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DOES GENDER AFFECT ANGER AND AGGRESSION IN HANDBALL PLAYERS?

CHRISTOS CHRISTOFORIDIS, VASSILIS KALIVAS[*], OURANIA MATSOUKA, EVANGELOS BEBETSOS[**] and ANTONIS KAMBAS[***]

ABSTRACT

The purpose of this study was twofold: 1) to assess the construct validity of the Competitive Aggressiveness and Anger Scale (Maxwell and Moores, 2007), and 2) to examine, if variables such as gender and athletic experience, influence the levels of athletes' aggressiveness and anger. The sample was 175 team handball players. Results of factor analysis provided evidence for the construct validity of the scale. Additionally, as results indicated, gender and athletic experience influenced aggressiveness and anger. In conclusion, the results indicated the important role of aggressiveness and anger on sport performance.

Keywords: Anger; Aggressiveness; Handball.

1. INTRODUCTION

Competition usually results in contention and, like it often happens in team or individual sport events, the effort for dominance can lead to the use of aggressiveness (Leith, 1982). Researchers have reached to the conclusion that violence and aggressiveness are two of the most serious problems in sports (Stephens, 1998) and (Conroy, Silva, Newcomer, Walker and Johnson, 2001), especially in sports like ice hockey (Worrell and Harri, 1986). A lot of discussion has been done for the appropriate definition of aggressiveness (Kerr, 1999) and (Kerr, 2002), as much as for the development of the appropriate tools for its evaluation (Husman and Silva, 1984) and (Stephens, 1998) and (Maxwell, 2004).

According to Smith (1983), aggressiveness "…is defined as any behavior planed to hurt someone physically or psychologically". Aggressiveness in sports is often construed as "the behavior intended to harm in sport areas" (Bredemeier, 1983). Furthermore, Husman and Silva (1984) define as sport aggressiveness "…any behavior not recognized as legal through the sport official regulations, which is

[*] Research assistant, Department of physical education and sport science, Democritus University of Thrace, Greece

[**] Lecturer, Department of physical education and sport science, Democritus University of Thrace, Greece

[***] Assistant Professor, Department of physical education and sport science, Democritus University of Thrace, Greece

directed towards an opponent, referee, teammate or fan who tries to avoid it". According to Tenenbaum, Stewart, Singer and Duda (1997), this last definition is the most accepted from ISSP (International Society of Sports Psychology).

In moral violence and aggressiveness issues, research in sports area is mostly empirical. Bredemeier with her students carried on some investigations (Bredemeier and Shields, 1984) and (Bredemeier, 1986a) and (Bredemeier, 1986b) and (Bredemeier, Weiss, Shields and Cooper, 1986) and (Bredemeier, Weiss, Shields and Cooper, 1987) and primarily examined the relationship between participation in sports and various issues that have to do with ethics, like moral causality, offensives and judgments regarding legality of deliberate harmful sport activities. The greater part of this research was focused on sports of moderate and high physical contact, because these sports have inherent dynamics for injuries and therefore moral issues come up, directly connected to violence and aggressiveness (Bredemeier and Shields, 1986).

About how important the kind of sport is (contact or not), early research containing general moral maturity measurements showed that college basketball players had lower level of maturity compared to all other students according to certain norms (Hall, 1981) and (Bredemeier and Shields, 1984). Furthermore, basketball players presented less cause maturity compared to non athletes regarding either life issues or sport ethics dilemmas (Bredemeier and Shields, 1986). Despite these, no significant differences were found between college level basketball players and swimmers (Bredemeier and Shields, 1986).

Bredemeier et al. (1986) also found that boys' full-time participation in high physical contact sports like rugby, wrestling, judo and girls' involvement in moderate physical contact sports like football and basketball, is correlated with less mature moral causality and greater self-reported tension for aggressiveness as much in sports as in real life. Other studies about long time participation of young children in moderate contact sports (Conroy et al, 2001) and participation in high contact between boys in sport camp (Bredemeier et al., 1987) agree with these results.

Research results have indicated that men and athletes of team sports presented higher rates of aggressiveness than women and athletes of individual sports (Baron and Richardson, 1994) and (Eagly and Steffen, 1986). Respectively, other results support that when the level of competitiveness is higher, the level of aggressiveness is also higher (Butt and Cox, 1992).

Silva (1983) examined whether there is a connection between contact sports and legality of aggressive behaviors. The researcher presented to students 12 slides on the topic of anti-sport behavior from various sports (American football, soccer, baseball and ice hokey). Students were asked to report whether they consider such behavior as acceptable during the match. Results indicated that, for men, as higher the level of contact was for the sport they were participating in, the more acceptable the corresponding behaviors were. On the other hand, women reported full opposition to such behaviors.

Later studies focused on the presentation of anti-sport behaviors, so that the effect of the level of contact on proper decision making is examined. Conroy et al (2001), presented 10 sport scenarios of aggressive and anti-sport behaviors to subjects of 8 to 19 years of age. They were asked to judge whether those behaviors were legal or not. Children who participated in sports of moderate to high contact sports, considered the presented behaviors as legal. An interesting result was that male of age of 12 years and older, gradually considered more and more of those behaviors as legal.

In another research, of Tucker and Parks (2001), results indicated that college athletes of high contact sports were more receptive to aggressive actions and behaviors in relation to athletes of moderate contact level sports. Studies also examined possible differences that may appear in morality and aggressive behavior in relation to the nature of the sport (individual, team). Particularly, Vallerand, Deshaies and Cuerrier (1997) examined possible differences between the individual sports of gymnastics, badminton and track and fields in contradistinction to the team sports of volleyball, basketball and ice hockey. It was asked from the athletes to report whether they would morally react in two anti-sport scenarios presented to them. Results indicated that team sports athletes reported they would act less morally than individual sports athletes.

Research from Kanussanu and Ntoumanis (2003), examined the relationship between long time participation in team sports and three moral scenarios. Subject consisted of college athletes who were part of soccer, ice hockey, basketball and rugby teams. Results indicated that athletes with greater participation rates in their sport had lower rates on morality and higher compared to aggressiveness.

In the field of sport psychology, three questionnaires are broadly used for the analysis of aggressiveness; (1) Buss-Durkee Hostility Inventory (Buss and Durkee, 1957), (2) Buss-Perry Aggression Questionnaire (Buss and Perry, 1992), (3) Bredemeier Athlete Aggression Inventory (Bredemeier, 1975) and (Bredemeier, 1978), (4) Continuum of Injurious Acts (CIA) (Bredemeier, 1985) and (5) Sports Brehaviour Inventory (Conroy et al, 2001). The first three of them examine terms like anger and aggressiveness, while the other two examine the perspective of the individual about the legality of certain aggressive behaviors.

In 2007, Maxwell and Moores developed another questionnaire, the C Aggression and Anger Scale (CAAS). The purpose was the need of an anger and aggressiveness evaluation tool for the better understanding of aggressiveness in competitive sports. Anger and aggressiveness have been recognized as two of the most powerful elements of aggressive behavior (Berkowitz, 1983) and (Berkowitz, 1989) and (Berkowitz, 1993), so that they consist determinants of athletes with aggressive emotions.

Many researchers examined the effects of aggressiveness on sports. The most frequent factors are the location of the court (Keltikangas-Jarvisen and Kelnonen, 1988) and (Lefebvre and Passer, 1974), the base court advantage (McGurie, Courneya and Widmeyer, 1992) and (Varca, 1980), the competition level (Butt and Cox, 1992)

and (Coulomb and Pfister, 1998), the competition frequency (Widmeyer and McGuire, 1997), the opponents' aggressiveness (Harrell, 1980) and (Russell, 1974) and gender (Bebetsos, Christoforidis and Mantis, 2008).

The purpose of the present study was twofold: a) to examine the construction validity of the evaluation tool of Maxwell and Moores (2007) and b) to investigate if factors like sex and sport experience alter the athletes' aggressiveness.

2. METHOD

2.1. Subjects

The sample included 175 team handball athletes from the Youth Team Handball Championship Finals Tournament, in Greece. More specifically, they were 75 men (42.3%) and 100 women (57.7%). The mean age was 15.2 yr. (*SD*=1.2) and ages ranged from 14 to 19 years.

2.2. Questionnaire

To measure athletes' aggression, the Competitive Aggressiveness Anger Scale was used (Maxwell and Moores, 2007). It measures two factors: Anger (six items, e.g., "I find it difficult to control my temper") and Aggressiveness (six items, e.g., "I use excessive force to gain an advantage"). The scale was translated into Greek using a back translation procedure in an earlier study by Bebetsos et al (2008). For the purpose of the present study, the Greek version of the instrument was administered to ten team handball athletes to examine whether the items of this version were comprehensive and well understood. No further modifications were made after the above process.

Responders were instructed to indicate the extent of their satisfaction with each item on a 5-point scale ranging from 1=never to 5=always. Also, at the end of the questionnaire the athletes were asked to indicate their gender and their athletic experience (yrs). Responses were given in a numerical format.

2.3. Procedure

The method chosen to conduct the research was that of self-completed questionnaires. Researchers informed all subjects that their participation was completely voluntary and the individual responses would be held in strict confidence.

3. RESULTS

3.1. Psychometric characteristics

One of the objectives of the paper was to test the psychometric properties of the scale in the context of Greek team handball players. A principal component analysis with varimax rotation was performed to test the factor structure of the scale. The above analysis was selected since the two factors were found to be uncorrelated. As shown in Table 1, the two factors that emerged from the analysis accounted for 60% of the total variance. These factors were the same as the Leadership and Personal outcome factors that were mentioned above. Additionally, using the Cronbach's coefficient α internal consistency, Anger was .80 and for Aggressiveness .75 (Table 1).

TABLE 1: PRINCIPAL COMPONENT ANALYSIS

Item	Anger	Aggressiveness
I become irritable if I am at a disadvantage during a match	.70	
I feel bitter towards my opponent if I lose	.80	
I taunt my opponents to make them lose concentration		.80
I verbally insult opponents to distract them		.72
I show my irritation when frustrated during a game	.76	
Opponents accept a certain degree of abuse		.55
I use excessive force to gain an advantage		.83
Official's mistakes make me angry	.50	
It is acceptable to use illegal physical force to gain an advantage		.77
I get mad when I lose points	.60	
Violent behavior, directed towards an opponent, is acceptable		.85
I find it difficult to control my temper during a match	.71	
Eigen value	4.35	2.12
% of variance explained	43.5	21.2
Mean scores	6.10	5.15
Cronbach's alpha	.80	.75

3.2. Gender

Independent-Samples t-tests were conducted in order to find any differences between genders. The results did reveal statistical significant differences on "aggressiveness" ($F_{1.1}$ =13.05, p<.001). More specifically, men (M=1.93) had higher scores than women (M=1.52).

3.3. Athletic experience

One-way analysis of variance was conducted to examine differences by the athletic experience level of the athletes. Results indicated statistical significant differences on "aggressiveness" ($F_{2.1}$ =7.34, p<.001). More specifically, the most experienced athletes (> 8 yrs), had the highest scores (M=6.3), followed by the intermediate group (5-7 yrs) (M=5.4), and last was the youngest group (1-4 yrs) (M=4.7). No significant differences were found for "anger".

4. DISCUSSION

One of the objectives of present research was the initial examination of structural validity of questionnaire of athletic aggressiveness. The results of factor analysis confirmed the existence of two factors, as they were also reported by their Maxwell and Moores (2007). Moreover, the good internal cohesion of two factors of questionnaire confirm his reliability. This means that other researchers, trainers or administrative executives of athletic organisms could use the particular instrument, in order to measure levels of anger and aggressiveness.

The results showed that male athletes presented higher score in both factors of questionnaire (anger and aggressiveness), than women. According to previous researches, men present themselves as more competitive which many times lead to a more aggressive behavior (Bredemeier, 1978) and (Maxwell, 2004). Also, researches support the idea that in the environment, which is determined as more "mannish", boys will present higher rates of aggressiveness (Lirgg, 1991). (As a result of that, because the boys-men judge many of their injuries as less serious, address more aggressive behaviors (Hiller and Morrongiello, 1998)). On the other hand, women are characterized as more sentimental and emotional (Harrell, 1980) and (Russell, 1974). Similar results were found in a previous research in Greece (Bebetsos et al, 2008).

Also the results of research showed differences among athletes on the aspect of "athletic experience" that were presented. More concretely, the individuals with greater athletic experience presented higher scores in aggressiveness. We should not forget that more experienced athletes are placing themselves in greater risks because they assert more i.e. championships, money prices, being members of the national or Olympic team, medals, or even academic molecules. Previous results support the idea that more experienced athletes, do show a greater aggressive behavior and rise moral dilemmas (Kavussanu and Ntoumanis, 2003) and (Konstantoulas, Bebetsos, and Michailidou, 2006) and (Bebetsos and Konstantoulas, 2006) and (Bebetsos et al 2008).

Finally, it should, also, be reported a limitation of the present study. All athletes were athletes of one sport (team handball).

Summarizing, we could say that this research stresses the importance of Anger and Aggressiveness in the Greek athletic reality. Similar researches can help athlete,

trainer and also individuals that deal with lifetime athletic experiences. Further use of the questionnaire in other sport environments, is considered useful.

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HUMAN CAPITAL AND EDUCATION POLICY IN GREECE

GEORGE M. KORRES*

ABSTRACT

Human capital accumulation is an important determinant of individuals' earning capacity and employment prospects, and therefore plays an important role in determining the level and distribution of income in society. Several studies have also confirmed the importance of investment in education as a determinant of economic growth. Education is also found to be associated with various non-economic benefits. Across countries, there is a broad consensus that some degree of government involvement is needed in the provision of educational services. All developed countries seek to ensure that all young people enter working life with a minimum amount of human capital acquired during the years of compulsory education. This paper is aiming to analyze the human capital and educational policy in Greece and also to examine the effects in economic growth.

Keywords: Education; Human Capital; Policy; Economic Growth; Competitiveness.

1. INTRODUCTION

It is well known that human capital is important for development and for individual earnings in particular. In a recent extensive robustness analysis by Sala-i-Martin et al. (2004), primary schooling turns out to be the second most robust factor influencing growth in GDP per capita out of sixty-seven explanatory variables in growth regressions on a sample of eighty-eight countries 1960–96. Later analyses have found a similarly clear positive association between years of schooling and growth, but results are sensitive to model specification, particularly which measures are applied for human capital (Hanushek and Woessmann, 2008). Macro studies indicate that the rate of return to schooling across countries is on average about 10 percent. Returns appear higher for low income countries, at lower levels of schooling and for women (Psacharopoulos and Patrinos 2004).

Similarly, human capital influences occupational choice and performance patterns within occupations. There is a huge literature with respect to the relationship between education on entry into and performance in entrepreneurship in developed countries. They find that an increase in education generally pulls individuals out of farm work but its impact on the choice of wage work versus enterprise activities are ambiguous. However, the relationship between schooling and performance is unambiguously

*Visiting Fellow University of Newcastle Centre of Urban and Regional Development Studies (CURDS) Newcastle: NE1-7RU, United Kingdom and Associate Professor, University of the Aegean, Department of Geography

positive. In developing countries an additional year of schooling raises enterprise profits by 5.5% which is lower than the impact of an additional year of education on wage income and lower than the effect in developed countries, estimated to 6.1%. Universities and research institutes have a large impact on technological performance. It is well known that the quality of labour force is enhanced by investment in human capital (training and education). For many future employees the educational institutes can provide a first contact with the new techniques that they will employ in the workplace.

In addition, educational bodies and research institutions can often play an important role in building up a core of expertise for a new industry before the industry becomes commercially viable. An important question is to examine not only the availability of human resources, but also the way in which these resources are used.

The question of human resources in Greece has two sides. On the other hand, there is an extensive educational system and only a small percentage of the population is illiterate; the relevant figure has declined from about 18% in 1961 to less than 9% in 1981. An important factor in the advancement of Greek science and technology is the number of outstanding individual scientists.

There is a large number of Greek graduates as a percentage of the total population. Human resources are an important factor in theoretical industrial research and the development of new technologies. However, there is large divergence between demand and supply sides. The big surplus of graduates is forced to migrate abroad (the *brain drain*). An additional problem is the absence of a strong link between *theoretical and productive research*. Future educational policy can benefit from the various Community research programmes, and it should be orientated to improvements in research facilities, vocational training, the establishment of new laboratories, and balance between supply and demand. This paper attempts to analyze the human capital and educational policy in Greece and also to examine the effects in the process of economic and regional growth.

2. THE DETERMINANTS OF TERTIARY EDUCATION INVESTMENT

The importance of educational policy and human capital for economic growth has been emphasized by economic literature. Much of the recent work on economic growth can be viewed as refining the basic economic insights of classical economists. The recent debate on the determinants of output growth has concentrated mainly on the role of knowledge typically produced by a specific sector of the economy, and furthermore in the role of human capital and the implications on economic growth.

Investment in education largely depends on three elements:

(i) The institutional framework of the education system;

(ii) The expected private rate of return on investing in education; and

(iii) Financing options available to education.

TABLE 1: DEMAND AND SUPPLY FACTORS

Socio-Economic Factors	Political and Institutional factors	Cultural Factors	Factors linked to education
• Poverty • Direct costs (fees, uniforms, transportation) • High opportunity costs and lower rate of return • Limited employment opportunities for graduates • Lower remuneration for graduates	• Budget constraints • Insufficient public support for education • Political instability • Inconsistent educational policies • Poor quality of education programmes • Lack of clear strategy for education. • Lack of public support for education activities.	• Parents' low level of education • Lower priority for education • Sceptical attitudes towards the benefits and outcomes from educating persons	• Low proportion of teachers • Teachers untrained • Stereotypes at school (curricula, textbooks) • School curricula in conflict with traditional culture • Lack of accommodations • Distance from school • Poor quality of hygienic facilities

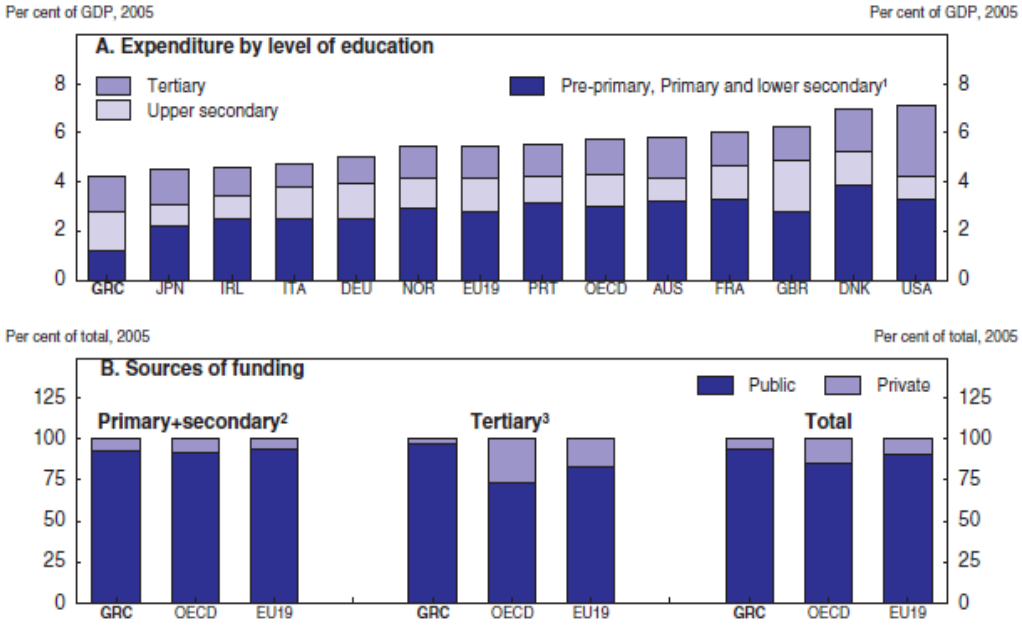
Source: Unesco

The various factors which affect education can be grouped in the following main categories:

- On the *demand side* socio-economic and cultural factors which affect the behaviour and the choices of parents and students;
- On the *supply side* political and institutional factors and factors linked to the school.

According to the UNESCO study for education determinant factors, Table 1 summaries and illustrates the main determinant demand and supply factors. Whereas, Figure 1 illustrates the resources spend on education levels (primary, secondary, upper secondary and tertiary levels) for a number of selected countries in 2005.

FIGURE 1: RESOURCES SPENT ON EDUCATION



▪ Notes: Pre-primary covers children aged three years and older. Upper secondary includes post secondary non-tertiary education. For the United Kingdom, primary and lower secondary only covers primary education, and upper secondary covers all secondary education. No pre-primary data available for Greece.

▪ Primary, secondary and post-secondary non-tertiary education.

▪ Private funding in tertiary education includes work-related training.

Source: OECD (2008), *Education at a Glance* and OECD (2007), *PISA 2006: Science Competencies for Tomorrow's World*, OECD Publishing.

Funding universities partly through tuition fees could reduce study times and raise the return to education and provide more funding for universities, which would be especially important for the fields where access is currently limited. To overcome credit market failures, many developed countries have developed elaborate loan and grant systems, especially the countries that have introduced or raised tuition fees. In other countries, such as Greece, the financing is mainly met by intra-family transfers, while the grant system is not generous and no student loan system exists. As low-income students are more affected by loan market failures, equity issues arise on top of the efficiency issues discussed above. An important motivation for individuals to invest in education is that the acquired knowledge and skills tend to raise their productivity and hence earnings potential. Investment in upper-secondary education is also associated with significant wage premia over lower-secondary education, especially in the United States and Canada.

3. EDUCATION POLICY IN GREECE

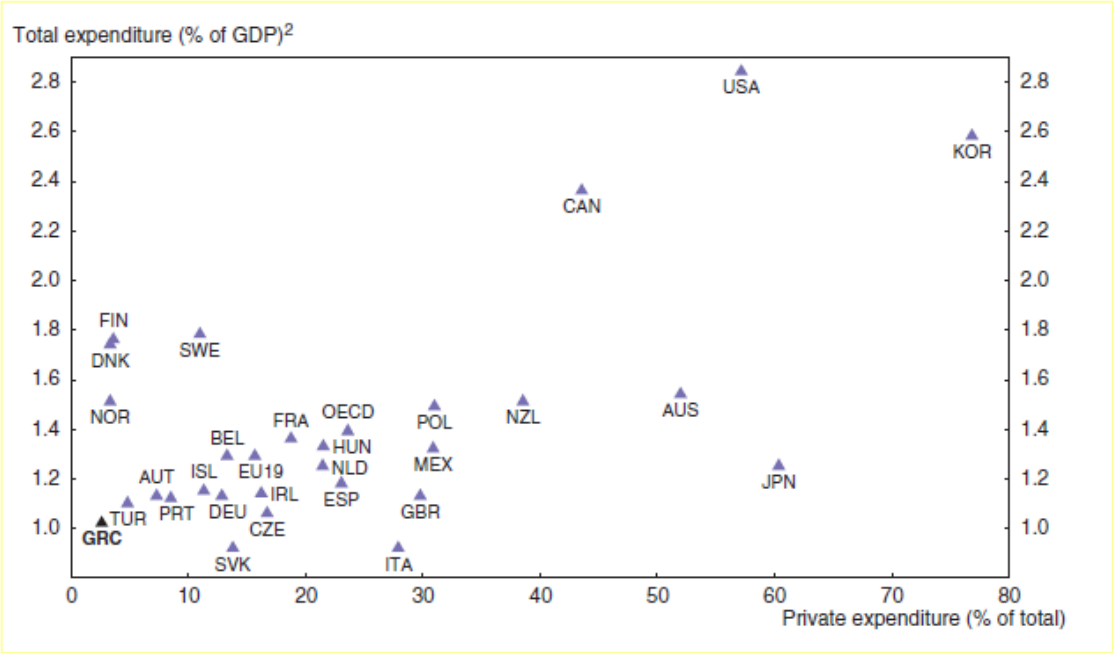
The Greek education system is characterised by a bias in favour of general programmes preparing students for tertiary education rather than for work. Despite initiatives to diversify upper secondary education and to upgrade vocational and technical education, only a third of students in upper secondary education were enrolled in vocational programmes in 2006 compared to an EU-27 area average of over half (European Commission, 2008b). Compulsory education runs from the age of 5 through 15. This includes one year of pre-primary school (kindergarten), six years of primary school, and three years of lower-secondary school. At the tertiary level, education is provided through public universities and technological institutes. Private higher-education institutions are not allowed by the Greek Constitution. Distance learning is available through the Hellenic Open University for students aged 22 years and over. Furthermore, according to the 2003 PISA study, Greece has one of the highest differences in mathematics between general and vocational programmes, even after controlling for the socioeconomic characteristics of students.

Education policy focuses on human resources and regional growth. This can involve various financial incentives, the support of education and training programmes and the provision of technical services. Education policy has multiple policy priorities and focuses on the following objectives: (a) Increase the efficiency of operation of human resources; (b) Enhance the knowledge, research and innovation base; (c) Develop regional competitiveness; and (d) Improve the efficiency and productivity level.

The main task of education policy is to improve and expand the quality of human resources. Both education policies require economic forecasts. For instance, there is little point in developing human resources if there is no market because of changing economic conditions. Therefore, planners must estimate the benefits and the costs of education and science policies. Education policy aims to encourage human resources through both *direct and indirect priority measures*. *Direct priority measures* encompass various subsidies and favourable tax treatments. On the other hand, *indirect priority measures* focus on other associated objectives (such as competition policy, research and innovation policies) which influence education and research activities.

The way in which priorities are combined and formulated in practice varies a great deal. Vocational and technical education needs to be better adapted to labour market needs. Improving the standing of vocational education so that it becomes a first choice for appropriate students is important to enhance Greece's position in the international ranking of upper secondary education attainment. The scheduled re-examination of curricula and design of qualifications in vocational institutes (post-secondary Institutes of Vocational Training and Schools of Initial Vocational Education and Training) therefore need to proceed rapidly. Furthermore, a broad based vocational system is important for lifelong learning.

FIGURE 2: SPENDING ON TERTIARY EDUCATION 2003[1].

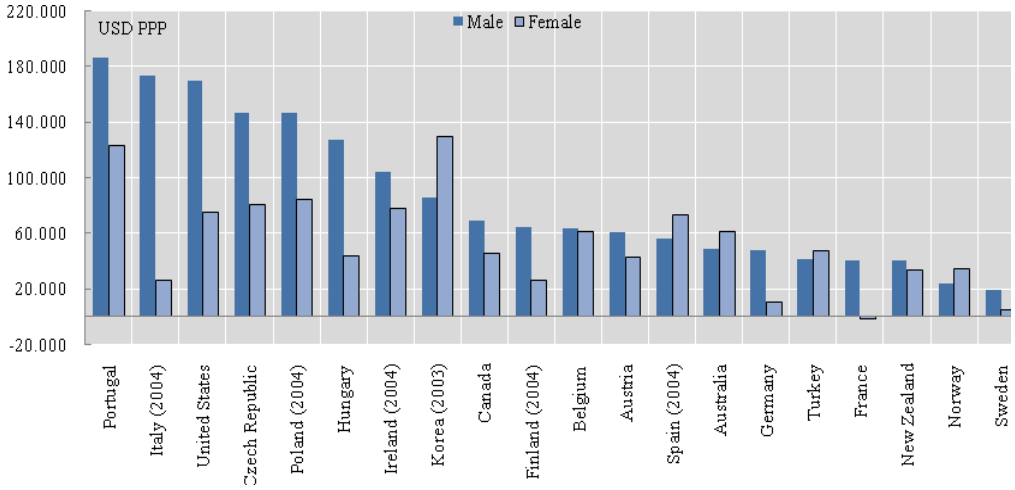


Source: OECD (2006), *Education at a Glance*, OECD, Paris; Ministry of Economy and Finance. Revised GDP data for Greece.

According to Psacharopoulos (2004), each year more than one billion euros (around 0.4% of GDP) are spent on preparatory courses aiming to help students enter a university. This implies that upper secondary education comes at a high cost. Many schools lack the necessary infrastructure (laboratories and teaching equipment), and are often overcrowded in the larger cities, despite progress in recent years. Unemployment is also high among young tertiary education graduates, indicating a mismatch between the acquired and demanded skills. Legislation passed in 2007 included several measures for improving the governance of universities, ensuring independent evaluation, limiting the duration of academic study and raising the provision of student loans.

The total level of spending tends to be much higher in countries that rely not only on government spending, but also have substantial contributions from students and other non-public resources. Greece stands out as having both a relatively low level of total spending on tertiary education and a high reliance on public funding. Figure 2 illustrates the resources spend on tertiary level (for both total expenditures as a percentage of GDP and private expenditures as a percentage of total expenditures) for a number of selected countries in 2003.

FIGURE 3: PRIVATE NET PRESENT VALUE FOR AN INDIVIDUAL OBTAINING TERTIARY EDUCATION AS PART OF INITIAL EDUCATION, 2005

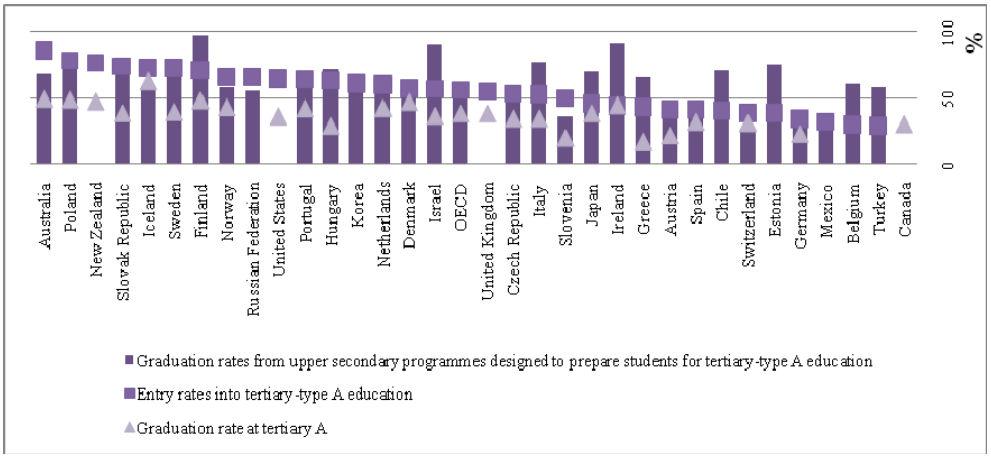


Source: OECD (2009). Note: Cash flows (components) are discounted by 5% interest rate. Assuming that foregone earnings for all individual refer to the minimum wage, except those countries reporting full time earnings: the Czech Republic, Hungary, Poland and Portugal.

It is clear that Greece needs to catch up with the best performing countries in the critical area of early childhood education and care. Despite progress in recent decades, upper secondary attainment levels remain below the OECD average, tending to reduce labour force participation rates. Figure 3 illustrates the private net present value for an individual obtaining tertiary education as part of initial education, and also Figure 4 indicates the percentage changes in size of the population at the basic, secondary and tertiary education for a number of selected countries. Figure 5 illustrates the graduation rates at doctorate level, as a percentage of the relevant age cohort for 2007and finally Figure 6 indicates the employees in high-skill occupations as a percentage of those with at least a university degree.

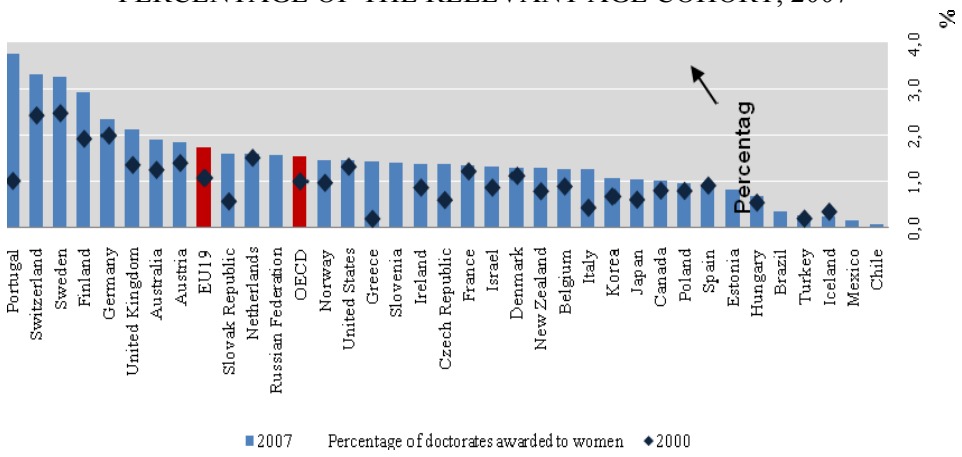
Recent EU data suggest that the percentage of 20-24-year olds in Greece having completed at least upper secondary education (82%) was somewhat above the E.U.-19 average (80%) in 2008. The employment rate of persons with below upper secondary education was 60% compared to 70% for upper secondary graduates in 2006 for the 25-65 age group. The gap was nearly three times larger for women compared to men. Teaching quality may be influenced by the quality and motivation of teacher trainees. Only 16% of university candidates in 2003 indicated primary teacher education among their top three preferences for study (OECD, 2006). Strategies to recognise and reward quality teaching would strengthen school quality.

FIGURE 4: TRANSITION FROM UPPER SECONDARY EDUCATION TO GRADUATION AT THE UNIVERSITY LEVEL, 2007



Source: OECD (2009)

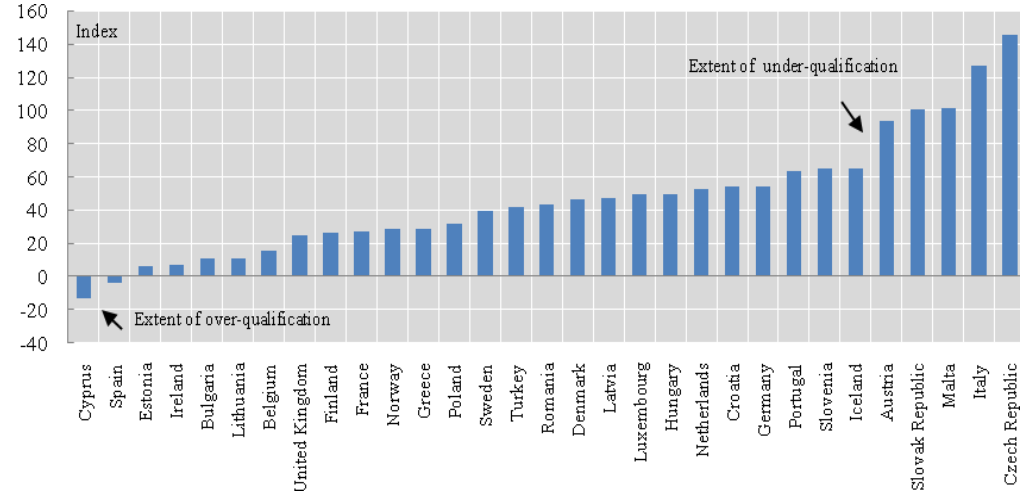
FIGURE 5: GRADUATION RATES AT DOCTORATE LEVEL: AS A PERCENTAGE OF THE RELEVANT AGE COHORT, 2007



Source: OECD (2009)

The introduction of a coherent system of performance evaluation is indispensible for such a policy to work. Lowering the comparatively high teacher to student ratio could release resources to reward good teachers, though such a reform should be combined with developments in distance learning.

FIGURE 6: EMPLOYEES IN HIGH-SKILL OCCUPATIONS AS A PERCENTAGE OF THOSE WITH AT LEAST A UNVERSITY DEGREE, 2009



Source: OECD (2009)

4. POLICY IMPLICATIONS, CONCLUSIONS AND RECOMMENDATIONS

The formulation of policy recommendations can better be understood in the light of the following considerations. Greece is facing an economic crisis that expresses itself at two levels. First, at the level of its productive system there are structural weaknesses which inhibit adaptation to a new economic environment. Second, it experiences serious macroeconomic imbalances in the form of fiscal and balance of payments deficits accompanied by inflationary pressures and increasing unemployment. Another key problem for the Greek economy is the *stagnation of national technological activities*. Only in the last two decades, has there been a serious attempt to support innovation activities through various economic policies:

- Human capital investment in all countries is associated with significant labour-market gains for the individuals in question, such as higher post-tax earnings, higher participation in the labour market and improved employment probability. The costs to individuals of pursuing post-compulsory education differ across countries and are strongly influenced by policy-related factors including the length of education programmes, the subsidisation of tuition fees and public financial support to students. In this respect, reform efforts should initially focus on upper secondary education, followed by comprehensive reforms of all other levels. The main conclusions of this analysis are the following:

- Ensure consistency of supply and quality for early childhood education and care services. Develop a more integrated system of early childhood education and care.
- Ensure a better match between the anticipated needs of the education system and the initial education of teachers and introduce a compulsory year of pedagogical training for secondary teachers.
- Reform of curriculum should also make vocational and technical education more attractive.
- Put in place a well-performing evaluation system of universities and make funding of universities dependent on performance.
- Increase the autonomy of universities in terms of selecting staff and students.
- Enhance the role of the social partners in the planning and implementation of vocational training policies and curricula, through the development of the network of labour market correspondents.

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TURKEY BETWEEN INTROVERSION AND REGIONAL HEGEMONY: FROM OZAL TO DAVUTOGLU

NICOLAS PANAYIOTIDES*

ABSTRACT

The aim of this article is to demonstrate Turkey's efforts to become a strong regional power, using its capability to exert geopolitical influence. It analyzes Turkey's foreign policy under the prism that Turkish politicians are very well aware, that USA needs Turkish support in the Middle East in order to promote its regional interests. Using as case referrals the strategy of the Turkish President, Turgut Ozal, during the Gulf crisis (1991), as well as the Grand Strategy of Turkey under the current minister of Foreign Affairs, Ahmed Davutoglu it is trying to illuminate the neo- ottoman model to the Turkish foreign policy and its consequences on the regional states, Greece and Cyprus. More specifically, this article shows that Turkey's efforts to gain Regional Hegemony runs at the expense of a fair solution of the Cyprus Problem.

Keywords: Regional Hegemony; New Ottoman Model; Pax Ottomana; Cyprus Problem; Hegemonic Power.

1. INTRODUCTION

The founder of the modern Turkish state, Kemal Ataturk, having the full knowledge of Turkey's weakness after World War I[1] and wanting to free his country from every external binding related to the ottoman heritage, he proclaimed the doctrine of "peace in the country, peace in the world."[2] However, not all subsequent formers of Turkish foreign policy willingly adopted this doctrine. On the contrary, there were and still are those politicians who are flirting with the country's ottoman past and depending on international coincidences, they want Turkey to adopt a more active presence and role in the sub-system that belongs, with whatever this entails. Examples like these, are the ex President and Prime Minister, Turgut Ozal[3], as well as the policy followed by Turkey's governing party, *of Justice and Development* (AKP), with main inspirer, the current minister of foreign affairs of Turkey, Ahmed Davutoglu. Before, however, entering into an analytical record of the policy of these two men, we will try to outline the post – cold war environment in which Turkey found itself.

The enormous systemic change that came after the collapse of the Soviet Union and the redistributions of power caused by it, brought Turkey face to face with new challenges, new dilemmas, but also facing the need for the redefinition of its role and

* Lecturer, American College, Business Department, Nicosia, Cyprus

interests in the international system. The threat which was in the northeast for over fifty years eliminated or decreased. Now, the role of the Turkish state as the basic embankment of the West against soviet penetration into the Middle East differentiated. It acquired borders with new states and was confronted with which policy to follow against these states, with which it is culturally related. Some of the countries which acquired their independence from the former USSR are considered to be of Turkish descent and Ankara did not and does not hesitate to use this relation to promote her influence on the area.[4] A number of analysts of that period have talked about Ankara's neo-ottoman policy.

The changes in the international and regional distribution of power, after the collapse of former USSR, were also reflected in other states with aspirations in the region, like Iran. In addition, the enfeeblement of the power factors of the former Soviet Union also reduced the capabilities of the client – states, of which Russia acted as a protector. States bordering with Turkey such as Syria lost their main ally. At the same time the Palestinians lost the possibility to manoeuvre between the superpowers and as a result they were forced to accept the Oslo agreement (September 1993) .[5]

2. TURKEY'S STRATEGY AFTER THE COLD WAR

In between these developments, Turkey was called to make some important decisions which would allow it to continue to cash either way its important geopolitical position. Towards the end of the 80s and beginning of the 90s, Turgut Ozal tries to underline again to the Americans the important geopolitical position of his country.[6] Using as a means its Islamic identity, but also diverging from the traditional non-adventurist line of non expansion or intervention to surrounding states (Deringil, 1992), Turkey will move towards obtaining a new role in the area, the role of the regional hegemon. Demonstrating his expansive aspirations, the Turkish politician will declare in a Greek newspaper (May 1991) that "The Dodecanese Islands was never Greek, they belonged to the Ottoman Empire. If I had been in Ismet Inonu's place in 1944, I would have gone in and taken them. Turkey committed a historic error in this case." (Deringil, 1992)

Turgut Ozal is considered to be the politician who introduced the *neo -ottoman model* to the Turkish foreign policy. What exactly is neo-ottomanism, though? As Yiorgos Karambelias (2009), notices: "Neo-ottomanism is a completion and expansion of islamism-kemalism, in the field of foreign affairs and regional policy. Confronted with the weakening of most of Turkey's neighbours, the temptation is born for an expansive policy with new conditions, a combination of economic, military and geopolitical power, which uses Islam and the strategic alliance with the West as its two gateways."

At this point it is useful, for the purpose of our analysis, to refer to how political scientists set the boundaries of Turkey's history, from the foundation of the Turkish

republic to Ozal's prevalence in 1983 (Veremis, 1995). The first period starts with the foundation of the Turkish Republic by Ataturk (29th October 1923) and ends with World War II.[7] This period is characterized by the avoidance of any involvement in the area, beyond the securing of its borders. The Lausanne Treaty, which essentially certifies the deconstruction of the Ottoman Empire and the creation of the Arabic state system, is in a prime position. However, during this period, and specifically in 1939, Turkey with flexible diplomatic manoeuvres, and in violation of the Lausanne Treaty gets Alexandretta with the help of France.

The second period ends in 1964 with the crisis in Cyprus. During this period, Turkey plays the role of the deputy of western interests via the Baghdad Pact (February 1955) and then CENTO which was under american supervision. It is worth noting that during this period the Middle East is split into two opposing sides. The first one consists of states which are supportive and friendly to the West, while the second one consists of states which are under the Soviet Union. The United Arab Republic (1958-1961) with the unification of Syria and Egypt will be the beginning of what the experts in Middle East happenings have called "the Arabic cold war".[8] In between these developments, one can realize how important Turkey is for the West, as well as the narrow boundaries in which the strategy of the Greek Cypriot leadership should be articulated as far as the Cyprus Problem is concerned.

Finally, the third period ends in 1980 and is characterized by Turkey's turn to the USSR[9] as well as the reviving of its relations with the Muslim states. When Turgut Ozal came into power in 1983, the main strength of turkish policy was the position his country held during the second Gulf crisis, having as its main aim to obtain regional hegemony.

As far as this crisis is concerned (Niblock, 1994), its historical and political boundary was articulated in the following way: In August 1990, Saddam Hussein accused Kuwait and the United Arab Emirates of exceeding their share in oil production by far and that they deliberately increased petrol prices, which for Iraq, was a cause of war. Saddam Hussein then demanded from Saudi Arabia and Kuwait to forget the 40 billion dollar loans that Iraq owed them. Revisional Iraq under Saddam Husein went a step further, demanding from Kuwait to give it control of the area of Rumaila which was rich in deposits, as well as compensation of 2.4 billion dollars for the oil it had drawn up to that point. Saddam Hussein also demanded from Kuwait to give Iraq control of certain islands which made access to the Gulf easier.

Numerous efforts from the Arabic governments to avoid the crisis, failed, and as a result on 2nd August Iraq projects its revisional might, conquering small Kuwait. At this point let us be allowed to turn our attention to the Cyprus Problem: Twenty seven years after the Turkish invasion to Cyprus, an expansionist state (Iraq), much more powerful than small Kuwait, attacks it, violating every international justice norm. The answer of the international community is known. Nevertheless, when Turkey invaded Cyprus in 1974, the international community, including the then Great Powers

remained uninterested and did nothing. This however, was not the case with the invasion of Iraq into Kuwait, since a mechanism of "collective security" was set very soon, and pointed out the victimizer (Iraq) and the victim (Kuwait) and afterwards, with the "Provide comfort" project, exerting superior power (24th February 1991) made the revisional state return to status quo ante. Iraq, which was quite hurt after an eight – year war against Iran, tried again to rearrange its powers. Internal reasons (prevention of destabilization of the regime due to financial causes) as well as external reasons (acquiring regional hegemony) indicated its revisional strategy against Kuwait. All this unfolded in the regional level.

In the international level, the collapse of the bipolar international system and the emerging of a new structure under the supremacy of the USA, dictated the re-engraving of its strategy as well as the reaffirmation of its role in the international system. The Gulf War and what came after it constituted the occasion for the consolidation of "Pax Americana" in the new international system. The hegemonic power wanted also to safeguard the control of the sub- system of the Middle East which was rich in oil deposits. Relevantly, in the Gulf crisis, the attitude of the USA brings in the limelight, the selective actions "double moral criteria" (Wight, 1991) when the major games in the region are threatened: The flow and price of oil and a favorable balance of power for the superpower, with the prevention of appointment of strengthened local poles of power, harmful for the regional interests of USA. Such developments may have also destabilizing results for the safety of USA's regional allies (Turkey-Israel). From a different point of view the regional allies of the superpower (Turkey-Israel) are ready to profit from the redistribution of power,[10] but also to contribute to their consolidation.

At this point we are obliged to return to Ozal's strategy. The Turkish politician, waiving the reactions in the interior[11], is all ready to profit from the whole crisis. Ozal's statements are indicative of his intentions: "My conviction is that Turkey should leave its previous passive and non decisive policy and follow a more energetic policy. The reason for which I placed this objective is that we are a powerful country in the region." (Veremis, 1995).

Despite the material profit that his country acquired from its involvement in the crisis[12], Ozal's words were consistent with his actions. He ordered the closure of the pipeline that transported oil from Iraq to the Mediterranean via Turkey (despite the economic cost) and allowed the American aviation to use the base in Injirlik for attacks against Iraq.

So, Turgut Ozal accomplished to underline again to the West that Turkey can always be useful to the engraving of American strategy in the region. On one hand, as an important geopolitical axis, with an increased role and prestige in the region, and on the other hand, as an Islamic state with a cosmic character, which can be the <<peacemaking state>> through its parliamentary experience, and this will help the West to handle the <<outcast states>> of the Arabic - middle eastern sub- system.

At the regional level, the importance of Turkey for the American strategy is shown. Consequently, it emerges that states with an important geopolitical position can profit from the systemic interactions, acquiring thus the power to violate international justice, and as a result to be intolerant to any efforts for negotiations. Consequently, regional problems such as the Cyprus Problem are difficult to be solved based on the rules of international justice. On the contrary, they are perpetuated in the meshes of power created by the hammering of cliental relations – on an exchanging basis between the superpower (USA) and its client states (Turkey). Such states are useful as critical geopolitical axons in important regions on the planet. As the Professor of International Relations, and excellent expert in geostrategy, Zbigniew Brzezinski (1998), points out: "Turkey is an important geopolitical axis. It stabilizes the region of Black Sea, it checks the access from it into the Mediterranean, it compensates Russia in Caucasus, it also constitutes an antidote to the Muslim fundamentalism and is useful as a southern anchorage of NATO."

In his effort to show the potentially vulnerable position the United States will find itself in, in the event that Turkey is not obedient to the American commands, Brzezinski adds: "An unsteady Turkey would probably start more violence in the southern Balkans, while it would facilitate the Russian control in the southern Balkans."

At this point it should be noted that the Turkish intervening policy is not terminated with the death of Turgut Ozal in 1993, but is also continued by his successors. Turkey did not hesitate to intervene in the Balkan region with the pretext of the existence there of Turkish and Islamic minorities, but also in order to create balancing processes against Greece. Once again, it secures its geopolitical position by granting bases to America.

During the Bosnia crisis (1992-1995), the United States with the help of Ankara will get involved in the creation of the Croatian-Muslim alliance (March 1994) by providing equipment and educating the Bosnian Muslims, changing the local balance against the Serbian side (Uzgel, 2001). During the Kosovo crisis, in order to underline again its geopolitical position, Turkey will allow the American forces to use two bases in Western Turkey, strengthening thus the effectiveness of the strategic bombardment of Yugoslavia, in April 1999.[13] Even though the Turkish bases finally did not need to be used because of the acceptance by Belgrade of the terms of NATO, this fact indisputably proves once again the dependence of American geostrategy on Turkey.

Finally, in the critical decade of 1990, Turkey appears to be credited by the West and mainly the USA with the possibility of exercising geopolitical and strategic influence in the wider region in which it belongs. From another perspective, the cloak of neo – Ottomanism in which Turkey seems to be dressed in, in the region of Caucasus and Central Asia, brings it in opposition with other powers in the area, namely Russia and Iran. Also, the whole effort basically contains the element of contradiction because as we know in the interior of Turkey, when Islam rekindles,

then this causes nuisances to the military. As far as the Cyprus Problem is concerned, however, Ankara with its strategy, acquires further support for its intransigence.

3. TURKISH GEOSTRATEGY: AHMED DAVUTOGLU AND THE THEORY OF "STRATEGIC DEPTH"

At this point we will turn our attention to the current Turkish Foreign policy and specifically to the person considered its absolute reformer, the professor of geopolitics, Ahmed Davutoglu Davutoglu, who is the head adviser of the Turkish Prime Minister, Tayip Erdogan on foreign policy issues, was upgraded in May 2009 to minister of the foreign affairs of the Erdogan Government. He is the inspirer of the doctrine of "strategic depth" (Davutoglu, 2010). This doctrine promises that the strategic depth, presupposes a geographical and a historical depth. According to the Turkish professor, Turkey as the contractor country of the Ottoman Empire possesses important geographic depth. This geographic depth places Turkey in the epicenter of many geopolitical fields of influence. Consequently, rationalizing the aforementioned, the Turkish geopolitician indicates that the doctrine of strategic depth requires active commitment to all the regional sub-systems that border on Turkey. This approach of the Turkish professor, however, lurks dangers for Turkey itself, as well as for the regional peace and stability.

It should be noted that, Ahmed Davutoglu, indicates that Turkey should not be considered a geopolitical region, but a geographic-geopolitical centre (Mazis, 2008). It is the geographic centre of Afro-Eurasia, located at the point where Europe meets Asia and Africa. It has, therefore a central geographic position and allocates inexhaustible geographic depth, extended to the Balkans/Europe, Eurasia[14], Asia, Middle East and North Africa. Relevantly, as we have also seen with the policy of Ozal and his successors, Ahmed Davutoglu prefers the Turkish foreign policy to be intensely involved in all the geographic areas that surround it.

More analytically, the planning proposed by the Turk geostrategist abuts in two axes (Mazis, 2008) of exercise of geopolitical influence:

(a) Economic/active (private investment in Central Asia and reinforcement of transit energy role of Turkey)[15]; and

(b) Cultural (intensification and projection of linguistic/cultural kinship, reinforcement of bonds via the Islamic cultural tool).

Ahmed Davutoglu does not omit to mention the new upgraded geopolitical role he wants his country to play. In a conference in Sarajevo[16] he mentioned among other things: "We wish for a new Balkan, that will be founded in political values, economic interdependence, collaboration and political harmony. All this was ensured in the Balkans". And he adds: "We will revive this era, the Ottoman Balkans were a successful part of History and now it should be reborn".

The Turkish minister of foreign affairs unfolding his thoughts even more, he adds: "We will make the Balkans, Caucasus, the Middle East, *along with Turkey*, the epicenter of the international political scene". Studying Davutoglu's statements, we can easily observe that his mentioning of "Ottoman Balkans" refers to his theory on geographic depth, while the mentioning of all the all above regions that *along with Turkey* will constitute the epicenter of international relations, refers to his theory on "strategic/geographic depth". Underlining the phrase ***along with Turkey*** clearly refers to the fact that Turkey – according to Davutoglu- should be the geopolitical centre that will lead the new period of "Pax Ottomana".

All these perceptions of Davutoglu for the reviving of a new regional order in the area, mean that regional problems – like the Cyprus problem- will be solved on Turkey's terms. Finally, the Turkish politician supports that there is no incompatibility between Islam and western democracy and he is a warm supporter of Turkey's entry in the European Union.[17] The geo- economic dimension of the geopolitical vision should not be overlooked. It should be noted that Turkey is "a rising economy" and is a member of the 20 industrial states, G-20. Since 31st December 1995 it has been commercially connected to the European Union. Main commercial partners of the country are the EU (59% of exports and 52% of imports), the USA, Russia, Japan and the Gulf countries (Rakkas, 2009).

At this point, however, we should turn our attention to the Cyprus Problem. To reinforce the aforementioned, the Turkish minister of the Exterior in a shared press conference with the Swedish Presidency and the Commission on 21st December 2009 expressed deep disappointment for the decision of Nicosia to freeze the six Turkish negotiation chapters. Characterizing the decision as one sided, he reported that it causes more and more concern for Turkey, how long these matters can continue, which as he supported, have nothing to do with the negotiations, but with certain irrelevant political matters, thus blocking the way between Turkey and EU. Ahmed Davutoglu went on to say, that the majority of the member states realize Turkey's strategic advantages. He also mentioned that these "minor matters" cannot avert from the great advantages the European Union acquires, due to its relations with Turkey. As we observe, the Turkish minister considers the illegal possession of Cyprus from his country "a minor matter", which the European Union should overlook compared to other advantages that Turkey will offer to her. More specifically, in his book "Strategic Depth: Turkey's International Position", the Turkish Minister mentions: "Even if neither one Muslim Turk existed in Cyprus, Turkey owed to maintain a Cypriot question. No one country can remain incurious for such an island, that it is found in the heart of her vital space". Analyzing more his geopolitical reasoning, Ahmet Davutoglu, adds: "Cyprus has a central position in the world continent as it is found in equal distance from Europe, Asia and Africa. It has the place of constant base and aircraft carrier that will touch the pulse of marine ways of Anten and Chormouz, along with the basins of Gulf and Caspian Sea. That is, the most important ways of

connection Eurasia-Africa. A country that ignores Cyprus cannot be active in the world and regional policies."

So, Davutoglu's views regarding Cyprus do not render us optimistic that there is the required political will from the Turkish political elit for a peaceful settlement of the Cyprus Problem, where Greek Cypriots and Turkish Cypriots will live in conditions of peace and security. The geopolitical perspective under which Ahmed Davutoglu faces the Cyprus Problem provokes great concerns if Turkey really wants to leave the two communities to administer their common future.

Moreover, we may add that the Turk geostrategist does not omit in any way to underline the geopolitical position of his country to the superpower (USA), in his effort to realize political profits from this position. The policy of "no problems" with the neighbours, which aims to settle Turkey's relations with Armenia as well as Syria, and Ankara's efforts to acquire a mediatory role in the conflict of the United States with Iran for its nuclear program, aim to send messages to the superpower that Turkey does constitute this "hegemonic stabilizer" the Americans can rely on, in order to solve regional problems which threaten their interests.

However, this direction of alliance between USA and Turkey is not unilateral, as we also mentioned above. Ahmed Davutoglu seeks to extract political profits and perhaps the tolerance of American government for the way of resolution of the Cypriot problem. The Turkish minister of Foreign Affairs himself, in his interview in "Newsweek"[18] magazine, when asked what the USA is expecting from Turkey, he answered the following: "If you allow me, the way that this question is formulated corresponds to the logic of the Cold War. It suggests that there is a superpower, the United States, which expects various things from its allies. However, alliance means mutuality. It has to do with communication, not only imposition. If you ask the minister of Foreign Affairs, Hilary Clinton, to tell you the ten most important matters of American foreign policy and then you ask me the same question, you will see that we will report the same things: "Iraq, Afghanistan, Palestine, energy safety, Caucasus, Balkans." Being a professor of Geopolitics himself and consequently an expert in the theory of "client-state" relations" between actors of unequal power, Davutoglu sends the USA the message that in order to take, they will have to give. Additionally, Davutoglu knows that Americans cannot impose their opinion on Turkey 100 %, but will have to collaborate if they want to keep –with its collaboration- a favorable distribution of power in the various regional fronts, in which Ankara is willing to act, with its major strategy on "strategic depth".

More analytically, in an alliance where the participants are of unequal power (NATO), it is very likely for the powerful state (USA) to find itself in what is called "the trap of investment". That is to say, it is in the interest of the powerful side that nothing happens, which will cancel previous military and political investments. Abiding by the proportions that are in effect in each individualized case, the United States interests lie with "nothing happening" on Turkey's part, that would endanger

their interests in the sensitive region of the Middle East. Ahmed Davutoglu, as an expert in geopolitics, realizes that there is a type of *dependence* on the USA by Turkey, specifically with regard to the region of the Middle East, as well as Caucasus.

In the theory of client-state relations (Ifestos, 2000) this is called "tyranny of the weak". The tactics that are adopted vary in every case. They could have to do with the stubborn and final refusal of the less powerful party to obey the orders of the hegemonic power, and even the reliable formulation of threats that would cost the more powerful ally a great deal, even if their own cost is very big. In any case, the aim of such strategies is not the barren juxtaposition with the Great Power, but obtaining of concessions on vital interests of the less powerful.

The above apposition of the theory of international relations did not happen accidentally and it should be seen in absolute interrelation with the geopolitical position of Greece and how this is appreciated by the hegemonic power (USA). It is a fact that the American centers of decision-making give priority to Ankara and not Athens. According to an American document-directive[19] which was made public by a senior American officer, Greece is not as important any more in the American planning and all the weight and attention has been turned exclusively to Turkey. More specifically, the Obama government puts Greece aside "until further notice" and gives high and direct priority to Turkey because this way and via Turkey "American interests can be fully served". This means that the Americans want Greece to become a simple recipient of their objectives through Turkey. And this means that Athens will become the recipient of increasing American pressure in order to conciliate with Turkey, with terms, however, detrimental to the Greek interests. Otherwise, the Ankara will not agree to what Washington is asking.

This type of reasoning is by no means advantageous for the resolution of the Cyprus Problem while in the triangular relation, Greece constitutes the *week-compliable ally* in the region, where it is carried away, in between a mesh of prompts, pressure and covered threats, into following a policy that many times does not best serve its national interests. On the contrary, Turkey is the *stable-favored ally* (Kefala, 1993) which has additional interests with the hegemonic power: The expansive plans against Cyprus, while it supports the United States in its wider objectives in the region. In the event of disagreement between these two types of allies the hegemonic power supports the objectives of the former (Turkey) against the latter (Greece), even if the objectives of its obedient ally are absolutely identified with the international justice and the international laws.

In conclusion, we report that the Turkish foreign policy has entered a new period, that of active involvement in the direct geographic region of Turkey. Ahmed Davutoglu seeks to revive a new regional order in the area, where Turkey will be the hegemonic centre. On their part, the United States consider Turkey a key country for serving their interests in the region. Therefore, Greece and Cyprus should be

particularly careful in order for this "special relationship" not to turn out against their own interests.

4. NEO – OTTOMANISM AND THE UNITED STATES

Coming back to the question of "neo-Ottomanism", it should be marked that the political strategy of Turgut Ozal during the 90s, as well as that of Turkey's controlling party, of *Justice and Development*, having as their most important point, Davutoglu's theories on "strategic depth", aim in the appointment of Turkey to a strong regional superpower.

Using as a compass the Ottoman past of the country and through the cultural relations with the Turkish -speaking and Muslim populations of other states, the Turkish foreign policy aims to enlarge Turkish influence in the former wider geographic region of the Ottoman Empire.

Islamists today aspire to continue the efforts of Turgut Ozal for appointment of the country into a regional power. It should be marked that, in the field of foreign policy, Kemalism "compromised"[20] painlessly with neo-Ottomanism, while political Islam on his part, having conscience of its weakness to impose an "Islamic State", accepted the secular-Kemalic character of the Turkish state.

More specifically, during his premiership, Turgut Ozal, restored Islam in the political and social life of the country as well as in education. Ozal's case constitutes an effort of composition between Islamism and kemalism. At the same time, with regard to the internal political scene of Turkey he faced the Kurdish populations who live in south-eastern Turkey with relative moderation.

As far as Turkey's European perspective is concerned, Turgut Ozal included it to his wider western orientation and treated it as the final and solid anchorage in the West. Contrary to the states of Southern Europe that treated their integration to EU as a golden occasion of democratization and reforms, but also as a pole against the USA, Ozal saw the Turkish integration, as a clear occasion of a surge of capital into Turkey (Pesmazoglou, 1993). The Turkish politician did not omit to underline the strategic importance of his country for the West, but also the possibilities that were opened for European capitals to invest in Turkey.

Some years after the death of Ozal, the Islamist Nejmetin Erbakan accomplishes to shape a government in June 1996 but is forced to resign by the military in 1997. It should be underlined that Erbakan is considered to be the father of political Islam in Turkey, after he founds the "National Order Party" in 1970, a political shaping that had Islam as its main ideological reference. The party in question, which is renamed in 1973 into the "National Salvation Party", was a religious fundamentalist party which believed in the principles of Islam. Erbakan sought the suppression of the kemalic principle of segregation of religion and state and declared the need to return to traditional ottoman structures (Yiallourides, 1997). It should also be marked that

Erbakan then, just as Erdogan today, believed that there should be an autonomous pole in Turkey, which will be supported exclusively by the principles of Islam. However, Erbakan was much more counteractive in his ideas than the current Prime Minister Tayip Erdogan.

5. CONCLUSION

In conclusion, it should be marked that the victory of Tayip Erdogan, in the 2002 elections with the party of *Justice and Development* (AKP) signals a new period for Turkey, so much in the interior, as in the regional and international scene. The undertaking of the ministry of the Foreign Affairs by Ahmed Davutoglu created new facts. His handlings in the field of foreign policy, are a continuation of Turgut Ozal's vison for the conquest of regional hegemony in the broader region that borders on Turkey and constitutes its "geostrategic depth'. Despite the issues[21] in the relations between Kemalists and Islamists, Tayip Erdogan managed to survive and, with Ahmed Davutoglu being the head of Turkish diplomacy, he follows a multidimensional exterior policy, which clears the road to the Arabic world, as well as to countries of Central Asia and Caucasus, without breaking the bonds of the country with the West. It should be marked that the neo-Ottoman model does not come into contrast with the objectives of the superpower in the broader region of the Middle East and Central Asia. On the contrary, it goes together with the effort of the hegemonic power to consolidate a favorable distribution of power in the sub-system of the Middle East, via which it will accomplish to promote its geo-economic interests. From the beginning of his election, Tayip Erdogan rushed to appease any concerns for the policy he was going to follow. He warmly supports the policy of Turkey's entry in the European Union and, as far as the big internal problem of the country -the Kurdish problem- is concerned, he tried to introduce reforms.

As it has already been pointed out, the United States needs the collaboration of Turkey in the sensitive and frail region of the Middle East and Central Asia. Despite the past "problems" in the relations of the two countries with Turkey's refusal to allow the use of Turkish establishments during the Gulf war (March 2003), it is certain that the United States will continue to need Turkey's help (Larrabee, 2008), in order to fulfill their objectives in the region, especially in the Iraqi front. It should be indicated that 70% of the military personnel and materials intended for Iraq, passes through Turkey. Moreover, many of the scenarios of disengagement of the United States from Iraq include the involvement of Turkey. Consequently, as we have already mentioned, the dependence of USA from Turkey in the Middle East, does not make us optimistic for a just and viable solution of the Cyprus Problem.

NOTES

1. The Lausanne Treaty (23 July 1923) had not ensured what Turkey would consider safety round its borders. During the period between the two world wars the Turkish state tries to consolidate a system of safety which will protect it from the threats that emanated from the surrounding states. There was the threat from Italy, which since 1912 made its intentions obvious by conquering Dodekanisa. In the time when the Sevres Treaty between the Ottoman state and the allies failed, Italy with Britain and France had contracted a Trilateral Agreement on Anatolia, which included its division in spheres of influence and economic exploitation. The disagreement with Britain on Mosouli was still there. Another matter that troubled the Turks was the matter of Dardanellia, which according to the Lausanne Treaty, they should be army free. The safety dilemma for Turkey was underlined even more because of its traditional fear for Russian intentions. This is also the reason that the Turks approached Britain, when the problem of Mosuli was solved in July 1926 with its concession to Iraq. Therefore, Kemal Ataturk, in his effort to solve these problems, approaches Greece and signs a treaty of reconciliation and neutrality with Eleftherios Venizelos (30 October 1930). Moreover, Turkey's entry in the Balkan Agreement (9 February 1934) in which Greece, Romania and Yugoslavia participated, is another effort of the feeble Turkish state to acquire safety from a common Italian-Bulgarian attack (Athanasopolou, 1999).
2. It should be underlined that one of the main reasons that Kemal Ataturk did not want to be involved in risky adventures abroad was the weakness of the Turkish state in combination with the multifaceted threats it faced (see above). However, after Ataturk's death, revisory tendencies were expressed in the Turkish foreign policy, having as their main points the effort of revision of the Lausanne Treaty, during the "Tripartite Conference" in London, in August 1955. In addition, in 1974, when Turkey found itself in a position of power, it did not hesitate to violate this doctrine, as well as international justice, with the invasion and occupation of northern Cyprus.
3. The moderate islamist, Turgut Ozal was the founder of the centre- right party of Mother Homeland (ANAP). He was the Prime Minister of Turkey from 1983 up to 1989, when he was elected president. He kept his position up to his death in 1993.
4. Towards the end of October 1992 when the President of Turkey, Suleiman Demirel, received the presidents of the newly founded states of Central Asia, of which the populations are of Turkish descend, he did not hesitate to talk about the Turkish state which will be extended henceforth not only between the Bosporus and the Iranian borders but also between the Adriatic sea and the Chinese walls. Therefore, the Turkish politician in a unique expression of grand vision restored in the turkish public sphere, the claims of the Ottoman Empire for national homogenisation of the region from the Balkans up to the western provinces of China. This approach of Demirel's, is an explicit sample of Turkey's effort to become a big regional power in this unsteady region (Yiallouridis, 2001).

5. On the Oslo Agreement (September 1993) between the state of Israel and the Palestinians, see (Morris, 1999).
6. A state will attempt to change the international system or the regional system in which it belongs, if the benefit (political, economic) exceeds the cost. In a similar way, a state will attempt to stop any tendency that undermines or threatens to undermine its position in the international system (Gilpin, 1983).
7. We should point out that, since the birth of the first Turkish Republic (29 October 1923) up to 1946, a single-party status quo is in effect in Turkey. It is the period when the particular military-bureaucracy is consolidated in the country. The majority of Turkish presidents, with just a few exceptions, such as Jelal Bayar, Turgut Ozal and finally Abdullah Gull were military officials. In addition, a number of military officials participate in the Turkish parliament (Grand Turkish National Assembly). Finally, Kemal Ataturk himself a victorious general, becomes President of the Turkish Republic (Sarris, 1992).
8. For this political phenomenon, see (Seale, 1986).
9. The letter of American president Johnson to the Turkish president Ishmet Inonu in June 1964, damaged their special relation momentarily and caused intense anti-Americanism in Turkey. As a result, there was a turn of Turkey to the former USSR. The Soviet Union, on its side, wished for the Russian-Turkish approach because Turkey possessed the straits of Dardanelle.
10. The basic American position adopted in 1967, after the "six days war" was that Israel should not be required to relinquish territories captured in 1967, without a quid pro quo form the Arab parties involving peace, security and recognition (Quant, 1993). This American stance is obviously against international law. For the American stance regarding the June 1967 crisis, see also (Quigley, 2005).
11. Ozal as President maintained every power in the management of international relations and foreign affairs of his country. Therefore, he exclusively handled the participation of his country in the Gulf crisis. This caused reactions by the opposition who believed that this constituted a removal from the Turkish postwar policy of non involvement in the middle-eastern affairs and conflicts. According to the opinion of Opposition, Ozal's policy in this particular matter put Turkey at risk of an Iraqi attack. There were also reactions from the military status quo, which believed the crisis to be an intra-Arabic issue. The head of the Turkish armed forces, General Nejip Torumbay, resigned on 3rd December 1990, bringing the generalized reactions of Ozal's policy to the public eye (Veremis, 1995).
12. Many researchers believe that the involvement of Turkey in the Gulf Crisis, did not attribute the expected benefits. And this is because after the crisis, the flow of Kurdish refugees into Turkey increased (Robbins, 2004).
13. However, as soon as the American personnel reached Turkey, Belgrade accepted the demands of NATO and the Turkish establishments were not used (Uzgel, 2001).

14. For the importance of Eurasia in the planning of the strategy of the Great powers (Mackinder, 1962).
15. How Ankara can exploit Turkey's geographic position elevating its energy transit role, it is also shown by the construction of the Nabuko pipeline, an ambitious program of transport of natural gas from Erzerum in Turkey to the "Boamgarten an Den March" port, in Austria. The pipeline, the length of which is 3300 km, will cross Bulgaria, Romania, Hungary before it reaches Austria. The whole plan is supported by the European Union and the United States and its aim is the reduction of Europe's dependence on Russian energy. It is estimated that the pipeline's manufacture, which will cost 8 billion dollars, will be completed in 2014-2015.
16. Davutoglu on Balkans, "Pax Ottomana" Politis Newspaper, 27/10/09.
17. "Greece and the phenomenon of Ahmed Davutoglu. The profile and beliefs of the Turkish Minister of the Foreign Affairs." An interview with the academic Vasilios Markezinis in the "Ethnos tis Kyriakis" newspaper, which is republished in the "Simerini" newspaper, 27/7/ 2009. Davutoglu supports that the Koran projects a series of fundamental values without imposing a certain political mechanism of their application. In regard to Turkey's entry in the EU, the Turkish professor points out that this will be advantageous for the European Union itself, since this is the only way it can hope to become a "world power".
18. Ahmed Davutoglu's statements in question, in *Newsweek* magazine, were published in, Costas Guliamos, 'Relations between Ankara –USA, on a different basis", Philelefthe ros Newspaper, 13/12/2009.
19. "*Priority to Turkey against Greece by the USA"*, Philelefthe ros newspaper, 18 July 2009.
20. This compromise began in the 1950s when the Turkish Prime Minister, Adnan Menderes, allowed the reappearance of political Islam in the Turkish community during an effort to liberalize the Turkish political system, but also clearly for electioneering reasons (Constantinides 2009).
21. The Constitutional Court of Turkey, which constitutes the bulwark of the Kemalists attempted, in July 2008, to ban the governmental Party of Justice and Development. In October 2008, giving the basics of the decision to publicity (350 pages) it reported that the Prime Minister of Turkey, Tayip Erdogan seems to be involved in "actions that go against the secularity of the Turkish state" "Relaunching of the Turkish state", To Vima newspaper, 25 October 2008.

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CONVERGENT VALIDITY AND RELIABILITY OF THE SW200 PEDOMETER IN GREEK CHILDREN

S. PAVLIDOU[*], M. MICHALOPOULOU and N. AGGELOUSIS[**]

ABSTRACT

The purpose of the present study was to examine reliability and validity of the pedometer (Yamax SW 200) in a sample of 61 Greek primary school students aged 10-11years old. Participants wore an accelerometer and a pedometer (SW 200) for four consecutive days. The study was designed to compare the criterion measure, the MTI/Actigraph, against the pedometer. The same procedure was repeated for the pedometer in order to examine test-retest reliability. Significant correlations were observed between the accelerometer data and the 4-day pedometer score ($r=0.72$, $p<0.01$). The ICC for the pedometer was 0.84 ($p<0.01$). The pedometer (SW 200) provides valid and reliable physical activity estimates for 10-11 year-old children in Greece.

Keywords: Pedometry; Validation; School Children.

1. INTRODUCTION

Several potential methods are available for physical activity assessment, including behavioural observation, self-report (Sallis and Saelens, 2000), electronic sensors (Trost, Kerr, Ward, and Pate, 2001; Vincent, Pangrazi, Raustorp, Tomson, and Cuddihy, 2003; Raustorp, Pangrazi, and Stahle, 2004; Duncan, Schofield, and Duncan EK., 2006), and physiological markers such as doubly labelled water (Ekelund et al., 2001) and heart rate (Rowlands, Eston, and Ingledew, 1997). Each technique carries certain strengths and weaknesses (Beets et al., 2005), since physical activity is a multi-dimensional construct that can vary in terms of type, duration, intensity and frequency (Ridley, Olds, and Hill, 2006). To accurately assess children's activity patterns, an instrument must be sensitive enough to detect, code, or record sporadic and intermittent activity (Welk, Corbin, and Dale, 2000) since establishing the validity of these instruments has always been an important problem.

Activity monitors have revolutionized the way in which we measure youth physical activity. Devices such as pedometers and accelerometers have become increasingly popular as measurement tools for physical activity. These devices reduce the subjectivity inherent in survey methods and can be used with large groups of

[*] Ph.D. candidate, Democritus University of Thrace, Department of Physical Education and Sport Sciences, Komotini, Greece

[**] Associate Professor, Democritus University of Thrace, Department of Physical Education and Sport Sciences, Komotini, Greece

individuals. Laboratory and field validations of pedometers and accelerometers yield relatively high correlations using oxygen consumption (r = 0.62 to 0.93) or direct observation (r = 0.80 to 0.97) as criterion measures (Sirard and Pate, 2001).

One method that has garnered increasing support is the pedometer (Tudor-Locke and Myers, 2001; Treuth et al., 2003; Jago et al., 2006). Compared to accelerometers, pedometers have become a popular choice to monitor physical activity in children because of their low cost and feasibility and have been shown to be reliable and valid in children (Eston, Rowlands, and Ingledew, 1998; Jago et al., 2006). Pedometers are reported to have moderate to high correlations with various objective measures of PA. These include accelerometers (median r = 0.86), behavioural observation (median r = 0.82) and different measures of energy expenditure (median r = 0.68), (Tudor-Locke, Ainsworth, Thompson, & Matthews, 2002). Pedometers also provide one of the few forms of physical activity assessment with a standard metric (most commonly, steps·day_1). Pedometers, therefore, are one of the few valid and reliable objective measures of youth physical activity (Kohl, Fulton, and Caspersen, 2000) that allow direct comparisons across studies. In children, pedometers are reported to have moderate to high correlations with behavioural observation (r = 0.74-0.85) (Scruggs et al., 2003), heart rate monitoring (r = 0.62-0.88) (Eston et al., 1998) and accelerometers (r = 0.50-0.98) (Kilanowski, Consalvi, and Epstein, 1999).

Determining the reliability and validity of the pedometer (SW200 YAMAX) is an important undertaking, given that primary school children from Greece may participate in different types of activities and respond to differently to the use of an activity monitor. Therefore, the purpose of this study was to evaluate reliability and convergent validity of the pedometer Yamax Digi- walker SW 200 in a sample of Greek primary school students.

2. METHOD

2.1. Subjects

Sixty one children (29 boys and 32 girls) from primary schools of Northen Greece volunteered to participate in the study. Descriptive statistics for the participants in this study are shown in Table 1. All participants provided written consent signed by their parents or legal guardian. Ethical approval for this study was obtained from the Department of Physical Education and Sport Science, Democritus University of Thrace Ethics Committee.

TABLE 1: PHYSICAL CHARACTERISTICS OF THE PARTICIPANTS (MEAN AND SD)

Characteristics	Boys (n=29)	Girls (n=32)	Total (N=61)
Age (year)	10.59±0.5	10.44±0.5	10.51±0.5
Weight (kg)	47.78±11.90	48.18±11.77	47.99±11.73
Height (m)	1.57±0.08	1.55±0.11	1.56±0.10
BMI (kg/m^2)	19.27±4.01	19.99±3.53	19.65±3.75

2.2. Instruments

Motion Sensor MTI/Actigraph. The MTI/ Actigraph activity monitor is a small (5.1 x 3.8 x 1.5cm) lightweight (43-45g) uni axial activity monitor designed to detect normal human motion while rejecting high frequency motion encountered outside these ranges. Further technical specification and performance properties have been described elsewhere (Janz, 1994; Melanson and Freedson, 1995; Melanson, and Sirard, 1998; Ekelund, Yngve, Sjostrom, and Westerterp, 2000; Freedson, Freedson and Miller, 2000; Nichols, Morgan, Chabot, Sallis, and Calfas, 2000; Swartz et al., 2000; Ekelund et al., 2001).

The MTI/Actigraph has been well validated in both children and adolescents against a wide range of outcomes (Freedson et al., 1998; Trost et al., 1998; Brage, Ekelund et al., 2000; Freedson and Miller, 2000; Ekelund et al., 2001; Welk et al., 2000; Weddekopp, Andersen, and Froberg, 2003). It has been validated against energy expenditure measured by indirect calorimetry and it was found to be a valid tool for quantifying energy expenditure in children and adults during treadmill running and walking. Correlations ranging from r =0.50 to r = 0.74 have been reported between the MTI/Actigraph accelerometer and heart rate telemetry of children in field settings (Janz, 1999). Additionally the MTI/Actigraph monitor provided more accurate estimations of energy expenditure when compared to TriTrac and other accelerometers (Welk et al., 2000). In studies with children, a significant correlation was observed between MTI/Actigraph activity counts and all energy expenditure estimates using the Doubly Labeled Water method (Ekelund et al., 2001).

Pedometer SW200. Pedometers are simple and inexpensive motion sensors that are increasingly used for objective assessment of children's physical activity behaviours (Eston et al., 1998; Rowland, Eston, and Ingledew, 1999; Treuth et al., 2003; Tudor-Locke et al., 2004; Duncan et al., 2006; Le Masurier and Corbin, 2006). In a comparison of five electronic pedometers, the Yamax most accurately recorded the number of steps taken (distance), had the most consistency between units, and was the most accurate at moderate activity levels (Bassett et al., 1996; Bassett, Cureton, and Ainsworth, 2000). All pedometers used in this study were tested for defects prior to

use by observing the recorded step count after walking 100 paces (Tudor-Locke et al., 2001), and instrumental error did not exceed ±3% in any of the pedometers (Schneider, Crouter, Lukajic, and Bassete, 2003).

2.3. Study design

The study was designed to compare the criterion measure, the Actigraph accelerometer, against the pedometer (SW-200) were placed on the right side of the body above the hip, on an elastic belt, for four continuous days (two weekdays and two weekend days). Four days of monitoring were shown to provide a reliable estimate of habitual physical activity levels in children (Trost, Pate, Freedson, Sallis, and Taylor, 2000; Vincent and Pangrazi, 2002). On the first day of monitoring, children were instructed on pedometer and accelerometer attachment, their removal (only during showering, bathing, swimming, or sleeping), and re-attachment each morning before going to school. The researcher attached the activity monitors on Friday evening and collected them at the end of the 4-day period of monitoring (Wednesday - morning). One week later, the same procedure was repeated only for the pedometer in order to examine test- retest reliability.

2.4. Statistical analysis

The participants' characteristics, age, height, weight and Body Mass Index were summarized using descriptive statistics. To determine concurrent validity, the Pearson product-moment correlation coefficients were calculated to evaluate the relations between MTI/Actigraph variables and the pedometer variables.

Regarding test-retest reliability, intra-class correlation coefficients (ICC) were calculated for the repeated administrations of the pedometer. Statistical significance was set at an alpha level of .05.

3. RESULTS

TABLE 2: MEANS AND STANDARD DEVIATIONS OF PEDOMETER 4 DAYS AVERAGE STEPS/DAY AND MTI/ACTIGRAPH 4 DAYS AVERAGE COUNTS FOR ALL THE PARTICIPANTS IN THIS STUDY.

	Boys	***Girls***	***Total***
Pedometer score 1st week (steps/day)	14,420±3,399	10,130±3,376	12,169±3,993
Pedometer score 2nd week (steps/day)	13,574±2,825	10,774±2,726	12,105±3,091
MTI/Actigraph score (Counts/day)	614,614±199,509	515,997±142,549	562,880±177,594

3.1. Validity and reliability study

Significant Pearson correlations between the MTI/Actigraph as a measure of validity, and the 4-day pedometer score was ($r=0.72$, $p<0.01$). The ICC for the pedometer score administered twice in a week was (ICC = .84)**.**

4. DISCUSSION

The current study examined the validity of the pedometer Digi-Walker SW-200 using MTI/Actigraph as a criterion measure. There was a significant positive association ($r = 0.72$) between the number of steps recorded by the pedometer and the MTI/Actigraph counts when Pearson correlation coefficient was estimated. This finding is similar to those of earlier studies in which pedometer counts were compared with criterion values of accelerometers counts. Digi-Walker step counts were highly correlated ($r = 0.60$-0.88) with uniaxial and three-axial accelerometer counts (Ramirez-Marrero, Smith, Sherman, and Kirby, 2005; Cardon, and de Bourdeauhuij, 2007; Rowlands et al., 2007). Generally, validation studies with pedometers in children and youngsters presented moderate and high correlations. A rather high correlation ($r = 0.67$) was found between Digi-Walker step counts and activity energy expenditure derived from DLW (Ramirez-Marrero et al., 2005). Correlations between observed steps and Digi-Walker step counts were moderate to high ($r = 0.59$-0.90) in laboratory and field studies among 3- to 11-yr-old children (Beets, Patton, and Edwards, 2005; McKee, Boreham, Murphy, and Nevill, 2005; Hands, Parker, and Larkin, 2006). Lower correlations ($r = 0.47$, $P< 0.0001$) between the MTI/Actigraph and the Digi-Walker SW-200 as a measure of validity, was reported by Treuth et al. (2003) in African- American girls. The duration of the monitoring procedure in our study was four days. These differences could be due to variations in children's adherence to the study protocol or to the accuracy of instruments recording different types of activities.

Pedometers possessed a substantial degree of internal consistency reliability with strong intra-class correlation between first and second administration (ICC = .84). We therefore conclude that the number of pedometer counts recorded by children 10-11 years old provided a reliable estimate of the physical activity in which they engaged. This finding is in accordance with the results of other reliability studies conducted with motion sensors in children and youngsters (Eston et al., 1998). In general though, the reliability studies that used the test re-test paradigm presented medium to high correlations (Rowe, Mahar, Raedeke, and Lore, 2004; Jago et al., 2006; Strycker, Duncan, Chaumeton, Duncan, and Toobert, 2007). Although, according to Treuth et al. (2003) the intra-instrument reliability of the Digi-Walker SW-200 tested over 4 consecutive days in 68 girls was poor (ICC = 0.08). Differences in study procedure and the above limitations to pedometers application, that the investigators mentioned,

could be the reasons of these controversial results. As pedometers are relatively inexpensive and have reasonable reliability they could provide an alternative to rather expensive acceletometry for objective monitoring in large population studies. Compared to accelerometers, pedometers have become a popular choice to monitor physical activity in children because of their low cost and feasibility and have been shown to be reliable in children (Eston et al., 1998; Vincent and Sidman, 2003).

Total physical activity is a function of context, of the type of stimulus, the intensity at which the stimulus is performed, and the duration of a single episode. Over an extended period, the frequency with which an exercise is performed is also important. Pedometers provide a total activity score over the entire period of recording, without information about the frequency, intensity, and duration of physical activities (De Vries, Bakker, Hopman-Rock, Hirasing, and Van Mechelen, 2006). It is thus critical for researchers to use multiple methods to overcome the limitation of one instrument and achieve a comprehensive assessment of all physical activity components (Kohl et al., 2000). Some combination of monitoring devices and self-report instruments may be a prudent step to increase validity in physical activity assessment (Sallis, Buono, Roby, Micale, and Nelson, 1993).

In conclusion, the choice of an appropriate motion sensor depends on the study purpose and on the sample. As a type of objective physical assessment instruments, pedometers offer a typically simple and low cost estimate of total volume of physical activity which is outputted as the number of steps taken. They provide a reliable and valid method for assessing levels of physical activity for large scale child studies.

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NEUTRON CAPTURE THERAPY AT IRT RESEARCH REACTOR: BASICS AND ACTIVITIES

MLADEN MITEV, KRASIMIRA ILIEVA,
SERGEY BELOUSOV and TIHOMIR APOSTOLOV*

ABSTRACT

The Neutron Capture Therapy (NCT) has proved itself to be a vital option for severe cancer treatment during the last 20 years. The arrangement of the Institute for Nuclear Research and Nuclear Energy of the Bulgarian Academy of Sciences' NCT facility is included in the technical project for reconstruction of the IRT research reactor. A number of activities in the acquisition and mastering of the existing experience, the building of the institute's multidisciplinary team and infrastructure, the NCT oriented information system, as well as the technical design of the NCT channel, have been done.

The modeling of geometry and material composition of filter/collimator for the NCT beam tube has been carried out as a base step in design optimization. It has followed the reactor beam tube configuration of the Massachusetts Institute of Technology and, additionally, has taken into account an ability to include the tube into IRT reactor geometry. The results of neutron and gamma transport calculations, performed for the model, have shown that the facility will be able to supply an epithermal neutron flux with quality, equal to the best value reached in the world until now. The NCT development will play a very significant role in the sustainable utilization of the reactor for application to patients from The Balkan region.

Keywords: NCT Basics; Medical Applications; Neutron Beam Design.

1. INTRODUCTION TO BNCT

1.1. Principles

The Neutron Capture Therapy is a form of radiotherapy that has the potential to selectively kill the cancer cells embedded within normal tissue. The physical principle of NCT is shown on Figure 1. It is based on the nuclear reaction that occurs when the stable isotope ^{10}B is irradiated with low energy or thermal neutrons to yield highly energetic helium-4 (^{4}He), nuclei (i.e. alpha particles) and recoiling Lithium-7 (^{7}Li) ions. NCT is a binary radiation therapy modality that brings together two components that have only minor effects on cells. The first component, is a stable isotope of boron, (boron-10) that can be concentrated in tumor cells by attaching it to tumor seeking compounds. The second is a beam of low-energy neutrons. Boron-10 in or adjacent to

* Institute for Nuclear Research and Nuclear Energy, Bulgarian Academy of Sciences

the tumor cells disintegrates after capturing a neutron, and the high energy heavy charged particles produced, destroy only the cells in close proximity to it, primarily cancer cells, leaving adjacent normal cells largely unaffected. To achieve this, NCT relies on initial targeting of tumor cells by an appropriate chemical compound tagged with ^{10}B, which preferentially concentrates in tumor cells. During the irradiation of the tumor site by neutrons, the short-range alpha particle and lithium ion deposit most of their energy within the cell containing the original ^{10}B atom. Therefore, if a higher concentration of ^{10}B exists in tumor cells relative to other normal tissues, a concomitantly higher dose will be delivered to tumor cells during neutron irradiation. The currently available compounds provide a ratio of 3 to 6 times between the boron concentration in the tumor and in the healthy tissue. There are other possibilities for emitters of secondary particles under neutron irradiation like gadolinium. Therefore the NCT can be Boron NCT, GdNCT, etc.

The fact that NCT brings together neutron and reactor physics, chemistry and pharmacokinetics, cell histology and medicine, makes it a true interdisciplinary treatment modality.

1.2. History

The idea of neutron capture therapy has arisen since 1936. In the United States of America, the first human trials of NCT started in the 1950s using 96% 10B-Borax sodium pentaborate as a boron carrier. The experiment was unsuccessful, mainly due to inefficient, non-discriminating boron containing drugs, and the use of poorly penetrating thermal neutron beams.

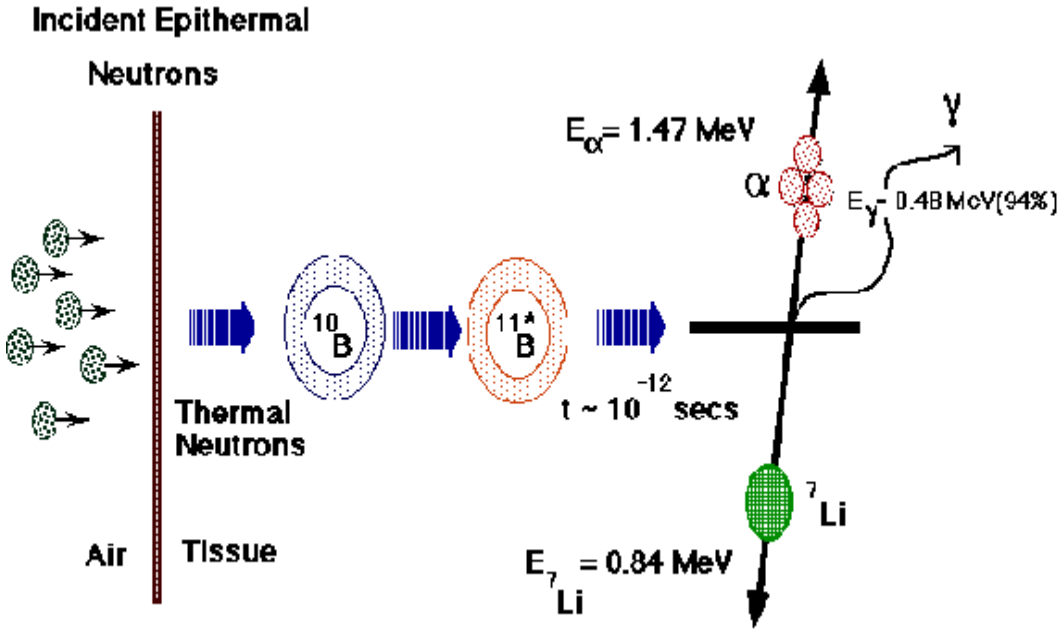
In Japan, however, experimenting was continued (1963-1980) by Professor Hatanaka focusing on glioma patients, and using BSH as a boron carrier. The encouraging results and the improved technology at that time started a new wave of attention to NCT in the late 1980s. New human trials in the USA took place in the 1990s.

1.3. Current Status

In the 1980s, improvements in neutron beams and boron compounds allowed reconsideration of NCT. Studies recommenced in 1994 in the USA. The treatments were given with a closed skull using epithermal beams. These beams were able to penetrate the superficial tissues of the scalp and skull to reach the tumour. The theoretical advantage of epithermal beams is that they can treat the Glioblastoma multiforme (GBM) cells, found at a distance from the main tumour mass, as well as deep seated tumours. Enhancing selectivity has been an ongoing challenge to chemists developing newer boron compounds with improved concentration ratios. Boron-10 carriers were developed that assure more favourable tumour-to-brain concentration

ratios than were obtainable with the early compounds. Significant boron compounds subsequently used, have included sulfhydryl–containing polyhedral borane (BSH) and borated phenylalanine (BPA) with improved tumour to normal tissue boron-10 concentration ratios.

FIGURE 1: SCHEMATIC OF BORON-10 NEUTRON INTERACTION,
SOURCE: WEB.MIT.EDU



Clinical interest in the trials performed in 1990-2003, has focused primarily on the treatment of high-grade gliomas and either cutaneous primary or cerebral metastases of melanoma. The best survival data from these studies are at least comparable with those obtained by current conventional therapy for glioblastoma multiform. The inability to achieve full tumour control of the glioma tumours, and in particular GBM, and the invention of new chemotherapy pharmaceuticals, that has similar effect on these tumours, was a stumbling-block in the transition of NCT from experimental to clinical treatment. It was obvious that it is necessary to find the appropriate target for NCT among the aggressive tumours.

The starting head and neck cancer treatment in Japan showed that NCT is the most vital alternative for these type of tumours. Both from Finland and Japan were reported impressive results (Kato 2009 and Kankaanranta, 2008). Nowadays, head and neck cancers are the main target for NCT, yet high-grade gliomas are still treated. Current

or recently completed clinical trials, that have been carried out in the Netherlands, Finland, Sweden, Italy, Czech Republic, Russia, Japan, USA and Argentina, are shown in Table 1.

TABLE 1: RECENT BNCT TRIALS

Facility	Year Started	Status	Patients number
HFR Petten	1997	Stopped Protocol expiration	26-glioblastoma, 4-melanoma
JRR-4 (JAERI)	1998	Active	>20, gliomas, meningiomas
KUR, Kyoto, Japan	1998	Active	>50 head and neck
VTT, Finland	1999	Active	>200, now head and neck
Rez, Czech Rep.	2000	Stopped Economical issues	5, glioblastoma
Studsvik, Sweden	2001	Stopped End of reactor life-time	>40
MIT, USA	2002	Stopped	7
Pavia, Italy	2001	Active	2, extracorporeal liver
Bariloche, Argentina	2003	Active	6, skin melanoma
THOR, Taiwan	2007	Active	

The vast majority of patients treated still has high-grade gliomas, but the number of head and neck patients is rapidly increasing. Also, the extra corporal liver treatment (Zonta 2006) which started in Italy at Pavia Research Reactor, is now to be applied at the TRIGA Research Reactor in Mainz, Germany. Worldwide, clinical trials have involved over 600 patients.

1.4. Neutron sources

The possible neutron sources for NCT are research reactors, accelerators and some radioisotopes (in particular 252Cf). While considered as very convenient for clinical use, the main challenge for accelerator sources is the low intensity of the beam. Up to now, the main investigations on the clinical use of accelerator sources are targeted on extracorporeal treatment, using thermal neutron beam (Esposito, 2009).

At present, all clinical trials have been performed on research reactors (Harling, 2009). Two approaches have been used for the designing of epithermal neutron irradiation facilities at fission reactors. Direct use of the core neutrons as the source, has been the predominant approach for modification or conversion of existing reactors for NCT. Another approach to using fission reactors has been based upon the use of a fission converter which converts a reactor's thermal neutrons to fission neutrons. An interesting new facility, which makes direct use of core neutrons from a small 30kW

reactor, specially designed for NCT, is currently under construction in China. The therapeutic beam parameters of most of the facilities, constructed up to now are shown in Table 2.

TABLE 2: BEAM PARAMETERS OF BNCT FACILITIES

Facility	Irradiation time	Flux density	Approach	Thermal power	Clinical trials start
	min	n cm^{-2} sec^{-1}			
IE, PETTEN (Netherlands)	50	$3.3x10^{8}$	Direct	45 MW	1997
NEW MITR, Massachusetts Institute of Technology (USA)	0.33	$5x10^{10}$	Fission converter	5 MW (150 kW)	2001
MITR - MIT (USA)	83	$2x10^{8}$	Direct	5 MW	1995
BNL(USA)	9	$1.8x10^{9}$	Direct	3 MW	
Kyoto University Reactor (Japan)		$3.28x10^{13}$		5 MW	
RA-6, Centro Atomico Bariloche (Argentina)				500 kW	2003
FiR-1, Helsinki (Finland)	17	$1.8x10^{9}$	Direct	250 kW	1999
NRI, Rez (Czech Republic)	30-40	$8.6\ x10^{8}$	Direct	10 MW	2003
Studsvik AB, (Sweden)				1 MW	2001
TAPIRO, Rome (Italy)	54	$8\ x10^{8}$		5 kW	

The acquired experience in NCT for the last three decades lead to the definition of the desired beam parameters (IAEA 2001), that NCT facility should provide:

- epithermal neutron flux $\cong 5x10^{9}$ neutrons/cm^2s (at the therapy position)
- neutron energy ~ 1 eV to ~ 10.0 keV
- gamma dose rate $\leq 2x10^{-13}$ Gy/cm^2
- fast neutron dose rate $\leq 2x10^{-13}$ Gy/cm^2
- current:flux (J/Φ) ratio > 0.8

The first parameter is connected with the irradiatiation time, and the last shows the convergence of the field.

Additionally, the general requirements to a reactor based NCT facility are:

- Facility with well filtered and collimated epithermal neutron beam;
- An irradiation room, an observation and monitoring room, patient preparation-room, other facilities: Doctor's needs, boron measurements, etc.;
- Excellent infrastructure for communication with the base hospital; and
- Well trained interdisciplinary team.

2. IRT RESEARCH REACTOR AS A NCT BASIC DEVICE

According to the decision of the Bulgarian government from 2001, the Research Reactor IRT (IRT), Sofia, of the Institute for Nuclear Research and Nuclear Energy of the Bulgarian Academy of Sciences (INRNE-BAS), is in a process of refurbishment from the previous reactor design IRT-2000. The project for reconstruction foresees the reactor of thermal power 200 kW with LEU fuel, six vertical experimental channels, seven horizontal experimental channels, maximal fast neutron flux of $3x10^{12}$ n/cm^{2}s and maximal thermal flux of $8x10^{12}$ n/cm^{2}s.

The refurbished reactor will be used for education and training of students, physicists and engineers; in the field of nuclear science and nuclear energy, implementation of applied methods and research, development and preservation of nuclear science, skills, and knowledge.

The building of NCT irradiation channel is included in the new design. The development of NCT for treatment of head and neck cancer, and brain cancer is one of the main tasks in the program for sustainable application of the reactor.

The Research Reactor IRT is a water-moderated, water-cooled pool type reactor, that was built and put into operation in 1961.The reactor site is arranged on the eastern open and flat part of Sofia, only 8 kilometers from the city center, and is a part of good communication infrastructure, that encompasses the near-by city hospitals.

The reactor hall (Fig.2) has enough space for the accompanying facilities such us irradiation room, patient preparation room, monitoring room, etc.

2.1. Establishment of NCT on IRT

Feasibility studies carried out within the national network of the INRNE-BAS, the Medical University in Sofia, the National Centre of Radiobiology and Radiation Protection, the Institute of Experimental Pathology and Parasitology, the Institute of Electronics of the Bulgarian Academy of Sciences, and the Faculty of Physics of Sofia University have shown that interest, necessity and human recourses are available to develop and conduct NCT.

Contacts with institutes experienced in BNCT, such as the EC JRC, Petten, the Netherlands, the VTT, Finland and the NRI-Rez, the Czech Republic, have been established.

An agreement for technical assistance in organizing, licensing and beam designing of IRT BNCT Facility was signed between INRNE-BAS and the BNCT team from MIT, USA.

Useful information and experience has been shared during the expert visits to INRNE-BAS of Dr. Raymond Moss from JRC-IE, Petten and Dr. Iiro Auterinen from Helsinki University Hospital and Prof. Akira Matsumura from the Institute of Clinical Medicine, University of Tsukuba, Japan.

FIGURE 2: IRT REACTOR HALL

During scientific visits, Bulgarian researchers acquainted with the BNCT facilities at High Flux Reactor at JRC-IE, Petten, the FiR-1 in Finland, the TRIGA Mark II at Pavia, the TAPIRO in Casaccia and the LVR-15 at NRI/Rez, in the Czech Republic.

Bulgarian researchers have also taken part on NCT workshops organized by JRC-IE, Petten.

Promising young specialists are also involved in the NCT development. Ms.Sci. and Ph.D. theses on the designing and dosimetry issues of NCT are carried out. The dosimetry methods and techniques needed for BNCT application are also included in the educational programme.

2.2. Modeling of NCT Beam Tube on IRT in Sofia

Modeling of geometry and material composition of filter/ moderator for the BNCT beam tube on IRT has been carried out, following the beam tube construction of the Massachusetts Institute of Technology Reactor (MITR) (Harling, 2002). The collimator design has been analyzed taking into account an ability to include the BNCT tube into the IRT-2000 geometry and following known recommendations concerning collimator shape optimization (Nava, 2005). The selected reactor core

configuration and beam design enable fuel assemblies to be positioned at the entrance of the beam tube so that core neutrons can be used directly.

The calculations of IRT NCT tube (Belousov, 2009) were carried out using the Monte Carlo code MCNP (Briesmeister, 2000).

The filter/moderator design and the lead reflector thickness were chosen to be the same as those used at the MITR. Different collimator surface shapes (pyramid, cone, and parabolic), length (L) and half angle (θ) of narrowing to the output aperture were analyzed for the purpose of design optimization. The collimator length L = 90 cm corresponds to the basic option when the collimator ends 60 cm inside the biological shielding.

The calculated results for epithermal neutron flux - φ_{epi} (neutrons with energy between 0.5 eV and 10 keV), at the NCT beam output (with area of 225 cm^2) are presented in Table 3. It is evident that the considered basic design produces beam intensity similar to that of the MITR facility. Using a basic collimator with a length equal to 90 cm, a cone shape is the most appropriate, although the results for the cone and pyramid shapes practically coincide for the same angle θ, within the limits of statistical uncertainty. The results for the different cone collimator length enable assessing the impact of collimator extension. The flux intensity decreases by more than a factor of two when increasing the collimator length from 72 to 124 cm.

FIGURE 3: IRT REACTOR CROSS SECTION AND MCNP MODEL FOR NCT TUBE CALCULATION

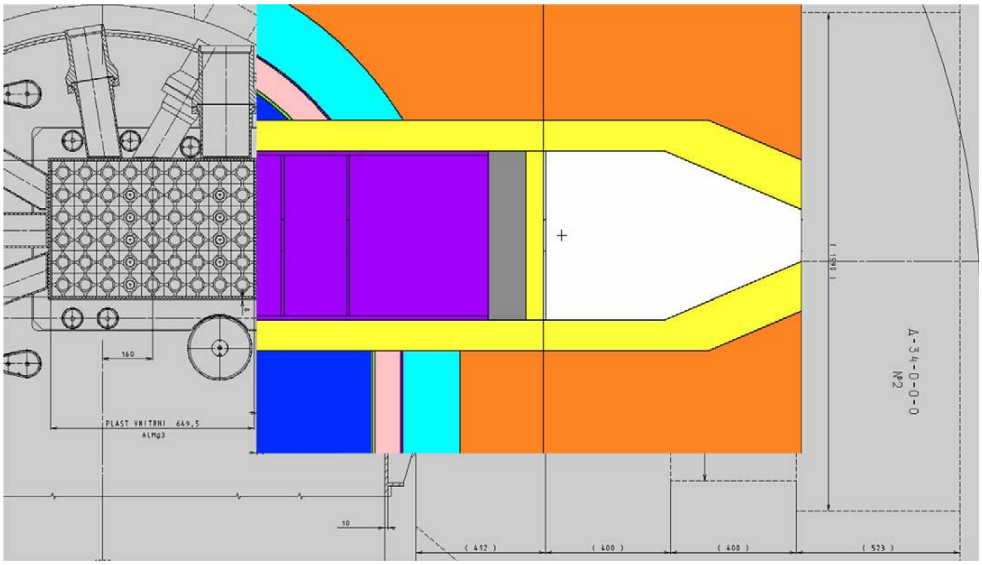


TABLE 3: CALCULATED NCT BEAM PERFORMANCE

Collimator design	φ_{epi}, $cm^{-2}s^{-1}$
Pyramid, L=90cm, θ = 17°	4.0E+9±4%
Cone, L=90cm, θ = 21°	5.0E+9±4%
Pyramid, L=90cm, θ = 21°	4.6E+9±4%
Cone, L=124cm, θ = 16°	2.7E+9±4%
Cone, L=72cm, θ = 27°	6.2E+9±4%

The efficiency of a parabolic collimator shape in the IRT beam configuration is evaluated comparing the results obtained for cone (L=90cm, θ = 21°) with those for parabolic inside surface collimator. The results of comparison for beam performance including "in-air" soft tissue doses (fast neutron − D_{fn}, and photon doses − D_{γ}) and beam collimation (currant to flux ratio − J_{epi}/φ_{ep}) evaluation are given in Table 2.

TABLE 4: PARABOLIC AND CONE COLLIMATOR IRT BNCT BEAM PERFORMANCE

Collimator	Cone	Parabolic
φ_{epi}, E+9 $cm^{-2}s^{-1}$	4.63±0.3%	4.78±1.0%
D_{fn}/φ_{epi}, E−11 cGy cm^2	2.10±1.0%	2.24±1.0%
D_{γ}/φ_{epi}, E−11 cGy cm^2	0.55±1.0%	0.63±1.0%
J_{epi}/φ_{epi}	0.704±1.0%	0.665±1.0%

In terms of epithermal flux intensity, the advantage of a parabolic collimator is about 3%, that is considerably less than the advantage obtained for TAPIRO reactor. A parabolic collimator shape does not appear to be advantageous for the IRT NCT beam tube. This preliminary modelling of the NCT beam tube at the IRT, Sofia reactor shows that the modelled beam performance at the IRT, Sofia is similar to the MITR facility and meets the existing requirements (IAEA 2001). The beam intensity is sensitive to the overall collimator length and angle of taper, with the longest collimator reducing epithermal flux by a factor of about 0.6.

2.3. NCT Scientific Information System

The NCT Scientific Information System was developed under Project NIK 2/2007 with the purpose to foster the development of NCT at the reconstructed research reactor IRT. It was built as a subsystem to the INRNE-BAS Intranet. The information system is based on a server and a set of notebooks and is implemented to the INRNE-BAS information network (Figure 4). It provides reliable access to the specific data, periodic publications, and a possibility for continuous exchange of information relating NCT between the researchers, jointly working on NCT development in Bulgaria. The information system also supplies easy and fast access to the basic and current information to the young specialists just starting in NCT.

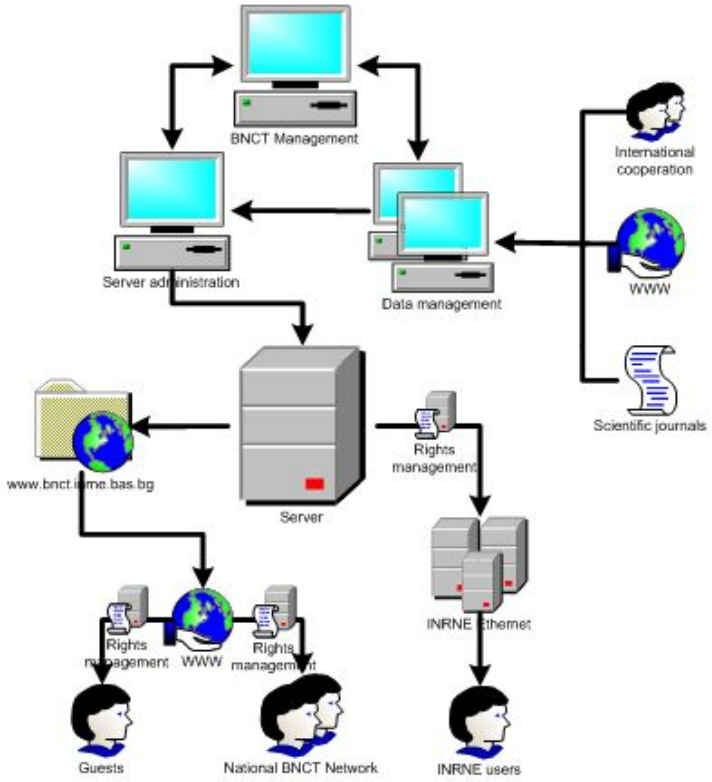
More than three hundred titles, presentations and technical reports are stored in the database. The content is divided into six sections: Clinical Matters and Biomedical Applications; Radiobiology; Chemistry and Pharmacology; Boron Imaging; Nuclear Physics and Engineering; Medical Physics. Differentiated access to the stored data has been created. Recent information from the leading periodic journals such as: Radiation Research (RRS, USA), Medical Physics (AAPM, USA), Nuclear Technology (ANS, USA), Nuclear Science and Engineering (ANS, USA) and International Journal of Radiation Oncology*Biology*Physics (ASTRO, USA and EU) can be found. The specific data together with the copyrighted and patients related materials are put into scientific database that is available only to INRNE-BAS staff and the members of the national NCT Network. A special section contains the Bachelor and Master theses that are done at INRNE-BAS from graduate students, giving them the possibility to publish their work and present themselves to the scientific community.

2.4. NCT Scientific Infrastructure

Elements of the NCT Scientific Infrastructure (SI) have been created within the Project D002-58 "Building of Scientific Infrastructure for Development of BNCT in Bulgaria". The NCT infrastructure requires creating, enforcing and managing of a multidisciplinary team. That is why, the NCT infrastructure building includes also the establishment and maintaining of contacts with institutes experienced in NCT, strengthening of the national NCT network and cooperation to the experienced and interested Balkan region countries as well. The TPS will be applied for a parallel study of the Photodynamic Therapy (PDT) (Avramov, 2005) and NCT, and the possibility to combine both. The PDT and NCT are modern cancer treatments that showed their efficacy in treating malicious tumours during the last ten years. PDT and NCT are binary modalities for cancer treatment involving activation of tumour cell-localized sensitizers with light or low-energy neutrons. Both therapies allow local control with minimal side-effects common in other cancer treatments. A specialized Treatment Planning System (TPS), as a basic component of the NCT, will be created for

treatment of patients with malignant tumor. The NCT TPS will include computer codes, a database for patient data storage with capability to be extended by additional data when available. Its anatomo-topographic module will be adopted from already existing and verified modules. The irradiation beam characteristics will be described by a new dosimetry module. This development imposes solutions during design elaboration, specialization of personnel, for the types of activities before the reactor re-commencement and after its reconstruction.

FIGURE 4: NCT SCIENTIFIC INFORMATION SYSTEM



The Integrated Management System of the INRNE-BAS is a base for hosting the QA management of the process of NCT. ISO 9001 for quality, ISO 14001 for environment, the Bulgarian Nuclear Regulatory Agency requirements, the Governmental requirements for occupational health and safety, and for security; and is certificated since 2003.

3. CONCLUSIONS

Preliminary modeling has shown that a NCT facility, with properties comparable or even better than existing ones, could be built at the research reactor IRT in Sofia. The interested parties for the development of NCT in Bulgaria are identified, and a collaboration, based on the mutual interest are established.

The results of neutron and gamma transport calculations, performed for the model, have shown that the facility will be able to supply an epithermal neutron flux of about 5.10^9 n/cm^{2}s, with quality, which is close to the best value reached in the world until now. More active collaboration with MITR team will hasten the process of NCT facility licensing. Further optimization of the beam tube for specific IRT, Sofia geometry conditions, filter/moderator, collimator with extender and shutter design will be done in order to create a facility with properties provided at the best facilities already existed/applied.

The NCT information system helps the researchers and students interested in NCT. The effective building of the NCT infrastructure, is a base for the NCT effective application. The NCT development will play a very significant role in the sustainable utilization of the reactor. Human and social results, thanks to the NCT application to patients from the Balkan region, are expected.

4. ONGOING TASKS

For successful establishment of the NCT facility on IRT it is needed:

- Further optimization of the beam tube for specific IRT, Sofia geometry conditions: Filter/moderator, Collimator with extender, Shutter design (1MW) in collaboration with MIT team;
- NCT infrastructure building;
- Multidisciplinary team enforcing; and
- Strengthening international collaboration.

NOTES

1. All the figures and photographs, except Figure 1 were made by the authors.

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FORMS OF PARTICIPATION IN GREEK INDUSTRY: WORKERS' HEALTH AND SAFETY COMMITTEES: THE CASE OF THE FEDERATION OF INDUSTRIAL TRADE UNIONS' INDUSTRIES

GEORGE O. TSOBANOGLOU[*] and PARASKEVI BATRA[**]

ABSTRACT

This paper presents at first level the existing Juridico-legal parameters in which, the Occupational Safety and Health (OSH) Committees in Greece operate. Secondly, it brings forward evidence from the Greek industry regarding the actual OSH practices and conditions. The study discusses the results of a first of its kind study realized in 25 industries, members of the Greek Federation of Industrial Labour Unions (OBES) undertaken by the Greek Institute for Occupational Health & Safety (ELINYAE) Athens, Greece in association with the Finnish Institute of Occupational Health (FIOH), Helsinki, Finland. The European Union's Directorate General V Employment financed the survey through the Health Education Life Protection (HELP) Programme (part of a wider scheme called SAFE). The main purpose of the survey was to assess the level of workers' awareness of OSH work conditions.

The participatory work-place programs regarding the running of OSH Committees found in the surveyed industries provide important evidence regarding such practices in the Greek industrial sector. The study registered key elements of the dominant participatory culture in Greek industry.

Keywords: Participation; Occupational Health and Safety Committees; Greece.

1. THE INSTITUTIONAL PARAMETERS FOR THE RIGHT OF REPRESENTATION ON ISSUES OF HEALTH AND SAFETY AT WORK

The institution of workers' representation has developed further in countries whereby labour policy leaves enough room for action for the social partners. This participation in the committees, which take their own decisions, differs greatly even across Europe, as the affectivity of this institution (workers committees) depends on the balance of social forces, between employees and workers and the general status of regulation in place. However, the example of countries like Italy in which, the workers' representative committees define to a great degree, labour issues, the protection of workers facing occupational hazards seem to be part and parcel of the

[*] Associate Professor, Sociology Department, University of the Aegean, Mytilini, Lesvos, Greece

[**] Ph.D., National Technical Polytechnic of Greece, President of the Association of Greek Women Scientists, Athens, Greece

long standing trade union drive to improve via collective agreements, wage rates and work conditions (Graham, 1996). Depending upon the established level of organizational culture other aspects, such as health and human safety at work come to the agenda.

In this paper, we will present the results of a study conducted in 25 factories with an emphasis on the workers' participation in their respective Health and Safety Committees. The 25 factories which participated in this survey represented the "Greek industrial reality" at the time.

In Greece, nearly up to the 80's there was very little to see regarding participation of workers in terms of health, safety and security. However, the 90's witnessed the real upturn of the situation with the establishment in workplaces (1991), as part of the national collective labour agreement, of the health and safety committees. These committees were to act as consultative bodies for the development and the maintenance of safe work conditions in the fields of mining and industry with a particular reference to the energy (electricity) field (EL.IN.Y.A.E, 1994; I.L.O., 1998 a; I.L.O., 1998 b). In parallel there was also the constitution of the Central Committee of Health and Safety at Work whose purpose was to implement this collective agreement (G.S.E.E., 1995). The terms of this collective labour agreement included, in Article 6, the formation of the Greek Institute of Occupational Health and Safety at Work (1991). This Institute is constituted by an equal number of representatives from the social partners.

The first time co-operation on issues of health and safety at work at a company level was set in place was when Law 1568/1985 became enacted (EL.IN.Y.A.E, 1996). This co-operation is practiced through the institutionalization of the representative body of the Committee of Health and Safety at Work that sets up the limits and operability in the company. The practice of the Commission of Health and Safety at Work depends very much on the workers' initiative. It is not dependent on action by the employers nor is it compulsory; the employer cannot refuse the workers to exercise this right voluntarily (Demaina-Manica, 1995; EL.IN.Y.A.E., 1996).

This Committee is composed of the workers' elected representatives in the company. Their number depends on the size of the company. The election of these members is done directly by workers who hold a general election every two years. The Health and Safety Committee is a consultative body with very clearly defined responsibilities (Panopoulos, 1993; EL.IN.Y.A.E., 1996). It is not a body of co-determination and it does not have the right to stop or block decisions by the employer nor does it have the right of a veto. Basic responsibility of this committee is its contribution to the regulation and control of occupational hazards. Their role is oriented towards the processing of mechanisms for information research and mediation. This kind of co-operation is very important, as from the moment the committee is armed with direct responsibilities, it can play a dynamic role. The protection from dismissal of the members of the Health and Safety Committee is

expressed clearly in the law and in the related protective measures, which refer to the elected workers representatives (Graham, 19996; Demaina-Manica, 1995). It is in this Committee that responsibility lays for researching the general conditions of work, and the right to introduce proposals not only for the control of hazards but also for the humanization of work conditions (Koukiadis and Blanpain, 1993; Karakatsanis and Gardicas, 1995). It also has the responsibility to analyse the various production processes, work methods and conditions of work, such as noise levels, stress at work etc. For this reason, this Committee has the right to investigate further on the general themes that are related to accidents and occupational dangers in the world of work as they influence the conditions of work. Such legislation defines the ways with which such right becomes applicable in the work process. The Health and Safety Committees have the right of immediate access to all the company documents in order to establish a possible exposure to danger. The worker is also obliged to give requested information. Concealing such information constitutes a violation of the law (Koukiadis, 1994). The law acknowledges to the Health and Safety Committees the right to monitor OSH conditions and to establish whether those conditions are in harmony with the legislation, as it aids its application at the shop floor (Leventis and Goutos, 1988; Karakatsanis and Gardicas, 1995). However, the committee does not have the right to do its own research with its own experts who are external to the factory as it happens in the Italian case. Such action presupposes the agreement with the employer, the safety engineer and the medical doctor. The Health and Safety Committee can organize meetings with safety and health officers and employers with a daily agenda to discuss solutions of emergent problems. The employer is obliged to give access to records and provide information to the members of the Health and Safety Committee. In this framework, he is required to give all the required technical support, to offer meeting rooms with a telephone and to cover the meeting expenses. The employer must encourage the training and education of the members of the Health and Safety Committee. The time of absence of these workers for the above purposes is being considered as working time. In certain conditions the responsibilities of workers' health and safety committee has expanded, particularly according to Law 2224/1994 (Metzitakos, 1994), as it empowers the Ministry of Labour to ask for the opinion of the Higher Council of Health and Safety at Work to issue Presidential Decrees in order to regulate the function and the responsibilities of the workers regarding health and safety. Presidential Decree 17/1996 gave the right to workers to elect the Health and Safety Committees, in companies with 21 workers. This Presidential Decree defined also the duration of the leave in which the members of this committee can have freedom to work on the implementation and the monitoring of the Health and Safety legislation. The 1767/1988 Law gave workers the right of having counsellors on themes of Health and Safety and it clearly defined the members of the Health and Safety Committees (EL.IN.Y.A.E. 1996). The Health and Safety Committee may compose a complimentary committee to the Workers Council

(Romanias; Dotsika, 1996). In case there is an overlap in responsibility, in certain cases the Workers' Council has the direct responsibility for the themes of Health and Safety, especially it can decide, together with the workers, for the set-up of the health and safety mechanism. Employers have the obligation to inform the Workers Council for a series of themes, such as the introduction of new technologies and their impact on the organization of production. They also need to co-decide on issues of rehabilitation for handicapped people after an accident, to be placed in special positions in the factory. For all of these themes and exceptionally for the later there are special responsibilities for the Health and Safety Committee. The Presidential Decree 17/1996 lifted all the previously unclear responsibilities between the two institutions, namely the Health and Safety Committee and the Workers Council. These Committees bear the basic instruments by which legislation of Health and Safety is exercised.

2. THE SURVEY

The factories, which participated in this research, were 25. As far as the status of ownership is concerned, nineteen (19) companies were Greek-owned and six-(6) multinational. According to another classification, about twenty one (21) factories were private and belonging to the Greek Public Enterprises system. The businesses had about 5,158 workers. Of these 253 (4, 91 %) responded to the distributed questionnaires. Considering the degree of health hazards existing in the factories (according to Greek law), ten of those participating in the survey belong to the A category (high degree of hazard) and 15 to the category B, (middle degree hazard). The productive activity of these factories covers a wide range, from wine making to explosives. A more detailed description of the factories, including a particular reference to the existence or not of the Health and Safety Committees is displayed in Table 1.

TABLE 1: FIRMS' PROFILE AND OSH COMMITTEES

Firm	Production Sector	Ownership	Risk Category	Number of Employees	Number of Responses	Workers' OSH Committee
1	Brewery	Multinational	**B**	342	37	**YES**
2	Wood-Processing	Greek	**B**	191	15	**YES**
3	Meat Processing	Greek	**B**	216	8	**YES**
4	Concrete-Quarries	Greek	**A**	42	14	**NO**
5	Electrical Equipment	Multinational	**B**	690	8	**YES**
6	Munitions	Greek	**A**	265	37	**NO**
7	Quarries- Cement	Greek	**A**	22	14	**NO**
8	Household Appliances	Greek	**B**	232	11	**NO**

Firm	Production Sector	Ownership	Risk Category	Number of Employees	Number of Responses	Workers' OSH Committee
9	Canning	Greek	**B**	200	9	**NO**
10	Sugar Production	Greek	**B**	380	7	**YES**
11	Aluminum	Greek	**A**	63	6	**NO**
12	Building Materials	Greek	**B**	28	6	**NO**
13	Production and Trade of Chemicals	Multinational	**A**	450	1	**NO**
14	Production of Asbestos-Cement Products	Greek	**A**	64	1	**YES**
15	Winery	Greek	**B**	31	4	**YES**
16	Clothing	Greek	**B**	96	8	**YES**
17	Textile	Greek	**B**	99	15	**NO**
18	Mining and Sales of Marble	Greek	**A**	128	3	**YES**
19	Plastics	Multinational	**A**	98	11	**YES**
20	Explosives and Munitions Manufacture	Greek	**A**	352	15	**YES**
21	Munitions Factory and Explosives	Greek	**A**	48	1	**YES**
22	Wood Processing	Greek	**B**	900	1	**NO**
23	Electrical Equipment	Multinational	**B**	65	8	**NO**
24	Bottling of AEROSOL & Liquid Cosmetics	Greek	**B**	104	7	**YES**
25	Solar Energy Heaters Factory	Multinational	**B**	52	6	**NO**

Table 2 that follows indicates overall, the existence of Health and Safety Committees in the factories concerned. It is surprising that workers in the multinational companies do not seem to be more aware of the OSH issues than in the Greek-owned companies.

TABLE 2: WORKERS' OSH COMMITTEE

Ownership	YES		NO		TOTAL
	Absolute numbers	Percentage (%)	Absolute numbers	Percentage (%)	
Greek	10	52.63	9	47.37	**19**
Multinational	3	50.00	3	50.00	**6**
TOTAL	**13**	**52.00**	**12**	**48.00**	**25**

2.1. Questions

The present study attempts to explore the workers' opinions, based on their own experience, about the function of the Health and Safety Committee. The data analysis indicated differences in the opinion, accordingly to whether health and safety committees operated or not in their workplace. Therefore we decided to present our results having taken into account this "reality aspect".

This table is based on the responses given by 125 employees working in the 13 factories with Health and Safety Committees in operation.

TABLE 3: RESPONSES TO THE QUESTION 1: HOW OFTEN DO YOU SEE THE MEMBERS OF THE OSH COMMITTEE?

ANSWER	Is there an OSH Committee in your firm?				TOTAL	
	NO		YES			
	Number	(%)	Number	(%)	Number	(%)
No answer	39	30.5	13	10.4	**52**	**20.6**
Every Day	2	1.6	55	44.0	**57**	**22.5**
Every Week	1	0.8	16	12.8	**17**	**6.7**
Every Month	5	3.9	9	7.2	**14**	**5.5**
I see them but we don't discuss OSH issues	9	7.0	19	15.2	**28**	**11.1**
Other	72	56.2	13	10.4	**85**	**33.6**
TOTAL	**128**	**100.0**	**125**	**100.0**	**253**	**100.0**

Almost 44% responded that they meet the members of the Health and Safety Committees every day, there is however, a 15.2% which declares seeing them but not exchanging any views with them. The 12.8% responded that they meet them every week, the 7.2% every month, and the 10.4% gave other answers. Approximately 10% did not respond to this question.

Question 2: *Under what circumstances do you meet with the OSH members?*

TABLE 4: RESPONSES TO THE QUESTION NO 2

ANSWER	Is there an OSH Committee in your firm?				TOTAL	
	NO		YES			
	Number	(%)	Number	(%)	Number	(%)
No answer	64	50.0	21	16.8	**85**	**33.6**
I don't see them at all, they are elsewhere	17	13.3	8	6.4	**25**	**9.9**
When they discuss with	2	1.6	4	3.2	**6**	**2.4**

me my work problems						
When they inform us about OSH issues	5	3.9	10	8.0	**15**	**5.9**
I find them and I report to them work problems I face	2	1.6	35	28.0	**37**	**14.6**
We have regular meetings			12	9.6	**12**	**4.7**
Other	38	29.7	35	28.0	**73**	**28.8**
TOTAL	**128**	**100.0**	**125**	**100.0**	**253**	**100.0**

Twenty eight (28%) percent of the workers indicated that they meet the members of the Health and Safety Committee after their own initiative, while only the 3, 2% meets them following the Committee's initiative. The 9, 6% declared having regular cooperation with the OHS Committee, and 8% meeting the members of the Committee when the Committee wants to dispense relevant information from the members of the Health and Safety Committee. Approximately 6% of the workers indicated not ever meeting the members of OH&S Committees, as the members were elsewhere. Finally, almost 17% did not respond to this question while the 28% gave other answer.

Question 3: *How do you evaluate the indications of the members of OSH Committee?*

TABLE 5: RESPONSES TO QUESTION NO 3

ANSWER	**Is there an OSH Committee in your firm?**				**TOTAL**	
	NO		**YES**			
	Number	**(%)**	**Number**	**(%)**	**Number**	**(%)**
No answer	65	50.8	23	18.4	**88**	**34.8**
They help me to protect myself from the dangers of work	13	10.2	76	60.8	**89**	**35.2**
They have no relation with work hazards			4	3.2	**4**	**1.6**
There are no such indications	20	15.6	17	13.6	**37**	**14.6**
Other	30	23.4	5	4.0	**35**	**13.8**
TOTAL	**128**	**100.0**	**125**	**100.0**	**253**	**100.0**

Approximately 61% indicated that the warnings or recommendations made by the members of the Health and Safety Committee were indeed useful in taking preventative measures to avoid occupational hazards. It is interesting to note that 3.2% viewed these recommendations as being irrelevant to occupational hazards, and

a further 13.6% reported that no such recommendations are made; 18.4% did not respond to this question, and 4% gave "other answer".

It seems that almost 40% of our sample did not evaluate positively the suggestions made by the OHS Committee.

Question 4: *Are the members of OSH Committee interested in their duties?*

TABLE 6: RESPONSES TO QUESTION NO 4

ANSWER	Is there an OSH Committee in your firm?				TOTAL	
	NO		YES			
	Number	(%)	Number	(%)	Number	(%)
No answer	66	51.6	14	11.2	**80**	**31.6**
Yes, indeed	2	1.6	31	24.8	**33**	**13.0**
Plenty enough	12	9.4	48	38.4	**60**	**23.7**
Not much	14	10.9	26	20.8	**40**	**15.8**
Other	34	26.6	6	4.8	**40**	**15.8**
TOTAL	**128**	**100.0**	**125**	**100.0**	**253**	**100.0**

Only 25% of the workers responded that the members of the Health and Safety Committee are interested in their duties; 38.4% viewed them as "interested enough" in their duties whereas 20.8% regarded them as showing "very little interest"; 11.2% did not respond to this question and 4.8% gave other answers. Over a third of the workers did not perceive the members of OSH Committee as interested and keen on their duties.

Question 5: *What do you expect from the members of the OSH Committee?*

This final question was open-ended, and was responded by 51 workers (20.2%). Every response was classified to a codified category, according to its content, in order to allow data analysis. These codified categories are displayed in Table 7.

TABLE 7: RESPONSES TO THE QUESTION 5

Answer	Respondents	Percentage %
No answer	202	79.8
To show interest	7	2.8
We expect them to inform us	6	2.4
To become better trained in OSH issues	1	0.4
They must perform their task properly	13	5.1
A committee must be formed	5	2.0
The committee must intervene	5	2.0
We expect more from them	7	2.8
We expect co-operation	6	2.4

We expect nothing	1	0.4
TOTAL	**253**	**100.0**

This question was not responded by the 80% of the respondents. No doubt this figure is very high and the reasons for not giving any answer need to be further explored. 5.1% expected from the members of the OSH Committee to do their job correctly; 2.8% to express an interest in their work, 2.4% expects from them to report and inform on OSH issues whereas a further 2.4% expected better co-operation.

3. CONCLUSIVE REMARKS

In conclusion, the workers in this survey registered their opinion regarding the role of Health and Safety Committees in their factory (considering only the responses of those who work in factories that have Health and Safety Committees in their workplace). We see that:

- The members of the Health and Safety Committee seem to have a regular presence in the factories however; *they are not always practicing their duties.*
- Workers are keen to report their problems to the Health and Safety Committee.
- Recommendations, whenever these are made, by the Health and Safety Committee are useful in the management of occupational hazards.
- The members of the Health and Safety Committee are perceived by the workers as showing enough interest in their role. Nonetheless, the workers expect from the members of Health and Safety Committee to do their job right.

This is the first exploratory study of its kind in Greece. As the 80% of workers did not respond regarding their expectations from the members of the OHS Committee it could be a good starting point for future research. It would be also interesting to explore further the status of training services regarding OHS as well as the general level of workers participation in other parts of the work organization, including, of course, the industrial service sector (cleaning, tourism). Furthermore, the study of working conditions in Greece needs to be recognised as a strategic field necessary for improving working life conditions, competiveness, lowering the cost of work and security. There is an urgent need to realise that safe working conditions, understood as part of the social protection model, will allow the mainstreaming of work quality and raise the quality prospects of the Greek labour market increasing its competiveness (Tsobanoglou, and Batra, 1999).

The distance between the nominal and the effective in the application of the law and regulations in the country is a serious issue and it must be taken into account, as it applies to all fields of practice particularly in work places. Coordination of agencies,

in this case, between the Labour Inspectorate and the Institutes monitoring working conditions, not to mention the specificities of the OHS model dominant in the country, are important aspects that define improved working life quality.

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ANALYZING THE EMPLOYABILITY OF HIGHER EDUCATION GRADUATES AND DETECTING THE EFFECTING FACTORS

VASSILIS KOSTOGLOU and PANAGIOTIS ADAMIDIS*

ABSTRACT

The employability of higher education graduates is nowadays one of the first priorities in Europe. This paper's main objectives are to analyze the existing differentiations in graduates' attitudes towards employment and to detect the effects of graduates' personal and educational characteristics on their employability. The first-born data used are based on the conduct of a survey on a large sample of 1541 graduates of Alexander TEI of Thessaloniki, Greece. The results yielded through thorough statistical analysis focus on two directions: a) the analysis of the main variables portraying graduates' activation towards employment after the acquisition of their first degree and b) the detection of the statistically significant effects of graduates' main characteristics to the variables describing their employability. Conclusions are drawn and further future work is suggested.

Keywords: Employability; Labour Market; Higher Education; University Graduate, hetero-employment.

1. INTRODUCTION

The number of fresh university graduates has been increased substantially during the last decade due to the high competitiveness in the labour market and the consequent dire need for specialization. This increase led to the rapid expansion of higher education in all European Union (EU) member countries. Thus, the employability of young graduates has become one of the first priorities in European, national and personal level, and constitutes today one of the main indicators of the educational system's efficiency (Kostoglou and Paloukis, 2007a).

The employment status of higher education graduates, a certain number of years after obtaining their first degree, has been the main subject of several studies and surveys. The overall average EU-15 graduates' employment rate four years after graduation was 84% and the lowest rates were observed in France, Spain and Italy; 69%, 73% and 79% respectively (Mora et al., 2003; Schomburg and Teichler, 2006). According to these surveys, five out of six graduates in the examined EU countries are part of the labour force. Among the remaining ones some were in advanced academic study, some were still in professional training, some spent most of their time on child rearing and family care, and some opted for a broad range of other activities. Amongst

* Associate Professor, Department of Informatics, Alexander Technological Education Institute of Thessaloniki, Greece

those belonging to the labour force, the average unemployment rate was approximately 4% (Teichler, 2007).

Regarding the unemployment rates of university graduates of EU countries, Latvia (1,2%), Ireland (1.6%), Netherlands (1.7%) and Luxemburg (1.9%) enjoy the lowest rates of less than 2%. On the contrary, Spain (9.2%), Lithuania (8.5%), Hungary (7.5%) and Greece (7.1%) present graduates' unemployment rates exceeding 7%. As far as the overall unemployment rate is concerned, Poland seems to be in the worst EU position (18.6%). By comparing the results, it becomes clear that countries with high overall unemployment rate also have high graduates' unemployment (France, Greece, Poland and Spain) (Eurostat, 2004). Furthermore, the current trend in the labour market sometimes forces the fresh European graduates to search for a job that is not vocationally related to their subject of study (hetero-employment).

Despite the comparatively high graduates' unemployment rate in Greece, studies related to their employability were carried out mainly during the last decade; mainly at institutional level. However, only a few of them were published. The first published study was carried out by the National Metsovio Technical University (NMTU), revealing that its young graduated engineers enjoy high employment rates, depending however significantly on the specialty. Also, some of university's specialties (civil engineers, topographers, architects and computer engineers) are among the ones with the lowest hetero-employment (NMTU, 2001). The second published institutional study was carried out by Alexander TEI of Thessaloniki (ATEI-Th) in 2007 and was addressed to the graduates of the years 1997-2001; this paper being based on the collected first-born data (Kostoglou and Paloukis, 2007b). The major relevant Greek study was addressed to the graduates of the years 1998 - 2000 of all 18 universities. The results yielded were based on a very large sample of 13580 graduates (22.3% of the total corresponding population). The principal findings can be summarized as follows: whilst 84% of university graduates are employed being 'labour incorporated' five to seven years after their graduation, 43% are not yet 'professionally incorporated'. This lack of professional incorporation is due to unemployment (6.4% of the total sample), to inactivity, i.e. non-active search for employment (9.3%) or principally due to lack of permanent employment (27%; about two thirds of these cases) (Karamesini, 2008). According to a recent survey conducted by the National Statistics Office concerning the employment of university graduates, only one out of two finds a job in short term (E-Paideia.net, 2006). The rest are unemployed or under-employed, resulting to the fact that 40% of Greek graduates are employed in sectors very different from their educational background, holding the second position after Italy among EU countries in hetero-employment (Newspaper "TA NEA", 2007).

The vast majority of the published studies gives emphasis on the determination and subsequent analysis and/or comparison of the employment characteristics, lacking the detection of the factors effecting significantly graduates' employment. This

research work attempts to cover exactly this gap focusing on the investigation of the significant factors and their effects on employment issues.

Regarding the structure of this paper, the research objectives as well as its contribution and advance of knowledge are argued in the next section. The fourth section is devoted to the description of the conducted survey's design and adopted methodology. Work's main results are displayed and commented in the paper's fifth section, being divided in two parts; the first one presents the results of descriptive analysis and the second focuses on the detection of significant effects on graduates' employability. Finally, the conclusions drawn are summarized opening the floor for suggested future work.

2. OBJECTIVES AND CONTRIBUTION

Graduates' employability includes numerous parameters, which define and characterize it. This paper focuses on the analysis of the main employment variables and to the thorough investigation of the factors affecting employability and graduates' attitudes towards the labour market.

This work's main objective is to detect the existing differentiations in graduates' attitudes towards employment, as well as in their employability prospects. Furthermore it aims to detect the effects of graduates' personal and educational characteristics on their employability.

This research work is the first one conducted in Greek higher technological education. Results and conclusions drawn are novel as they concentrate, for the first time, on the determination and statistical analysis of the existing statistically significant effects on graduates' employability. Regarding its contribution, the results and conclusions of this study can be useful for researchers in the fields of employment and labour market, decision makers in higher education establishments and for the ministries of education and employment, and, most importantly, fresh university graduates for a more efficient professional orientation. The advance of knowledge at international level, especially for countries with similar educational and employment characteristics with Greece, can also be substantial due to the lack of research in employment factor detection.

3. SURVEY'S DESIGN AND METHODOLOGY

The conduct of telephonic interviews with the use of a structured questionnaire was chosen as the most feasible and effective survey method. The main reasons for this decision were the geographical spreading of the graduates all over the country, their large number, and the consecutive prohibitive cost of interviewing or approaching them. The use of mail survey was also been rejected due to the expected

low response rate according to relevant literature review. The methodology adopted was designed carefully in order to fit to the 'local' needs (Bishop et al., 1988).

A research team consisting of 14 persons (project leader, survey co-ordinator, analyst, evaluator, two computer technicians and eight interviewers) was formed for the implementation. The large database of graduates held in the Careers Office of ATEI-Thessaloniki was used as the principal source for obtaining their necessary communication data. This information was initially extracted from an Oracle database in a file compatible to MS-Excel. Consecutively, data transition was carried out in a specially created file compatible to MS-Access where appropriate tests were applied regarding obvious faults and data consistency to several characteristics. The result of this procedure was a file consisting of all 5558 graduates of 20 departments having graduated in a period of five consecutive years. The data were stratified according to department, gender and year of graduation. Finally, the elements of every stratum were rearranged in a random manner.

A questionnaire formed by a previous pilot study has been used as the main survey tool after some essential adjustments to the 'local' needs. A new user-interactive computer programme was designed and applied for an efficient entry of the filled questionnaires. This application enabled the automatic filling and control of several fields from the graduates' database which enabled the fast data entry avoiding errors. Additionally, an intranet server was adjusted and three terminals were prepared for the use of the application. A strict security policy has been adopted with the creation of access codes and the receipt of automatic backup copies during the night hours. This procedure was a decisive factor for the survey's safe and unbiased implementation. The eight interviewers were selected among 15 candidates and subsequently trained extensively for the telephonic interviews and the use of the developed computer application giving special emphasis to the approach of the selected graduates.

Regarding the final sample size (number of filled and valid questionnaires) the target set was a fully stratified sample, sized 26-30% of total graduates. Additionally the sample size of every specialization (department of origin of graduates) was not less than 50. The whole procedure lasted five months. Following the achievement of the sample sizes target the data were extracted to a file compatible to MS-Excel and given to the analyst for statistical elaboration.

4. ANALYSIS AND RESULTS

The final collected sample consisted of 1541 filled and valid questionnaires. The statistical analysis was carried out with the use of SPSS, v. 15.0, the statistical package for the social sciences. Graduates' responses were analyzed through descriptive and analytical statistical techniques with emphasis to the identification of the factors affecting significantly employability. This section is divided in two parts; in the first one, the main results of the responses' analysis are presented and discussed, whereas

the second focuses on the detection of significantly affecting factors with the use of appropriate statistical analysis.

4.1. Main results

This subsection includes a selection of the most important results and findings directly related to graduates' employment. These findings focus on postgraduate studies' attendance and relevance, the detailed statuses and types of graduates' employment and its relation with the first degree, the way of finding the present position, the reasons for seeking another one, as well as the degree of satisfaction from employment and earnings.

The following two tables present the main information regarding the continuation of ATEI-Th graduates for postgraduate studies; attendance (table 1) and relevance with their first degree (table 2). Nearly one out of ten graduates has acquired or is currently (at the time of the survey) studying for a postgraduate degree. More than half of them have or will acquire this degree from a Greek university.

TABLE 1: POSTGRADUATE STUDIES ATTENDANCE

	Frequency	**Percentage (%)**
Yes (in Greece)	71	4.6
Yes (abroad)	65	4.2
No	1405	91.2
Total	**1541**	**100.0**

TABLE 2: RELEVANCE OF POSTGRADUATE STUDIES WITH FIRST DEGREE

	Frequency	**Percentage (%)**
Irrelevant	16	11.9
Small	6	4.4
Medium	13	9.6
High	43	31.9
Very high	57	42.2
Total	**135**	**100.0**

Table 2 shows that graduates' estimation about the relationship of their postgraduate studies with their basic degree covers the whole spectrum of the scale, from irrelevant to very high relevance. Nevertheless, the concentration of scale's positive values is significantly higher: about three quarters of the graduates who continued for postgraduate studies report that their relevance is high or very high.

Tables 3 and 4 present the most important findings regarding graduates'

professional statuses; aggregate percentages and analytical employment statuses of the graduates of all specialties respectively.

TABLE 3: GRADUATES' PROFESSIONAL STATUSES

	Frequency	**Percentage (%)**
Employed	1108	71.9
Self-employed	197	12.8
Unemployed	129	8.4
Inactive	107	6.9
Total	**1541**	**100.0**

About 85% of the graduates are currently working (72% as employees and nearly 13% of them are self-employed). On the other hand, 8.4% are unemployed (in the process of looking for a job) and nearly 7% are inactive (not presently interested in seeking employment).

TABLE 4: EMPLOYMENT STATUSES FOR ALL SPECIALTIES

Department of graduation	**Employed (%)**	**Self-employed (%)**	**Unemployed (%)**	**Inactive (%)**	**Sample Size**
Informatics	94.6	5.4	0.0	0.0	56
Vehicle engineering	83.1	11.9	0.0	5.1	59
Electronics	82.1	9.5	2.1	6.3	95
Automation	78.2	18.2	3.6	0.0	55
Accounting	72.9	13.8	3.6	9.8	225
Aesthetics and cosmetology	51.0	25.5	3.9	19.6	51
Civil infrastructure	50.0	35.2	5.6	9.3	54
Nutrition and dietetics	47.3	41.8	7.3	3.6	55
Physiotherapy	57.4	26.2	8.2	8.2	61
Marketing	75.9	9.3	8.6	6.2	162
Midwefery	80.4	2.0	9.8	7.8	51
Library science	84.0	4.0	12.0	0.0	50
Food technology	68.0	12.0	12.0	8.0	50
Nursing	83.2	1.7	12.6	2.5	119
Animal production	69.8	5.7	13.2	11.3	53
Medical laboratories	71.7	5.0	13.3	10.0	60
Farm management	64.7	5.9	13.7	15.7	51
Plant production	61.7	21.0	14.8	2.5	81

Tourist industry	68.0	12.0	15.0	5.0	100
Childhood care and education	69.8	3.8	15.1	11.3	53
Total	**71.9**	**12.8**	**8.4**	**6.9**	**1541**

Having ranked the departments of origin (specialties) of graduates in ascending order of unemployment rate, the conclusions are evident. The graduates of the faculty of technological applications (informatics, vehicle engineering, electronics, automation and secondarily civil infrastructure engineering) present the lowest unemployment rates. Graduates of accounting and nutrition and dietetics have also low rates of unemployment. On the other hand, six (out of the 20 examined) specialties related to agriculture (food or animal production and farm management), health (medical laboratories, childhood care and education and nursing) and tourism suffer of unemployment rates over 12.5%.

The type of employment of working graduates is presented in table 5. Eight out of ten of them are full time employees, whereas only 5% are engaged on part-time basis. About one third of the self-employed graduates have personnel in their enterprise (5.1% of the employed graduates); the others (nearly 10% of the working population) work alone.

TABLE 5: TYPE OF EMPLOYMENT

	Frequency	**Percentage (%)**
Full time employee	1036	80.2
Part time employee	65	5.0
Self-employed with employees	66	5.1
Self-employed without employees	124	9.6
Total	**1291**	**100.0**

Figure 1 portrays the relation between bachelor studies and present employment. This relationship is mainly either high or very high (60%) or minimal (25%), showing that one out of four graduates have switched to hetero-employment a recent phenomenon having been observed in Greece as well as in some other EU countries (Kostoglou et al., 2007c).

FIGURE 1: RELATION BETWEEN STUDIES AND EMPLOYMENT

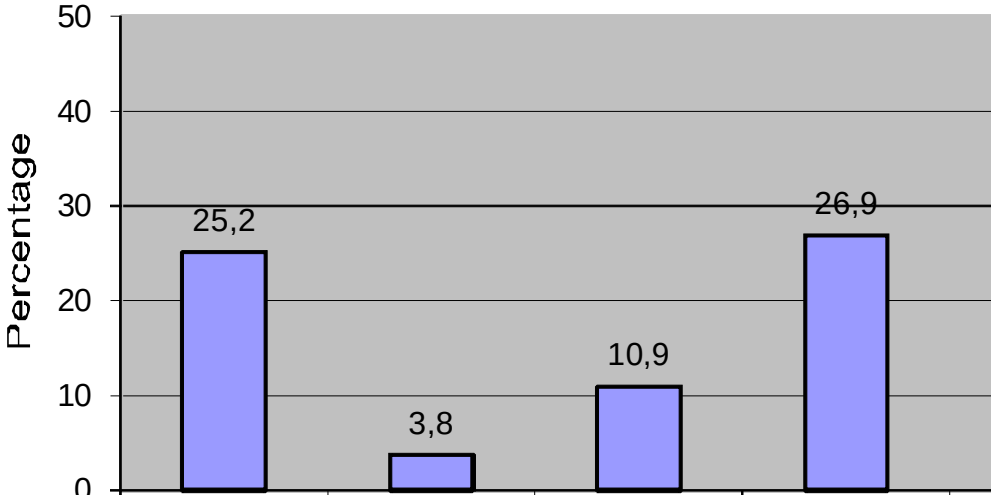


Table 6 outlines another important characteristic of graduate's employment, the way they found their present position. The results show that graduates have used nearly all possible channels for finding a position in the labour market. Nevertheless, there is an obvious preference in the formal state examinations (often held at national level for various specializations) where at least 38% of university graduates have eventually succeeded, in family or personal connections (22.5%) and in announcements published in newspapers, coming mainly from the private sector (18%). Some other not clearly defined procedures have been the successful means for quite a few graduates (11.7%). It is worth noting that some well known channels of the public sector (the nationwide Manpower Employment Organization, the compulsory six-month practical training and institution's Career Office) seem to be unpopular - and possibly ineffective - channels for helping graduates in getting a position in the labour market, as they have contributed cumulatively in less than 10% of the total number of engagements.

The degree of graduates' satisfaction from their employment is portrayed in the next three figures. The first of them (fig. 2) presents the satisfaction of all employed graduates, the next one (fig. 3) the satisfaction of the self-employed ones and the last (fig. 4) the satisfaction from their earnings.

More than six out of ten employed graduates (63%) report that they are highly or very highly satisfied from their present position. Almost two out of ten stand for medium satisfaction and nearly 15% declare their dissatisfaction.

TABLE 6: WAY OF FINDING PRESENT POSITION

	Frequency	Percentage (%)
Through state examinations	421	38.4
With the help of friends or family	247	22.5
From announcements in newspapers	197	18.0
Through other procedure(s)	128	11.7
Through the 6-month practical training	54	4.9
From Manpower Employment Organization	33	3.0
From the Career Office of TEI	16	1.5
Total	**1096**	**100.0**

The results presented on figure 3 prove that the satisfaction of self-employed graduates is much higher. The vast majority (86.2%) are very or quite satisfied from their decision to have their own business, and only a few (13.4%) report dissatisfaction.

Regarding the satisfaction from their remuneration, the relevant distribution is quite symmetrical (figure 4). Nearly two thirds of them (63.6%) report medium or high satisfaction, whereas there is a significant percentage (17.1%) that reports dissatisfaction. Very few graduates (5.5%) seem to be very satisfied from their wage. It is worth noting that the overall satisfaction from salary is significantly lower than the one from the employment itself and even more from self-employment.

These findings are further confirmed by graduates' answers regarding the reasons for seeking another position (table 7).

TABLE 7: REASONS FOR SEEKING ANOTHER POSITION

	Frequency	Percentage (%)
The present position is not related to studies	150	13.5
The present position does not satisfy ambitions	168	15.2
The salary is not satisfactory	433	39.1
Other reason	234	21.1
No answer	**123**	**11.1**

The present salary is the principal reason for changing job for nearly 40% of working graduates. The lack of relevance with their bachelor degree and the position's prospects gathering 13.5% and 15.2% of the answers respectively are the other two main reasons for seeking another position. Other not specified reasons concentrate the relevant selection of at least one-fifth (21.1%) of the respondents.

FIGURE 2: SATISFACTION FROM PRESENT EMPLOYMENT (ALL EMPLOYED GRADUATES)

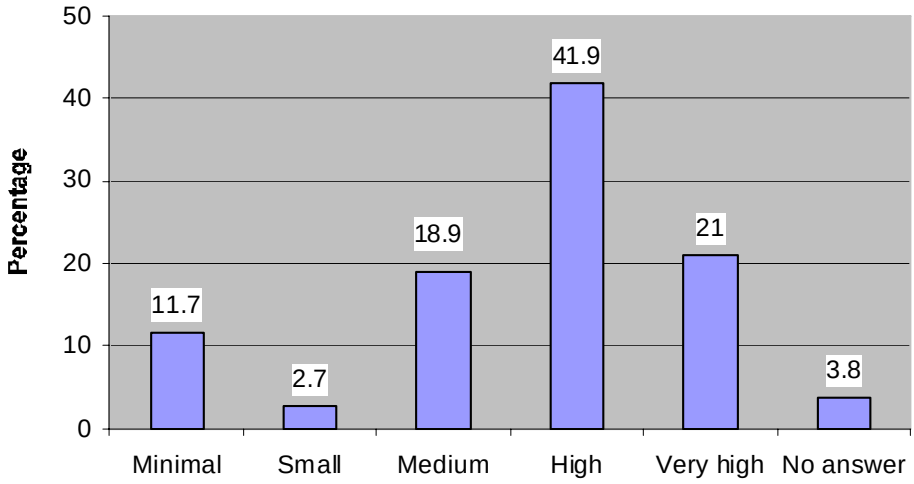


FIGURE 3: SATISFACTION FROM PRESENT EMPLOYMENT (SELF-EMPLOYED GRADUATES)

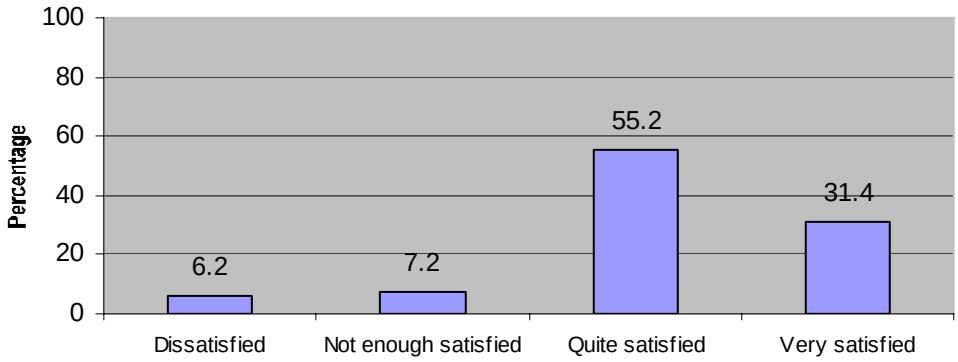
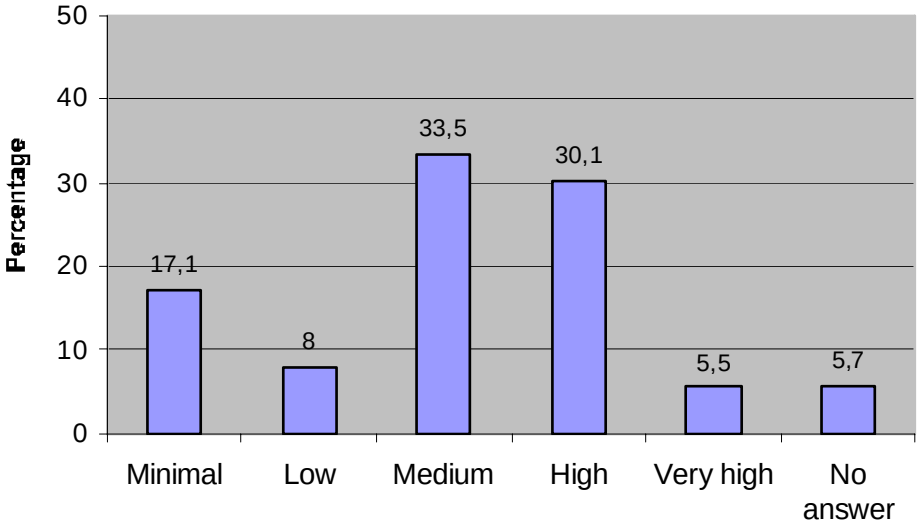


FIGURE 4: SATISFACTION FROM SALARY



4.2. The affecting factors

The association among the main employment variables is investigated with the use of techniques of inductive statistical analysis. Depending on the type of relevant variables and available data, the techniques used are the following:

1. The X^2 test and the Cramer's V coefficient:

The classical X^2 test is used for the detection of existing association between any two nominal variables; considering one as dependent and one as independent. Having set a significance level of 95%, a p-value less than 0.05 is considered as statistically significant.

The statistical Cramer's V is the most appropriate measure for cases with small number of registrations in the contigency tables. The Cramer's V is directly explanatory as its maximum value is the unity. V-values greater than 0.25 are considered as significant.

2. The analysis of variance (ANOVA):

The ANOVA was used for cases of connection between a quantitative and a

qualitative variable. P-values of less than 0.05 denote the existence of statistical significance.

3. The Spearman's correlation coefficients:

They are used as an auxiliary test for detecting any existing trends between ordinal variables. The coefficients, taking prices between -1 and 1, have been calculated for significance levels of 95% and 99%.

The analysis carried out focuses on the effects of the main graduates' characteristics (considered as independent variables) on the issues outlining employment (dependent variables). As the problem's independent variables the gender, the mark of degree, the place of residence, the department (specialty) and the faculty of origin as well as the degree of knowledge of foreign languages are selected. The dependent employment variables which are examined are the graduates' professional status, the kind of employment, the way of finding the present position, the salary, the time elapsed until first employment and the relationship between employment and bachelor degree.

Table 8 presents the revealed relationships between independent and dependent variables (the symbol ✓ signifies the existence of a statistically significant relationship at a significance level of 95%). The results show that graduates' gender and specialty (department) play the most important role on their employment characteristics, developing different attitudes towards employment. Regarding the existing trends of the statistically significant effects (examined additionally through the calculation of corresponding Spearman's correlation coefficients) it is worth noting the following findings.

- Gender vs. professional status:

The percentage of self-employed men is at least double than that of women (18.8% vs. 9.1%). At the same time, men suffer of half unemployment or inactivity rates (4.4% vs. 10.9% and 4.1% vs. 8.7% respectively).

- Gender vs. kind of employment:

Women turn to part-time employment much more than men (6% vs. 3.7%). This, along with their low self-employment rates, results to women's significantly higher full-time employment (83.6% vs. 75.6%).

- Gender vs. salary:

Monthly salary of up to 800 euro declares 30.2% of women; the corresponding

percentage of men is 19.3% proving that women occupy the first position in low salaries. On the contrary, men excel significantly in the high ranges of salaries. All relevant statistical tests show that women graduates earn significantly less than men do.

- Gender vs. way of finding present position:

Men turn to newspapers' announcements significantly more than women (23.2% vs. 14.6%) for a position in the labour market. On the other hand, women prefer to look for work through public channels (42.4% found their present position through examinations and 3.9% through the Manpower Employment Organization; the corresponding percentages of men being 32.2% and 1.6% only). It has also been noticed that the environment of family and friends has helped more the men graduates (26.5%) than women (20%) to achieve this purpose.

- Gender vs. time until finding first work:

ANOVA tests prove significant difference of the mean waiting time for finding work between men and women (16.8 and 10.8 months respectively). However, this six-month delay is probably due to men's military obligations.

TABLE 8: SIGNIFICANT RELATIONSHIPS BETWEEN INDEPENDENT AND DEPENDENT VARIABLES

Dependent variables → **Independent variables**	**Professional status**	**Kind of employment**	**Self-employment**	**Way of finding present position**	**Salary**	**Time until first employment**	**Relation between employment and studies**
Gender	✓	✓	✓	✓	✓	✓	
Mark of degree			✓	✓			
Place of residence				✓			
Department	✓	✓	✓	✓		✓	✓
Faculty						✓	✓

Knowledge of English				✓		✓	
Knowledge of French				✓		✓	

- Place of residence vs. way of finding work:

The place of residence plays a significant role in the channel used for finding work. The Manpower Employment Organization is used much more in large cities and environment's help is greater in Athens and in small towns. Graduates living in small or larger cities of the province turn to state examinations much more than those from Athens and Thessaloniki.

- Mark of degree vs. way of finding present position:

Higher degree marks give candidates more confidence and make them turn to state examinations. These graduates use significantly less newspapers announcements and family environment.

- Effects of foreign languages knowledge:

Knowledge of the English language, as well as the degree of this knowledge plays a significant role on employment characteristics. Graduates with excellent knowledge present higher rates of full-time employment (81.7%, ten units above the average of 71.9%). Consequently, these graduates turn to self-employment at a lower level. In addition, the waiting time until finding their first job is significantly reduced (becoming at least four months shorter) for graduates with very good knowledge of English, French or Italian. The excellent knowledge of English clearly makes the graduates turn to state examinations instead of seeking the help of friends and family.

- Department/faculty of studies vs. relation between employment and studies:

The effect of graduates' specialty on hetero-employment is very significant. The graduates of nearly all the departments of health sciences professions' faculty, as well as of Informatics report a very high relation between their employment and studies. On the contrary, graduates of the faculty of agriculture (Plant or Food production, Farm management), Marketing and Tourist industry evaluate that the average relation of their work with studies is small to medium.

5. CONCLUSIONS

Without doubt, graduates' employability is a multidimensional issue with several parameters describing their professional status, attitudes and relevant existing effects. This work's findings are based on the conduct of a survey on a large sample of graduates of a five-year period. The results focus on two directions: a) the analysis of the main variables portraying graduates' activation towards employment after the acquisition of their first degree and b) the investigation of the significant effects of graduates' main characteristics to the variables describing their employment.

Almost a tenth of Alexander TEI of Thessaloniki graduates turn to a postgraduate degree in Greece or abroad. Three quarters of these degrees are highly or very highly relevant to their first degree. Graduates' overall employment and unemployment rates are 85% (72% working for an employer and 13% self-employed) and 8.4% respectively. The professional status depends highly on the department and faculty of graduation. The relation between specialty and employment is not always strong, indicating a high percentage of hetero-employment for the graduates of some departments.

ATEI-Thessaloniki graduates have used all usual channels for getting their present position; the first three main priorities being the state examinations, the help of family or friends and the work advertisements in the press. Despite the relatively low salaries, which are the first reason for seeking another position, the satisfaction from the present employment is on average quite high. However, this satisfaction is significantly higher for the self-employed graduates.

It has been proved that all graduates' main characteristics (place of residence, mark of degree, faculty, as well as knowledge of English or French language) affect significantly at least one of the employment variables. Nevertheless, graduate gender and specialty are the most important characteristics affecting nearly all these variables and thus determining very different employability prospects and attitudes towards the labour market.

In our opinion, the methodology adopted in this paper (or a similar one) should be repeated frequently for a constant detection of any significant changes in the effects on employability and relevant attitudes. Our suggestion is that the time interval between two successive surveys should not exceed three years. Equally, if not more, important is the communication of the corresponding results to the decision makers and to the fresh higher education graduates.

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INNOVATION CONVERGENCE AND REGIONAL DEVELOPMENT: GOAL OR REALITY?

AIKATERINI KOKKINOU*

ABSTRACT

Globalization and worldwide competition has shifted the comparative advantage of economies towards the factor of knowledge and innovation, where productivity based on the endogenous development capabilities plays a rather important role, as far as growth and competitiveness enhancement are concerned. In new economy, sustainable development comparative advantage is mainly focused on the factors of knowledge, innovation and entrepreneurship, as among the most important factors influencing economic development, both in national and regional level. This paper attempts to examine the main topics related to innovation activities and to estimate the effects on competitiveness and economic growth process, as well as to measure the effects on convergence and cohesion, as well as the effects on the convergence process of regions within the European Union, in order to conclude and reach in some safe results and policy implications.

Keywords: Sustainable Development; Regional Development; Innovation Activities; Competitiveness; Convergence.

1. INTRODUCTION

Development process and technological change has been increasingly based on Research & Development (R&D) and innovation is considered to be rather important to economic growth, development and welfare. Firstly, it stimulates investments which introduce new commodities and processes, and it leads to new developments, which increase the comparative advantage of an economy and affect positively the trade performance and competitiveness of a country or a region. European Union regional development policy makes substantial efforts to upgrade the production infrastructure, as well as financial and organizational structures through capital equipment, state–of–the–art knowledge, and human capital investment, combined with innovative and technology-based production processes (Korres, 2008).

Within this framework, this paper attempts to provide an insight about the dynamics of the European regional innovation process towards the goal of convergence and sustainable development. More specifically, this paper aims to describe the regional growth differentials through regional innovation differences. Particular emphasis is put on the role of regional innovativeness performance in

* Dr. Aikaterini Kokkinou, Department of Economics, University of Glasgow

explaining economic differences and catch-up process. The main questions raised could be summarized in the following: To which extent economic development depends on the presence of a network favorable to knowledge, innovation and entrepreneurship, based on the endogenous development capabilities? What is the relative position of a region as far as development and innovation competitiveness are concerned?

2. SUSTAINABLE DEVELOPMENT AND INNOVATION

The systematic analysis and the theoretical framework of the effects of innovation on the economic efficiency, productivity and growth is based on the endogenous growth theory developed by Solow, 1957, Arrow, 1962, Romer 1986 and 1990, Lucas, 1990 and 1993. The endogenous growth theory claimed that not only the accumulation of capital, but mainly the development and accumulation of knowledge and technological change leads to increased and sustainable growth. The reason is that the long-run productivity decrease is avoided, due to capital accumulation through the qualitative-technological improvements of natural and human capital. According to Romer (1986, 1990), knowledge and technological progress are the main engines of economic dynamism and the economy grows endogenously through the accumulation and spillover of knowledge. Growth rate depends on the amount of technological activity within the economy and on the ability of the economy to exploit external technological achievements (Martin and Ottaviano, 1999, Grossman and Helpman, 1994, Coe and Helpman, 1995). Increasing returns and technical change are incorporated within the production function as determinants of the endogenous growth rate (Romer 1986, Lucas 1988, Grossman and Helpman 1994, Barro and Sala-i-Martin, 1997) and economic growth is sustained because of the continuous creation and diffusion of knowledge.

An important contribution of the endogenous growth theory (Romer, 1986 and 1990) has been to identify the central role that knowledge and knowledge spillovers play in creating and sustaining growth. Pavitt and Soete (1982) examined growth as a result of the development of new knowledge in a country, and the diffusion of knowledge between countries. According to Fagerberg (1987) there is a close relation between a country's economic and technological level of development. The rate of economic growth of a country is positively influenced by the technological level of the country and its ability to increase it through imitation and exploitation of the possibilities offered by the technological achievements elsewhere. Krugman (1991) identified the major role that knowledge spillovers play in generating increasing returns and higher growth. Geroski and Machin (1993) asserted that innovations positively affect the development of enterprises and economies. Moreover, according to Silverberg and Verspagen (1995), technological change and diffusion constitute important factors in long-run macroeconomic growth and development. Moreover,

Barro and Sala-i-Martin (1995 and 1997) asserted that the growth rate may increase in correlation with the technological growth. Furthermore, Freeman and Soete (1997) focused on the importance of technology and innovation claiming that lack of innovation leads to economic death. At the same point of view, Sternberg (2000) said that in industrialized economies the rate of long-term macroeconomic growth depends on the ability of constant development of innovative products and processes.

The endogenous growth theory, as represented by Romer (1986), takes innovation as an endogenous variable which can explain the different national growth rates and why economies, even with different rates, do not converge to long-run steady state equilibrium. The reason is that the long-run productivity decrease is avoided, due to capital accumulation through the qualitative-technological improvements of natural and human capital. According to Romer (1986, 1990), knowledge and technological progress are the main engines of economic dynamism and the economy grows endogenously through the accumulation and spillover of knowledge. Growth rate depends on the amount of technological activity within the economy and on the ability of the economy to exploit external technological achievements (Martin and Ottaviano, 1999, Grossman and Helpman, 1994, Coe and Helpman, 1995). Increasing returns and technical change are incorporated within the production function as determinants of the endogenous growth rate (Romer 1986, Lucas 1988, Grossman and Helpman 1994, Barro and Sala-i-Martin, 1997) and economic growth is sustained because of the continuous creation and diffusion of knowledge.

Developments in the theory of economic growth have renewed the interest for the role of innovation in the development process, underlining the interaction between the investment in innovative activities, technological change and economic growth. Technology and innovation play an important role in economic growth and technology has become one of the most important factors in the models of growth (Geroski and Machin, 1993, Barro and Sala-i-Martin, 1995, 1997, Freeman and Soete, 1997, and Sternberg, 2000). As a motive force, it prompts to long-term development objectives and the advancement of productive structures, so that they maintain the elements of growth, competitiveness and employment. Investments in new technologies aim to the modernisation of productive process and the qualitative upgrade of products, which is one from the basic factors of increase of enterprises. The reason is that the new technologies lead to increase of productivity of factors of production, contributing in the long-term improvement of competitiveness (Griliches, 1980). The technology, also, contributes in the growth of economy, on the one hand because the new or improved products that result from innovations improve the level of existence, and on the other hand, because with regard to the international trade, the record of open economy depends also on the propensity to innovativeness (Fagerberg, 1988). The same holds also for countries and regions, which in order to maintain the elements of growth, competitiveness and employment, owe to change fast the new ideas in technical successes.

As far as regional convergence is concerned, innovation is considered to be rather important to economic growth, development and welfare. Firstly, they stimulate investments which introduce new commodities and processes, which improve the living standards of the society. Moreover, they lead to new developments, which increase the comparative advantage of an economy and affect positively the trade performance and competitiveness of a country worldwide. These effects result in a greater level of economic growth. While innovation may lead to divergence between firms or nations, imitation through diffusion and dissemination tends to erode differences in technological competencies, and hence lead to convergence (Fagerberg and Verspagen, 2002). On the other hand, combining the production functions in order to create and disseminate innovations leads to improvements in productivity and economic development (Malecki and Varaia 1986; Malecki 1991, Fagerberg and Verspagen, 2002). The economic processes that create and diffuse the new knowledge are critical in the development process and there are powerful contacts between the investment in the human capital, the technological change and finally economic growth (Acs, Anselin and Varga, 2002). The reason is that the new technologies lead to increase of productivity of factors of production, contributing in the long-term improvement of competitiveness (Griliches, 1980). Technology, also contributes in the growth of economy, on the one hand because the new or improved products that result from innovations improve the level of existence, and on the other hand, because with regard to the international trade, the record of open economy also depends on the propensity to innovativeness (Fagerberg, 1988).

3. REGIONAL CONVERGENCE IN EUROPEAN UNION

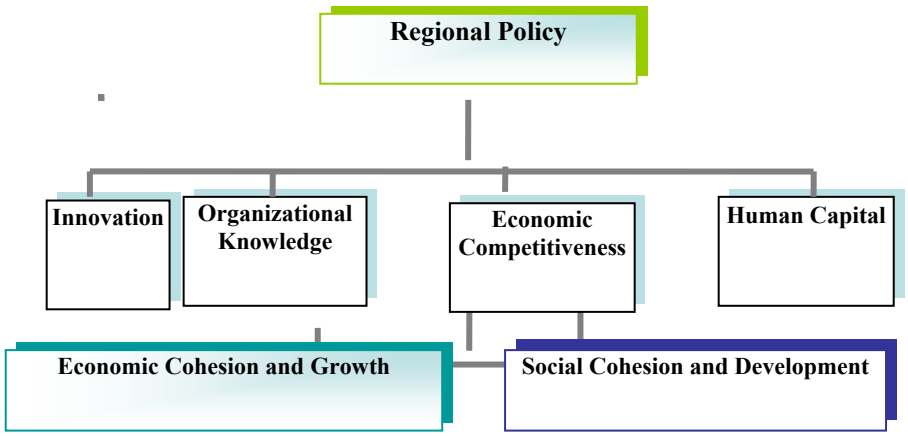
During the last three decades, regional development and convergence of the lagging regions in European Union have been one of the main objectives of the European development strategy. Development problems are more intense in lagging regions which present major differences in level of prosperity, economic performance, output, productivity and employment, compared to other E.U. regions. These disparities arise due to structural deficiencies in factors which restrain economic activities and overall development. The imbalances in the E.U., threatening the convergence path, are summarised in the following table:

TABLE 1: THREATS TO E.U. REGIONAL CONVERGENCE

Regional level	Threatens
• At EU level • At national level • At regional level • Within regions and cities • In areas constrained by geographical features (islands, sparsely populated areas and mountain areas) • In outermost areas, with natural and geographical handicaps	• High concentration of economic activity and population in the central metropolitan areas, which account for the major percentage of population, GDP and R&D expenditure. • Persistence of pronounced imbalances between the main metropolitan areas and the rest of the country in terms of economic development. • Persistence of territorial disparities beyond those measured by GDP or unemployment, such as, social exclusion, inadequate economic links and falling population. • Development of poverty and social exclusion in areas with often only limited availability of essential services. • Declining population and ageing, while accessibility continues to be a problem and the environment remains fragile and threatened. • Continuation of severe social and economic problems which are difficult to tackle because of their remoteness, isolation, topological features, climate, small size of market and dependence on a small number of products.

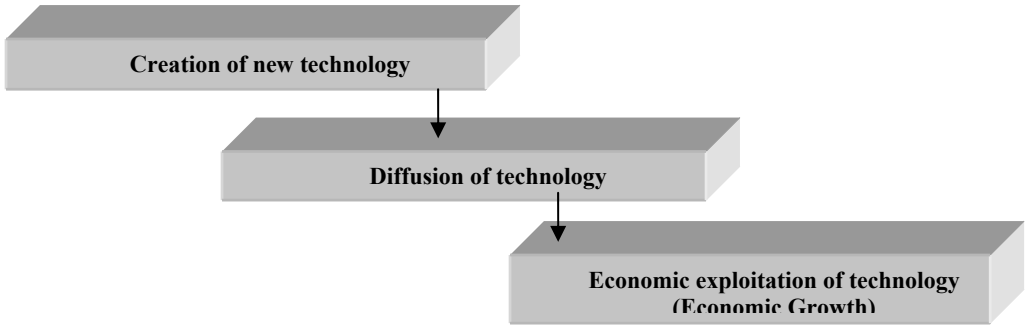
These territorial disparities affect the overall competitiveness of the E.U. economy, implying a sub-optimal allocation of resources, as well as a lower level of efficiency and economic competitiveness. Within this framework, the enhancement and convergence of growth and productivity are a major topic in the economic and social policy agenda of E.U. members, since governments seek to concentrate on problems not only related to growth, such as low employment growth, high unemployment, fiscal deficits and public debt, but also to regional disparities and convergence attainment. Strengthening regional competitiveness throughout the Union will boost the growth potential of the E.U. economy. Securing a more balanced spread of economic activity across the E.U. will reduce the risk of imbalances and divergence, making it easier to sustain the European model of economy and society, as in figure 1.

FIGURE 1: REGIONAL E.U. POLICY



Within this framework, development and innovation consist two of the core subjects both in economic and political analyses. In E.U. there is an increasing interest in the contribution of knowledge in the sustainable long-term economic growth, taking into consideration the need that competition forces technological innovations that increase productivity. Developments in the theory of economic growth have renewed the interest for the role of innovation in the development process, underlining the interaction between the investment in innovative activities, technological change and economic growth. Technological change, innovation and technology creation and diffusion are an important factor to economic progress, as illustrated in the figure that follows:

FIGURE 2: INNOVATION AND ECONOMIC GROWTH



In policy terms, the objective is to help to achieve a balanced sustainable development by reducing disparities, avoiding regional imbalances, making policies more coherent, improving integration and encouraging cooperation between states and regions.

4. E.U. REGIONAL POLICY OBJECTIVES

Nowadays, economies all over the world are described taking part in a race seeking the most appropriate and effective ways that could provide them with the strengths and opportunities necessary to obtain and sustain a competitive advantage over their rivals. Due to this competitiveness race, productivity enhancement is of great importance for the economic development in the face of uncertainties generated by international competition. That is the reason why countries are struggling to maintain and also accelerate their growth rates.

Within this framework, at the Lisbon Summit (2000), European Union set itself the goal of becoming the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth and closer regional as well as social cohesion. At the Lisbon European Council, E.U. defined a comprehensive strategy aiming at long term economic growth, full employment, social cohesion and sustainable development in a knowledge - based society. Into doing, it has identified a number of priorities:

TABLE 2: ECONOMIC DEVELOPMENT PRIORITIES

Priority	Means and actions
• Give priority to innovation and entrepreneurship	• Creating closer links between research institutes and industry, developing conditions favourable to R&D, improving access to finance and know-how and encouraging new business ventures;
• Ensure full employment	• By emphasizing the need to open up employment opportunities, to increase productivity and quality at work and to promote lifelong learning;
• Ensure an inclusive labour market	• Unemployment is reduced and social and regional disparities in access to employment are narrowed;
• 'Connect' Europe	• Closer integration and by improving transport, telecommunications and energy networks;
• Protect the environment	• Stimulating innovation and introducing new technologies, for example, in energy and transport.

The above mentioned priorities could be incorporated within an action framework, in which development and innovation consist two of the core subjects both in

economic and political analyses. In E.U. there is an increasing interest in the contribution of knowledge in the sustainable long-term economic growth.

Development process is supported henceforth in the strategic planning, which constitutes a process of long-term objectives and policies based on scientific analysis, international experience, participative processes and the special conditions that prevail in each economy. In the frame of configuration of developmental priorities, the exploitation of comparative advantages should be mainly taken into account, combining the exploitation of developmental possibilities and the reduction of regional inequalities.

In this aspect, the SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) is used in order to diagnose the main characteristics of internal and external environment of European Innovation process, as analyzed in table 3:

TABLE 3: SWOT ANALYSIS

a) Strategic goal and Development Pillar: Competitiveness enhancement	
Strengths	High skilled human resources
Weaknesses	Large number of Small and Medium Enterprises (SMEs), low productivity of public sector, imbalances in labor supply and demand
Opportunities	Modern administrative and law framework, technology and knowledge diffusion, clustering enhancement, education
Threats	Delays in market liberalization, labor market rigidities
b) Strategic goal and Development Pillar: Productivity enhancement	
Strengths	Convergence under Lisbon strategy goals, modern European technological policies
Weaknesses	Bureaucracy, credit market rigidities, weaknesses of SMEs to support knowledge creation and accumulation, low value added
Opportunities	EU enlargement with countries with developing economies, low labor cost, high productivity and value added
Threats	Dualism in entrepreneurial activity and development
c) Strategic goal and Development Pillar: Investment enhancement	
Strengths	Mobility and diffusion of entrepreneurial and investment capital, credit market liberalsation
Weaknesses	Large number of SMEs, low degree of specialization, limited productive network, low connection of education with market needs
Opportunities	E.U. enlargement with developing economies and markets, European development and innovation programs,
Threats	Trade and transport infrastructure weakness, limited business services
d) Strategic goal and Development Pillar: R&D infrastructure enhancement	
Strengths	Increase of the technology – based firms, increase in the technology and innovation expenditure, connection of knowledge creation with economic results and economic

	products
Weaknesses	Low level of R&D expenditure, low technological infrastructure,
Opportunities	International trade trends, tax regimes, European development funds
Threats	Regional disparities in technological expenditure and knowledge diffusion, imperfect competition in energy market
e) Strategic goal and Development Pillar: Environment protection enhancement	
Strengths	New energy resources, clean environment practices
Weaknesses	Insufficient Administrative framework
Opportunities	Development funds, innovation policies
Threats	Global warming, polluting agents
f) Strategic goal & Development Pillar: Human resources & employment enhancement	
Strengths	High skilled human capital, education enhancement, high education expenditures, higher education participation, international research activities
Weaknesses	Small percentage of skilled R&D personnel, limited life – long learning, low human capital mobility
Opportunities	Education infrastructure, regional education and innovation activities
Threats	Brain drain towards U.S.A., labor market rigidities

Into this framework, the aid of growth and productivity constitutes main subject in the European economic and social policy. The EU is not focused more, only in the problems of employment, unemployment, budget deficit, public debt, but also in the problems of national differences and achievement of convergence and cohesion on issues of technology and innovation. The technological policy of European Union aims immediately in the aid of role of competitiveness of Europe, as well as in the aid of cohesion of community and in balancing of regional differences between the member states. In the European Council of Lisbon, the EU determined a strategy that aimed in the long-term economic growth, employment, social cohesion and sustainable development based on knowledge society, underlining a broad spectrum of priorities, as displayed in the following table 4.

TABLE 4: FINANCING OF THE PROGRAMMING PERIOD 2007 – 2013

	Total (bil. €)	**Convergence (bil. €)**	**Regional Competitiveness and Employment (bil. €)**	**Territorial Co-operation (mil. €)**
Bulgaria	6,9	6.7		179
Estonia	3,45	3,4		52
Cyprus	0,64	0,213	0,399	28
Lithuania	6,9	6,78		109
Letonia	4,6	4,5		90
Poland	67,3	66,55		731
Spain	35,2	26,2	8,5	559
Sweden	1,9		1,6	265
Portugal	21,5	20,47	0,938	99
Ireland	0,901		0,751	151
France	14,3	3,2	10,2	872
Hoalnd	1,9		1,6	247
Luxemburg	0,065		0,05	15
Denmark	0,613		0,51	103
Malta	0,855	0,84		15
Chech Rep.	26,7	25,9	0,419	389
Italy	28,8	21,6	6,3	846
Slavakia	11,6	10,9	0,449	227
United Kingdom	10,6	2,9	6,9	722
Belgium	2,3	0,638	1,4	194
Slovenia	4,2	4,1		104
Hungary	25,3	22,9	2	386
Germany	26,3	16,1	9,4	851
Romania	19,7	19,2		455
Austria	1,46	0,177	1,03	257
Finald	1,7	1,6		120
Greece	20,4	19,6	0,635	210

Source: European Commission (2008)

The contribution of research and technology in the regional growth as well as in the cohesion of European community is considered particularly important and the

economic competitiveness of European Union depends, to a great degree, on research and innovation.

5. E.U. REGIONAL INNOVATION PERFORMANCE

The European Innovation Scoreboard (EIS) is the instrument developed at the initiative of the European Commission, under the Lisbon Strategy, to evaluate and compare the innovation performance of the EU Member States. The EIS includes innovation indicators and trend analyses for the EU25 Member States, plus the two new Member States: Bulgaria and Romania, as well as for Croatia, Turkey, Iceland, Norway, Switzerland, the US and Japan[1]. The 25 EIS innovation indicators have been classified into five dimensions to better capture the various aspects of the innovation process: a) *Innovation drivers* measure the structural conditions required for innovation potential, b) *Knowledge creation* measures the investments in R&D activities, c) *Innovation & entrepreneurship* measures the efforts towards innovation at the firm level, d) *Applications* measures the performance expressed in terms of labour and business activities and their value added in innovative sectors, and e) *Intellectual property* measures the achieved results in terms of successful know-how.

With respect to the situation in Europe, significant national differences are still observed. Based on their EIS score and the growth rate of the EIS, the European countries can be divided into four groups or clusters[2]:

- Sweden, Switzerland, Finland, Denmark, Japan and Germany are the *innovation leaders*, with SII scores well above that of the EU25 and the other countries. The lead of the innovation leaders has been declining compared to the average of the EU25, with the exception of Denmark.
- The US, UK, Iceland, France, Netherlands, Belgium, Austria and Ireland are the *innovation followers*, with SII scores below those of the innovation leaders but above that of the EU25 and the other countries. The above EU25 average innovation performance of the innovation followers has been declining. Also, the gap of the innovation followers with the innovation leaders has on average slightly increased.
- Slovenia, Czech Republic, Lithuania, Portugal, Poland, Latvia, Greece and Bulgaria make up the group of *catching-up countries*, with SII scores well below that of the EU25 and the innovation leaders, but with faster than average innovation performance improvement.
- Estonia, Spain, Italy, Malta, Hungary, Croatia and Slovakia seem to be *trailing*, with SII scores well below that of the EU25 and the innovation leaders, and innovation performance growth which is either below or only just above that of the EU-25.

TABLE 5: TOTAL GROSS R&D EXPENDITURE (GDP %)

	1996	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
E.U.	1.76	1.84	1.86	1.87	1.88	1.87	1.83	1.84	1.84	:
Belgium	1.77	1.94	1.97	2.08	1.94	1.88	1.87	1.84	1.83	:
Bulgaria	0.52	0.57	0.52	0.47	0.49	0.5	0.5	0.49	0.48	:
Czech Rep.	0.97	1.14	1.21	1.2	1.2	1.25	1.25	1.41	1.54	:
Denmark	1.84	2.18	2.24	2.39	2.51	2.58	2.48	2.45	2.43	:
Germany	2.19	2.4	2.45	2.46	2.49	2.52	2.49	2.48	2.53	:
Estonia	:	0.69	0.61	0.71	0.72	0.77	0.86	0.93	1.14	:
Ireland	1.3	1.18	1.12	1.1	1.1	1.17	1.24	1.26	1.32	1.35
Greece	:	0.6	:	0.58	:	0.57	0.55	0.58	0.57	:
Spain	0.81	0.86	0.91	0.91	0.99	1.05	1.06	1.12	1.2	:
France	2.27	2.16	2.15	2.2	2.23	2.17	2.15	2.12	2.09	:
Italy	0.99	1.02	1.05	1.09	1.13	1.11	1.1	1.09	:	:
Cyprus	:	0.23	0.24	0.25	0.3	0.35	0.37	0.4	0.42	:
Letonia	0.42	0.36	0.44	0.41	0.42	0.38	0.42	0.56	0.7	:
Lithuania	0.5	0.5	0.59	0.67	0.66	0.67	0.76	0.76	0.8	:
Luxemburg	:	:	1.65	:	:	1.66	1.63	1.57	1.47	:
Hungary	0.65	0.69	0.78	0.92	1	0.93	0.88	0.94	1	:
Malta	:	:	:	:	0.26	0.26	0.54	0.54	0.54	:
Holland	1.98	1.96	1.82	1.8	1.72	1.76	1.78	1.74	1.67	:
Austria	1.59	1.88	1.91	2.04	2.12	2.23	2.22	2.43	2.49	2.55
Poland	0.65	0.69	0.64	0.62	0.56	0.54	0.56	0.57	0.56	:
Portugal	0.57	0.71	0.76	0.8	0.76	0.74	0.77	0.81	0.83	:
Romania	:	0.4	0.37	0.39	0.38	0.39	0.39	0.41	0.45	:
Slovenia	1.31	1.39	1.41	1.52	1.49	1.29	1.42	1.46	1.59	:
Slovakia	0.91	0.66	0.65	0.64	0.57	0.57	0.51	0.51	0.49	0.46
Finland	2.52	3.16	3.34	3.3	3.36	3.43	3.45	3.48	3.45	3.37
Sweden	:	3.57	:	4.18	:	3.86	3.62	3.8	3.73	:
England	1.86	1.86	1.85	1.82	1.82	1.78	1.71	1.76	1.78	:
Croatia	:	:	:	:	1.04	1.05	1.13	1	0.87	:
Iceland	:	2.3	2.67	2.95	2.95	2.82	:	2.77	:	:
Norway	:	1.64	:	1.59	1.66	1.71	1.59	1.52	1.52	:

Source: Eurostat, http://epp.eurostat.ec.europa.eu, (2009)

- Cyprus and Romania form a separate fifth cluster of fast growing, catching-up countries. Cyprus being one of the smallest EU countries and Romania starting from very low levels of innovation performance, this cluster is less robust than the other clusters, and is therefore not considered to be a real cluster. Luxembourg, Norway and Turkey do not fit into any of these groups.

As far as the gross expenditure on R&D is concerned, there are profound differences among the European member stated, as indicated in the following table:

With the subscription of Community programs are created inter-country networks for the distribution of knowledge beyond national, cultural and economic borders. The Community inquiring programs can play a central role and extend the collaboration between the economic and scientific institutions of various regions of Europe and accelerate the creation of real European Community of science and technology.

6. CONCLUSIONS AND PROSPECTS

Globalization and worldwide competition has shifted the comparative advantage of economies towards the factor of knowledge and innovation, where productivity based on the endogenous development capabilities plays a rather important role, as far as growth and competitiveness enhancement are concerned. As it has already been mentioned, innovation and technology is an important source of regional competitiveness through facilitating cooperation between the various parties involved in both the public and private sectors. In particular, they can improve collective processes of learning and the creation, transfer and diffusion of knowledge and transfer, which are critical for innovation. Such cooperation and the networks that are formed help to translate knowledge into economic opportunity, while at the same time building the relationships between people and organizations which can act as a catalyst for innovation. Such actions should extend to all the policy areas relevant for economic, scientific and social development and should ideally establish a long-term policy horizon. The initiatives for the Research and Development enhancement may be focused on the promotion of R&D internal market, space of free trading of knowledge, researchers and technology, aiming at the promotion of collaborations and the achievement of synergies, collaboration, and supported “alliances” in national and regional level.

European cohesion policy makes a major contribution to these objectives, especially in those regions where there is unused economic and employment potential which can be realized through targeted cohesion policy measures. From a policy perspective, at the regional level, growth policies should focus on creating favorable environment for the co-operation between firms and institutions that support the development and exploitation of knowledge and innovation. Furthermore, policies should promote the entrepreneurial relations between firms and institutions, fostering

the development and dissemination of the expertise, the mobility of human and physical capital and the enhancement of the relationships between business and research entities. Specifically, they should encourage actions such as, promoting innovation, technology transfer and interactions between firms and higher education and research institutes, networking and industrial co-operation and support for research and technology supply infrastructure. Such cooperation and the networks that are formed help to translate knowledge into economic opportunity, while at the same time building the relationships between people and organizations which can act as a catalyst for innovation. Such actions should extend to all the policy areas relevant for economic, scientific and social development and should ideally establish a long-term policy horizon.

Under this perspective, growth policies should focus on creating favorable environment for the co-operation between firms and institutions that support the development and exploitation of knowledge and innovation. Furthermore, policies should promote the entrepreneurial relations between firms and institutions, fostering the development and dissemination of the expertise, the mobility of human and physical capital and the enhancement of the relationships between business and research entities. Specifically, they should encourage actions such as, promoting innovation, technology transfer and interactions between firms and higher education and research institutes, networking and industrial co-operation and support for research and technology supply infrastructure.

This, however, needs to happen not just in central parts where productivity and employment are highest and innovative capacity most developed but throughout the Union. Countries and regions need assistance in overcoming their structural deficiencies and in developing their comparative advantages. Despite the importance of innovation a lot of countries of EU face difficulties in regard to their innovative activity. Mainly, the new E.U. member states require main economic and institutional reforms and adaptations so that the may strengthen the innovative activity. This means among others that, encouraging the development of knowledge-based economic activities and innovation and that particular attention needs to be given to:

- Developing new innovation promotion policies which focus much more on the provision of collective business and technology services to groups of firms which can affect their innovative behaviour, rather than direct grants to individual firms which tend only to reduce costs temporarily.
- Developing new policies to strengthen the capacity of SMEs to innovate through business networks and clusters and improving their links with the knowledge base, including with universities and research centres.
- Encouraging the development of the indigenous R&D potential of weaker regions and their capacity to adapt technological advances made elsewhere to local circumstances and needs.

- Facilitating access of researchers, businesses and others in less favoured regions to international networks of excellence, sources of new technology and potential R&D partners.

These conditions are largely related to economic competitiveness and include, among others, the capacity of a regional economy to generate, diffuse and utilize knowledge and so maintain an effective regional innovation system.

NOTES

1. The EIS report and its annexes, accompanying thematic papers and the indicators' database are available at http://www.proinno-europe.eu/inno-metrics.html.
2. European Innovation Scoreboard (2008).

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ORGANISATIONAL CULTURE AS A FACTOR AFFECTING COMMUNICATION WITHIN A PRIVATE AIRLINE

DIMITRIOS P. KAMSARIS*

ABSTRACT

This research aimed at answering the strategic question, "in which way does the organisational culture affect the communication prevailing in a private airline company?" as well as the following secondary questions: Does communication result to conflict or conflict resolution? What is the problem represented to be? What presuppositions underlie the conceptions concerning the communication process? What effects are produced by such representations? How are subjects constituted within the communication?
The questions were answered by people from different levels of the hierarchical chain of all the departments of the airline organisation.

Keywords: Organisation; Organisational Communication; Culture; Organisational Culture; Content Analysis.

1. INTRODUCTION

This paper is based on a previous research (Kamsaris, 2007) on organisational culture and the affect it has on the communication between different departments of an organisation. The objective of this paper is to present a topic of organisational culture as a factor affecting communication within a private airline company.

In summary, the view taken in this report is: (a) in every organisation a particular "organisational culture" prevails, in which particular values are embedded characterising the culture of the organisation, (b) the organisational culture is expressed in the forms of communication that prevail in the company and, (c) in each organisation the values and the forms of communication are combined in a unique "pattern" of communication.

The research focuses on the organisational culture prevailing in a private airline company, and examines, (a) in what way the members of different departments communicate with each other in order to achieve the company's goals and how they view each other and (b) whether the pattern of communication can be modified in order to facilitate conflict resolution.

* Lecturer, School of Business Administration, Metropolitan College, Athens, Greece

2. THEORETICAL FRAMEWORK

2.1. Conceptualising the organisation

According to Hall and Taylor, as cited in Kamsaris (2007), sociological institutionalism defines organisations broadly, to include not just formal rules, procedures or norms, but, the symbol systems, cognitive scripts, and moral templates that provide the 'frames of meaning' guiding human action (Hall and Taylor, 1996). Sociological institutionalists have a distinctive understanding of the relationship between organisations and individual action, which follows the 'cultural approach'. Furthermore, they also take a distinctive approach to the problem of explaining how institutional practices originate and change… arguing that organisations often adopt a new institutional practice, not because it advances the means ends efficiency of an organisation or its participants but because it enhances the social legitimacy of the organisation or its participants" (Hall and Taylor, 1996).

The view of the organisation from the perspective of sociological institutionalism seems to suit the purposes of this research.

2.2. Culture and organisational culture

According to Luthans and Hodgers as cited in Kamsaris (2007), culture is the acquired knowledge which people use to interpret experience and generate social behaviour. For Hodgers and Luthans (1991) "culture is acquired by learning and experience, people as members of an organisation share culture, it is cumulative and it passes from one generation to the next, it is the human capacity to symbolise or to use one thing to represent another, it has structure and is integrated, therefore a change in one part may bring changes in another".

Furthermore Hodgers and Luthans (1991) argue that "culture also affects perception" and that this is the "process through which people receive, organise, and interpret incoming information". In other words, a person's view of reality, and stereotypes that are the tendency to perceive another person as belonging to a specific category. There are different perceptions for "how people view themselves, how they view others, how they believe others view them" (Hodgers and Luthans, 1991).

Dawson (1996) describes organisational culture as "shared values and beliefs, which characterise particular organisations". Luthans and Hodgers (1989) further refine the concept stating, "organisational culture consists of the organisation's norms, beliefs, attitudes and values". Baumard (1994) argues that organisational culture can be also understood as a "tacit system of knowledge conversion and regulation and it is concerned with the organisational information systems". Furthermore, Kroeber and Kluckhohn, (1952) state that "culture consists of patterns, explicit and implicit, of and for behaviour acquired and transmitted by symbols, constituting the distinctive

achievement of human groups, including their embodiment in artefact" (p.181). We may therefore conclude that organisational culture consists of shared norms, values, beliefs and attitudes and that it is expressed in all communication processes and shapes patterns of behaviour and action within the organisation.

2.3. Communication and its forms

In this research, Bovee and Thill, as cited in Kamsaris (2007), argue, communication is defined as the flow of information in order to share the meaning). Each organisation has "its own approach to transmitting information throughout the organisation" (Bovee and Thill, 1992). According to a categorisation presented by Bovee and Thill (1992), communication may assume the following forms: (a) verbal or written (b) formal or informal (c) top-down or bottom-up. These analytical categories should not be considered as mutually exclusive.

Kamsaris (2007) states, in the everyday life of an organisation, verbal communication is used to discuss events or ideas and is used for sharing information on a day-to-day basis. It can therefore be just as important as written communication (in the form of notes, memos, training manuals, newsletters, bulletin board announcements, or policy directives) which may also be used to prescribe a certain course of action.

According to Sifianou, as cited in Kamsaris (2007), communication is not always explicit and well structured. In order to communicate "we do not simply produce statements, questions and requests… a certain reaction by the other part is required as feedback". Furthermore "features of context such as, who communicates with whom, why, when, where and how, contribute overt and covert information to the exchanges produced and have to be taken into account for the decoding of the intended message" (Sifianou, 2001). Therefore, a potent non-verbal aspect may be involved in a communication process. Non-verbal communication is usually less structured, more intense and spontaneous and has a bigger impact and greater efficiency than verbal communication (Bovee and Thill, 1992). According to this view, "if a person says one thing but transmits a conflicting message non-verbally, the non-verbal signal is believed", motions and kinesis may overshadow the verbal message (Bovee and Thill, 1992).

Furthermore, Bovee and Thill, (1992), argue that "informally every employee accumulates facts and impressions that contribute to the organisation's collective understanding of the outside world", Hodgers and Luthans (1991) suggest that the effectiveness of communication depends on the closeness of meaning that the sender and the receiver attribute to the message. Alternatively, perceptual communication barriers may appear".

Bovee and Thill state that "communication requires perception, concentration and appreciation of the communication process" (1992) In order to communicate a process

is followed by the communicating parts. Through the communication process, "culture, knowledge, objectives, news and gossips pass among the organisation's individuals" (Bovee and Thill, 1992). According to Bovee and Thill (1992) these activities belong to a chain of events that can be broken into five phases linking the sender to the receiver, as described in Kamsaris (2007).

Combining the forms of communications and the steps taken within a communication process one may arrive at a pattern of communication (and possibly upon further elaboration of the theoretical framework to a typology of patterns of communication) that characterises an organisation and concords with the values embedded in its organisational culture.

3. METHODOLOGY

3.1. Research strategy

This study follows similar methodology with the one used by Kamsaris (2007); an exploratory, qualitative research methodology. An interpretative approach will be assumed "combining the facts creatively in order to stimulate explanatory suggestions to the issue" (Remednyi, Williams, Money, Swartz (1998). This approach seems particularly appropriate to the topic of the research since according to Kamsaris (2007) an interpretative approach can be used in order to determine the link between understanding and action, which is seen as indirect, mediated through people's thinking, values and relationships with each other.

3.2. Content analysis

The main method used in the research is content analysis, as it was used by Kamsaris (2007). Billig argues that, in order to be "capable of understanding the meaning of a discourse in an argumentative context", the researcher should try to examine the words within that discourse, the thoughts in the speaker's mind at the moment of the communication and "the set of positions which are being criticised, or against which a justification is being compared

According to Sifianou, as cited in Kamsaris (2007), "discourse" is the interaction between people in real social situations, and "mere knowledge of the meanings of words…does not guarantee successful interaction, since actual communication is situated in particular socio-cultural contexts contributing significant information". These contexts involve specific individuals with specific life histories, values, beliefs and social standings in relation to others, "who usually enter interactions with specific intentions of what they want to convey". Sifianou (2001) adds that "the contexts also involve particular settings in terms of both space and time".

In order to overcome some of the limitations of traditional qualitative and quantitative methods, content analysis can be used (Kabanoff, 1996). Content analysis is a research method that uses a set of categorisation procedures for making valid and replicable inferences from data to their context. This method combines both qualitative aspects by defining the categories and quantitative aspects by determining numbers within categories that has be exhaustive and mutually exclusive.

3.3. Research design

Semi-structured Interviews is the technique used for the present research. A small number of actors is chosen because the "bases of organisational processes can often be understood in terms of small group dynamics" (Sayles, 1980) which are analogous to interactions among larger components such as departments (Smith, 1973).

Organisations may consist of integrated subgroups linked together (Simon, 1965), because subgroups are imposed on organisations for managerial efficiency (Granovetter, 1973), or because subgroups emerge as organisations grow and interactions among actors cannot be sustained at levels high enough to integrate each actor directly into the common organisation (Robinson, 1981). Most relevant for us, subgroups may be areas of strong subcultures (Sackmann, 1992) within an organisational culture.

4. DISCUSSION

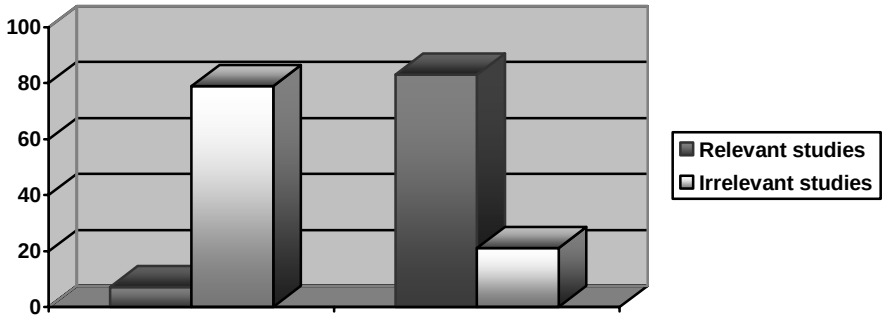
The majority (79%) of the personnel working in the flight operations department have undertaken relevant studies that finally assist them to enter the organisation, while the studies undertaken by the administration department employees are irrelevant with their present occupation and did not assist them enter the organisation. One possible interpretation of this difference is that the flight operations department is employing people with relevant studies, while the administration department does not seem to have any similar practice.

Nobody (7%) from the two departments sees that they are working for a company, not for a department. This may indicate that both department employees are operating in separation. One possible interpretation of this difference is that, as Hall and Taylor (1996) imply that "the actors have preferences and behave so as to maximise the attainment of these preferences, they see politics as a series of collective action dilemma, the actors have strategically calculated behaviours and expectations". The respondents answered according to the department they belong, where their actual interest is.

TABLE 1: RELEVANCY OF EMPLOYEE STUDIES

Department	Administration	Flight Ops
Relevant Studies	7	83
Irrelevant Studies	79	21

FIGURE 1: RELEVANCY OF EMPLOYEE STUDIES



Furthermore, the employees of both departments believe that their company provides the necessary communication assistance, and, that their communication should be a two way. So, both departments have realised that the communication is very essential for the effective and efficient operations of the organisation, resulting in the development of inter-organisational channels of communication, as Pacanowsky and O'Donnell-Trujillo (1982), argue that "organisational culture represents the distribution of information", also takes into account the duality of the communication.

There are differences, concerning the forms of communication between the departments, which is in accordance to the Festinger's (1950) view, that one of the basic feature of most organisations is that actors influence one another through interaction, for example through face-to-face contact, as informal communication. Furthermore "features of context such as, who communicates with whom, why, when, where and how, contribute overt and covert information to the exchanges produced and have to be taken into account for the decoding of the intended message" (Sifianou, 2001).

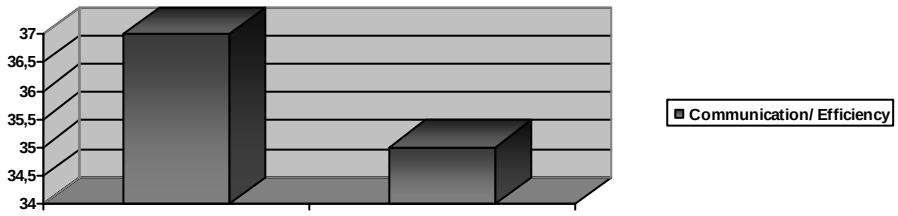
There are non-significant differences (35% versus 35%)between the two departments, concerning the way the communication forms affects the efficiency of the departments, by resulting into confusion and misunderstanding, as each internal department has its own approach to transmitting information throughout the organisation (Bovee and Thill, 1992). Also, the prioritisation issue is important as one department is not aware of the information that other department has (Macdonald,

1995) and proposes that it may not be wise to argue that departments as pursing pieces of information to which they know others have, but they pursue the potential information that might be gained through an interaction. Furthermore, many organisations gather more information and don't use it, ask for more and ignore it, make decisions first and look for more relevant information afterwards.

TABLE 2: COMMUNICATION AFFECTS EFFICIENCY

Department	Administration	Flight Ops
Communication affects efficiency	37	35

FIGURE 2: COMMUNICATION AFFECTS EFFICIENCY



Since the flow of information is prioritised, and the priority protocols of the two departments are different from the information sent i.e. from the flight operations department to the administration department may be high in priority for that department, but on the contrary they may be low in priority for the administration department, which may lead to confusion and misunderstanding, since the administration department may need some other information that may be low in priority for the flight operations department.

Concerning the cases where communication results to conflict between them, on the one hand, the flight operations department argues that administration has their own codes of communication, and on the other hand the administration argue that the flight operations department has limited experience about real situations.

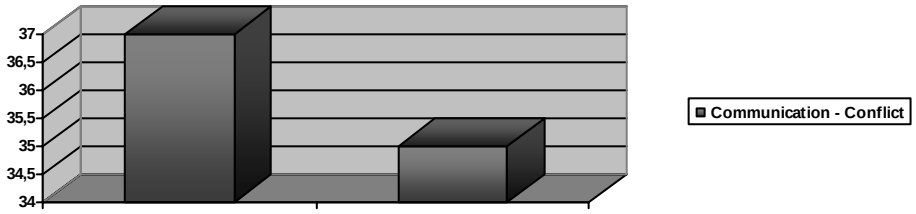
One possible interpretation of this difference is that, since there are different priorities in communication, resulting in confusion and misunderstanding, those working in flight operations department cannot understand those working in the administration and vice versa.

There are non-significant differences (49% versus 47%) between the two departments, concerning the cases that communication results to conflict resolution between them.

TABLE 3: COMMUNICATION - CONFLICT

Department	Administration	Flight Ops
Communication affects efficiency	49	47

FIGURE 3: COMMUNICATION - CONFLICT



It is very interesting to observe that there is a significant difference in the view of the employees of the two departments regarding “time for real communication”. On the one hand, the flight operations department argues that “time for real communication” can be achieved in the form of informal communication. The term “informal” contains the status of freedom and democracy. The aim of communicative planning is to empower groups, and to democratise the processes within which they may participate. In addition, Foucault (1992) states, "planning could be associated with the dominator power of systematic reason pursued through bureaucracies". On the other hand, the administration does not suggest a way by which “time for real communication” could be realised. In bureaucratic organisations learning is based on institutionalised experience and the organisation expects to continue more efficiently the same behaviour that worked in the past.

One possible interpretation is that the organisation has located that the existing conflicts, could be resolved through real “time for real communication”. But, the search of “time for real communication” is not coordinated.

In order to limit the communication problems between the two departments, communication requires perception, concentration and appreciation of the communication process (Bovee and Thill, 1992).

Since the problem with communication is obvious to the two departments and to the organisation, a new communication structure has to be developed. The choice of the communication structure depends on the communication imperfections to be considered. In other words, communication imperfections take the form that the message transmitted has a noisy component, making the interpretation of the message less accurate. Furthermore, an optimal communication structure coincides here with a

structure that maximises the chance that no message is lost at every level of the communication process.

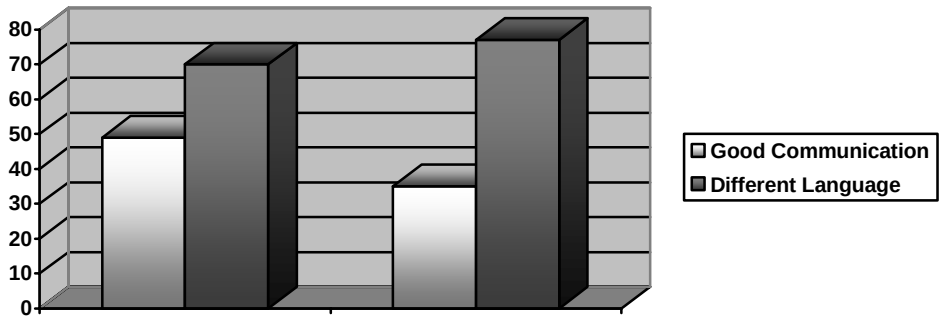
There are some significant differences between the departments concerning the view that the different level employees have about the organisational communication smoothness between the departments. Both departments' employees agree that in the cases where there is lack of communication the result is lack of cooperation. This happens because there are close function situations within the departments, which are obvious to the employees. The awareness of that situation makes them agree that in the cases of limited communication the cooperation is low as well.

There are some significant differences between the departments, concerning the organisation communication process assumptions. It is assumed that the communication between the departments is well established but, simultaneously, they agree that the language used is different.

TABLE 4: COMMUNICATION – LANGUAGE

Department	Administration	Flight Ops
Well established communication	49	35
Different language used	70	77

FIGURE 4: COMMUNICATION - LANGUAGE



One possible interpretation is that the employees do not blame the communication system but the other and vice versa. Deetz (1995) proposes an "open participatory democracy supersedes all other goals of communication. From a communication perspective, efficiency, effectiveness and information transfer cannot stand alone, but are interpreted within the promotion or demise of participation. Communication

research is thus about the creation of more participatory communication practices and the critique and/or deconstruction of control processes. Therefore, the participate ethics intrinsic to communicative processes provide a preferable foundation to that provided by any dominant group's interests".

There are some non-significant differences between the departments, concerning the organisation communication results by agreeing that the communication process is good.

One possible interpretation is that, although, the communication between the two departments is very essential, they seem to be very happy about the result. That suggests that, communication is neither well-weighted nor taken into account seriously.

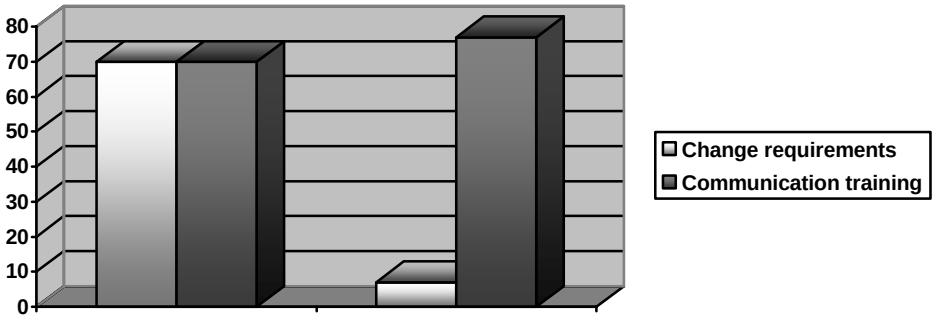
Concerning the view of the way the subjects are constituted within the communication of the organisation, the flight operations department argues that the administration does not have a common origin, while the flight operations department agrees with that view. For once more, the administration, posits the view that the flight operations department does not understand several administration issues. Surprisingly, the top management and the low managers argue that the flight operations department and the administration should operate as one team. One possible interpretation is that it is obvious to the flight operations department as outsiders, and the administration as insiders, that the administration do not have common background. That fact makes the coordination of the administration department more difficult, with respect to communication with the flight operations department aspects.

There are significant differences between the flight operations department (7%) and the administration departments (70%), concerning the possibility of communication changes in the organisation, all of the respondents answered that the communication processes established in the organisation are very effective and therefore, no change is required. Simultaneously, half of the total sample respondents which are equally distributed between the flight operations department and the administration department, that communication seminar could be useful.

TABLE 5: COMMUNICATION CHANGE AND TRAINING

Department	Administration	Flight Ops
Change requirements	70	7
Communication seminars	70	77

FIGURE 5: COMMUNICATION CHANGE AND TRAINING



One should not forget that organisations as a function of communication can be defined as large social groups in which the leadership hierarchy and role-differentiation have become formalised into fixed ranks and offices, norms have become rules, and in which methods of communication and work are prescribed.

One possible interpretation is that change is a taboo word. The idea of change, involves movement between some discrete and rather fixed 'states'. As proposed by Argyris (1977) organisational change through organisational learning is "a process of detecting and correcting errors". Furthermore, according to Amburgey and Rao (1996), the purpose of organisational change is nothing else but to improve the efficiency of an organisation.

Negroponte (2000), studied the relation between innovation, as a factor of change within a culture and sees "innovation as inefficient, undisciplined, contrarian, and iconoclastic, and it nourishes itself with confusion and contradiction. Yet without innovation we are doomed to decline". Furthermore, Negroponte (2000) suggests that "diversity is one of the basic components of a good innovation system. The more powerful a culture is, the less likely it is that it encourages the innovative thought. Rules and models of behaviours are enemies of new ideas".

There are differences concerning the possibility of communication issues that should remain unchanged in the organisation all of the respondents answered that additional communication is needed. This suggests that combining the forms of communications and the steps taken within a communication process one may arrive at a pattern of communication that characterises an organisation and concords with the values embedded in its organisation culture.

There are four organisational information processes: (a) information acquisition, (b) information transmission, (c) conceptual utilisation, and (d) instrumental utilisation processes.

There are differences concerning the possible benefits the employees receive from the organisation. The flight operations department employees answered that the flight operations department will be benefited, while the administration department employees answered that the administration department will be benefited.

The flight operations department and administration department are mutually depended, although sometimes distant. As Kamsaris (2007) suggests, administration meetings should include every member of the company's flight operations department, so that the administration people know that flight operations department people are involved in the administration process and the flight operations department people know how their ideas are implemented in order to comprehend that they are inter-linked and mutually dependent.

There are no differences concerning the view that the different employee level of the flight operations department and administration department have communication smoothness of the organisation, all of the respondents answered that the communication is following a hierarchical order.

This suggests that the communication is preformed only through the top managers. Quirke (1995) argued that "the role of communication becomes not the top-down dissemination of management thinking, but the bottom-up means of connecting those who know what needs to change to those who have authority to make change happen".

5. CONCLUSIONS

The results of this study showed that there are differences in the background, the level of education, understanding of the organisation, the organisation culture, organisation communication, the affects the organisation culture has on the communication between the flight operations department and the administration, self-perception, the perception of the forms of communication developed within the company, perception on the way communication produces conflict or conflict resolution and on the sources of that problem, in the perception of the communication smoothness, of the communication process assumptions, of the results that representation produce, of the change in the communication, of the same in the communication, of the way to be benefited, when comparing the two departments. However, there are also differences suggested in the perception of the one department with respect to the other and self-perception when comparing the two departments that deserves further study.

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FAILURE MODE AND EFFECT ANALYSIS (FMEA) IMPLEMENTATION IN CONFERENCE TOURISM SERVICES

PANAGIOTIS KYRATSIS[*], CHRYSSOULA CHATZIGEORGIOU[**], APOSTOLOS TSAGKARIS[***] and VAYA DINOPOULOU[****]

ABSTRACT

The service in the conference tourism is a subject that started being referred to the international literature within the last few years. Despite the fact that they are activities with great added value, these services are planned and provided mainly based on the conference managers' experience rather than based on quality tools. A quality tool that has been widely used with great success in the automotive industry and which could be used in the tourism industry is the Failure Mode and Effect Analysis (FMEA) methodology. The present paper focuses on the application of a systematic method for conference planning, based on the analysis of the potential failures, their causes and their effects (Service FMEA). Once the most severe potential failures are highlighted, corrective actions are recommended. Further quality tools are also used, while this holistic approach gives a strong argument base to support the need for changes.

Keywords: Failure Mode and Effect Analysis (FMEA); Tourism Services; Conference Tourism; Quality Tools.

Abbreviations: FMEA: Failure Mode and Effect Analysis; S-FMEA: Service FMEA; ICCA: International Conference and Convention Association; PCOs: Professional Conference Organizers; S: Severity; O: Occurrence; D Detection; RPN Risk Priority Number.

1. INTRODUCTION

The events of special tourism interest are a unique form of tourism dealing with a variety of events from World Trade Fairs and World Sports Events up to Municipalities' cultural projects. These events consist of an integral part of tourism development and marketing plans. Even though the majority of these events first started out for non tourism purposes, such as religious holidays, contests etc., there is

[*] Lecturer, Department of Industrial Design Engineering, Technological Educational Institution of West Macedonia, Kila, Kozani, Greece

[**] Lecturer, Farm Management Department, Technological Educational Institution of Thessaloniki, Greece

[***] Lecturer, Department of Automation, Technological Educational Institution of Thessaloniki, Greece

[****] Associate Professor, Department of Industrial Design Engineering, Technological Educational Institution of West Macedonia, Kila, Kozani, Greece

a tendency to be exploited and a trend towards the creation of new events exclusively for tourism purposes (Bramwell, 1997). A significant portion of those events deals with conference meetings and exhibitions both in universal and in national level (Severt et al., 2007; Weber, 2001).

Globally speaking, according to data published by the International Conference and Convention Association (ICCA), the top five conference holding cities in 2006 were: Vienna, Paris, Singapore, Barcelona and Berlin, whereas on a country level the top ten conference hosting countries are: USA, Germany, UK, France, Spain, Italy, Brazil (the only Latin American country), Austria, Australia and last but not least the Netherlands which in 2005 was ranked at fourth place. In 2017 the list is expected to change with Canada, China and Saudi Arabia being contenders for top spots.

2. REQUIREMENTS FOR CONFERENCES SUCCESS

According to Danielides (2008), Mattsson (1994), Lagrosen and Lagrossen (2006) and Lois et al. (2004), a number of actions are required in order to make the conference product more competitive while improving a country's image abroad. These actions are the following:

- Recognition of the need of planning and implementing a long-term tourism strategy aiming at high entrepreneurial goals.
- Commitment on behalf of the public authorities to upgrade tourism infrastructure and improve the environment preservation.
- Cooperation with the private sector in order to achieve the required investments.
- Training of Professional Conference Organizers (PCOs). Establishment and certification of the PCO profession.
- Use of the appropriate quality tools during conference planning.

Conference related literature usually focuses on PCOs, who are often the ones to choose the destination, and prerequisites for the successful implementation of a conference (Clark et al., 1997). However, customer satisfaction is essential for hotel income and conference centers as well as the recognition of cities as conference destinations (Oliver and Mano, 1993). It is essential to comprehend the multiple and usually complex dimensions used by conference attendees when evaluating a conference and their intention to recommend the conference to others (Severt et al., 2007).

The current research presents a methodology that incorporates quality tools via a holistic approach to designing conference tourism services. It also includes the potential failures, their causes together with their effects. All these are systematically documented in order to support the arguments for changes when planning a conference.

3. FAILURE MODE AND EFFECT ANALYSIS (FMEA)

High competition leads businesses to use FMEA tools in order to reduce the cost of their products/services by simultaneously increasing quality. One of the most important factors of success is their use when the time is right. It is meant to be a before-the-event action rather than an after-the-fact action. Planning ahead, completing an FMEA when service changes can be most easily and inexpensive implemented, will minimize late change crises. Actions deduced from an FMEA can reduce or eliminate the chance of implementing a change that would create an even larger concern.

FMEA can be described as a systematic tool aiming at:

- Identifying and evaluating the severity (a value associated with the most serious effect for a given failure mode), the occurrence (expresses the likelihood that a specific cause will occur resulting the failure mode) and the detection (a rank associated with the detection actions of failure mode recognised) of a potential failure mode, in addition to its results.
- Finding the appropriate actions to reduce or eliminate the potential failure mode.
- Documenting the whole process for future use (knowledge and experience transfer in future projects, newcomers' training etc.).

FMEA is a tool with a limited use in tourism industry (Berkley, 1998; Chuang, 2007; Shahin, 2004) but it can help the conference organizing team to improve its service by asking "What can go wrong". The process should include past experience, customers' needs and delights, performance requirements etc. The tool has been successfully implemented by the automotive industry for a number of years (Chrysler Corporation et al., 1995; Dale and Shaw, 1990; SMMT Ltd, 1989; Stamatis, 2003). The present paper makes use of an FMEA variation known as Service FMEA (S-FMEA). It documents the thoughts, experience, expertise, knowledge from international bibliography and every new idea coming from the participants, while improving the final service provided (Rotondero and Oliveira, 2001). There is no single or unique way for a S-FMEA implementation. However a form is available, which guides the organizing team and is based on the following pieces of information:

Service: is the service for which the S-FMEA is executed.

Potential failure mode: is defined as the manner in which a service could potentially fail to meet or deliver the intended service described in the item column. The basic assumption made is that the failure could occur, but may not necessarily occur. A recommended starting point is a review of past things-gone-wrong and a group brainstorming.

Potential effects of failures: are defined as the effects of the failure mode on the item/service as perceived by the customer. Describes the effects of the failure in terms

of what the customer might notice or experience. The customer may be an internal customer as well as the end user.

Potential causes of failure: is defined as an indication of a designed service weakness, the consequence of which is the failure mode. Every conceivable failure cause is listed, for each failure mode. The cause should be listed as concisely and completely as possible so that remedial efforts can be aimed at pertinent causes.

Current service controls: lists the prevention, validation/verification or other activities which will assure the service adequacy for the failure mode under consideration. Current controls are those that have been or are being used with the same or similar services.

Severity (S): is an assessment of the seriousness of the effect of the potential failure mode to the customer, should it occur. Severity applies only to the effect. It uses appropriate values ranging usually between 1 and 10. Suggestively, when the existence of a failure results a noncompliance with European and/or government regulation, the maximum value is used. When the existence of the failure is not expected to result in any problem, then the minimum value is used.

Occurrence (O): is the likelihood that a specific cause will occur. The likelihood of occurrence ranking number has a meaning rather than a value. Removing or controlling one or more of the failure mode causes through process change, is the only way that a reduction in the occurrence ranking can be achieved. Once more appropriate values ranging usually between 1 and 10 are used. If the possibility of the potential failure to occur is more than 50%, a value of 10 is used, while if the same possibility is less than 1/1.500.000, then a value of 1 is proposed.

Detection (D): is an assessment of the ability of the proposed current service controls to detect a potential cause of failure. In order to achieve lower ranking, the planned service control has to be improved. If the current service control cannot detect a potential cause of failure (or if there is no current service control) the value proposed is 10, while if it is certain that the potential cause of failure will be detected, the minimum value is used.

Risk Priority Number (RPN): is the product of the severity (S), occurrence (O) and detection (D) ranking. The RPN is a measure of service design risk. The value should be used to order the concerns. For higher RPNs the organizing team must undertake efforts to reduce it, through corrective actions. In general practice, regardless of the resultant RPN, special attention should be given when severity is high.

Recommended Actions: When the failure modes have been ranked by RPN, corrective action should be first directed at the highest ranked concerns and critical items. The intent of any recommended action is to reduce one or all of the severity, occurrence and detection rankings. An increase in validation/verification actions will result in a reduction in the detection ranking only. A reduction in the occurrence ranking can be affected only by removing or controlling one or more of the causes of

failure mode through a service design revision. Only a major service design revision can bring a reduction in the severity ranking.

In order to implement this quality tool, a team of experts should work together. In that way, a greater objectivity is ensured when selecting the appropriate ranks. The group could consist of representatives from enterprises and occupational organizations involved with conferences, independent professional conference organizers (PCOs) and quality tools specialists.

4. FMEA IMPLEMENTATION IN CONFERENCE TOURISM

A flow chart is used to describe the necessary steps to be taken in order to organize a conference. The steps follow two different paths. First, the scientific committee of the conference deals with all matters relevant to its scientific side (paper acceptance, proceedings publication etc.) and second, the organizing committee which deals with all the issues relevant to its financial side (sponsors, registration etc) Figure 1).

The first step is common for both committees to choose the conference venue, which will fulfill the requirements set. Factors such as room capacity, food and beverage facilities, available room concentration etc. are taken into consideration. Once the venue is finalized, the organizing committee together with the scientific committee's contribution proceeds to the "First Call for Papers", where important dates are announced for abstract submission, final paper submission and guidelines for authors. From this point on, the two flows are separated and each committee is engaged with their specific tasks, in order to achieve a well organized, successful and memorable event.

Aiming at a first investigation of the main causes for problems during conference organization, a cause and effect diagram has been used (Figure 2). Such diagrams are usually selected when there is a problem that can be hierarchically described. It allows the elaboration of a large amount of information on a problem and encourages the definition of problem's causes to many levels. The categories used in the case of a conference are human resources, material, processes and equipment.

FIGURE 1: FLOW CHART FOR THE PROCESS OF ORGANIZING A CONFERENCE

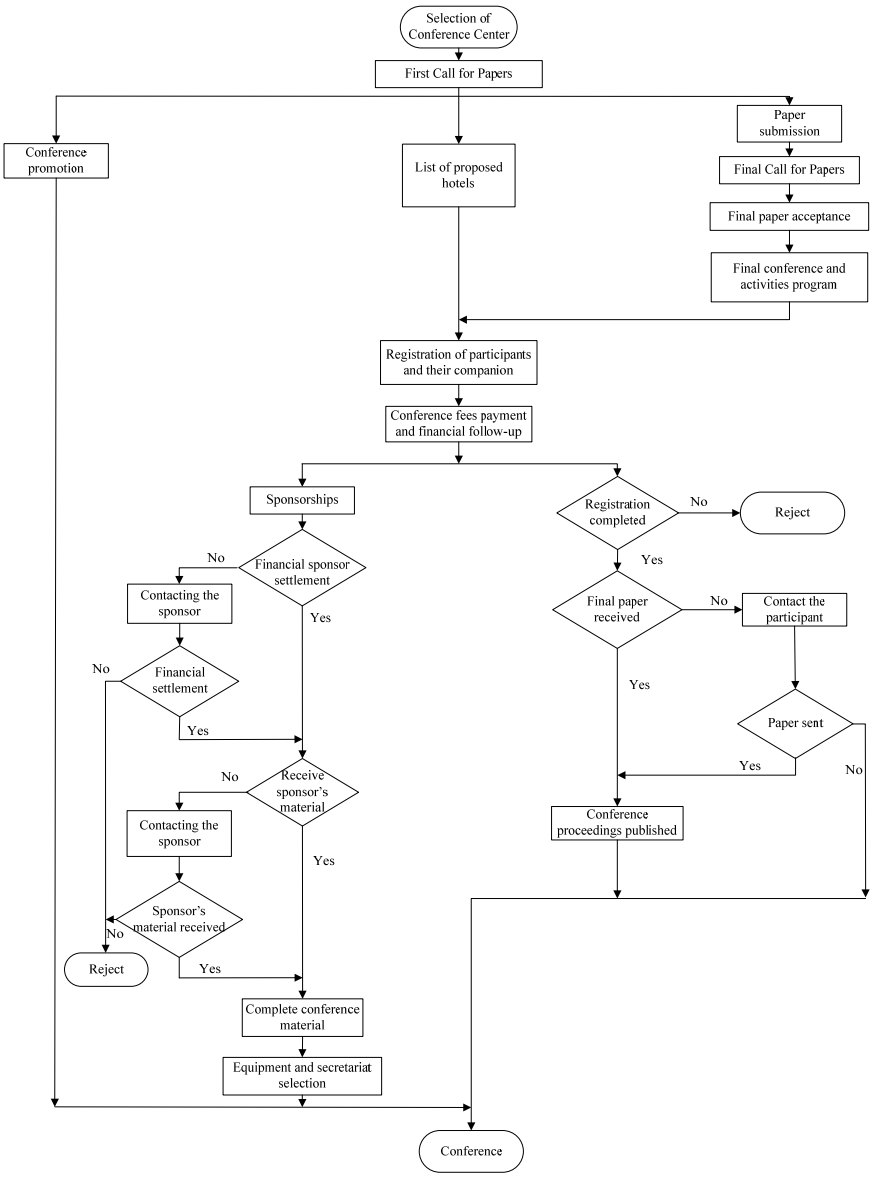
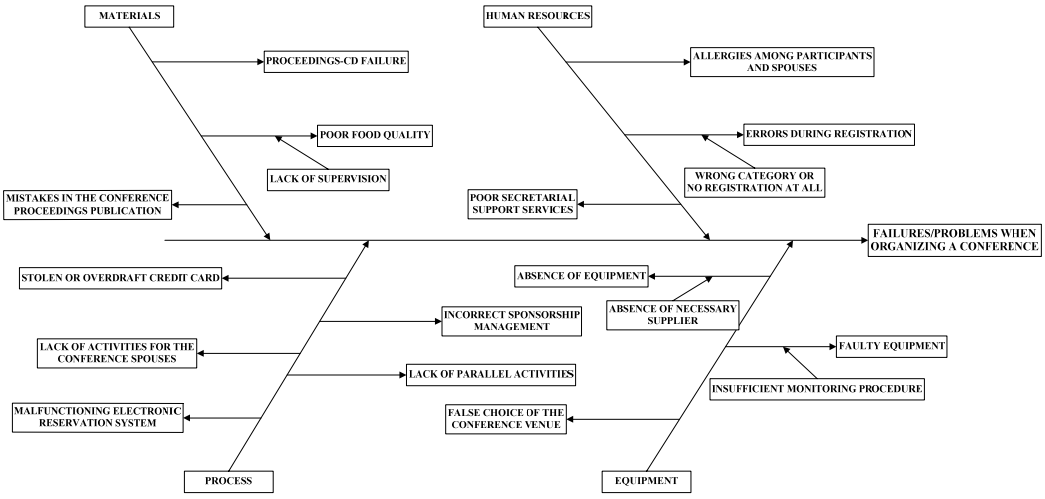


FIGURE 2: CAUSE AND EFFECT DIAGRAM FOR THE PROCESS OF ORGANIZING A CONFERENCE



The contribution of the diagram is the creation of a first list with possible problems and their causes that someone might encounter, when organizing a conference. The whole process was divided in four sub-categories:

- Organization itself, which includes filing, financial monitoring, sponsorships and conference proceedings.
- Secretarial support, whose quality is defined according to the available staff.
- Venue, where issues like location, cleanliness, rooms and equipment are examined.
- Parallel activities, concerning participants' and spouses' activities, food and beverage.

Based on the experience acquired the S-FMEA form was used and the potential failure and effects were further analyzed (Table 1).

TABLE 1: SERVICE FMEA FOR THE PROCESS OF ORGANIZING A CONFERENCE

Item/Service	Potential Failure Mode related with	Potential Effects of Failures	S	Potential Causes of Failure	O	Current service control	D	RPN	Recommended actions	S	O	D	RPN
Organization	*Incomplete Filing*	Registration of a delegate to the wrong category	4	No clear indication from the delegate	5	Obligatory record in the registration sheet	1	20					
		Non entry of a delegate	5	Loss of registration sheet	6	Cross check of registration sheets with financial data	3	90					
	Financial Monitoring	Mischarging	4	No charge for spouse	4	Obligatory record in the registration sheet	1	16					
		On line system failure	7	Lack of bank support	7	Regular communication with the bank agent	2	98					
		Stolen/overcharged credit card	7	Lack of bank support	8	Often communicate with the bank agent	1	56					
	Sponsorhsips	Not meeting the sponsors' demands	8	Mistaken sponsor classification	4	Sponsorship contract	2	64					
		Non satisfactory promotion of sponsors	8	Not appropriate sponsor classification	4	Sponsorship contract	2	64					
		Inadequate financial resources	9	Failure to support the conference	3	Regular monitoring of budget and costs	3	81	Promotion of the conference and sponsorhip contracts	9	3	1	27
		Sponsor's material not included in the conference bag	8	Failure to receive sponsor's material	5	Strict deadlines	4	160	Regular communication with sponsors	8	3	1	24
	Conference Proceedings	Late proceedings publication	8	Failure to keep a time schedule	3	Strict deadlines	1	24					
		CD failure	7	CD poor quality	10	CD test	5	350	Test every CD	7	6	1	42
Item/Service	**Potential Failure Mode related with**	**Potential Effects of Failures**	**S**	**Potential Causes of Failure**	**O**	**Current service control**	**D**	**RPN**	**Recommended actions**	**S**	**O**	**D**	**RPN**

Organization (cont.)		Research paper missing from the proceedings	8	Failure to keep records	7	Cross check of registration sheets with proceedings	2	112	Cross checks of the delegates who settled their registration fees with the papers to be included in the proceedings	8	4	1	32
Secretariat	*Staff*	Weakness in finding a delegate	8	Failure to keep records	7	Cross check of registration sheets with delegates' lists	2	112	Alphabetical records per category	8	5	1	40
		Lack of foreign language skills	6	Lack of communication with delegates	9	Staff interview	1	54					
		Weakness in problem solving	6	Unfamiliar with conference details (i.e. location, programme etc)	10	Detailed update of the staff	3	180	Regular supervision by the conference manager	6	8	1	48
		Impolite behavior	9	Lack of communication skills	10	Staff interview	6	540	Staff interview (conference manager), case study training	9	8	3	216
Venue	*Location*	Lack of parking	4	Poor venue inspection	3	Site visit	1	12					
		Small lobbies	4	Poor venue inspection	3	Site visit	1	12					
		Distance from city gates	5	Poor venue inspection	3	Site visit	1	15					
	Cleanliness	Rooms not thoroughly cleaned	9	Poor venue inspection	7	Site visit	3	189	On site visit to the venue the day before the conference	9	5	2	90
Item/Service	**Potential Failure Mode related with**	**Potential Effects of Failures**	**S**	**Potential Causes of Failure**	**O**	**Current service control**	**D**	**RPN**	**Recommended actions**	**S**	**O**	**D**	**RPN**
Venue (Cont.)	*Rooms*	Small rooms	7	Poor venue inspection	6	Site visit	2	84					
		Disperse rooms	7	Poor venue inspection	8	Site visit	2	112	On site visit to the venue 6 months prior to the conference	7	1	1	7

		Sight obstacles	4	Poor venue inspection	8	Site visit	1	32					
	Equipment	Lack of equipment	8	Insufficient contract	9	Written contract with the contractor	1	72					
		Faulty equipment	9	Lack of control mechanism	10	Operation Check before the first day of the conference	7	630	Back up equipment	9	8	1	72
Parallel Activities	*Delegates' Activities*	Lack of participation	3	Insufficient promotion	6	Regular newletters	8	144	On site registration	3	6	3	54
		Lack of cultural activities	7	Lack of time	7	Implementation check	2	98					
		Lack of spousal activities	8	Miscalculation of spouses	5	Obligatory record in the registration sheet	2	80					
	Food	Poor food quality	9	Insufficient supervision	9	Site visit	8	648	Selection of caterers who apply with international standards of hygiene	9	9	2	162
		Allergies	10	Record of nutrition habits on the registration sheet	7	Obligatory record in the registration sheet	6	420	Health staff - nutritionist contribution	10	7	1	70

The quality of research papers from the scientific point of view was not included in S-FMEA since the scientific committee ensures their originality. Thus, participants usually don't express dissatisfaction concerning issues purely scientific but mainly to organizational ones such as secretariat or dinners.

Finally, a Pareto diagram was used (Figure 3), where potential causes of failure were ordered based on their RPN. The most important failures identified, were those with RPN equal or higher to 112. For each cause of failure, recommended actions were proposed. Furthermore, recommended actions were also proposed for a further cause, which even though it had a low RPN (81), it was ranked with high severity (S=9). Finally, the new RPNs were estimated based on the corrected severity, occurrence and detection (calculated after the recommended actions were in place). The fact that the new RPNs are smaller than the initial ones, indirectly states that there is a clear improvement of service quality by eliminating causes of failure.

The outcome of the S-FMEA is the five most crucial factors mainly linked to security, health and effective presentation issues which are:

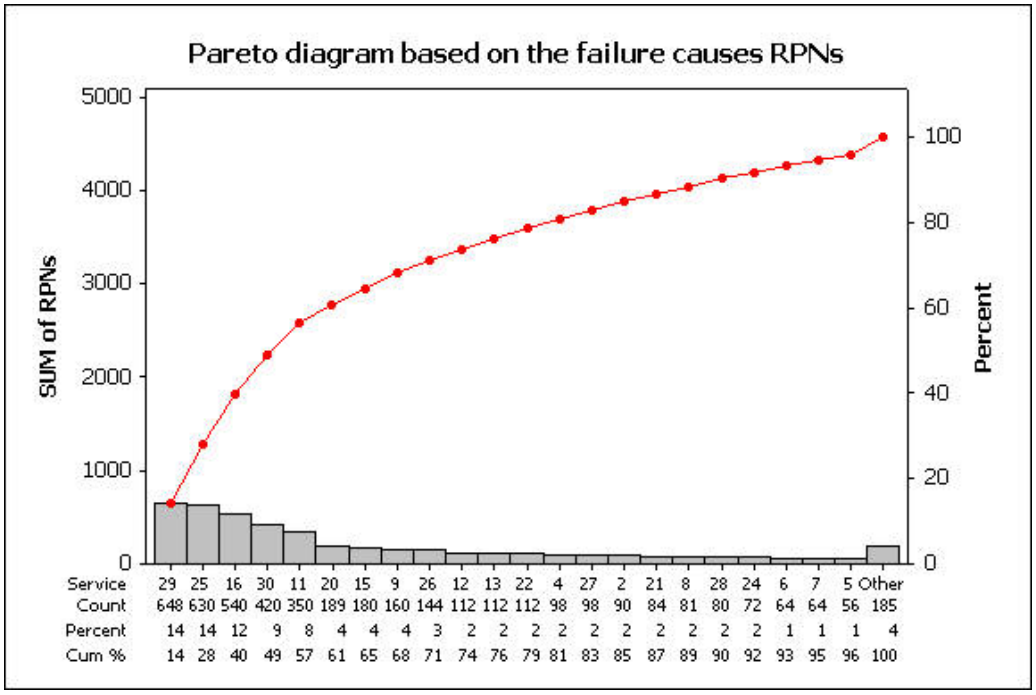
- Poor food quality.
- Inadequate or non functioning equipment during paper presentations.
- Secretarial support noble service.
- Possible allergies.
- Conference proceedings and CD malfunctioning.

5. CONCLUSIONS

It is necessary to comprehend the multiple and often complex dimensions used by delegates to evaluate a conference. Furthermore, delegate satisfaction is essential both for hotel and conference venue income as well as for the establishment of a city as a conference destination. Quality tools, like S-FMEA, contribute towards this direction. The application of S-FMEA to conference tourism, promotes the identification of the crucial factors that might lead to failures and consequently delegate dissatisfaction.

Services in general and conference tourism in particular form an area, where satisfaction is achieved, when customer needs are met or exceeded. Transferring tools like FMEA from manufacturing industry to services is an innovation by itself and their increased use can significantly contribute to service excellence.

FIGURE 3: PARETO DIAGRAM BASED ON THE FAILURE CAUSES RPNS



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