74 and $p < 0.001$) than it is affected (0.14 and $p < 0.001$).

In all cases, there is a statistically significant relationship between the two variables, leading to the acceptance of H1. Figure 2 presents the conducted path analysis model. It presents graphically the relationship between the various organizational elements and how organizational culture and leadership are developed. Moreover, the model presents the exact interaction between leadership and culture. The results indicate a positive and statistical significant ($p < 0.001$) explanatory interaction up to 33% of the total value of its variable.

6. Synopsis and implications

Organizational culture and leadership have long been considered as crucial elements for performance and efficiency achievement, although the "culture-driven" nature of leadership is neglected in most of the literature (Alvesson, 2011). The results of the research revealed the existence of a strong and statistically significant relationship between leadership and culture in the Greek business environment. This relationship is empowered when, leading to statistical significant and positive relationship between the examined variables, a dominant leadership style is associated with its relative cultural type (for example, market-oriented leadership in association with market culture).

Moreover, it was recognized that the leader-centric character of the national market, as a result of the major impact of leadership on culture, is greater than the effect culture has on leadership. The results are in accordance with Hofstede's work (1980), which is the most widely cited work in existence (Bond, 2002) on the related topic. In order to create national–cultural profiles, Hofstede used a five dimensions tool (Power Distance, Individualism vs. Collectivism, Uncertainty avoidance, Long-term orientation vs. Short-term orientation, and Indulgence vs. Restraint) which significantly differs from Quinn and Cameron's four dimension model (flexibility, control, internal orientation, and external orientation) which aims to create an industry-related cultural model. Having a different starting point (national specific model vs. industry specific model) there is small relevance between these two models to be discussed, but there are similarities in results related with Greek context.

According to Hofstede's results, Greece has the lowest degree of "Uncertainty Avoidance" between 50 countries worldwide, while it has a rather high degree of "Power Distance." "Uncertainty Avoidance," is the extent to which people are threatened by uncertain events or by lack of structure and "Power Distance Index" is the extent to which the less powerful members of organizations accept that power is distributed unequally. Both variables indicate a risk avoidance culture, which is mostly relied on leadership and routines in order to avoid mistakes and initiatives. Hofstede (2008) recognized that his outcomes explain at large why employees in Greece are reluctant to take decisions and why they require structured routines. This situation leads to empower leadership as a business determinant, but moreover it resulted to another two phenomena: (a) growing of "control-oriented" cultural types and leadership styles and (b) coordination between leadership and culture. The present study proved that Greek telecommunication market is dominated by market and hierarchy orientation, in both leadership and culture aspects. The existence of flexibility orientation is statistical insignificant in the business environment examined.

The coordination between leadership and culture is an unexplored phenomenon even though corresponding coordination has been studied about the relationship between culture and organizational strategy (Gupta, 2011). The organizational viability and the operational growth demand a bilateral relationship, but the strength of each element depends on a series of market conditions. As the results imply, each type of culture is strongly and positively affected by the equivalent type of leadership, while lack of coordination between the two elements results in a negative impact. This has a significant importance in change management. New leadership styles can distract organizational harmony and new cultural elements may become obstacles for the effective management of leadership. Before any managerial change should take place, the cultural type ought to be examined in order to reveal the operational framework. Otherwise, change, resistance, and frictions may occur.

As Sivananthiran and Venkata (2004) revealed during their study for Sri Lanka Telecom, lack of coordination may lead to low involvement, luck of commitment and trust, poor team collaboration, conflicts between top management and employees' unions, in bureaucracy, and low levels of communication between different organizational layers, delays implementing business strategy, performance's reduce, etc. The results presented in the present study are consistent with research concerning the relationship between culture and leadership effectiveness (Kwantes & Boglarsky, 2007) and the implications about a relationship between inactive leadership and negative culture rating (Block, 2003).

The research's implications are useful in dynamic and rapidly changing industries, such as the telecommunication industry, because by defining leadership style and by developing desirable cultural elements, employees can be motivated to cultivate an efficient mentality and a competitive culture. The comprehension of leadership style and cultural type can be proved a useful tool in the global economic environment, where mergers, acquisitions, and strategic alliances occur. Managers, competitors, and regulators should have evidence of these elements before reaching any decision. Leadership and culture can become a non-imitable competitive advantage and guarantee viability and growth. Lack of coordination between these two elements can lead to change–avoidance phenomena, conflicts between top management and employees, and reduced operational efficiency.

Cultural type is affected by degree competition, with internal-oriented cultures being negatively affected and external-oriented cultures being positively affected, while the exactly opposite results are revealed to the relationship between leadership and market competition. This situation should be taken into account from managers during human resource management and strategic planning. The results imply that as market competition grows, managers tend to develop more hierarchical leadership patterns in an attempt to control procedures, while the overall organizational culture tends to become more market oriented in order to respond to competition. These tendencies should be taken into account in order to prevent the existence of an operational gap between top management's leadership patterns and the rest of the companies' cultural orientation.

Furthermore, the operational age and size affect the relationship between the two elements in a similar way. Leadership styles and almost all cultural types (except clan culture) are significantly correlated with both variables. Firm's age and size are negatively (when statistically significant) connected with external's orientation cultural types, while there is a positive (and statistically significant) relationship with hierarchical culture. The results describe a situation in which for companies getting "bigger" and "older," there should be a transition from external orientation cultures to internal orientation cultures and leadership styles. Regarding the relationship between leadership style and firms' age/size, the conducted hierarchical regression did not support the results, revealing statistically insignificant values.

As far as firms' size is concerned, the results are supportive of Cameron and Quinn (1999), who related the internal process model to large organizational size, and are consistent with many scholars who reported that larger organizations are characterized by standardized procedures, limited flexibility, and bureaucratic control (Child, 1973; Keats & Hitt, 1988; Lawler, 1997). As regards firms' age, the results are consistent with organizational life cycle theories where it is proposed that more hierarchical structures emerge as organizations grow and age (Greiner, 1998; Kriesi, 1996) since the growing firms might develop more complex management systems (Birley & Westhead, 1990).

Management should take into account background factors such as corporate age and size. Such factors can become obstacles to the adoption of an appropriate business strategy, by affecting both market orientation and cultural type. They should take into account that as firm gets larger (through business expansion, mergers, or acquisitions) or/and "older," the more hierarchical will be its culture. Cultivating desired subcultures in separate business departments or restructuring the firm (refreshing its structure) can lead to more external-oriented cultures. Furthermore, the degree of market competition affects whether culture type cultivates the leadership style or vice versa. This knowledge permits managers to estimate whether they can reshape organizational culture according to their standards or to conform. Finally, policy-makers should take into account these factors when regulating markets. The more concentrated the telecommunication industry (firms with great size) and more aged (few new firms), the more hierarchical it will be.

7. Limitations and directions

The study is subject in a series of limitations regarding the proposed quantitative research design. First, the study results relied on an instrument designed for gathering data, but facing some restrictions. These restrictions are related with cases such as: (a) participants responding randomly to the questionnaire in order to quickly complete the survey, (b) participants misunderstanding the instructions of how to properly complete the survey, and (c) participants that may have had someone else complete the questionnaire, resulting in inaccurate data. Secondly, the results have arisen under a certain national–cultural context and in a specific business environment. The usage of a quantitative approach during the leadership's and culture's measurement permits, in a later stage, global comparisons between companies operating in different national contexts, under a differentiated cultural framework and following different leadership models.

Apart from validating the results in different national and business environments, authors have some future directions to suggest. Further research is needed for the creation of a model exploring the extent in which the relationship between leadership and culture is affected by (a) industrial

characteristics (such as firm's age and size and employees' education and tenure) and (b) national culture's characteristics (power distance, individualism, masculinity, uncertainty avoidance, and long-term orientation). Regarding the relationship between leadership style and firms' age/size, the conducted hierarchical regression did not support the results, revealing statistically insignificant values. Even though there is an established relationship, the extent and the depth should be a matter of future research. Finally, it is important to develop a time-series database and to test the relationship between leadership style and organizational culture in a longitudinal framework in order to provide more insights into the probable causation. The time sequence of the relationship cannot be determined unambiguously by using cross-sectional data only.

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