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Conference Paper

Organizational Culture in the Greek Science and Technology Parks: Implications for Human Resource Management.

46th Congress of the European Regional Science Association: "Enlargement, Southern Europe and the Mediterranean", August 30th - September 3rd, 2006, Volos, Greece

Provided in Cooperation with:

European Regional Science Association (ERSA)

Suggested Citation: Pelagidis, Theodore; Kriemadis, Thanos (2006) : Organizational Culture in the Greek Science and Technology Parks: Implications for Human Resource Management., 46th Congress of the European Regional Science Association: "Enlargement, Southern Europe and the Mediterranean", August 30th - September 3rd, 2006, Volos, Greece, European Regional Science Association (ERSA), Louvain-la-Neuve

This Version is available at:

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A Note on the Organizational Culture in the Greek Science and Technology Parks

Abstract

This paper contributes to an understanding of the organizational culture of the spin-off knowledge-based enterprises, which operate within the Science Parks in Greece. In this context, this paper focuses on the fieldwork and analyses its results. In this context, a critical number of questionnaires have been distributed to the spin-offs to examine whether firms born within the parks have developed a functional organizational culture, one that provides a solid foundation for organizational effectiveness and business excellence. The paper deals with a quantitative analysis of the data collected. It also includes the results as well as the necessary policies for the Greek Science Parks to overcome organizational culture problems and approach business excellence.

Keywords: Science Parks, Organizational Culture

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1. Introduction

After the Bretton Woods collapsed and as, at the same time, the rigid fordist mass production-mass consumption model was reaching its limits, a new mode of business organisation began gradually to make its appearance based on flexibility in production and distribution.¹ The most distinctive characteristic of the so-called flexible production or business systems was the encouragement, if not necessity, for close links between enterprises and research institutes or/and Universities.² That was a critical break up with the "fordist" past where industries and Universities were quite separate fields of activities, representing organisations with quite different and separate roles within the socio-economic system. The new "flexible" paradigm, encouraging team working and polyvalence in skills, needed highly educated workers, ready to execute diversified and high quality tasks, often changing rapidly working positions. With the appearance of the so-call "new economy" and the new generation of "flexible technologies", the co-operation of firms with research institutes and Universities became a necessary prerequisite to pursue competitiveness in an increasing globalized market.

In the '80s and '90s, governments started building new, tighter relations between "research and production" by financing infrastructure as well by promoting through institutional means "science or/and technological parks", in an effort to succeed high rates of productivity and growth. The development flexible, knowledge-based companies within the "parks" (so-called spin-offs) based in a location linked to a centre of technological excellence (a University or an Institute) became the primary target of national industrial policies, especially in the EU member-states.

Henceforth, science parks are said to facilitate,

- ◆ flexibility in production, new industrial activities, modernisation, and internationalisation of enterprises through technology transfer,
- ◆ accumulation of technologies and of core activities in a region,
- ◆ close links between universities and industries or small enterprises, in order for the construction of co-operation and communication networks³, and last but not least,
- ◆ culture of innovation, selectivity and competition.

Science Parks were originally an American phenomenon dating back to the 1960's, devised to meet the needs of entrepreneurial-minded academics. In Europe, the Science

¹ See the classic study by M. Piore and C. Sabel, *The Second Industrial Divide*, New York: Basic Books, 1984.

² See C. Antonelli (ed), *New Information Technology and Industrial Change: The Italian Case*, London: Kluwer, 1988, for the Italian model of cooperation between Universities and Industries, SMEs in particular; For the Californian Silicon Valley case see, P. Hall and A. Markusen (eds), *Silicon Landscapes*, Mass: Allen and Unwin Inc., 1988.

³ For networks and 'clusters' of mutual co-operation see M. Enright, *Survey of Characterization of Regional Clusters*, University of Hong Kong working paper, 2000. For 'regional systems of innovation' see F. Coulon, *Regional Systems of Innovation: A Case Study of four Science Parks in Belgium and Sweden*, University of Linköping, Sweden.

Park "movement" made its appearance first in the UK in 1971 with the formation of Parks at the Heriot-Watt University and at Cambridge University.⁴

Research and technological poles have been also set up in Greek regions but only in the late '80s, introducing local economy into the modern international competitive environment. These infant cores of innovation have already inspired both academics and entrepreneurs to construct new models of investment planning and production. Although not yet fully developed, some of them, they have already created complex links between universities and industries, giving birth to many spin-off knowledge-based enterprises.

Firm's organisation quality and culture is one of the pillars of success in international competition. This paper focuses on examining the quality of organisational culture of the spin-off knowledge-based enterprises, within the Greek science and technology parks. It also includes firms that have lately exited the parks but still have a close co-operation with them. It focuses on the fieldwork and analyses its results. A critical number of questionnaires have been distributed to the spin-offs to examine whether firms born within the parks have developed a functional organizational culture, one that provides a solid foundation for organizational effectiveness and business excellence. The paper deals with a quantitative analysis of the data collected. It also includes the results as well as the necessary policies for the Greek Science Parks to overcome organizational culture problems and approach business excellence.

2. Field Work

2.1 Culture and organization

The term culture refers to a set of beliefs, values and behaviours held by a society (Lim, 1995). Uttal (1983) defined culture as a "system of shared values (what is important) and beliefs (how things work) that interact with a company's people, organizational structures, and control systems to produce behavioural norms." Cameron and Freeman (1991) proposed the following framework of four organizational culture types: (a) Market, (b) Clan, (c) Adhocracy, and (d) Bureaucratic Hierarchy. Each culture type is characterized by a particular set of shared beliefs; style of leadership, set shared values that act as a bond for all employees within the company. The Market culture emphasizes a goal-oriented enterprise, competitive actions and achievement. The Clan culture is characterized by a personal place and emphasizes human resources. The Bureaucratic Hierarchy culture is characterized by a formalized, structured places held together by formal rules and policies emphasizing stability. Finally, the Adhocracy culture emphasizes a dynamic entrepreneurial place held together by a commitment to innovation and development. Most companies have elements of several types of cultures. Lund (2003) examined the impact of organizational culture types on job satisfaction of firms in the USA using the model of organizational cultures developed by Cameron and Freeman (1991). The author identified that job satisfaction was positively related to Clan and

⁴ The British Council, "Science Parks", Briefing Sheet7, UK Partnerships, October 1999, at www.ukspa.org.uk, p. 4

Adhocracy cultures and negatively related to Market and Bureaucratic Hierarchy cultures.

Hofstede (1980) stated that culture accounts for the economic performance of various countries. Schein (1990) suggested that the idea of corporate culture provides a basis for understanding the differences that may exist between successful companies operating in the same national culture. Peters and Waterman (1982) found out that successful companies possess certain cultural traits of business excellence. Ouchi (1981) reported a relationship between corporate culture and increased productivity while Deal and Kennedy (1982) argued for the importance of a “strong” culture in contributing towards successful organizational performance. Kotter and Heskett (1992) examined how changing environments affected culture and performance, and found that companies with consistently good economic performance over time tended to possess core values that emphasized the importance of an adaptive culture. They also suggested that culture might only be an intermediary of the impact of effective leadership on organizational performance. A number of studies alleged the presence of a “strong” culture as a positive influence on organizational performance. According to Sadri and Lees (2001), while culture is not the only determinant of business success or failure, a positive culture can be a significant competitive advantage.

2.2 Research Method: Research Instrument

The Organizational Culture Assessment Questionnaire (OCAQ) was developed by Sashkin (1996) to help people identify and understand the nature of the culture in their own organization, as a first step in identifying problems and defining the sort of culture they want (and the sort of culture that will help deal with organizational problems). The data obtained by means of the OCAQ can be used to identify and find ways to deal with culture-based organizational problems.

The OCAQ is based on the work of Dr. Talcott Parsons, a sociologist at Harvard. Parsons developed a framework and theory of action in social systems. He argued that all organizations must carry out four crucial functions if they are to survive long-term. These four functions are: (a) Managing Change: Scale I of the OCAQ assesses the degree to which respondents see the organization as effective in adapting to and managing change; (b) Achieving Goals: Scale II of the OCAQ asks respondents to describe how effective the organization is in achieving goals; (c) Coordinated Teamwork: OCAQ Scale III assesses the extent to which an organization is effective in coordinating the work of individuals and groups; (d) Customer Orientation: Scale IV of the OCAQ assesses the extent to which organizational activities are directed toward identifying and meeting the needs of customers; and (e) Building a Strong Culture: Scale V of the OCAQ assesses the strength of the organization’s culture, asking respondents to report on the extent to which people agree on values and examining the extent to which certain “meta values” are present such as the belief that people should support their views with facts.

Each of five OCAQ Scales has six items, with each item score ranging from 1 (low or poor) to five (high or good) and thus, the total score of the OCAQ can be as low as 30 or as high as 150. Sashkin (1996) has developed a table of norms (Table 1) showing what scores on each scale are high and what sorts of scores are low. Sashkin (1996) mentioned that the table of norms should be seen as suggestive, not as absolutely defining what is high and what is low.

2.3 Sample and Data Collection

There are four Greek Science Parks. Two of them, the 'Thessaloniki Technology Park (TTP)⁵ and the Crete Scientific and Technological Park (STEP-C)⁶, are considered to be

⁵ Thessaloniki's Technology Park was established in 1988, to meet the need for greater exchange of ideas, people and facilities between universities and industry. In 1994, the Thessaloniki Technology Park Management and Development Corporation (TTP/MDC S.A.), a separate company, was created with the participation of FORTH/CPERI and major industries of central Macedonia. The company promoted and enhanced the activities of the Thessaloniki's Technology Park in close co-operation with the Association of industries of Northern Greece, and with the University of Thessaloniki.

"The Center for Research and Technology Hellas" promotes activities, which contribute to the increase of competitiveness of Greek industry with special emphasis on Chemical Technology (specialised software for polyethylene and propylene production facilities, environmental friendly catalyst for production of fuel etc), Food & Beverage, Textiles and Energy and Environment. Furthermore, TTP/MDC identifies present, future and latent industry needs within Northern Greece and links them with technological innovation. It promotes technology transfer among Greece, the EU, the USA, Eastern Europe and the Balkans and coordinates the Greek-American initiative for technology co-operation with the Balkans. This is being accomplished through organisation, implementation and participation in national and European training programmes and workshops on the use of technologies.⁵ It also serves as Industry – Research Liaison, performs partner searches, executes assessment and exploitation of research results, assists with RTD proposal preparation, submission and project management. Furthermore, it ensures information dissemination concerning research results, technological developments and the emergence of new technologies. Technology brokerage, technology search & assessment, assistance for technology implementation are also provided. Finally measurements and testing quality control through promotion of analytical services are also undertaken.

⁶ The Science and Technology Park of Crete established in 1993, it was inspired to promote the creation of a third thrust of development on the island, in addition to the agriculture and tourism industry. The EU as well as the local and central government funds supported the development of the Park during the early 90's. The Managing Company of STEP-C (EDAP S.A) was established in December 1993 with FORTH as its main shareholder (35%). STEP-C gears itself to become an ever increasing attraction as an incubator, nurturing spin-offs and small innovative companies in the areas of Medical Equipment, Biotechnology, Telecommunications, Telematics and Teleworking, Microelectronics and Laser Applications, Polymers and Applied Mathematics, which are key strength areas of FORTH and the UoC. The park focuses on technology transfer, incubation facilities and promotion of the park products. One of the key objectives of STEP-C is the transfer of deliverables of research and other activities to the industry. STEP-C has developed incubation facilities through various projects financed by the Greek Ministry of Development. Today there are 25 companies, which reside within the park premises in the areas of Information Technology, Biotechnology, Environmental Technology, Laser Applications, Biomedical Technology and Services. The Park also developed co-operation and bilateral relations with the main local actors in the field of Education, Science and Technology and Business as well as with the Regional Authorities. The Science and Technology Park of Crete, known to many by one of its key activities as the Heraklion Incubator, is today the leading Park in the country, with promising perspectives.

relatively well-developed, while Patras⁷ and Volos⁸ science parks still have some (Volos) or most (Patras) of their structures, at least partly, under construction. The data for the present study were obtained by the OCAQ mailed to a sample of 33 spin-off companies which operate within the aforementioned Science and Technological Parks. The mailing consisted of the questionnaire itself, a cover letter, and a stamped pre-addressed return envelope. As response inducement, each respondent was promised a copy of the study results on request. Of the 33 questionnaires mailed after phone contact, 33 were received, representing a 100% response rate. This high response rate was due to the fact that companies within the Science and Technological Parks have realized the value of participating in field research conducted by the Universities and take advantage of the knowledge disseminated by them. It should be also noted that the Greek Ministry of Development contributed, at least indirectly, to the 100% response rate as it let the parks know its intention to proceed to their funding thorough the 4th framework program with a clear intention and policy goal to create the so-called “Regional Poles of Innovation”.

Table 1
OCAQ Norms

	Managing Change	Achieving Goals	Coordinated Teamwork	Customer Orientation	Cultural Strength	Total
Very High	30	28-30	28-30	25-30	26-30	119 +
High	26-29	23-27	24-27	21-24	22-25	108-118
Average	19-25	16-22	18-23	15-20	17-21	87-107
Low	15-18	11-15	14-17	11-14	13-16	76-86
Very Low	6-14	6-10	6-13	6-10	6-12	30-75

⁷ Patra’s Science Park, mainly still under construction, was founded in 1989. It is interested in Business Exploitation of R&D results, with emphasis on new innovative technology based companies. In addition, it concentrates on R&D – Production liaison, promotion of Innovation, linking of finance innovation and also activities outside the park aiming at: enhancement of competitiveness and construction of an environment favouring innovative developments in the area.

⁸ The technological park of Volos (Thessaly) was founded in November 2001. Taking advantage of the Volos' industrial area, the aim of the technological park is to provide facilities to knowledge-based enterprises that are located in the greater Thessaly region, to connect them with the Polytechnic University of Volos and to give birth to new spin-offs in industrial sectors and fields. The "parks is a S.A. and its among shareholders are 39 modern firms, the University of Thessaly and the local authorities.

2.4 Results

Table 2 presents a summary of respondents' mean scores as well as the total score for all companies involved in this study. Regarding Managing Change, the mean score is 15.82 and is considered low compared to the corresponding mean of the table of norms. According to Sashkin (1996), this area of action concerns how well the organization is able to adapt to and deal effectively with changes in its environment. All organizations are open, to some extent, to rapid technological and social change.

The mean score for Achieving Goals is 15.03 and is considered low compared to the corresponding mean of the table of norms. Sashkin (1996) stated that having a clear focus on explicit goals as been proven repeatedly to have a very strong relationship to actual success and achievement.

Regarding Coordinated Teamwork, the mean score is 13.96, again low compared to the corresponding mean of the table of norms. Sashkin (1996) believes that long term organizational survival depends on how well the efforts of individuals and groups within the organization are tied together, coordinated and sequenced so that people's work efforts fit together effectively.

The mean score for Customer Orientation is 13.51 and is considered low compared to the corresponding mean of the table of norms. Sashkin (1996) argued that no matter how strong the culture and no matter how well the other functions of the organization are performed, if no one wants what the organization produces, then the organization is not likely to survive and prosper.

Finally, the mean score for Cultural Strength is 13.67, again low compared to the corresponding mean of the table of norms. Sashkin (1996) stated that a strong culture based on values that support the functions of managing change, organizational achievement, customer orientation, and coordinated teamwork, will provide greater stability of organizational functioning.

The total score 71.99 is very low compared to the corresponding one of the table of norms. However, Sashkin (1996) stated that the OCAQ is intended as a diagnostic aid, a first step in building better functioning organizational cultures. Through the OCAQ the company's management can probably get some feeling for what sort of numbers are "high" and what might be considered "low" from looking at Table 1. Most important is that the items that make up the scales provide concrete directions about what an organization might actually do to improve its culture.

Table 2
Results of the Study

	Managing Change	Achieving Goals	Coordinated Teamwork	Customer Orientation	Cultural Strength
N	33	33	33	33	33
MEAN	15.82	15.03	13.96	13.51	13.67
SD	2.25	2.49	3.35	2.79	3.37

Total Score: 71.99

3. Policies and Conclusions

Sashkin (1996) stated that all organizations have a culture based on values and beliefs shared by some, most or all of the organization's members. However, when the culture is based on values that do not support the functions of managing change, organizational achievement, customer orientation, and coordinated teamwork, then this culture might actually hamper organizational survival and growth.

Businesses of the Greek Science and Technological Parks need to adopt new approaches in attempting to change and manage effectively their organizational culture. Williams et al. (1993) suggested the following five methods commonly used by management:

- (a) Changing Human Resource management policies, management style and work environment.
- (b) Training employees in new skills and thus influencing their job attitudes.
- (c) Providing employees with training and role models appropriate to the desired culture, a culture which supports change, organizational achievement, customer orientation, and coordinated teamwork.
- (d) Greater emphasis on selecting people with the desired attitudes as well as technical skills and experience. This may include the use of more sophisticated selection techniques, for example psychometric testing, assessment centres, and biodata.
- (e) Moving people into new jobs to break up old sub-cultures.

According to Whiteley (1991), the organization may use the following strategies to be customer driven:

- a. Information from customers is used in designing products/services
- b. The organization regularly asks customers to give feedback about its performance (satisfaction measures look at the extent to which customers are satisfied with the service they have received)
- c. Customers' complaints are regularly analyzed in order to identify quality problems
- d. Internal procedures and systems that do not create value for the customers are eliminated
- e. Employees are encouraged to go above and beyond to serve customers well

- f. Employees who work with customers are supported with continuous training and resources that are sufficient for doing the job well
- g. Employees are empowered to use their judgement when quick action is needed to make things right for a customer.

Working as a team is a natural human behaviour. Everyone acts as part of a team, for the good of the entire organization. Verespej (1990) found that the most important benefits to working in teams are: a) improved involvement and performance, b) positive morale, and c) sense of ownership and commitment to the product/service that teams create.

Dr. Deming also argued that competition is counterproductive inside an organization. The establishment of quality circles is a good example of teamwork. Quality circles consist of small groups of employees who meet to uncover and solve work-related problems. Members get together regularly to learn interpersonal skills and statistical methods associated with problem-solving and to select and solve real problems. Members meet an hour a week both during regular and outside of regular working hours. Meetings are chaired by a group leader. The leader is a discussion moderator who facilitates the problem-solving process. Problems are not restricted to quality, but also include productivity, cost, safety, morale, environment and other topics (Crocker, Charney and Chiu, 1984).

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