

THE
CYPRUS
JOURNAL OF
SCIENCES

PUBLISHED BY AMERICAN COLLEGE

VOL.12 2014

The Cyprus Journal of Sciences

The e-Journal of American College

Editor

Charalambos Louca
American College

Co-Editors

Andreas Petasis
Yianna Danidou
Marios Charalambous
Christina Frangou
American College

Editorial Board

Andreas Andreou, University of Cyprus, Cyprus
Andros Gregoriou, Brunel University, Uxbridge, Middlesex, UK
Andreas A. Jobst, International Monetary Fund (IMF), Washington, USA
Andreas Kapardis, University of Cyprus, Cyprus
Anton Anthonissen, University of Utrecht, the Netherlands
Arie De Ruijter, Tilburg University, the Netherlands
Athanasios Laios, Democritus University of Thrace, Greece
Biser Petrov, Bulgarian Academy of Sciences, Sofia, Bulgaria
Caroline Ann Wiscombe, University of Wolverhampton, Wolverhampton, UK
Charles M. Beach, Queen's University, Kingston, Ontario, Canada
Constantinos-Vasilios Priporas, Athens Graduate School of Management, Thessaloniki, Greece
Costas Zafiropoulos, University of Macedonia, Thessaloniki, Greece
David Cooper, University of Salford, Salford, UK
David Songhurst, Wolverhampton Business School, Wolverhampton, UK
Demetris Vrontis, University of Nicosia, Cyprus
Eleni Berki, University of Tampere, Finland
Evangelos Charos, Merrimack College, North Andover, USA
George Korres, University of the Aegean, Greece

George Tsobanoglou, University of the Aegean, Greece
Graham Orange, Leeds Metropolitan University, Leeds, UK
Irene Sciriha, University of Malta, Malta
Jan Katherine Bamford, London Metropolitan University, London, UK
Joseph S. Joseph, University of Cyprus, Cyprus
Kalliope Agapiou-Josephides, University of Cyprus, Cyprus
Krassimira Ilieva, Bulgarian Academy of Sciences, Sofia, Bulgaria
Leonidas A. Phylactou, Cyprus Institute of Neurology & Genetics, Cyprus
Marianna Sigala, University of the Aegean, Greece
Marina-Selini Katsaiti, United Arab Emirates University, UAE
Mary Koutselini-Ioannidou, University of Cyprus, Cyprus
Mary Vaxevanidou, Hellenic Open University, Greece
Panagiotis Kyratsis, Technological Educational Institution of West Macedonia, Greece
Paul Verweel, University of Utrecht, the Netherlands
Povey Ghislaine, University of Wolverhampton, Wolverhampton, UK
Savvas Katsikides, University of Cyprus, Cyprus
Sean W. Cleary, York University, Toronto, Ontario, Canada
Sergey Belousov, Bulgarian Academy of Sciences, Sofia, Bulgaria
Sofiane Aboura, Essec Business School, France
Suzanne Gatt, University of Malta, Malta
Vasiliki Vrana, Technological Educational Institute of Serres, Serres, Greece
Vasilios Grammatikopoulos, University of Thessaly-TEFAA, Trikala, Greece

Assistants to Editors

Andri Kyriacou
Andri Pouroutidou
Stella Georgiou
American College

CONTENTS

Editorial Board
Notes for Contributors

Inside Front Cover
Inside Back Cover

Articles

Humanities and Social Sciences

- Prosecution Reliance on the Quantity rather than the Quality of
Evidence for Children's Testimonies 3
Marilena Kyriakidou, Alexia Zalaf and Mark Blades
- The Importance of Children's 17
Early Relationships with their Educators
Sidiropoulou Trifeni and Schiza Melpomeni
- The Effect of the Coach's Absence on the Behaviour and Performance of 29
Young Athletes in an Important Competition in Individual Sports
*Theophilos Piliandis, Nikolaos Mantzouranis,
Maria Gamvroudiou, Fani Berberidou and Michalis Proios*

Management, Finance and Tourism

- A Survey on Innovation, Knowledge and Regional Growth 39
*George M. Korres, Elias Kourliouros,
Maria Athina Artavani and Aikaterini Kokkinou*
- European Strategy 2020: Assessing the Extent to which Greek SMEs have the 53
Ability to Respond to the Targets of this Strategy
Panagiotis Katis
- An Unobserved Components Model for US Real GDP 69
Christos N. Christodoulou-Volos
- Cultural Tourism and Ottoman Monuments in Chios, Greece 79
Panoraia Poulaki, Dimitrios Lagos and Maria Ntoumi
- Regional Innovation and Industrial Policy in the European Union: 101
A Technical Efficiency Approach
Aikaterini Kokkinou

Incentives for Participation of Artisanal Fishermen in the Regulation and Control of Fisheries Protection Areas: A Case Study from Greece	121
George O. Tsobanoglou and Eirini Ioanna Vlachopoulou	

PROSECUTION RELIANCE ON THE QUANTITY RATHER THAN THE QUALITY OF EVIDENCE FOR CHILDREN'S TESTIMONIES

MARILENA KYRIAKIDOU*, ALEXIA ZALAF** and MARK BLADES***

ABSTRACT

What characterizes testimonies by children that proceed to prosecution as compared with those that do not? Data for 46 cases that included a child's testimony were collected from the police force databases and transcriptions of children's videotaped testimonies in Cyprus. Prosecution rates were highly correlated with the evidence provided but with no other factors investigated. Study outcomes suggest a link between evidence provided and prosecution rates raising puzzling indications that the decision regarding whether a case gets prosecuted or not relies heavily on the number of evidence gained and not on the quality of questions used during the criminal investigations.

Keywords: Prosecution; evidence quantity; evidence quality; children's testimonies.

1. INTRODUCTION

Policing children's testimonies involves procedures emphasizing the elicitation of accurate and informative responses from interviewees (e.g. the use of appropriate question types) and carefully arranging procedures (e.g. suitable training courses) that can contribute further to gaining useful evidence for prosecution. Children's testimonies are vital for criminal investigations. Such testimonies may often be the only source of evidence for a police force in the investigation of an alleged crime as unambiguous evidence (like medical evidence) or third testimonies do not usually exist in cases of alleged sexual abuse against children (Dhami and Ayton, 2001; Jong, 1996; O'Keefe, 2004). Judges and juries rely heavily on testimonials in deciding the outcome of a trial (Porter and Brinke, 2009) especially in cases with children (Spencer and Flin, 1993). In the literature so far, research questions cover a variety of topics such as the impact of question types on the quality of potential evidence provided by children (DeVoe and Faller, 2002), the effects of police officers' training on the quality of question types (Lamb, Sternberg, Orbach, Esplin and Mitchell, 2002), and the prosecution rates in relation with the quality of a child's testimony (Wood and Garven, 2000). The present study aspires to link the most important factors in children's forensic investigations (such as evidence provided, question types,

* Research Fellow, Coventry University, Coventry, United Kingdom

** Researcher, Association for the Prevention and Handling of Violence in the Family, Nicosia, Cyprus

*** Senior Lecturer, Sheffield University, Sheffield, United Kingdom

interviewers' experience) and explore their relationships by emphasising the prosecution rates. Each of these factors is discussed below and this literature review is followed by a description of the procedures surrounding the policing of children's testimonies in Cyprus.

1.1. Factors investigated

The decision regarding whether a case is prosecuted or not in the Republic of Cyprus is a joint decision between the Police Force and the Attorney General. When the police complete a criminal investigation of an alleged crime, the police submit a file with all the evidence gathered from the investigation to the Law Office of the Attorney General. A prosecutor of the Law Office would study the case and decide whether the case can proceed to prosecution on the basis that there is enough evidence that could substantiate the charges (Kyprianou, 2010). A question explored was how the amount of evidence provided influenced the prosecution rates, as well as what the effect of inappropriate and appropriate question types was on the prosecution rates. Various studies propose that a minor percentage of between 1 to 16 % of all police cases involving children get prosecuted (Sedlak, et al., 2006; Stroud, Martens and Barker, 2000; Wood and Garven, 2000). For example, Gallagher and Pease (2000) found that only one-fifth of cases in England and Wales (in 1997) proceeded to prosecution. The authors suggested that a main reason as to why police forces do not always proceed with prosecution is due to unsatisfactory children's testimonies. Studies with adults showed that they are more likely to characterize a child's testimony less convincing when inappropriate questions have been used (Lindsay & Lamb, 2010; Tubb, Wood and Hosch, 1999). Further studies have shown that a number of cases that proceeded to prosecution contained unsatisfactory and sometimes misleading evidence (Ashworth, 1998; Baldwin and Bedward, 1991). As a consequence of the insufficient cases suggested by the police for prosecution, problematic issues and weaknesses often arise during or following a trial (Leng, 1993).

Eliciting children's evidence during police questioning is a challenge for policing children's testimonies. Incidents of abuse are complex events that typically require integration of multiple types of forensic details (e.g. time, place, description of genitals). Each detail is used to construct the source or origin of the abusive incident. The ability of children to combine these forensic details into a cohesive testimony is critical for forensic investigations. Researchers provided indications that children fail to successfully describe abuse experiences (Leander, Christianson and Granhag, 2007; Pipe, Lamb, Orback and Cederborg, 2007). The experiences children will share during police questioning seem to be highly relevant to the way the interviewer approaches them.

Different question types can influence the accuracy and fullness of children's recall. There is a general agreement that open-ended questions (as defined by the Memorandum of Good Practice, 1992) access recall memory which is likely to extract accurate information as opposed to focused questions (as defined by Memorandum of Good Practice, 2007) that access recognition memory that could produce less accurate details (Davies, Westcott and Horan, 2014; Leichtman and Ceci, 1995). There is, however, a general inconsistency among researchers as to how to define and analyse different question types. As discussed by Oxburg, Myklebust and Grant (2010) in their review study, there is variation in the literature about how different question types are approached in different research methodologies among researchers in the field of police questioning. Oxburg, et al. (2010) categorized all definitions of question types used from 19 different studies into two main schemes: (i) the productive or appropriate and (ii) unproductive, risky or inappropriate. The productive or appropriate category included open-ended questions, probing and facilitators. The unproductive, risky or inappropriate category included closed, echo, leading, suggestive, multiple, forced choice, opinion/statements and hypothetical questions. The present paper discusses question types based on Oxburg's, et al. (2010) categorization of appropriate and inappropriate question types.

Inappropriate questions as defined by Oxburg et al. (2010) such as focused questions as defined by Home Office (2007) may be more developmentally appropriate for children and result in important information that children might not recall otherwise (Lyon, 1995; Yuille, Hunter, Joffe and Zaparnuik 1993). For example, after open-ended questions children only mentioned a small percentage of all the body touches they had experienced during a doctor's visit (e.g., 10% in the Saywitz study, and 25% in the Steward study) (Saywitz, et al., 1991; Steward, et al., 1996). Other studies indicated that children did not discuss abuse after the first few open-ended questions but more precise focused questions could be effective in eliciting more information (DeVoe and Faller, 2002; Mordock 1996). In DeVoe and Faller (2002), an average of 92 questions was required before children started disclosing information relating to sexual abuse. Some studies have shown that open-ended questions may not provide more details compared to focused questions and that children do not always elaborate their answers (Patterson and Pipe, 2009). Another example, by Davies et al. (2014), provided clues that children of 11 years old and even younger ones provided more information following inappropriate specific questions. These studies suggest that inappropriate questions were essential to help children disclose abusive incidents (Mordock 1996).

However, question types that fall within the inappropriate category should be used with caution as they could be challenged in the courtroom by defense lawyers by arguing that police interviewers misled children and distorted their accounts (Warren and McGough, 1996). For example, choice and yes/no questions that are within the inappropriate category, are characterized as two of the worst types of questions to rely

on during questioning. This could be because children assume that they have to answer police officers' (or lawyers') questions even if they do not know the answer (Poole and Lamb, 1998) or if the question makes no sense (Hughes and Grieve, 1980). It is therefore highly recommended in police guidelines and suggestions (American Professional Society on the Abuse of Children, 2002; Bull, 1995; Cyprus Police Guidelines, 2005; 2007; The Swedish Code of Judicial Procedures, 1942) for police officers to offer opportunities to children (via appropriate questions types such as open-ended questions) to give free descriptions of alleged events. Children's answers could be up to five times more detailed if open-ended questions were used appropriately (e.g. at the beginning of the interview) (Sternberg et al., 2001; Lamb et al. 2003). Multiple studies have provided evidence on the truthfulness of accounts following open-ended questions (Bull, 2010; Goodman and Aman 1990; Myklebust and Bjørklund 2006, 2009). When children do not know an answer in response to an open-ended question they are likely to answer 'don't know' rather than provide a false detail compared with inappropriate question types (Ceci and Burck, 1995; Davies, Westcott and Horan, 2000).

The experience of the interviewers was another factor investigated in relation to the evidence provided, questions types and prosecution rates. Myklebust and Bjørklund (2006) examined how interviewers' experience and long-term training affects the use of open and closed questions by police officers in field investigative interviews of children. A total of 100 interview questions were analysed and compared between those who had considerable experience and training compared with interviewers who did not. The study did not show any statistically significant differences between the interviewers who had experience and attended long-term training courses and the interviewers who were less experienced and attended less training courses. Beyond this study and to our knowledge there is no other research related to the effects of interviewers' experience on the quality of question types, evidence provided and how this influences the prosecution rates. Prior to the presentation of this study's methodology a description of the situation surrounding children's forensic testimonies in Cyprus is provided.

1.2. Policing children's testimonies in the Republic of Cyprus

The police unit within the criminal investigation department (CID) entitled the Domestic Violence and Child Abuse (DV/CA) Office is responsible for applying and extending the use of videotaped testimonies in the Republic of Cyprus. Videotaping children's testimonies is allowed due to the Violence in the Family (Prevention and Protection of Victims) Law 2004 and secondly through the Protection of Witnesses Law, 95(I)/ 2001. One of the most significant changes concerning the statutes about children's evidence is law 14(I)/2009. According to this law, a child's testimony can convict a suspect without the need for corroborative evidence, irrespective of whether

the child is under oath or not. This is a very significant change because it emphasises the importance of the child's testimony in the courtroom, something that did not exist in the past. The system of videotaping children's testimonies was firstly applied in the Republic of Cyprus in 2004.

Police officers who want to obtain videotaped testimonies from children have to be trained to carry out such interviews. However, there are no any retraining programs and so every interviewer has attended only one training course during his/her career. The DV/CA Office organizes a training programme once a year for all officers who intend to interview children. This training program lasts about a week and officers have the opportunity to learn about the theoretical aspects of children's testimonies and practice their knowledge by taking a mock testimony. At the end of training program each trainee interviewer receives feedback from the DV/CA Office on his/her performance during the course.

1.3. Present study

The present study addressed three research questions. First, how the prosecution rates were influenced by: a) The amount of evidence provided, b) The number of inappropriate and appropriate questions used during the police questioning and c) The interviewers' years of experience. It was expected that the more evidence a testimony gained the more likely it was to proceed to prosecution. It was hypothesized that when police officers detected high proportions of inappropriate questions within a child's forensic testimony, that would lead to withholding the case for prosecution. It was also expected that an increased number of appropriate questions within a testimony would result in higher rates of prosecution as police forces would have been aware of the beneficial outcomes of such question types. The interviewers' experience in association with the evidence provided and use of different question types was on an exploratory basis. Second, how children's potential evidence provided during police questioning were correlated with: a) The number of inappropriate and appropriate questions used during police questioning and b) The interviewers' years of experience. It was expected that the amount of evidence provided would have been positively correlated with the amount of inappropriate and appropriate questions used. Third, research question was on whether appropriate questions used related with: a) The number of inappropriate questions used during the police questioning and b) the interviewers' years of experience. It was expected that the experience of interviewers would not have affected the amount of inappropriate and appropriate question types used in the police interviews.

2. METHODOLOGY

2.1. Ethical issues

Permission was given by the Chief of Police to gain access to children's transcribed testimonies to one of the researchers. The study was in agreement with the Processing of Personal Data (Protection of the Individual) Law of 2001 and its amendment (Law No. 37(I)/2003) in the Republic of Cyprus. Any information revealing the identity of the alleged victims, suspects as well as the police interviewers and investigators were replaced with codes. This ensured respect to all people involved and their personal details during the data collection, coding, analysis and distribution of the findings. All testimony transcripts were analysed in the Domestic Violence and Child Abuse (DV/CA) Office. No transcripts were removed from the DV/CA Office. Access to police electronic databases was not directly permitted to the researchers but police officers could access the databases to answer the researchers' questions.

2.2. Procedure and coding

For the first element, "*Prosecution*", the police databases were accessed to detect the outcome of each case where a child's videotaped testimony was elicited. Cases which were prosecuted were valued as 1 and cases which were not prosecuted were valued as 2.

For the second element, "*Evidence*", data were collected from the transcriptions of children's videotaped testimonies. Each time a child conveyed a potential forensic detail (e.g. description of sexual incidents, references to individuals) this was calculated as evidence. The children's evidence was counted only the first time it was given in an interview. Information that the children repeated was not counted again.

For the third element, "*Appropriate Question Types*", and fourth element, "*Inappropriate Question Types*", the transcriptions of children's videotaped testimonies were used to categorise each of the questions asked by the interviewers. All question types were classified using the ABE manual (Home Office, 2007; Ministry of Justice, 2011). The appropriate question types combined open-ended questions and facilitators. The inappropriate question types included yes/no questions, specific questions and questions where a choice is given. However, a specific question could be coded as an open-ended question if it asked children to provide a free recall. For example, "what happened next?" was defined as an open-ended question and not as a specific question.

For the fifth element, "*The experience of the interviewer*", data were collected from the police electronic databases. This was the result of the year the testimony was

gained minus the year the interviewer attended his first training course on children's testimonies.

Because of the difficulty of eliciting permission for a second rater for the transcriptions of children's testimonies, and due to the fact that the police databases could be accessed only by police officers who provided the information to the researchers, there was no possibility to conduct inter-rater reliability tests.

2.3. Analysis

The normality test Shapiro-Wilk showed that all variables were non-normally distributed variables at $p < .001$. Non-parametric tests such as Mann-Whitney and Spearman's Correlation Coefficient tests were chosen to explore whether there were any differences or relationships between the seven elements. The Mann-Whitney test is considered as one of the most powerful non-parametric tests and can be conducted with highly unequal samples (Landers, 1981).

2.4. Sample

The average age of children interviewees was 10.11 ($SD=3.35$) with the youngest child being 3 years old and the oldest 16 years old. There were 27 cases that proceeded to prosecution, 6 cases that did not proceed and 13 cases were still under investigation or were unknown as to whether they proceeded to prosecution or not. There were 22 interviewers that, at the time of the interview, had 3 years or less experience in interviewing children. There were 24 interviewers that had 4 to 6 years of experience in interviewing children.

3. RESULTS

Spearman's analysis showed a significant positive correlation between the evidence provided and the number of inappropriate questions ($rs(44) = .30, p < .05$) and appropriate questions ($rs(44) = .38, p < .01$). There was no significant correlation between the evidence provided and the experience of the interviewer ($rs(44) = .10, p > .05$ rho). Spearman's analysis also showed a significant positive correlation between appropriate questions and inappropriate questions used ($rs(44) = .53, p < .001$). There was no significant correlation between the appropriate questions and the interviewers' experience ($rs(44) = .10, p > .05$).

The Mann-Whitney analysis showed a significant difference in the number of evidence gained between cases that proceeded to prosecution ($Mdn = 43$) and cases that did not proceed to prosecution ($Mdn = 16$) ($U = 34, p = .028, r = .38$). This test did not show a significant difference between cases that have been prosecuted and cases that have not concerning the number of inappropriate questions ($U = 71.5, p = .657$,

$r = .07$), appropriate questions ($U = 71$, $p = .639$, $r = .08$) and the experience of interviewers ($U = 68$, $p = .535$, $r = .2$).

4. DISCUSSION

The first research question concerned how the prosecution rates were influenced by: a) The amount of evidence provided, b) The number of inappropriate and appropriate questions used during the police questioning as well as the c) Interviewers years of experience. The study's outcomes indicated that prosecution mainly relies on the number of evidence provided despite the issue of whether this evidence was gained from inappropriate or appropriate question types or from experienced or inexperienced interviewers. The most significant factor influencing whether a case was prosecuted was the number of evidence within the child's testimony. This outcome replicated earlier studies suggesting the importance of eliciting informative testimonies that could proceed to prosecution (Wood and Garven, 2000). This finding reflects the necessity of potential forensic details from children's testimonies to satisfy the prosecution criteria of a police department.

On the other hand, this study contradicted our hypothesis that police interviews with higher number of inappropriate questions would have resulted in fewer chances for prosecution. This hypothesis was based on studies which showed that adults are more likely to characterize a child's testimony less convincing when inappropriate questions have been used (Lindsay and Lamb, 2010; Tubb, Wood and Hosch, 1999). Similarly, the hypothesis that testimonies with higher number of appropriate questions would have more chances to result in prosecution was also proven false. Cases that proceeded to prosecution had about equal numbers of inappropriate questions with cases that did not proceed to prosecution. The same applied for appropriate questions where there was an equal distribution of them in cases that proceeded and did not proceed to prosecution. This finding suggests that police officers may not consider whether the details gained by children came from appropriate questions or questions that may produce inaccurate information. Officers and the Attorney General Office seem to base their decision on whether to proceed to prosecution or not mostly on the amount and not on the quality of evidence.

In addition to this, the experience of the interviewer of a case did not result in an increase in the prosecution rates. This links with a finding from the second research question where the experience of an interviewer did not result in an increase on the amount of evidence provided, therefore, there was no reason to expect an increase on the prosecution rates for experienced interviewers. It is also associated with a finding from our third research question where interviewers' experience did not end up increasing the amount of appropriate questions or decreasing inappropriate questions; something that was in agreement with Myklebust and Bjørklund's (2006) study. It seems that the interviewers' performance was constant irrespective of their experience.

This finding should cause great concern for the police force as measures should be taken to ensure a greater amount of evidence as well as the accuracy of this evidence gained by children during police questioning.

Our second research question was how children's potential evidence provided during police questioning were correlated with: a) The number of inappropriate and appropriate questions used during police questioning and b) Interviewers' years of experience. The evidence provided correlated with the increase of both inappropriate and appropriate questions but it was irrelevant with the experience of the interviewer. This replicated earlier findings demonstrating the need for using inappropriate questions in order to elicit details that may not be otherwise gained with the sole use of open-ended questions (Davies et al., 2014). Likewise, it appears that open-ended questions are also essential for gaining important evidence for criminal investigations (Bull, 2010).

The third research question investigated whether appropriate questions were related with: a) The number of inappropriate questions used during the police questioning and b) Interviewers' years of experience. Interestingly with the increased use of appropriate questions, the number of inappropriate questions also increased. This outcome suggests a stable link between appropriate and inappropriate question types, with the likelihood of each interviewer relying equally on both to obtain useful details from children.

4.1. Suggestions

Two main practical implications for policing children's testimonies arise from the present outcomes of the study. The first one relates to the need for the police force to recruit intelligence analysts specializing in children's forensic investigations in order to assist police officers in determining which testimonies can be prosecuted or not. This study suggests that cases that proceed to prosecution cannot be distinguished through the quality of question types, but rely heavily on the amount of evidence provided. As a consequence these testimonies may lead to unsatisfactory evidence that may end up causing difficulties during a trial (Ashworth, 1998; Bedward, 1991; Leng, 1993). There may be cases, in which interviewers gained few evidences by relying on appropriate questioning and have not proceeded to prosecution due to the inadequate number of evidence. However, in such cases, an intelligence analyst could argue for the prosecution of the case as the accuracy of these few evidence could result in convicting a suspect. Intelligence analysts can help on this theme by providing an opinion not only on the quantity of the evidence elicited but also on their accuracy.

A second suggestion would be for the police force to consider changing its policing from the provision of one training course to the adaptation of the supervision and addition of repeated training courses. Benefits of any training program could be short-lived without any on-going practice (Powell, Fisher and Hughes-Scholes, 2008).

As Jones (1992) argued “*The support of a team or colleagues within an agency or department is essential. Supervision and/or consultation is/are a must, not only as the clinician starts in the area of sexual abuse, but throughout his or her career. Many who have tried to continue in this field without these emotional and professional supports have become less effective over time*”. If police officers receive regular feedback on their interviews and if this feedback or supervision is repeated, it could improve the way interviewers approach children during forensic investigations (Lamb, Sternberg, Orbach, Esplin and Mitchell, 2002). Lamb et al. (2002) conducted an experimental study where 74 interviews conducted by interviewers who received supervision and interviewers who did not receive any supervision were analysed. The study demonstrated that interviewers who received supervision used more open-ended questions (equivalent 1:4) than interviewers who did not receive any supervision (equivalent 1:2).

It is concluded that prosecution reliance on the quality rather than the quantity of evidence from children’s testimonies should be reconsidered by police forces and that recruiting intelligence analysts within its premises and offering further training should be explored further.

REFERENCES

- American Professional Society on the Abuse of Children. (2002). *Guidelines for psychosocial evaluation of suspected sexual abuse in young children*. Chicago, IL: American Professional Society on the Abuse of Children.
- Ashworth, A. (1998). *Incorporating the “public interest” element in the decision to prosecute*. In Hall Williams, J.E. (Ed). *The role of the prosecutor*. Aldershot: Gower.
- Baldwin, J. and Bedward, J. (1991). Summarising tape recordings of police interviews. *Criminal Law Review*, pp. 671 - 679.
- Bull, R. (1995). Innovative techniques for the questioning of child witnesses, especially those who are young and those with learning disability. In M. Zaragoza, G. Graham, G. Hall, R. Hirschman & Y. Ben-Porath (Eds.). *Memory and testimony in the child witness*, pp. 179 – 194. Thousand Oaks, CA: Sage.
- Bull, R. (2010). The investigative interviewing of children and other vulnerable witnesses: psychological research and working professional practice. *Legal and Criminological Psychology*, 15, pp. 5 - 23.
- Ceci, S. J. and Bruck, M. (1995). *Jeopardy in the courtroom: A scientific analysis of children's testimony*. Washington, DC: American Psychological Association.
- Cyprus Police (2005). *Cyprus Police Guidelines*. Domestic Violence and Child Abuse Office: Cyprus.
- Cyprus Police (2007). *Cyprus Police Guidelines*. Domestic Violence and Child Abuse Office: Cyprus.
- Davies, G., Westcott, H. and Horan, N. (2000). The impact of questioning style on the content of investigative interviews with suspected child sexual abuse victims. *Psychology, Crime and Law*, 6, pp. 681 - 697.

- Deviesl, G.A., Westcott, H.L. and Horan, N. (2014). The impact of questioning style on the content of investigative interviews with suspected child sexual abuse victims. *Psychology, Crime and Law*, 6, pp. 81 - 97.
- DeVoe, E. R. and Faller, K. C. (2002). Questioning strategies in interviews with children who may have been sexually abused. *Child Welfare*, 81, pp. 5-32.
- Dhami, M. J. and Ayton, P. (2001). Bailing and jaling the fast and frugal way. *Journal of Behavioral Decision Making*, 14, pp. 141 - 168.
- Gallagher, B. and Pease, K. (2000). *Understanding the attrition of child abuse and neglect cases in the criminal justice system*. ESRC End-of-Award Report, Grant number R 000 236 891.
- Goodman, G. S. and Aman, C. (1990). Children's use of anatomically detailed dolls to recount an event. *Child Development*, 61, pp. 1859 - 1871.
- Home Office. (2007). *Achieving best evidence in criminal proceedings: Guidance for vulnerable and intimidated witnesses, including children*. London: HMSO.
- Hughes, M. and Grieve, R. (1980). On asking children bizarre questions. *First Language*, 1, pp. 149 - 160.
- Jones, D. P. (1992). *Interviewing the sexually abused child: Investigation of suspected abuse* (4th ed.). Royal College of Psychiatrists.
- Jong, A. D. (1996). Impact of child sexual abuse medical examinations on the dependency and criminal systems. *Child Abuse and Neglect*, 22, pp. 645 - 652.
- Kyprianou, D. (2010). *The role of the Cyprus attorney general's office in prosecutions: rhetoric, ideology and practice*. Springer.
- Landers, J. (1981). *Quantification in History, Topic 4: Hypothesis Testing II Differing Central Tendency*. Oxford: All Souls College.
- Lamb, M. E., Sternberg, K. J., Orbach, Y., Esplin, P. W. and Mitchell, S. (2002). Is ongoing feedback necessary to maintain the quality of investigative interviews with allegedly abused children? *Applied Developmental Science*, 6, pp. 35 - 41.
- Lamb, M. E., Sternberg, K. J., Orbach, Y., Esplin, P., Stewart, H. and Mitchell, S. (2003). Age differences in young children's responses to open-ended invitations in the course of forensic interviews. *Journal of Counseling and Clinical Psychology*, 71(5), pp. 926 - 934.
- Leander, L., Christianson, S. A., and Granhag, P. A. (2007). A sexual abuse case study: Children's memories and reports. *Psychiatry, Psychology, and Law*, 14, pp. 120 - 129.
- Leichtman, M. D. and Ceci, S. J. (1995). The effects of stereotypes and suggestions on preschoolers' reports. *Developmental Psychology*, 31, pp. 568 - 578.
- Leng, R. (1993). *The right to silence in police interrogation: A study of the issues underlying the debate*. Royal Commission on Criminal Justice Research Study No.10, London: HMSO.
- Lindsay, C.M. and Lamb, M.E. (2010). Biases in judging victims and whose statements are inconsistent. *Law and Human Behavior*, 34, pp. 46-48.
- Lyon, T. (1995). False allegations and false denials in child sexual abuse. *Psychology, Public Policy, and Law*, 1, pp. 429 - 437.
- Mordock, J. B. (1996). Treatment of sexually abused children: Interview technique, disclosure, and progress in therapy. *Journal of Child Sexual Abuse*, 5, pp. 105 - 119.

- Myklebust, T. and Bjørklund, R. A. (2006). The effect of long-term training on police officers' use of open and closed questions in field investigative interviews of children (FIIC). *International Journal of Investigative Psychology and Offender Profiling*, 3, pp. 165 - 181.
- Myklebust, T. and Bjørklund, R.A. (2009). The child verbal competence effect in court: a comparative study of field investigative interviews of children in child sexual abuse cases. *Journal of Investigating Psychology and Offender Profiling*, 6, pp. 117 - 128.
- O'Keefe, M. (2004). A case of suspected child sexual abuse. *Journal of Clinical Forensic Medicine*, 11, pp. 316 - 320.
- Oxburgh, G., Myklebust, T., and Grant, T. (2010). The question of question types in police interviews: A review of the literature from a psychological and linguistic perspective. *International Journal of Speech Language and the Law*, 17, pp. 45 - 66.
- Patterson, T. and Pipe, M. (2009). Exploratory assessments of child abuse: Children's responses to interviewer's questions across multiple interview sessions. *Child Abuse and Neglect*, 33, pp. 490 - 504.
- Pipe, M. E., Lamb, M., Orbach, Y. and Cederborg, A.C. (2007). *Child sexual abuse: Disclosure, delay, and denial*. Mahwah, NJ: Lawrence Erlbaum.
- Poole, D. A. and Lamb, M. E. (1998). *Investigative interviews of children: A guide for helping professionals*. Washington, DC: American Psychological Association.
- Porter, S. and Brinke, L. (2009). Dangerous decisions: A theoretical framework for understanding how judges assess credibility in the courtroom. *Legal and Criminological Psychology*, 14, pp. 119 - 134.
- Powell, M. B., Fisher, R. P. and Hughes-Scholes, C. H. (2008). The effect of using trained versus untrained adult respondents in simulated practice interviews about child abuse. *Child Abuse and Neglect*, 32, pp. 1007 - 1016.
- Processing of Personal Data (Protection of the Individual) Law, the Republic of Cyprus (2001).
- Processing of Personal Data (Protection of the Individual) Law, the Republic of Cyprus (2003).
- Protection of Witnesses Law, the Republic of Cyprus (2001).
- Saywitz, K., Goodman, G., Nicholas, E. and Moan, S. (1991). Children's memory for a genital examination: Implications for child sexual abuse cases. *Journal of Consulting and Clinical Psychology*, 59, pp. 682 - 691.
- Sedlak, A.J., Schultz, D., Wells, S.J., Lyons, P., Doueck, J.J. and Gragg, F. (2006). Child protection and justice systems processing of serious child abuse and neglect. *Child Abuse and Neglect*, 30, pp. 657 - 677.
- Spencer, J. R. and Flin, R. (1993). *The evidence of children: the law and the psychology* (2nd ed.). Blackstone Press Limited.
- Sternberg, K. J., Lamb, M. E., Davies, G. M. and Westcott, H. L. (2001). The memorandum of good practice: Theory versus application. *Child Abuse and Neglect*, 25, pp. 669 - 681.
- Steward, M.S., Steward, D.S., Farquhar, L., Myers, J.E., Reinhart, M. and Welker, J.J. (1996). Interviewing young children about body touch and handling. *Monographs of the Society for Research in Child Development*, 57, pp. 1 - 232.
- Stroud, D. D., Martens, S., and Barker, J. (2000). Criminal investigation of child sexual abuse: A comparison of cases referred to the prosecutor to those not referred. *Child Abuse and Neglect*, 24, pp. 689 - 700.
- The Swedish Code of Judicial Procedures (SFS). (1942). *The Swedish Code of Statutes* (SFS). Number 740.

*Prosecution Reliance on the Quantity rather than the Quality of
Evidence for Children's Testimonies*

- Tubb, V., Wood, J. M. and Hosch, H. M. (1999). Effects of suggestive interviewing and indirect evidence on child credibility in a sexual abuse case. *Journal of Applied Social Psychology*, 29, pp. 1111 - 1127.
- Violence in the Family (Prevention and Protection of Victims) Law, the Republic of Cyprus (2004).
- Warren, A. and McGough, L. (1996). Research on children's suggestibility: Implications for the investigative interview. *Criminal Justice and Behavior*, 32, pp. 269 - 303.
- Wood, J. M. and Garven, S. (2000). How sexual abuse interviews go astray: Implications for prosecutors, police, and child protection services. *Child Maltreatment*, 5, pp. 109- 129.
- Yuille, J., Hunter, R., Joffe, R. and Zaparnuik, J. (1993). Interviewing children in sexual abuse cases. In G. Goodman, and B. Bottoms (Eds.), *Child victims, child witnesses: Understanding and improving testimony*, pp. 95 - 115. New York: Guilford.

THE IMPORTANCE OF CHILDREN'S EARLY RELATIONSHIPS WITH THEIR EDUCATORS

SIDIROPOULOU TRIFENI* and SCHIZA MELPOMENI**

ABSTRACT

This current study on kindergarteners' socio-emotional behavior indicates that relationships between children and teachers in preschool settings play a prominent role in the development of children's social and emotional competencies. Specifically associations between children's socio-emotional behaviour with peers, during play and verbal communication and the two specific characteristics of their teacher-child relationships, conflict and closeness were examined in a sample of 124 children, 4-5 years old, of middle socioeconomic status who attended the various state-run nursery schools in Athens. Conflict was positively associated with hostile aggression and negatively associated with complex play and verbal communication. Closeness was positively associated with social behaviours, complex play and verbal communication and negatively associated with social withdrawal and hostile aggression.

Keywords: Kindergarten; teacher-child relationships; socio-emotional behavior; conflict; closeness.

1. INTRODUCTION

Social and affective relationships that children establish with those adults that take care of them since birth are essential to their survival and development. Different researchers who have studied the social and affective development of children, have agreed that the affective relationship model established between the child and the parent, will become the basis of his or her socialization process and the way he or she will adapt in other contexts such as school (Bowlby, 1969, Ainsworth, 1991, Cassidy, 1999, Weinfield, et al., 1999).

Diverse researchers suggest that educators have a preponderant role in children's lives once they enter the school environment, and that the relationship established between them can have a great influence on the way children adapt to it, both socially and academically. This influence can be as strong as the one the parents have on their children (Lynch and Cicchetti, 1992, Howes, Matheson and Hamilton, 1994, Birsch and Ladd, 1997, Pianta, 1999). Since the early development of the attachment theory, Bowlby (1969) identified the role of other people who take care of the child in the

* Assistant Professor of Phychopedagogics, Early Childhood Department, Technological Educational Institution (TEI) of Athens, Greece

** Kindergarten Teacher, Athens, Greece

absence of one parent or other elementary figures, calling them auxiliary attachment figures. Other authors have highlighted the importance of the relationship the child has with all the care givers or alternative figures inside and outside the family context, and have noted among these alternative figures siblings, uncles, aunts, grandparents, friends and guardians within education institutions (Ainsworth, 1991, Pianta, 1992, Howes, 1999).

2. LITERATURE REVIEW

2.1. The importance of the primary mother-child relationship

According to the attachment theory, a child will develop a representational model or working model of the self, others, and self-other relationships based on the first experiences he/she had with his/her mother (Bowlby, 1969; Bretherton and Munholland, 1999). These working models can be considered as filters through which incoming information is being processed and also contribute to the interpretation of unclear or ambivalent behavior of others (Thompson, 1999). Sroufe and Waters (1977) described attachment as “an organizational construct that integrated development in the domains of affect, cognition, and behavior during infancy and served as a foundation for social and emotional development during infancy” (Vaughn, 2005, p. 371). Contrasted with bonding, the attachment experience is not limited to the first weeks or months of life, but rather it is a gradual and interactive process in the child’s responses and feelings toward his/her caregiver (Mercer, 2006).

Numerous studies have shown that insecure attachment to mother constitutes a risk factor for children’s future socio-emotional development (Thompson, 2008, Weinfeld et al., 2008). Children who are more securely attached to their mothers are more likely to behave in a positive way toward others whereas less securely attached children may more quickly rely on hostile, aggressive interaction styles (Cohn, 1990; Thompson, 1999). For preschoolers and early elementary school children, the quality of mother-child attachment has been associated with externalizing behavior problems in the classroom, such as aggression (Cohn, 1990, Turner, 1991, DeMulder et al. 2000).

Several authors have assumed that the quality of the early mother-child attachment relationship also impacts upon the quality of children's future relationships with their educators (Howes and Matheson, 1992, Lynch and Cicchetti, 1992, Kobak, 1999; Zajac and Kobak, 2006). Researchers have indeed found positive associations between the quality of mother-child attachment and the quality of educator-child relationships (Cohn, 1990, Turner, 1993, Pianta et al., 1997, DeMulder et al., 2000, Rydell, Bohlin, and Thorell, 2005). However, according to van IJzendoorn, Sagi and Lambermon, (1992), associations between mother-child attachment quality and later socio-emotional development are only modest, leaving room for other relational influences.

2.2. From mother-child relationship to educator-child relationship

Attachment theorists have suggested that educator–child relationship quality can act or not as a protective factor against negative developmental outcomes for children at risk due to adverse caregiving experiences, such as low mother–child attachment quality (Goossens and van IJzendoorn, 1990; Lynch and Cicchetti, 1992; Pianta and Steinberg, 1992). Especially for children who are less securely attached to their mothers, sensitivity of the kindergarten educator may be a very crucial element in the development of a close educator–child relationship (Kobak, 1999; Zajac and Kobak, 2006).

Robert Pianta is one of the main researchers who have extensively studied the aspects, causes and implications of the educator-child relationship. He proposed a classification of educator-child relationship based on three dimensions: (a) *closeness*, (b) *conflict* and (c) *dependency* (Pianta, Steinberg and Rollins, 1995). Those three dimensions have been identified repeatedly in subsequent studies in which the quality of the educator-child relationship was examined from the teachers' perception (Howes and Hamilton, 1992, Birch and Ladd, 1997, Howes and Ritchie, 1999, Hamre and Pianta, 2001, Pianta and Stuhlman, 2004). These studies have shown that in relationships characterized by *closeness*, the educators perceive high levels of warmth, affection and open communication with the children; they also feel effective in handling the children and comfortable with the relationship. On the contrary, in relationships characterized by *conflict*, educators perceive high levels of negativity, difficult interactions and lack of communication, as well as difficulty in handling the children.

2.3. Educator-child relationship and socio-emotional development

Possessing an understanding of socio emotional development and related attributes is one of the most crucial factors in determining how children adapt in schools, form peer relationships, and develop self-confidence, relationship skills, self-management, and emotional competencies required for successful participation in group learning (Thompson and Happold, 2002). Socio-emotional competence has been described as “cooperative and pro-social behavior, instigation and continuation of peer friendships and adult relationships, appropriate management of aggression and conflict, development of a sense of mastery and self worth and emotional regulation and reactivity” (Aviles, Anderson and Davila, 2006). For children, early indicators of behaviour problems include: temperamental difficulties, aggression, language difficulties, and non-compliance (Stormont, 2002). Early education teachers often feel unprepared to handle challenging behaviors effectively (Buscemi et al., 1995; Hemmeter, Corso and Cheatham, 2006).

Research carried out on this subject has come to the conclusion that affective relationships between the child and the teacher have a very important potential for encouraging the children's social adaptation and academic success in school (Howes, Matheson and Hamilton, 1994, Howes and Smith, 1995, Birch and Ladd, 1997). Early childhood educators have adopted a variety of curriculum models and approaches to teaching. As summarized in Hyson, Copple, and Jones (2006), several studies have examined relationships between the emphasis of a specific early childhood curriculum (especially along the dimensions of teacher-directed vs. child-focused) and the type of relationships the educator has, warm emotionally positive relationships with children. Howes (2000) also performed a research on the climate of the preschool classroom and educator-child relationships. Howes' (2000) findings showed that early educator-child relationships and classroom climate contribute to the prediction of social competence in second graders. Also educator-child closeness at the beginning of the kindergarten years predicts cooperation during activities in the classroom as well as children's liking of school during kindergarten and the beginning of first grade (Ladd and Burgess, 2001).

3. THE PRESENT STUDY

Thompson and Happold (2002) noted that "child-adult relationships have a more significant impact on a child's learning than educational material or pre-school curricula" (Aviles, Anderson and Davila, 2006). Our study will focus on the affective aspects involved in the interaction between educators and children in the nursery setting. Particularly the main purpose for this research was to examine whether there is a relation between the socio-emotional behaviour of preschoolers and the quality of relationships that they have established with their kindergarten teacher.

The hypotheses put forward are as follows:

Children whose relationship with their teacher can be characterised as one of closeness are more active on a social level - in collaborative activities, playing games and in their verbal communication.

Children whose relationship with their teacher can be characterised as one of conflict are less active on a social level that is to say in collaborative activities, playing games and verbal communication.

4. METHOD

4.1. Sample

The sample of this study comprised of 124 children, 4-5 years old, of middle socioeconomic status who attended the different state-run nursery schools in Athens.

4.2. Materials

In order to assess the teacher-child quality of relationship, the Student Teacher Relationship Scale (STRS) was used. The STRS is a teacher-report instrument produced by Pianta (2001) which measures a teacher's perception of the quality of their relationship with a specific child. It is comprised of ten questions and the teacher is required to grade from a choice of five options, as in the style of Likert, the description that best fits (the choices ranged from not in the slightest to absolutely) his/her thoughts and feelings. The factor analysis of the questionnaires points to two factors which are addressed *a) closeness and b) conflict*.

The socio-emotional behaviour of the children was measured using the questionnaire "Observations of the Behaviours of Nursery School children" as conducted by Duhm E. and Althaus D. (1979) and adapted by Zachari (1996). This consists of a set of 78 questions. The present study did not cover all types of behaviours the questionnaire measures but focused specifically on the following:

- (a) The extent of social activity or passivity when working in a group
- (b) The aggressive behaviour towards other students and their teacher
- (c) The intensity and productivity or their passivity during play time
- (d) The child's verbal ability or difficulties

The educator was asked to grade the behaviour of a child from a choice of 5 options on a Likert Scale, (it ranged from never to always), the frequency with which the child manifests the predetermined types of behaviour.

4.3. Procedure

For the requirements of this study, six preschool teachers were asked to fill in the questionnaires on teacher-child relations as well as the questionnaires on observations of the behaviour for the children in their classrooms. The teachers were given a period of two weeks at the end of the school year in order to complete the questionnaires.

5. RESULTS

As shown in the Table 1 below the closer the relationship with the teacher, the more likely it is that a child will be active on a social level. Moreover, in the situation where the child-educator relationship is described as one of closeness, the child is less likely to be socially passive within a group.

It can also be concluded that closeness is negatively related to the display of aggressive behaviour. On the other hand, the display of aggressive behaviour is positively related to a relationship of conflict with the educator.

It was also found that children who are productive and involved in play, have a relationship of closeness with their educator, while children who are passive during play have a relationship of conflict with him/her.

Last it was found that there is a positive correlation between closeness and verbal ability. In other words the closer the educator feels with the child the higher he/she grades him/her in verbal ability. On the other hand there is a negative correlation between closeness and verbal difficulties. Therefore, if the educator-child relationship is described as one of closeness, the child will be less likely to have verbal difficulties. On the contrary, conflict is negatively related to verbal ability. Consequently, children who have a relationship of conflict with their educator, get lower grades in verbal ability.

TABLE 1: CORRELATIONS (SPEARMAN R) BETWEEN QUALITY OF TEACHER-CHILD RELATIONSHIP AND A CHILD'S BEHAVIOR

	social activity	Pro-ductivity during play	verbal ability	social pas-sivity	Aggressive behaviour	Passivity during play	verbal difficulties
Closeness	0,61	0,33	0,39	-0,26	-0,19	-0,06	-0,21
Conflict	-0,16	-0,1	-0,34	0,08	0,69	0,27	0,16

p<0,001

6. DISCUSSION

The aim of the study was to investigate whether there is any relationship between the type of relationship preschool children establish with their educator children's psychosocial behaviour. The results supported the first hypothesis according to which it was expected that children whose relationship with their teacher is characterised as one of closeness to be more active on a social level – in collaborative activities, playing games as well as in their verbal communication. According to the results closeness was found to be associated positively with social activity and negatively with social passivity and aggressive behaviour. During play, closeness was concluded to be positively correlated with a child's increased involvement and productivity.

Positive educator-child relationships have been shown to support children's adjustment to school, to contribute to their social skills, to promote academic performance, and foster children's resiliency in academic performance (Birch and Ladd, 1997, Hamre and Pianta, 2001, Battistich, Schaps and Wilson, 2004). Educators who experience close relationships with children, in the classroom, had children who were less likely to avoid school, appeared more self-directed, more cooperative, and

more engaged in learning (Birch and Ladd, 1997, Klem and Connell, 2004). Also, children reported liking school more and experiencing less loneliness if they had a close relationship with their educators. Children with better educator-child relationships also showed better performance on measures of academic performance and school readiness (Birch and Ladd, 1997). Preschoolers who have close relationships with educators tend to know more letters, have higher math scores and advanced language and literacy skills while in preschool (Howes et al., 2008). Researchers have also found that close educator-child relationships and quality classroom practices are related to better language and cognitive skills among preschoolers (Peisner-Feinberg and Burchinal, 1997).

According to the second hypothesis, we expected to find children whose relationship with their educator has characterised as one of conflict to be less active on a social level that is to say in collaborative activities, playing games and verbal communication. This hypothesis was confirmed by the results of this study. Conflict was positively correlated to aggressive behavior and it was also linked with a lack of interest and productivity during play.

It has been documented that relationships with high levels of conflict positively correlate with negative conducts such as avoiding school, low levels of pro-social behavior and the increase of behavior problems in the children (Pianta, Steinberg and Rollins, 1995, Birch and Ladd, 1998, Hamre and Pianta, 2001). High conflict educator-child relationships in kindergarten and first grade have also been linked with lower social skills in the areas of responsibility, cooperation, self-control and assertion in the first grade (Pianta and Stuhlman, 2004). Also congruent with previous studies, we found teacher-child conflict to be associated with high levels of aggressive behavior (Birch and Ladd, 1998, Hughes, Cavell and Jackson, 1999, Howes, 2000, Pianta and Stuhlman, 2004, Silver, Measelle, Armstrong and Essex, 2005). Based on these findings, researchers tend to agree that “the quality of the teacher-child relationship, even in early school years, can predict later problems as well as successes” (Hamre and Pianta, 2001).

Additionally this study showed that closeness is positively related to verbal abilities. Conversely, a low ability in verbal skills has been detected where a relationship of conflict exists. This finding is consistent with what research has so far shown. Preschoolers with poorly developed language skills are perceived by their educators as having more conflictual relationships (Rudasill et al., 2006). Close educator-child relationships were related to better receptive language for all children, but this was even stronger for children of color than for white children. Further, the connection between positive teacher-child relationships and children's language was even stronger for preschool children than early elementary school children (Burchinal et al., 2002).

6.1. Implications

Research has suggested that educator-child relationships play a significant role in influencing young children's social and emotional development. In early childhood settings, each moment that educators and children interact with one another, is an opportunity to develop positive relationships. Caring adult-child relationships are the key to helping young children grow in every way. When children sense that the adults in their lives think they are important, they respond positively. When they feel accepted and respected as individuals, they learn more. It is important for teachers to use developmentally and individually appropriate strategies that take into consideration children's differing needs, interests, styles, and abilities. Children need a combination of intellectual skills, motivational qualities, and socioemotional skills to succeed in school. Unfortunately, many children's preschool experiences do not fully support their social and emotional development.

Many researchers recognize the link between social and emotional development and successful academic learning, including early literacy (Raver and Knitzer, 2002). Some researchers believe the emotions are the primary motivators and organizers of *all* development and learning (Hyson, 1994). We all do better when we know we are truly cared for and valued by those around us - especially important people in our lives. The same is true for children. Caring is a key part of constructing the relationships that make learning possible (Elias et al., 1997). By demonstrating caring attitudes, openness, and responsiveness to the needs of young children, we create a predictable, safe, and stimulating place for learning.

However our research highlighted the importance of teacher's role in children's socio-emotional development, the family is the first social context in which children become socialized (Denham, 2001). It would be very interesting to examine whether there is a relation between the socio-emotional behaviour of preschoolers and the parent-child quality of relationship.

REFERENCES

- Ainsworth, M. D. S. (1991). Attachment and Other Affectional Bonds Across the Life Cycle. In C. M. Parkes, J. Stevenson-Hinde and P. Marris (Eds.), *Attachment Across the Life Cycle*. New York: Routledge.
- Aviles, A. M., Anderson, T. R. and Davila, E. R. (2006). Child and adolescent social-emotional development Within the Context of School. *Child and Adolescent Mental Health*, (1), pp. 32-39.
- Battistich, V., Schaps, E. and Wilson, N. (2004). Effects of an elementary school intervention on students' "connectedness" to school and social adjustment during middle school. *The Journal of Primary Prevention*, 24(3), pp. 243 - 262.
- Birch, S. H. and Ladd, G. W. (1997). The Teacher-Child Relationship and Children's Early School Adjustment. *Journal of School Psychology*, 35, pp. 61 - 79.

- Birch, S. H. and Ladd, G. W. (1998). Children's Interpersonal Behaviors and the Teacher-Child Relationship. *Developmental Psychology*, 34, pp. 934 - 946.
- Bowlby, J. (1969). *Attachment and Loss*. New York: Basic Books.
- Bretherton, I. and Munholland, K. (1999). *Internal working models in attachment relationships: A construct revisited*. In J.Cassidy and P. R.Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications*. New York: Guilford.
- Burchinal, MR., Peisner-Feinberg, E., Pianta, R. and Howes, C. (2002). Development of Academic Skills from Preschool Through Second Grade: Family and Classroom Predictors of Developmental Trajectories. *Journal of School Psychology*, 40(5), pp. 415 - 436.
- Buscemi, L., Bennett, T., Thomas, D. & Deluca, D. A. (1995). Head Start: Challenges and training needs. *Journal of Early Intervention*, 20 (1), pp. 1 - 13.
- Cassidy, J. (1999) The Nature of the Child's Ties. In: J. Cassidy and P. R. Shaver (Eds.), *Handbook of Attachment: Theory, Research, and Clinical Applications*. New York: Guilford.
- Cohn, D. A. (1990). Child-mother attachment of six-year-olds and social competence at school. *Child Development*, 61, pp. 152 - 162.
- DeMulder, E. K., Denham, S., Schmidt, M. & Mitchell, J. (2000). Q-sort assessment of attachment security during the preschool years: Links from home to school. *Developmental Psychology*, 36, pp. 274 - 282.
- Denham, S. A. (2001). Dealing with feelings: Foundations and consequences of young children's emotional competence. *Early Education and Development*, 12, pp. 5-10.
- Duhm, E. and Aulthaus, D. (1979). *Beobachtungsbogen für kinder im vorschulalter*, Westermann Verlag.
- Elias, M. J., Zins, J. E., Weissberg, R. P., Frey, K. S., Greenberg, M. T., Haynes, N. M., Kessler, R., Schwab-Stone, M. E. and Shriver, T. P. (1997). *Promoting social and emotional learning: Guidelines for educators*. Alexandria: Association for Supervision and Curriculum Development (ASCD).
- Ζάχαρης, Δ. (1996). *Ψυχολογία της βρεφικής και παιδικής ηλικίας*. Ιωάννινα: Πανεπιστήμιο Ιωαννίνων.
- Goossens, F. A. & van IJzendoorn, M. H. (1990). *Quality of infants' attachments to professional caregivers: Relation to infant-parent attachment and day-care characteristics*. *Child Development*, 61, pp. 932 - 937.
- Hamre, B. K. and Pianta, R. C. (2001). Early Teacher-Child Relationships and the Trajectory of Children's School Outcomes Through Eighth Grade. *Child Development*, 72, pp. 625 - 638.
- Howes, C. (1999). Attachment Relationships in the Context of Multiple Caregivers. In J. Cassidy and Ph. Shaver (Eds.), *Handbook of Attachment. Theory, Research and Clinical Implications*. New York: The Guilford Press.
- Howes, C. (2000). Socio-emotional climate in child care, teacher-child relationships and children's second grade peer relations. *Social Development*, 9, pp. 191 - 203.
- Howes, C. and Hamilton, C. C. (1992). Children's Relationships with Child Care Teachers: Stability and Concordance with Parental Attachments. *Child Development*, 63, pp. 867-878.
- Howes, C. and Matheson, C. C. (1992). Contextual constraints on the concordance of mother-child and teacher-child relationships. In R. C.Pianta (Ed.), *Beyond the parent: The role of*

- other adults in children's lives. *New directions for child development*, 57 (pp. 81-107). San Francisco, CA: Jossey-Bass.
- Howes, C., Matheson, C. C. and Hamilton, C. E. (1994). Maternal, Teacher, and Childcare History Correlates of Children's Relationships with Peers. *Child Development*, 65, pp. 264 - 273.
- Howes, C. and Smith, E. (1995). Relations Among Child Care Quality, Teacher Behavior, Children's Play Activities, Emotional Security, and Cognitive Activity in Child Care. *Early Childhood Research Quarterly*, 10, pp. 381 - 404.
- Howes, C., Burchinal, M., Pianta, R., Bryant, D., Early, D., Clifford, R. and Barbarin, O. (2008). Ready to learn? Children's Pre-Academic Achievement in Pre-Kindergarten Programs. *Early Childhood Research Quarterly*, 23, pp. 27 - 50.
- Hughes, J. N., Cavell, T. A. and Jackson, T. (1999). Influence of the teacher-child relationship on childhood conduct problems: A prospective study. *Journal of Clinical Child Psychology*, 28, pp. 173 - 184.
- Hyson, M. C. (1994). *Emotional development of young children: Building an emotion-centered curriculum*. New York: Teacher's College, Columbia University.
- Klem, A. M. and Connell, J. P. (2004). Relationships matter: Linking teacher support to student engagement and achievement. *Journal of School Health*, 74(7), pp. 262 - 273.
- Kobak, R. (1999). *The emotional dynamics of disruptions in attachment relationships*. In J. Cassidy, and P. R. Shaver (Eds.), *Handbook of attachment: Theory, research and clinical applications*. New York: Guilford.
- Ladd, G. W. and Burgess, K. B. (2001). Do relational risks and protective factors moderate the linkages between childhood aggression and early psychological and school adjustment? *Child Development*, 72, pp. 1579 - 1601.
- Lynch, M. and Cicchetti, D. (1992). Maltreated children's reports of relatedness to their teachers. In R. C. Pianta (Ed.), *Beyond the parent: The role of other adults in children's lives*. *New directions for child development*, 57 (pp. 81-107). San Francisco, CA: Jossey-Bass.
- Mercer, J. (2006). The many stages of attachment. *Scholastic Parent and Child*, 13(6), pp. 50 - 51.
- Peisner-Feinberg ES, Burchinal, MR. (1997). Relations Between Preschool Children's Child-Care Experiences and Concurrent Development: The Cost Quality, and Outcomes Study. *Merrill-Palmer Quarterly*, 32(1), pp. 451 - 477.
- Pianta, R. C. (1992). Beyond the Parent: The Role of Other Adults in Children's Lives. *New directions for child development*, 57, San Francisco: Jossey-Bass.
- Pianta, R. C. (2001). *Student-teacher relationship scale*. Professional manual. Lutz, FL: Psychological Assessment Resources.
- Pianta, R. C., Nimetz, S. L. and Bennett, E. (1997). Mother-child relationships, teacher-child relationships, and school outcomes in preschool and kindergarten. *Early Childhood Research Quarterly*, 12, pp. 263 - 280.
- Pianta, R. C. & Steinberg, M. (1992). Teacher-child relationships and the process of adjusting to school. In R. C. Pianta (Ed.), *Beyond the parent: The role of other adults in children's lives*. *New directions for child development*, 57 (pp. 81-107). San Francisco, CA: Jossey-Bass.

- Pianta, R. C., Steinberg, M. S. and Rollins, K. (1995). The First Two Years of School: Teacher-Child Relationships and Deflections in Children's Classroom Adjustment. *Development and Psychopathology*, 7, pp. 297 - 312.
- Pianta, R. and Stuhlman, M. (2004). Teacher-Child Relationships and Children's Success in the First Years of School. *School Psychology Review*, 33, pp. 444 - 458.
- Raver, C. and Knitzer, J. (2002). Promoting the Emotional Well-Being of Children and Families Policy Paper No. 3: *Ready to Enter: What research tells policymakers about strategies to promote social and emotional school readiness among three- and four-year old children*. New York: National Center for Children in Poverty.
- Rudasill, K. M., Rimm-Kaufman, S. E., Justice, L. M. and Pence, K. (2006). Temperament and language skills as predictors of teacher-child relationship quality in preschool. *Early Education and Development*, 17(2), pp. 271 - 291.
- Silver, R. B., Measelle, J. R., Armstrong, J. M. and Essex, M. J. (2005). Trajectories of classroom externalizing behavior: Contributions of child characteristics, family characteristics, and the teacher-child relationship during the school transition. *Journal of School Psychology*, 43, pp. 39-60.
- Stormont, M. (2002). Externalizing behavior problems in young children: Contributing factors and early intervention. *Psychology in the Schools*, 39(2), pp. 127-138.
- Thompson, R. A. (1999). Early attachment and later development. In J.Cassidy and P. R.Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications*. New York: Guilford.
- Thompson, R. A. (2008). Early attachment and later development: Familiar questions, new answers. In J. Cassidy, & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications*, 2nd ed. New York: Guilford.
- Thompson, R. and Happold, C. (2002). The roots of school readiness in social and emotional development. *The Kauffman Early Education Exchange*, 1, pp. 8 - 29.
- Turner, P. (1991). Relations between attachment, gender, and behavior with peers in preschool. *Child Development*, 62, pp. 1475 - 1488.
- Turner, P. (1993). Attachment to mother and behavior with adults in preschool. *British Journal of Developmental Psychology*, 11, pp. 75 - 89.
- Vaughn, B. E. (2005). Discovering pattern in developing lives: Reflections on the Minnesota study of risk and adaptation from birth to adulthood. *Attachment and Human Development*, 7(4), pp. 369 - 380.
- Weinfield, N., Sroufe, A., Egeland, B. & Carlson, E. (1999). The Nature of Individual Differences in Infant-Caregiver Attachment. In J. Cassidy and Ph. Shaver (Eds.), *Handbook of Attachment*. New York: The Guilford Press.
- Weinfield, N. S., Sroufe, L. A., Egeland, B. and Carlson, E. (2008). Individual differences in infant-caregiver attachment: Conceptual and empirical aspects of security. In J.Cassidy and P. R.Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications*, 2nd ed. New York: Guilford.
- Zajac, K. and Kobak, R. (2006). Attachment. In G. G.Bear and K. M.Minke (Eds.), *Children's needs III: Development, prevention and intervention*. Washington, DC: National Association of School Psychologists.

THE EFFECT OF THE COACH'S ABSENCE ON THE BEHAVIOUR AND PERFORMANCE OF YOUNG ATHLETES IN AN IMPORTANT COMPETITION IN INDIVIDUAL SPORTS

THEOPHILOS PILIANIDIS*, NIKOLAOS MANTZOURANIS**,
MARIA GAMVROUDIOU, FANI BERBERIDOU and MICHALIS PROIOS***

ABSTRACT

The purpose of this study was to identify whether the coach's absence could affect the young athletes' behaviour and performance in an important competition in individual sports. The athlete's version of the CARE Questionnaire was translated in the Greek language and completed by 100 athletes aged 14.9±1.1yrs who participated in the activities of Taekwondo, swimming, tennis and athletics. The varimax rotation of the principal component analysis gives 6 factors with eigen values greater than one. Conclusively, the coach's absence from an important competition affects negatively the young athletes' pre-competitive behaviour and it influences their performance in individual sports.

Keywords: Adolescence; communication; performance; feedback.

1. INTRODUCTION

It is generally agreed that the job of the coach is to help athletes achieve their best possible level of performance. In a variety of athletic activities, the coach is an important factor preparing the athletes to win their competition. The effectiveness of the coach must be characterized by providing feedback, high-levels of corrections and reinstruction aiding the athlete to formulate productive and realistic reasons for success or failure, reasons that may later result in optimum performance (Doag and McAuley, 1992). Furthermore, it is commonly observed that the coach has a substantial impact on the athlete's behaviour, while the importance of the coach's presence in a significant competition is greater if the athlete is young with poor competitive experience (Barnett, Smoll, Smith, 1992, Petlichcoff, 1993).

A number of behavioral analysis studies have investigated the role of the coach in the athlete's competition in a variety of physical activities (Marger and Raglin, 1994; Duda, 1996; Jowett and Clark-Carter, 2006). Because of the fact that the most

* Associate Professor, Democritus University of Thrace, Department of Physical Education and Sport Science, Komotini, Greece, Komotini, Greece

** Teacher of Physical Education, Democritus University of Thrace, Department of Physical Education and Sport Science, Komotini, Greece

*** Lecturer, Aristotle University of Thessaloniki, Department of Physical Education and Sport Science, Thessaloniki, Greece

essential object of competition is winning, the athletes must be able to release both psychic and physical energy in order to succeed (Hall and Kerr, 1997; Adie, Duda, Ntoumanis 2008). In individual sports, the role of the coach is complicated, complex, crucial and similar to that of a business manager - both are reproducible for obtaining results through the effort of other people. A lot of coaches act like psychologists, attempting to improve performances by "psyching up" the participants. Also coaches want their athletes to be successful, regardless how they might measure success, and they want to manage their athletes' activities towards the achievement of success (Prendergast, 1994).

Furthermore, the coach-athlete relationship is a two-way voyage of exploration. Coaches are not merely people who provide training schedules, practice programs and motivation to their athletes before competition or assessors of worth. In particular, the coach-athlete relationship has shown to affect a young athlete's level of self-regard and his/her willingness to continue in sport (Ntoumanis and Biddle, 1998). The coach-athlete communication network fluctuates among the four types of stimuli (verbal, vocal, physical and situational) and it may be transmitted and received by the coach and athlete according to the level of their intercommunication which may range from novice to top-level athletes. In the well experienced athletes the relationship and the co-operation between the coach and the competitor is based on norms, reality and professionalism (Iso-Ahola, 1995).

The qualitative dimension of the coach-athlete relationship is based on factors like respect and trust in each other as well as in a good and clear communication between them. It is important for the coach to understand that young athletes are not simply little adults and that the methods which are appropriate in coaching senior athletes may not be the best for youngsters. In the last 20 years the importance of the coach's presence in an important competition in individual sports, has been surprisingly little assessed. The purpose of the present study was to identify whether the coach-athlete interpersonal relationship could affect the individual sports athlete's competitive performance when their coach was absent. Additionally, this study prospectively attempted to determine whether the coach's absence could affect psychologically the young athlete's behaviour before an important competition.

2. METHODOLOGY

2.1. Instrument

In the present study, a modified questionnaire was applied in order to evaluate the changes which may occur in young athletes' pre-competitive behaviour and competitive performance when their coach was not present (Appendix) and it was based on the *Coach-Athlete Relationship Evaluation Questionnaire-CARE-Q* (Jowett and Ntoumanis, 2004). The research instrument (athlete version) was translated (back

to back procedures) in the Greek language by two expert professionals. In general, the questionnaire's sub-scales explored: general information for the participants' training background, the coach-athlete interpersonal relationship and the effects of the coach's absence on the participants' behaviour and performance before and during an important competition. The reliability analysis which was applied exhibited a satisfactory internal consistency for all the subscales of the instrument (Mantzouranis and Marigli, 2004). The 30-item questionnaire (Greek version) had a 5-point Likert scale ranging from "always" (1) to "never" (5) and assessed whether the changes in the psychological factors of insecurity, fear of failure, self-confidence, pre-competition stress, self-control and aggressiveness affect the competitive performance of participants in the individual sports of taekwondo, swimming, athletics and tennis.

2.2. Participants

The sample was comprised of 100 participants with a mean age of 14.9 ± 1.1 yrs. All of them were boys, high-school students and athletes in Cypriot Clubs of taekwondo (n=26), swimming (n=28), athletics (n=21) and tennis (n=25). The selection of this study's participants was based on the criteria of: i) the National or District performance level but not high experienced athletes, and ii) the coach-athlete relationship of at least 12 months.

2.3. Data collection

The participants were instructed to complete anonymously the study questionnaire according to their competitive background, recalling their most recent participation behaviour and performance in an important competition with the absence of their coaches. The athletes were requested to fill in the questionnaire without being given any explanation or additional details as to the research purpose, while the participants' coaches were fully informed for the objectives of the study. The athletes completed the questionnaire prior to their coaches' arrival in the evening training session because the researcher wanted to avoid the possibility of influence from their coaches' presence during the completion of the instrument. After the questionnaire's filling, a discussion took place with the study's participants, coaches and their parents who were escorting the athletes. The data collection of this research was held during the competition period of 2011 (1-30 July) in athletes of taekwondo, athletics, swimming and tennis clubs in Nicosia, Cyprus.

2.4. Statistical analysis

Descriptive statistics with cross-tabulation was firstly generated for all questionnaire items. From the exploratory factor analysis, the sampling adequacy

(Kaiser-Mayer-Olkin) and the Bartlett's Test of Sphericity were firstly evaluated. The construct validity of the instrument was assessed by applying the principal component analysis. The non-parametric Krustal-Wallis analysis of variance was applied in order to assess the differences in the questionnaire's subscales of coach-athlete inter-relationship, athletes' behaviour and performance in an important competition with their coach absent in relation to each one of the individual sports (grouping variables). In addition, the independent samples Mann-Whitney U test was used in order to identify the inter sports differences in research instrument items. All statistical analyses were carried out by employing the SPSS-PASW software, version 18.0 for Windows, (SPSS, Inc., Chicago, IL).

3. RESULTS

The cross tabulation procedures illustrated general information regarding the participants' training and competition background in relation to each individual sport (Table 1).

TABLE 1: THE PARTICIPANTS' GENERAL INFORMATION REGARDING THEIR TRAINING BACKGROUND IN RELATION TO ATHLETIC ACTIVITIES (%)

		Taekwondo	Swimming	Athletics	Tennis
Items		Frequencies (%)			
Athlete's level	<i>National</i>	45	57.1	71.4	0
	<i>District</i>	35	25	4.8	36
	<i>Local</i>	20	17.9	23.8	64
Training experience	<i>< 3yrs</i>	0	0	14.3	0
	<i>3-4yrs</i>	10	0	0	52
	<i>> 4yrs</i>	90	100	85.7	48
Competition experience	<i>< 1yr</i>	3.8	32.1	19	32
	<i>1-2yrs</i>	23.1	42.9	14.3	28
	<i>3-4yrs</i>	11.5	10.7	38.1	0
	<i>> 4yrs</i>	61.5	14.3	28.6	60

Important competitions	> 20	3.8	35.7	28.6	28
	19-12	0	7.2	4.8	12
	11-6	23.1	25	23.8	8
	5-1	73.1	32.1	42.9	52
Recent competitions	> 10	3.8	35.7	66.7	0
	5-9	3.8	14.3	4.8	28
	< 4	92.3	50	28.6	72

Source: Cross-tabulation statistics of the instrument items.

The varimax rotation offers six (6) factors with eigenvalues greater than one. The first factor was responsible for the 34.7% of the total variance and included 4 participants' behaviour items: "precompetitive stress - lose of self-control - insecurity-fear of failure" and 3 items related to the athletes' competitive performance: "participation with coach absent - fear of injury- advices & feedback". The second factor interpreted the 10.6% of the total variance influencing 4 variables which were strongly related to the subscale of the inter-personal coach-athlete relationship: "athlete's disappointment from the coach's absence - encouragement and discussion before the competition". Table 2 presents the questionnaire items with eigenvalues greater than one.

The Krustall-Wallis analysis revealed that the athletes differ according to the individual sports participation (taekwondo, swimming, athletics and tennis) in an important competition only in four items. Specifically, the reported items with statistical significance in the studied young athletes were: the importance of the coach presence ($\chi^2=12.61$, $df=3$, $p<0.05$), the athlete's belief that his/her performance is coach driven ($\chi^2=7.81$, $df=3$, $p<0.05$), the coach's pressure on the athlete to win ($\chi^2=13.88$, $df=3$, $p<0.05$) and the lack of the coach's advice to the athlete ($\chi^2=37.41$, $df=3$, $p<0.001$). The Mann-Whitney analysis presented that the coach presence in an important competition is more demanding in swimming and athletics. Furthermore, the coach-athlete relationships in relation to the competitive performance as well as the great pressure of the coach to his/her athlete to win were strongly related only with the sports of tennis and athletics. Finally, athletics reported to be the most demanding in relation to the other individual sports (taekwondo, swimming and tennis) regarding the importance of the coach' advice in a significant competition.

TABLE 2: THE REVEALED COMPONENT EXTRACTED FROM THE INSTRUMENT'S VARIMAX ROTATION OF THE PRINCIPAL COMPONENT ANALYSIS

Items	Component					
	1	2	3	4	5	6
Athlete's fear of injury	.976					
Participation with coach absent	-.971					
Athlete's stress in competition	.959					
Athlete's competitive performance	.956					
Athlete's fear of failure	.949					
Athlete's insecurity in competition	.942					
Athlete's loss of self-control	.937					
Athlete's taking risks in competition	.914					
Importance of coach presence	.531					
Athlete's encouragement in competition		.821				
Lack of coach advice in competition		.780				
Coach-athlete conversation level		.545				
Athlete's disappointment in competition		.422				
Athlete's training experience			-.793			
Athlete's enjoyment of participation			.656			
Coach-athlete relationship & performance			.471			
Coach's pressure on the athlete to win				.796		
Coach's advice in competition				.617		
Replace coach (who)				.528		
Coach-athlete interpersonal relationship					.783	
Importance of competition					.713	
Athlete's coached years						.725
Athlete's performance level						-.661

Source: the component matrix of the factor analysis.

4. DISCUSSION

The sports participants' behaviour and its effect on the performance are widely examined over the last four decades. Especially, young athletes' participation in competitive sports is believed to foster acquisition of a variety of positive physical and physiological attributes, including fitness, responsibility and autonomy, morality and social skills (Feltz, 1986; Ntoumanis, Taylor, Thøgersen-Ntoumani, 2012). In addition, it is generally agreed that the role of the coach is to prepare the athlete for the competition, especially the novice sport participants. The young athlete's behaviour and performance in an important competition with his/her coach's absence is strongly related to the quality of the coach-athlete interpersonal relationship. Coaches typically adopt either a positive or a negative approach when establishing relationships with their performers and the young athletes respond well to coaches who are open, friendly and encouraging (Mageau and Vallerand 2003; Lafrenière et al., 2008).

According to the findings of the current study, the coach's absence from their athletes' important competition affects negatively the athletes' behaviour and this may result in a notable reduction in the young competitors' performance. More specifically, due to the lack of the coaches' technical corrections the athlete may be overwhelmed with fear of failure or injury, loss of self-control, increase of insecurity and anxiety which make the athlete unable to create or take risks during an important competition. Furthermore, this study proved that the lack of the coach's encouragement affects the young athlete's performance during the competition. Similarly with the sport psychology literature, the feelings of insecurity and the loss of self-confidence are characterized by the perception that the studied athletes are not in control of what happens and the apprehension which accompanies the insecurity is always detrimental for the competitive performance in individual sports (Hardy, Parfitt, Pates, 1999; Ntoumanis and Biddle, 2000).

Regarding the differences among the young athletes in taekwondo, swimming, athletics and tennis, this study's findings showed that athletics seems to be the sport with the most negative effect on the athlete's pre-competition behaviour and competitive performance when their coach was absent. More specifically, the participants increase their aggressiveness level which results in denial and surrender phenomena during an important athletics competition. In accordance with the literature, the coach absence in an athletics competition leads to the disturbances in concentration and attention of the young athletes. The athletes may release both psychic and physical energy during a competition in athletics and take risks which come to contrast with their coach's advice affecting in a negative way their optimum competitive performance (Lauder, 1992; Spink, 1992; Prendergast, 1994).

5. CONCLUSION

In summary, the clear inter-personal coach-athlete relationship is likely to harbour various feelings in individual sports. The coach who has a comprehensive understanding of his/her athletes' psychological structure and knowledge of the communication theory is better prepared to interact with them thus aids the athletes to achieve the particular goals they are striving for. The findings of this study justify that the coach absence in an important competition in individual sports leads to pre-competitive behaviour disturbances in young athletes which could differentiate the participant's success or failure in a significant competition. According to the nature of the sports, it was confirmed that athletics was the most demanding individual sport in relation to taekwondo, swimming and tennis while the coach's absence from an important competition was strongly related to both pre-competitive behaviour and competition performance of young athletes with poor training experiences in athletics.

REFERENCES

- Adie, J.W., Duda, J.L. and Ntoumanis, N. (2008). Achievement goals, competition appraisals, and the psychological and emotional welfare of sport participants. *Journal of Sport and Exercise Psychology*, 30(3), pp. 302 - 322.
- Barnett, P.N., Smoll, L.F. and Smith, E.R. (1992). Effects of Enhancing Coach-Athlete Relationships on Youth Attrition. *The Sport Psychologist*, 6, pp. 111 - 127.
- Doag, K. and McAuley, E. (1992). Goal setting, self-efficacy and Exercise Behaviour. *Journal of Sport and Exercise Psychology*, 14, pp. 352 - 360.
- Duda, J.L. (1996). Maximizing motivation in sport and physical education among children and adolescents: The case for greater task involvement, *Quest*, 48, pp. 290 - 302.
- Feltz, D.L. (1986). The relevance of youth sports for clinical child psychology. *The Clinical Psychologist*, 39, pp. 74 - 77.
- Hall, H.K. and Kerr, A.W. (1997). Motivational antecedents of precompetitive anxiety in youth sports. *British Journal of Psychology*, 86, pp. 449 - 478.
- Iso-Ahola, S.E. (1995). Intrapersonal and interpersonal factors in athletic performance. *Scandinavian Journal of Medicine and Science in Sports*, 5, pp. 191 - 199.
- Jowett, S. and Ntoumanis, N. (2004). The Coach-Athlete Relationship Questionnaire (CART-Q): development and initial validation. *Scandinavian Journal of Medicine and Science in Sports*, 14, pp. 245 - 257.
- Jowett, S. and Clark-Carter, D. (2006). Perceptions of empathic accuracy and assumed similarity in the coach-athlete relationship. *British Journal of Social Psychology*, 45(3), pp. 617 - 637.
- Lafrenière, M.A., Jowett, S., Vallerand, R.J., Gonahue, E.G. and Lorimer, R. (2008). Passion in sport: on the quality of the coach-athlete relationship. *Journal of Sport and Exercise Psychology*, 30(5), pp. 541 - 560.
- Lauder, A. (1992). The role of the track and field coach in Australia: complex, complicated-yet crucial. *Modern Athlete and Coach*, 30(4), pp. 16 - 22.

- Mageau, G.A. and Vallerand, R.J. (2003). The coach-athlete relationship: a motivational model. *Journal of Sports Science*, 21(11), pp. 883 - 904.
- Mantzouranis, N. and Marigli, H. (2004). Development of a questionnaire for the evaluation of young athlete's behavior and performance, as a result of their coach absence, in an important competition. *Short Paper Publication. Proceedings of the 7th International Congress in Sports Medicine, Drama, Organized by the Sports Medicine Association of Greece*, pp. 340 - 343.
- Marger, J.G and Raglin, S.J. (1994). Correspondence between Actual and Recalled Precompetition Anxiety in Collegiate Track and Field Athletes. *Journal of Sport and Exercise Psychology*, 16, pp. 206 - 211.
- Ntoumanis, N. and Bibble, S.J. (1998). The Relationship Between Competitive Anxiety, Achievement Goals, and Motivational Climates. *Research Quarterly for Exercise and Sport*, 69(2), pp.176 - 187.
- Ntoumanis, N. and Biddle, S.J. (2000). Relationship of intensity and direction of competitive anxiety with coping strategies. *The Sport Psychologist*, 14, pp. 360 - 371.
- Ntoumanis, N., Taylor, I.M. and Thøgersen-Ntoumani, C. (2012). A longitudinal examination of coach and peer motivational climates in youth sport: implications for moral attitudes, well-being, and behavioural investment. *Developmental Psychology*, 48(1), 213 - 223.
- Petlichcoff, L.M. (1993). Coaching Children. Understanding the Motivational Process. *Sport Science Reviews*, 2(2), pp. 48 - 61.
- Prendergast, K. (1994). Coaching as a Management Exercise. *New Studies in Athletics*, 9(1), pp. 57 - 63.
- Spink, K. (1992). Strategies for enhancing motivation. *New Studies in Athletics*, 7(1), pp. 39 - 43.

A SURVEY ON INNOVATION, KNOWLEDGE AND REGIONAL GROWTH

GEORGE M. KORRES^{*}, ELIAS KOURLIOUROS,
MARIA ATHINA ARTAVANI^{**} and AIKATERINI KOKKINO^{***}

ABSTRACT

Innovation activities contribute essentially to regional dimension and growth. Technological infrastructure and innovation capabilities affect not only regional growth but also the whole periphery and economy. Technical change and innovation activities have an important role for growth and sustainable development. There is a huge literature for the role and economic impact of invention and innovation activities; many studies investigate the relationship between productivity, technical change, welfare, growth and regional development. Technology has two aspects, called “embodied” or “disembodied”. This paper attempts to analyze the theory and the effects of innovation in regional growth, and in particular to review some of the main models on innovation and regional growth. Within this context, it is also aiming to emphasize and review the appropriate techniques, the most common methods and particular problems.

Keywords: Innovation; regional growth; knowledge; endogenous theory; catching-up; growth theory; neoclassical theory.

1. INTRODUCTION

Technological knowledge indicates the manner in which resources can be combined to yield outputs of goods and services. Most countries have relied either on the *disembodied innovative capacity* (measured as a proxy of R&D intensity) or on the *technology embodied in investment* (measured as a proxy of capital formation per employee). Technological knowledge can be embedded in the designs of equipment and machinery, the skills or even in technical literature. Technical change can be considered as a change that affects a set of existing techniques where the new knowledge affects the output (*disembodied technical change*), or a change that affects through the introduction of new techniques where the new techniques replace the old ones.

^{*} Professor, University of the Aegean, Department of Geography, Mytilene, Lesvos, Greece

^{**} Associate Professor, Department of Military Science, Hellenic Military Academy, Greece

^{***} Post-Doctoral Researcher, Economic Geography, Regional Development and Territorial Planning Laboratory, Department of Geography, University of the Aegean, Mytilene, Lesvos, Greece

In *disembodied technical change* the output that can be produced by any technical feasible factor combination is greater than before; thus given the input levels, the output is *augmented* and can be represented by an upward shift in the output surface. On the other hand, the *embodied technical change* implies an incremental improvement in the output yield. Therefore, we can consider that the *embodied technical change* is a kind of *biased technical change*.

This paper attempts to review the theoretical foundations of models with growth theory and technical change. In addition, it also attempts to analyze the theory and the effects of innovation in regional growth, and in particular to review some of the main models on innovation and regional growth.

2. LITERATURE REVIEW

2.1. Technical change in Economic Theory

Economic theory is relatively clear about the positive long-term consequences of the introduction of new technologies which lead to increased factor productivity. It is argued that the introduction of new technologies may lead to job destruction for some industries and some skill categories without creating sufficiently offsetting new job opportunities in others. There has been a considerable debate about the economic consequences of technological progress over the last decades. At the macro-economic level however, the expected positive impact of new technologies on trend factor productivity has not been easy to identify. On the contrary, as underlined by the often-quoted "Solow paradox", most economies experienced a slowdown in productivity growth in the aftermath of the first oil shock and the subsequent pick-up in the 1980s, 1990 and early 2000s is, at best, modest despite significant changes in information technologies. Following the literature of economic theory the main forces of economic growth are:

- Capital accumulation including all new investment in physical equipment and human resources.
- Technological progress.
- Growth in human capital and labor force.

Let us assume the proportionate of all factors of production, and let's say, that only capital and land is increased in quality and quantity. Since normal conditions, both products will require the use of both factors as productive inputs, in different combinations, in order to shift the production possibility frontier. Figures 1-5 illustrate the effects of technological change on the production possibility frontier (Korres, 2012).

FIGURE 1: THE EFFECT OF INCREASES IN PHYSICAL AND HUMAN RESOURCES ON THE PRODUCTION POSSIBILITY FRONTIER

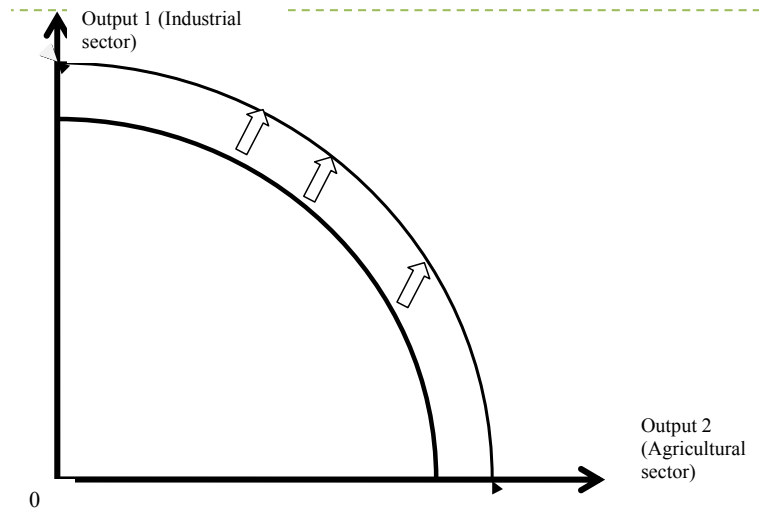


FIGURE 2: THE EFFECT OF GROWTH OF CAPITAL STOCK ON THE PRODUCTION POSSIBILITY FRONTIER

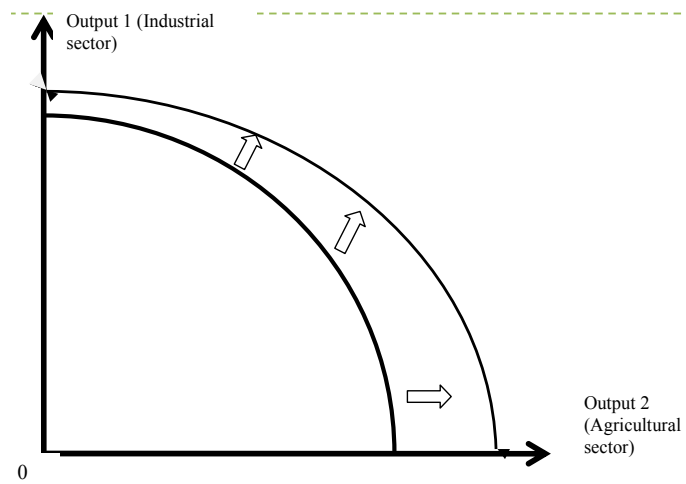


FIGURE 3: THE EFFECT OF GROWTH OF LABOR ON THE PRODUCTION POSSIBILITY FRONTIER

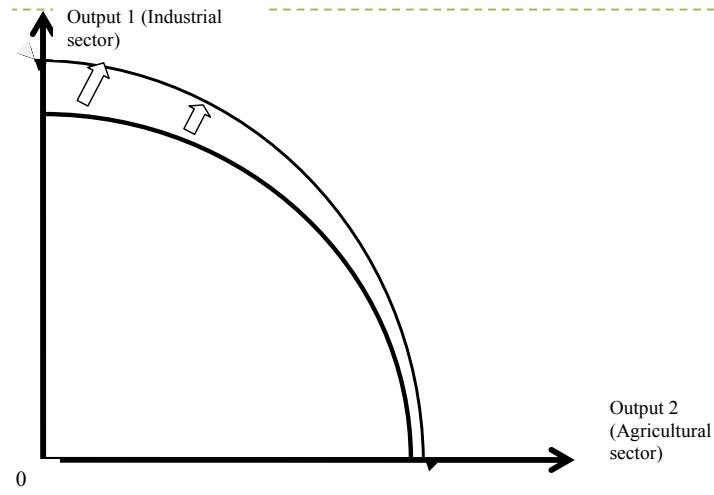


FIGURE 4: THE EFFECT OF TECHNOLOGICAL CHANGE ON THE PRODUCTION POSSIBILITY FRONTIER OF THE AGRICULTURAL SECTOR

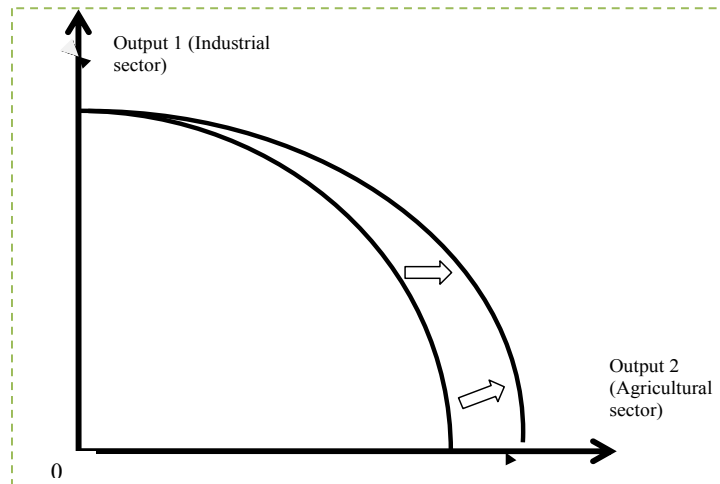
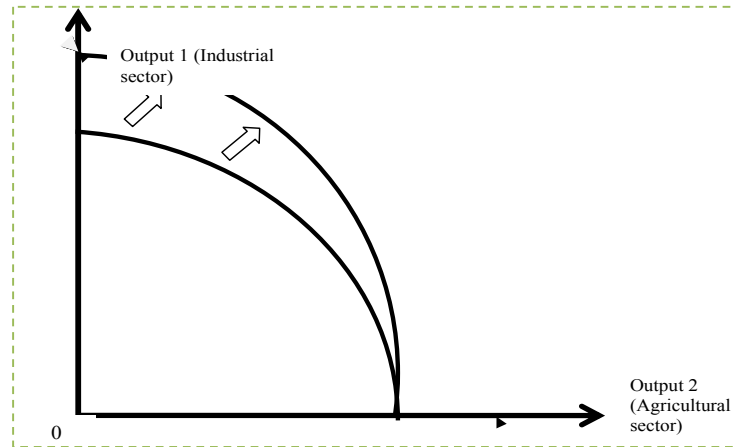


FIGURE 5: THE EFFECT OF TECHNOLOGICAL CHANGE ON THE PRODUCTION POSSIBILITY FRONTIER OF THE INDUSTRIAL SECTOR



Technological progress results to increased applications of new scientific knowledge in the form of inventions and innovations with regard to capital, both physical and human. Such progress has been a major factor in stimulating the long-term economic growth of advanced countries. There are three basic classifications of technological progress:

- The world's scientific neutral technological progress shifts outwards the production possibility curve, where the double of total output is conceptually equivalent to a double of all productive inputs.
- Labor saving technological progress where the higher level of output can be achieved with the same quantity of labour inputs. In other words, technological progress which may be capital augmenting (or capital intensive), occurs when the quality of labor force or skills are upgraded.
- Capital saving (or labour intensive) technological progress where the higher level of output can be achieved with the same quantity of capital inputs Capital saving technological progress, is a much rarer phenomenon. In other words, technological progress which may be labor augmenting (or labour intensive), occurs when the capital and technological research aims to save capital and not labor. In labor abundant countries, capital saving technological progress is what is most needed.

Technology is generally represented graphically with the help of level curves or isoquants. Technological progress in this simple framework is a shift upwards of the production function, or shift downwards of the representative isoquant. An alternative way is to look at cost functions which relate levels of cost of production to level of output and to factor prices. In many cases, cost functions are easier to characterise

production functions. Given input prices, we can view technological improvement as a downward shift of cost function. Technological change does not affect all factors equally. When it does, it is considered neutral technical change. Otherwise, it may have a specific factor using or factor saving bias.

Developed countries invested extensively in education and in the accumulation of substantial physical capital. The ratio of investment increased from relatively low levels to more than 30 percent in the 1980s. Figure 6 (Korres, 2012) illustrates the interaction of knowledge acquisition, investment and human capital. Initially, the economy is at point A on production function f_0 . As physical and human capital accumulation proceeds, it moves to point E on the production function f_1 . The shift to the higher production function is realised because of the growing utilisation of international best practice. However, the benefit from this accumulation of knowledge would have been less $AB < DE$, if capital per worker had not grown. The size of the benefit from the growing import of knowledge and from local efforts to increase productivity depends on the stock of physical investment and skills complementing local unskilled labor (Nelson, 1973).

Because learning is the main source of new knowledge, and learning is mainly local, and because of the irreversibility of production factors and lay-out, technological change is localized: for instance, it is induced by changes in factor and product markets that cannot be accommodated by technical changes in a given map of isoquants and the related price and quantity adjustments and based upon the local opportunities for learning and generating new knowledge (Antonelli, 2001).

FIGURE 6: THE INTERACTION OF KNOWLEDGE ACQUISITION, INVESTMENT AND HUMAN CAPITAL

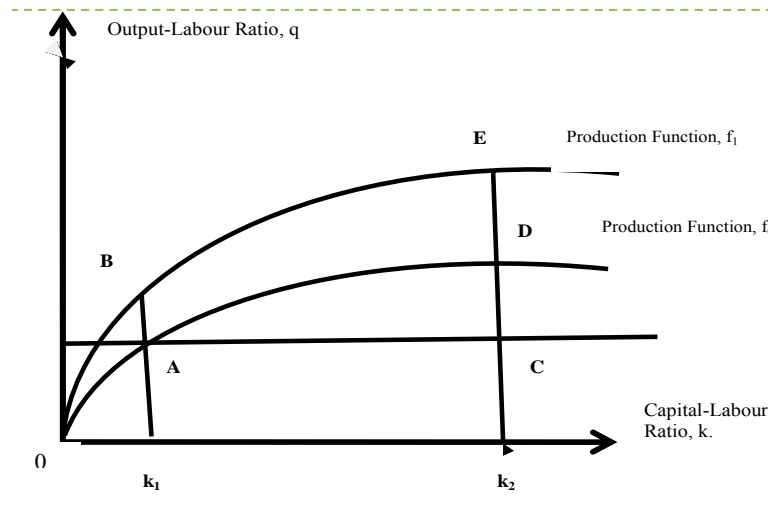
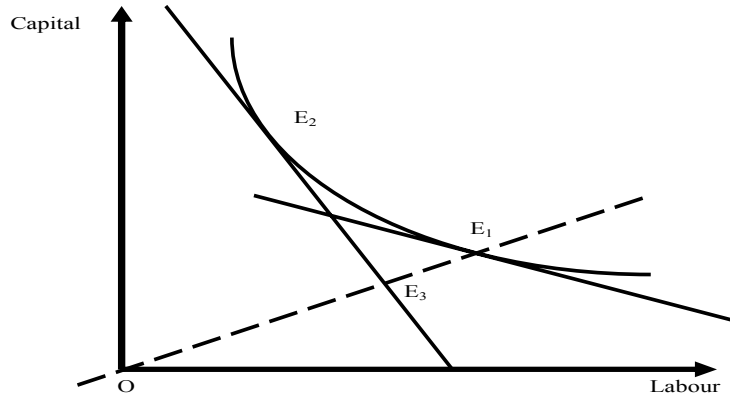


FIGURE 7: TRADE-OFF BETWEEN TECHNICAL CHANGE AND TECHNOLOGICAL CHANGE



In Figure 7 (Korres, 2012) we can see that a change in relative factor price affects the viability of previous equilibrium E_1 . The firm can either change the technique and move to E_2 or change the technology by means of the introduction of technological innovations, so as to find a new equilibrium in the proximity of the isocline $O E_1$, in E_3 or (possibly) beyond. The outcome will depend upon the levels of switching costs, that is the amount of resources that are necessary to perform all the activities to move from E_1 to E_2 , compared to the amount of resources that are necessary to innovate and move towards and beyond E_3 . Typically new firms with lower levels of irreversible factors, that are able to produce in the new equilibrium point E_2 .

2.2. The Growth Theory and the Growth-Accounting Approach

Growth accounting tries to explain changes in real product and total factor productivity based mainly on a comparison between the growth of inputs (capital and labour) and the growth of output. One part of actual growth cannot be explained and has been classified as ‘unexplained total factor productivity growth’ (or the so called residual). In particular, following the decomposition analysis by Solow (1957), many alternative factors can explain the path of economic growth. According to Solow’s findings, technology has been responsible for 90 per cent of the increase in labour productivity in the twentieth century in the United States. The unexplained decline in productivity growth can thus be regarded as resulting from a collapse in technological activities. This may have happened because the availability of technological opportunities has been temporarily or permanently reduced.

The growth regressions approach (Bosworth and Collins, 2003) originates from the empirical literature on growth and convergence, starting with the resurgence of the

endogenous growth literature. This debate is related with the question of whether TFP convergence is taking place and under what conditions. One of the main controversies in the empirical growth literature is to identify how much of the convergence that we observe is due to convergence in technology versus convergence in capital – labour ratios, since convergence may be the result of three different mechanisms:

- Convergence due to capital accumulation;
- due to technology transfer; and
- due to both.

Growth accounting methodology was theoretically motivated by Jorgenson and Griliches (1957), and put in a more general input-output framework by Jorgenson, Gollop and Fraumeni (1987) and Jorgenson, Hob and Stiroh (2003). Growth accounting allows one to assess the relative importance of labour, capital and intermediate inputs to growth, and to derive measures of multi-factor productivity (MFP) growth. MFP indicates the efficiency with which inputs are being used in the production process and is an important indicator of technological change. Under the assumptions of competitive factor markets, full input utilization and constant returns to scale, the growth of output in industry j can be expressed as the (compensation share) weighted growth of inputs and multifactor productivity (denoted by AY):

$$\Delta \ln Y_{jt} = \bar{v}_{jt}^X \Delta \ln X_{jt} + \bar{v}_{jt}^K \Delta \ln K_{jt} + \bar{v}_{jt}^L \Delta \ln L_{jt} + \Delta \ln A_{jt}^Y,$$

where v_i denotes the two-period average share of input i in nominal output and $v_L + v_K + v_X = 1$. Each element on the right-hand side indicates the proportion of output growth accounted for by growth in intermediate inputs, capital services, labour services and MFP, respectively.

Growth accounting is looking at the same equation, growth in output is attributed to labour, capital, intermediate inputs and residual changes in MFP. The theoretical framework for the growth-accounting approach is rooted in the economic theory of production. The standard model is based on the seminal work by Solow (1957) and its development, in particular by Zvi Griliches, Dale Jorgenson, and Erwin Diewert. The standard growth-accounting model is based on the microeconomic theory of production and relies on a number of the following assumptions.

- Production processes can be represented by production or transformation functions at various levels of the economy. Production functions relate maximum producible output to sets of available inputs.
- Producers behave efficiently, *i.e.* they minimise costs and/or maximise revenues.
- Markets are competitive, and market participants are price-takers who can only adjust quantities but not act individually on market prices.
- There exists a production technology that can be represented by a production function, relating gross output, Q , to primary inputs labour L and capital services K , as well as intermediate inputs such as material, services or energy (M).

- The production function exhibits constant returns to scale.
- Neither labour nor capital inputs are necessarily homogenous. There are N different types (qualities) of labour, L_1, L_2, \dots, L_N , M different types of capital services, K_1, K_2, \dots, K_M , and R different types of intermediate inputs M_1, M_2, \dots, M_R :

$$Q = f(L_1, L_2, \dots, L_N, K_1, K_2, \dots, K_M, M_1, M_2, \dots, M_R, t)$$
- Productivity changes are of a Hicks-neutral type, *i.e.* they correspond to an outward shift of the production function, captured by a parameter A :

$$Q = Af(L_1, L_2, \dots, L_N, K_1, K_2, \dots, K_M, M_1, M_2, \dots, M_R)$$
- Factor input markets are competitive and for any desired level of output, the firm minimises the costs of inputs, subject to the production technology.
- Labour and intermediate inputs can be hired at any moment at the market rates w_i for labour and p_m for intermediate inputs.
- Provision of capital services requires investment in the different types of capital and there are no adjustment costs associated with investment.

Growth accounting and most other approaches to measuring productivity are firmly rooted in a standard neo-classical equilibrium concept. Equilibrium conditions are very important because they help to guide measurement of parameters that would otherwise be difficult to identify. Although its usefulness is generally recognised, it has been argued that an equilibrium approach sits uneasily with the notion of innovation and productivity growth. Evolutionary economists (Dosi, 1988; Nelson and Winter, 1982; Nelson, 1981), in the tradition of Schumpeter, argue that innovation and technical change occur as a consequence of information asymmetries and market imperfections. The point made by evolutionary economists is that equilibrium concepts may be the wrong tools to approach the measurement of productivity change, because if there truly was equilibrium, there would be no incentive to search, research and innovate, and there would be no productivity growth.

Solow (1956) expanded the work by John Stuart Mill and developed *neoclassical growth models*. *Neoclassical growth theory*, as developed by Solow and his followers, dominated over the literature of *long term or trend movements* in per capita income for more than three decades. The starting *neoclassical growth models* of Solow are important studies for economic growth and convergence. In these models, the rate of exogenous technical progress is the key parameter determining the steady state growth rate of per capita income. Since Solow 1956, technological change is regarded as one of the main sources of economic growth. According to the neoclassical models based on the assumptions of marginal productivity, technological change (or labour growth) is needed to compensate for the negative productivity effects of capital accumulation.

The recent debate about the determinants of output growth has concentrated mainly on the role of knowledge, typically produced by a specific sector of the economy. This approach considers the economy in a three sector framework (Romer 1990), where the R & D sector produces knowledge to be used as an input by firms producing capital goods. Output growth rate is indigenously determined by the

allocation of human capital in research and manufacturing sectors and is not affected by other crucial variable such as the unit cost of production of new capital goods.

Schumpeter and Schmookler supported that productivity growth is related to an economy's structure and policies; on the one hand, they tried to explain the links between industrial innovation and economic growth, while on the other hand, they tried to explain the market conditions and innovation rates. Many of the early models treated technological progress as an exogenous process driven by time.

Romer (1986), discussed the possibility that learning-by-doing might be a source of sustained growth, maintained this treatment of technological progress as wholly the outgrowth of an external economy. Many others have followed his lead, such as, Grossman and Helpman (1991), Aghion and Howitt (1998) and Young (1993).

However, the work developed by Harrigan (1995), shows that there are systematic differences across countries in industry outputs that cannot be explained by differences in factor endowments. While there are many possible explanations for this result, such an explanation is that technology is not the same across countries. This is a hypothesis which has gained greater attention from international economists recently, including Dollar and Wolff (1993), and Harrigan (1997).

2.3. The approach of Endogenous Theory

The concept of endogenous technological change has resulted in the so-called "new growth theory". It embodies technical change and refers to the improvements in the design or quality of new capital goods or intermediate inputs. Disembodied technical change is not incorporated in a specific factor of production. (Rennings Klaus and Sebastian Voigt 2008). The literature of endogenous growth provide us with better insights in the causes and effects of technological change as a determinant of economic growth.

We can distinguish two different types of technological change. An increase in the number of technologies, (the embodied technological change, so-called the product-innovation). On the other hand a quality improvement of existing technologies (the disembodied technological change, otherwise the process-innovation). In order to present the different approaches of endogenous technical change which can be found in the literature, we will essentially follow the exposition scheme proposed by Barro and Sala-i-Martin (1995), in distinguishing three main models of endogenous growth motivated by endogenous technological change:

- models based on expanding product variety;
- Schumpeterian models based on improvements in the quality of products; and
- models based on human capital accumulation.

Schumpeter and Schmookler supported that productivity growth is related to an economy's structure and policies. On the other hand, they tried to explain the links

between industrial innovation and economic growth, while, on the other hand, they tried to explain the market conditions and innovation rates too.

2.4. The catching-up models

Technological gap theories (Abramovitz, 1986, Fagerberg, 1987, 1988, 1994), relate the technological level and innovation activities to the level of economic growth. According to these theories, countries where more innovation activities take place tend to have a higher level of value added per worker (or a higher per capita GDP). The size of the productivity factor differs substantially across countries, with Japan and France having the highest rates for their respective time periods and the US and the UK having the lowest.

Catching-up theory (Abramovitz, 1986; Fagerberg, 1987) starts with the investigation of growth performance. The main idea is that large differences in productivity among countries tend to be due to unexpected events (for instance wars). According to these studies, the only possible way for technologically weak countries to converge or catch up with advanced countries is to copy their more productive technologies. The outcome of international innovation and diffusion process is uncertain; the process may generate a pattern where some countries follow diverging trends or one where countries converge towards a common trend. In this literature, economic development is analysed as a disequilibrium process characterised by two conflicting forces:

- innovation, which tends to increase economic and technological differences between countries, and
- diffusion (or imitation), which tends to reduce them. Technological gap theories are an application of Schumpeter's dynamic theory.

A higher level of innovation activities tends to have a higher level of value added per worker (or a higher GDP per head) and a higher level of innovation activities than others. Following technological-gap arguments, it would be expected that the more technologically advanced countries would be, the most economically advanced (in terms of a high level of innovation activities and in terms of GDP per capita). The level of technology in a country cannot be measured directly. A proxy measure can be used to give an overall picture of the set of techniques invented or diffused by the country of the international economic environment. For productivity measurement, we can use the real GDP per capita as an approximate measure. The most representative measures for *technological inputs and outputs* are indicators of patent activities and research expenditures. The three alternative models can be given as follow:

$$\begin{aligned}\text{GDP (or PROD)} &= f[\text{GDPCP, EXPA (or GERD), INV}] \text{ basic model} \\ \text{GDP (or PROD)} &= f[\text{GDPCP, EXPA (or GERD), INV, EXP}] \\ \text{GDP} &= f[\text{GDPCP, EXPA (or GERD), INV, TRD}]\end{aligned}$$

The first model may be regarded as a pure *supply model*, where economic growth is supposed to be a function of the level of economic development GDPCP (GDP per capita with a negative expected sign), the growth of patenting activity (EXPA with a positive sign) and the investment share (INV with a positive sign). However, it can be argued that this model overlooks differences in overall growth rates between periods due to other factors and especially differences in economic policies.

3. CONCLUSIONS

In economic literature, there are various explanations for the slow-down in productivity growth. One source of the slow-down may be the substantial changes in the industrial composition of output, employment, capital accumulation and resource utilisation. The second source may be that technological opportunities have declined and furthermore the application of new technologies to production has been less successful. Technological factors act in long run and should not be expected to explain medium-run variations in the growth of GDP and productivity.

The so-called *new growth theories* argue that greater investment (both in physical and human capital) creates externalities and economies of scale effects. These theories emphasize the role of economy returns for scale, expenditure on R&D, human capital formation and the role of investment on diffusion and technical change. Higher rates of gross investment could raise the rate of growth of productivity by increasing the rate of substitution of the old by new capital.

The *new growth theories* examine the way in which some countries been able to grow with no apparent tendency to slow down and try to explain why some countries exhibited medium or long term accelerations or decelerations in their growth. Romer makes technological change endogenous by assuming that technology is a good public and private investment in capital, it increases the level of technology available to entrepreneurs; higher investment rate will accelerate the economic growth.

Theoretical and empirical models of *endogenous growth* emerged in the 2000s. The approach of *endogenous growth* suggests that growth rates are not exogenous, instead they depend on internal allocation processes; this arises rather because of non-decreasing returns to scale or because of production externalities. *Endogenous growth* differs from *neoclassical growth models* because it assumes that economic growth is an endogenous outcome of an economic system and not the result of forces that infringe from outside. *Endogenous growth theory* has the advantage of explaining the forces that give rise to technological change rather than following the assumption of *neoclassical theory* that such change is exogenous. *Endogenous growth models* emphasize the role of international trade; they suggest that high productivity growth is possible in poor countries as a result of the diffusion of knowledge already available in industrial countries. Since Solow (1956), technological change has been regarded as one of the main sources of economic growth. Neoclassical models assume that

marginal productivity, and technological change (or labour growth) are needed to compensate for the negative productivity effects of capital accumulation.

Technological gap models represent two conflicting forces: innovation, which tends to increase the productivity differences between countries, and diffusion, which tends to reduce them. In the Schumpeterian theory, growth differences are seen as the combined results of these forces. Research on *why growth rates differ* has a long history which goes well beyond growth accounting exercises.

The catching-up hypothesis is related to economic and technological relations among countries. There are different opportunities for countries to pursue a development strategy that depends on resource and scale factors. In summary, we can say that the introduction of new technologies has influenced economic growth.

REFERENCES

- Abramovitz, M. (1986). Catching-up, foreign ahead and falling behind, *Journal of Economic History*, 46.
- Aghion, P. and Howitt, P. (1998). *Endogenous Growth Theory*, The MIT Press.
- Antonelli, C. (2001). *The microeconomics of technological systems*, Oxford University Press, Oxford.
- Barro, R.J. and Sala-i-Martin, X. (1995). *Economic Growth*, McGraw-Hill, New York.
- Bosworth, B. and Collins, S. M. (2003). The Empirics of Growth: An Update. *Brookings Papers on Economic Activity* 2003, (2), pp. 113 - 206.
- Bovenberg, A.L. and Smulders, S.A. (1996). Transitional Impacts of Environmental Policy in an Endogenous Growth Model. *International Economic Review*, 37(4), pp. 861 - 893.
- Diewert, Erwin (1992). The Measurement of Productivity. *Bulletin of Economic Research*, 44, p.p. 163 - 198.
- Dollar, D. and Wolff, E. N. (1993). *Competitiveness, Convergence, and International Specialization*, MIT Press, Cambridge, MA.
- Dosi, G. (1988). Sources, procedures, and microeconomic effects of innovation. *Journal of Economic Literature*, XXVI, (Sept), pp. 1120 - 1171.
- Fageberg, J. (1987). A technology gap approach to why growth rates differ. *Research policy*, 16, pp. 87 - 99.
- Fageberg, J. (1988). Why growth rates differ, chapter 20 in Dosi G., Freeman Ch., Nelson R., Soete L. et (ed.) *Technical change and Economic theory*.
- Fageberg, J. (1994). Technology and international differences in growth rates, *Journal of Economic Literature*, September, XXXII(3).
- Grossman, G.M. and Helpman, E. (1991). *Innovation and Growth in the Global Economy*, MIT Press, Cambridge (USA).
- Harrigan, J. (1995). Factor Endowments and the International Location of Production: Econometric Evidence for the OECD, 1970-1985. *Journal of International Economics*, 39, p.p. 123 - 141.
- Harrigan, J. (1997). Technology, Factor Supplies and International Specialization: Estimating the Neoclassical Model. *The American Economic Review*, 87, p.p. 475 - 494.

- Jorgenson, D.W. and Griliches Z. (1967). The explanation of productivity change. *Review of Economic Studies*, 34, p.p. 249 - 183.
- Jorgenson, D.W., Gollop, F.M. and Fraumeni, B.M. (1987). *Productivity and U.S. economic growth*, Growth in Aggregate Output, Harvard University Press.
- Jorgenson, D. W., Hob, M. S. and Stiroh, K. J. (2003). Lessons from the US growth resurgence. *Journal of Policy Modeling*, 25, pp. 453 – 470.
- Korres, G. (2012). *Handbook of Innovation Economics*, Nova Publishers, New York.
- Nelson, R. (1973). Recent Exercises in Growth Accounting: New Understanding or Dead End? *American Economic Review*, 73, pp. 162 - 68.
- Nelson, R. (1981). Research on productivity growth and productivity differences: Dead ends and new departures. *Journal of Economic Literature*, XIX, (September), p.p. 1209 - 1064.
- Nelson, R.R. and Winter, S.G. (1982). *An Evolutionary Theory of Economic Change*, Cambridge, MA: The Belknap Press of Harvard University Press.
- Rennings, K. and Sebastian, V. (2008). *Data Sources for Measuring Endogenous Technological Change in E3 Models*, Centre for European Economic Research (ZEW) Mannheim, January 2008.
- Romer, D. (1986). Increasing Returns and Long Term Growth. *Journal of Political Economy*, 94(5), pp. 1002 - 1037.
- Romer, D. (1990). Endogenous Technological Change. *Journal of Political Economy*, 98, p.p. 71 - 102.
- Schmookler, J. (1966). *Invention and economic growth*, Harvard University Press.
- Schumpeter Joseph A. (1934). *The theory of economic development*, Cambridge, MA, Harvard Economic Studies.
- Solow, R. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics*, 70(February), pp. 65 - 94.
- Solow, R. (1957). Technical change and the aggregate production function. *Review of Economics and Statistics*, 39, pp. 312 - 320.
- Solow, R. (1994). Perspectives on Growth Theory. *Journal of Economic Perspectives*, 8(1), pp. 45 - 54.
- Young, A. (1993). Invention and Bounded Learning by Doing. *Journal of Political Economy*, 101(3), pp. 443 - 472.

EUROPEAN STRATEGY 2020: ASSESSING THE EXTENT TO WHICH GREEK SMES HAVE THE ABILITY TO RESPOND TO THE TARGETS OF THIS STRATEGY

PANAGIOTIS KATIS*

ABSTRACT

The role of Small Medium Sized Enterprises SMEs is increasingly becoming very crucial for the development of EU economies given their impressive number of 23 million units throughout the European Union. Nevertheless they have been severely hit by the economic crisis and are currently faced with the challenge of their viability and development. Within the context of this challenge for SMEs as well as European economies generally, the EU introduced the strategy known as 'Europe 2020' built on the lessons learnt from the Lisbon Treaty failure and aiming to achieve five distinct objectives by the year 2020 including promotion of: employment, innovation, education, environment, social cohesion/ reduction of poverty. As far as the SMEs are concerned the Small Business Act SBA and the respective policies that EU put in place for each of its ten principles, comprise a clear guidance for SMEs in order for them to be able to meet Europe's 2020 strategy requirements. As far as the Greek SMEs are concerned, despite the measures that the Greek State has taken, they still present a weak performance profile in most of the ten SBA areas vis-à-vis their European counterparts. Therefore unless the Greek state provides them with easier access to finance, simplified taxation laws and streamlined state aid and procurement as well as administration processes, and give Greek entrepreneurs second chance to making business, Greek SMEs will not be able to respond to 'Europe's 2020' requirements and meet its targets effectively.

Keywords: European strategy 2020; Greek SMEs; European Commission; Lisbon strategy; Europe 2020's targets; SBA principles and policies.

1. INTRODUCTION

In a turbulent and complex external macroeconomic environment which is mainly characterised by strong competitive rivalry and pressures as well as continuous structural changes, the role of SMEs is becoming increasingly crucial as creators of job and employment opportunities, as well as contributors to the development of local and peripheral communities (Commission of European Communities, Brussels, 2010). Moreover, one can easily realise the significance of the SMEs presence that is reflected on their impressive number that reaches the 23 million units that operate in the European Union EU which in turn represent 99 % of the total number of existing

* OECD, Greek Embassy, Ph.D. candidate, University of the Aegean, School of Social Sciences, University Hill, Mytilene, Greece

businesses in the member states of the EU. The valuable role of SMEs in EU countries stems from their potential to drive economic growth, provide employment to more than half of their labour force as well as social integration to EU member states (OECD, 2010). However, it has to be noted at this point that contemporary EU SMEs (and especially the ones operating in Greece) are faced with the challenge to cope with the turbulence and uncertainty implied by the current financial crisis. This challenge mainly results from two crucial conditions: the need for development of their innovativeness as well as their entrepreneurial frameworks and skills (OECD, 2009).

2. THE STRATEGY - "EUROPE 2020"

Realising the contemporary challenges faced by economies and their enterprises, on 23 and 24 March 2000, in the capital of Portugal, the leaders of the EU Member States explicitly expressed their intention to make the European Union "the most competitive and dynamic knowledge economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion " by 2010 (European Commission, 2010).

Within the context of this intention, the Lisbon Treaty, also known as the 'Reform Treaty', was designed and introduced in order to amend the founding treaties of the European Union and was signed on December 13, 2007 at the Lisbon Summit, which was attended by political leaders and foreign ministers of the EU Member States.

Specifically, the aim of the Lisbon Strategy was to reunite the enlarged Europe of 27 Member States, around two main axes: freedom and democracy (European Commission, 2010). The vision was the creation of a Europe that is a better place than any other union or group of countries, by not through imposing but through proposing global solutions that the world urgently needs. The European Commission stated that through the ratification of the Lisbon Treaty, the EU countries would be able to face internal as well as external challenges so that EU citizens and their economies will experience the positive results of this scheme as well as the respective efforts.

Nevertheless, the new institutional framework of the European Union brought about by the Treaty of Lisbon, proved to be inadequate, short-sighted and ultimately inappropriate for addressing the issues of the crisis. Even the strongest advocates of the Treaty rushed to seek a series of reviews upon reviews (Papadimoulis, 2011). It was then commonly accepted, that the Lisbon Treaty, despite its promising and encouraging character, failed to provide the results expected, with this failure being reflected on EU economies' poor financial results and particularly on the performance of their SMEs which in turn indicated that further significant steps should be taken to enable SMEs to exploit their full potential. Generally, European SMEs indicated lower levels of productivity and growth at a much slower pace than the corresponding SMEs in the USA, with less European SMEs innovating compared to large enterprises and their global counterparts (European Commission, 2012).

Hence, it was realised that a more effective strategy should be designed and put in place and proper operation (European Union, 2013).

The strategy that was then designed and chosen to be applied, in order to compensate for the failure of Lisbon Treaty, was according to José Manuel Barroso, (the President of the European Commission) the well known 'Europe 2020' which is the EU's growth strategy for the coming decade (Commission of the European Communities, 2010).

Specifically, the Union has specified clear objectives for European Strategy 2020 which include innovation & entrepreneurship, employment, social inclusion, education, and climate/energy. These objectives have to be reached by the year 2020. Consequently, the implications for each Member State include the adoption of national targets in each of these five distinct areas which is expected to be followed by the implementation of concrete and effective action at national level in order to underpin the strategy (European Commission, 2014).

The Committee of the Regions (COR) finds that the Member States, as they complete their national reform programmes, as this is dictated by "Europe 2020", have not drawn enough lessons from the failure of the Lisbon Strategy and certainly Europe cannot afford to fail again. Therefore, in order to avoid a new failure, the efforts required should be everyone's business (COM, 2008). This is the message sent by Mrs. Bresso President of the European Council. All Member States have committed to the Europe 2020 strategy. Nevertheless, EU member states have translated the overall EU objectives into national targets in its National Reform Programme. In 2008 the European Council expressed its strong support for an initiative aimed at boosting growth and competitiveness of European Union SMEs and demanded the immediate adoption of the Act that was named "Small Business Act SBAJ". This is an initiative that was developed and applied in order to help European SMEs achieve the ambitious goals of the new reform agenda of the Commission, within the framework of the strategy "Europe 2020" (COM, Brussels 2011).

Following the adoption of SBA policies by the European SMEs in June 2008, there has been a significant progress in their relevant performance through the actions that these took with respect to SBA principles. It should be noted at this point, that the SBA framework provides a clear classification of EU policies under its 10 discrete principles, which mainly address business entrepreneurship and innovation through action in their micro as well as their macro operating environment including: (1) entrepreneurship; (2) second chance; (3) think small first; (4) responsive administration; (5) state aid and public procurement; (6) access to finance; (7) single market; (8) skills and innovation; (9) environment; and (10) internationalisation (Commission of the European Communities, 2010).

The policies and measures dictated by the SBA comprise a very well structured framework that each Member State can apply in order to comply with the 'Europe 2020' requirements (European Commission, 2014). Nevertheless, the main question

posed here, concerns the relevant action taken (in terms of the policies applied) as well as the outcomes achieved by the Greek SMEs in relation to the EU policies applied and the related action taken. With respect to the European SMEs and their compliance with the strategy 'Europe 2020' requirements, the SBA framework and its principles have been introduced taking also into consideration the areas not being addressed by the Lisbon Strategy as well as its areas of failure, such as development and improvement of the entrepreneurial climate, creation of a knowledge society, establishment of common European standards of economic policy as well as environmental protection (European Commission, 2010).

3. RELATION OF SBA PRINCIPLES TO EU POLICIES FOR MEETING EUROPE'S 2020 REQUIREMENTS

In order for the EU to provide consistent guidance for development and progress to SMEs, it designed a series of policies following the ten distinct SBA principles as follows:

1st Principle: This principle relates to the creation of an operating environment that is conducive to and fosters entrepreneurial prosperity. The main areas of respective EU policies in place include: design and operation of development programmes for entrepreneurs, especially young entrepreneurs (i.e. Erasmus, Leonardo Da Vinci etc) aiming at a cross border diffusion of knowledge and exchange of entrepreneurial practices. Another area of respective policies developed, relates to female entrepreneurship through development of mentoring programmes designed to provide them with the right and proper guidance towards establishment of their own SME.

2nd Principle: Bankruptcies comprise the main cause for the closure of 15% of all the EU SMEs. About 700,000 of SMES go bankrupt every year in Europe (COM, 2008). Nevertheless, for bankrupt entrepreneurs to attempt a new beginning of their business is a rather complicated and lengthy process (4 months - 9 years). Within this context the EU is implementing policies that promote:

- Opportunities for a second chance in business through the exchange of best practices.
- A positive attitude of society to entrepreneurs wishing to retry doing business ensuring a fair and equal treatment.

3rd Principle: The biggest restriction faced by SMEs is their compliance with the relevant administrative regulations.

On this principle, the EU (European Commission, 2011) implements policies that:

- Assess the impact of relevant regulations and legislation on the operation of SMEs and take the results of this evaluation into account when planning new proposals.

- Consult representatives of SMEs, at least 8 weeks prior to the design and implementation of administrative regulations directly related to their operation.
- Aim to implement policies that reduce administrative 'barriers' by 25% for SMEs by 2013.

4th Principle: With respect to modernisation and responsiveness of public administration, the EU implemented policies to cover the following areas of this principle which include:

- Acceleration of the launch process of SMEs reducing and simplifying procedures.
- Ensuring that the applicable EU Directive assign a 'contact point' for each new SME where entrepreneurs can derive all the necessary information for the start of their business and the ability to complete all the necessary procedures electronically.

5th Principle: The SMEs face obstacles when participating in public projects and assignments. The policies developed by the EU in this area include:

- Implementation of Best Practice Code for public authorities that manage and assign projects in a manner that develops a climate of transparency and reduces bureaucracy.
- Design of websites for more transparency and information with easy access provided to SMEs so that they can be informed about the opportunities that arise for undertaking projects related to supply and procurement to public authorities and services.
- Establishment of Government Assistance policy (State Aid policy) in order for the respective SMEs' needs to be met more effectively.

6th Principle: Access to capital and finance is the second main source of barriers to the operation of SMEs. In order to overcome these barriers the policies implemented include:

- Development of financing programmes designed to fill gaps between 100,000 and 1 million Euros.
- Arrangement of relevant legal and tax obstacles.
- Ensure that the taxation of business profits encourages investment.

7th Principle: An effective single market creates opportunities in a competitive environment and helps businesses to exploit opportunities arising from the global business operating environment. The policies that have entered the EU indicative include (European Commission, 2012):

- Increase financial assistance from the EU to SMEs (eg 2.1 million in 2009 from 1 million in 2008).
- Remove the fragmentation of consumer protection regulations so as to make cross-border trade between SMEs easier and smoother with as few administrative burdens as possible.

- Create and establish 'SME Helpdesks' composed of representatives of SMEs associations and organisations.

8th Principle: Since SMEs particularly suffer from a lack of technical and managerial skills and trained workforce, the EU implements policies such as:

- A European Cohesion Policy of EUR 13.5 billion for the period 2007-2013 introduced to promote adaptation of employees as well as entrepreneurs themselves to the new and constantly evolving operating environment.
- A policy that provides guidance to SMEs for the management of their intellectual property through the so-called 'e-government transactions'
- The Framework Programme FP7 which apart from other key factors on which SMEs depend for European research and innovation capacities also supports:
 - Research infrastructures for the benefit of SMEs.
 - The integration of science in business.
 - Horizontal transnational cooperation activities of SMEs.

9th Principle: Climate change, scarcity and depletion of energy resources, etc. are the key challenges for SMEs to adopt alternative standards and models of production and operation in order to offer environmentally friendly products and services. Relevant EU policies in place include:

- Eco-Audit and Management Scheme (EMAS) - Program Audit and management through simplified procedures and reduced costs.
- Creation of a European network of business consultants who provide consulting services to businesses and funding opportunities for companies implementing environmentally friendly operations and procedures.
- Adoption of a fund of 2.5 billion for the Cohesion Program and to support green products and operational processes of European SMEs.

10th Principle: The policies implemented by the EU in order to help SMEs exploit the opportunities offered within a globalised environment include:

- Establishment of the so-called 'Market Access Teams' the aim of which is to bring together Member States and European commercial consultants business creating synergy which in turn will help improve awareness of SMEs while reducing barriers to international trade in which they are or want to be active.
- Establishment of the European Business European Business Centres in selected and rapidly growing markets (such as India and China) to provide guidance and information to the European SMEs planning and aim to conduct business in their respective global markets.

4. A SUMMARY OF THE EU POLICIES ADOPTED AND IMPLEMENTED BY THE GREEK STATE TO SUPPORT SMES AND MEET SBA REQUIREMENTS

With respect to the 1st SBA principle (Entrepreneurship), the Greek government introduced an action plan to support youth employment and entrepreneurship in January 2013. A budget of €600million, including € 517million from the European Social Fund and the European Regional Development Fund was allocated to support this plan. Moreover the Entrepreneurship Fund as part of Hellenic Fund for Entrepreneurship (ETEAN) in order to support Greek SMEs improve their competitiveness through contributing around €540 and consisting of funds mainly aiming to support business restart and assist island tourism entrepreneurship develop further. Also a programme to strengthen women's entrepreneurship was introduced by the Special Management Service of the Regional Operational Programme. As far as the second principle (second chance) is concerned, no new policy has been applied nevertheless time and cost of closing a business are in line with the respective measures taken in the EU.

As far as the third SBA principle is concerned (Think small first) although a new Law (No 4072/2012) to support more flexible SMEs legal form was designed and put in place, actual implementation was slow, mainly due to the involvement of a number of different ministries and regional authorities which rendered the necessary collaboration, coordination and required underlying decision-making synergies difficult to be achieved (European Commission, 2013). In relation to the fourth SBA principle Greek State through the Ministry of Development and the Law No 407/2012 introduced a number of acts to modernise and simplify licensing procedures for SMEs. Nevertheless the oxymoron that resulted was that although the number of professionals provided with the right to operate their SMEs increased, the number of licences issued decreased.

With respect to the fifth SBA principle (State aid & public procurement) the measures taken by public authorities increasing the time span of payment to SMEs (from 66 days to 112 days in 2013) contributed to deterioration of the Greek SMEs' performance. The latest policies applied by the Greek State to overcome this problem mainly include the introduction of the Late Payment Directive as well as the use of e-procurement to facilitate SMEs dealing with public contracts.

As far as the sixth SBA principle (Access to Finance) is concerned, a series of funding programmes have been put in place. Specifically, a new SME Guarantee Fund guaranteeing loans up to 1 billion Euros to SMEs via Greek partner banks has been established. Moreover, The National Fund for Entrepreneurship and Development (ETEAN SA), a financing institution launched in 2011, is improving the SMEs' access to finance, through Business Restart and the Fund for Island Entrepreneurship.

With respect to the seventh SBA principle (single market) Greek SMEs do not exploit the single market's full potential, restricting their exporting activities to their neighbouring countries which have also been affected by the economic depression.

As far as the eighth SBA principle (Skills & Innovation) is concerned, also in 2013, the Special Management Service of the Regional Operational Programme launched a measure to support manufacturing, tourism, trade and services SMEs investing innovation, the environment and ICTs. Nevertheless, the implementation of the initiative Venture Capital for Innovative Enterprises, announced by the government in 2012, is still pending.

In relation to the ninth SBA principle (Environment) since Greek SMEs performed quite well in 2012 with nearly 50% of their turnover being generated by green products and services, the Greek State did not apply any supportive policies in this area. This approach though led to a deterioration of Greek SMEs performance in this area in 2013 as it is reflected in the diagrammes below.

Lastly, in terms of the tenth SBA principle a policy called 'Business Competitiveness' aiming to increase SMEs internationalisation was introduced by the Ministry of Development, Competitiveness and Shipping. Moreover, the same Ministry launched a programme in order to provide support to SMEs for their HR training on issues related to internationalisation of their operational activities. Finally, the new Law 4072/2012 (introduced to improve business environment) has also provided for the design and development of an integrated information system to facilitate importing and exporting transactions and procedures.

5. PERFORMANCE OF THE GREEK SMES WITH RESPECT TO THEIR EUROPEAN COUNTERPARTS.

As stated above, 'Europe 2020' is the new developmental strategy designed and aimed to be achieved over the next decade with its mission statement being: "in a changing world, we want the EU to become a smart, sustainable and inclusive economy" (European Commission, 2013) through setting five main objectives - on employment, innovation & entrepreneurship, education, social inclusion and climate / energy – which have to be achieved by 2020. In order to provide an answer to the question posed above with respect to the ability of Greek SMEs to meet 'Europe 2020' strategy's requirements the analysis below and relevant figures (which present Greek SMEs' performance vis-à-vis their EU counterparts) are very important to depict reality so that valid conclusions can be drawn.

DIAGRAMME 1: GREEK SMES PERFORMANCE IN 2012

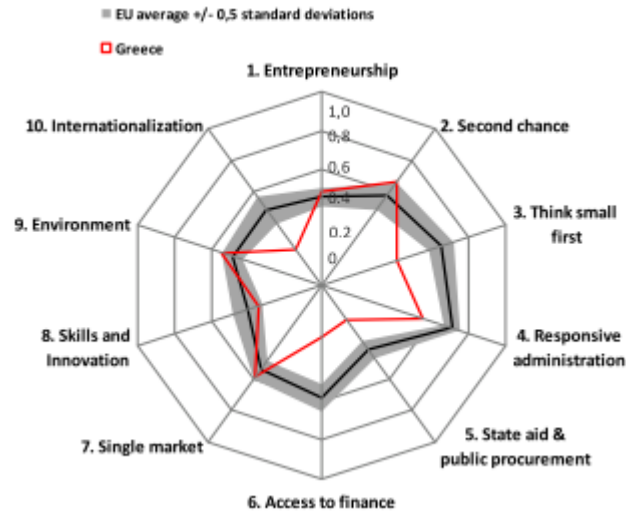


DIAGRAMME 2: GREEK SMES PERFORMANCE IN 2013

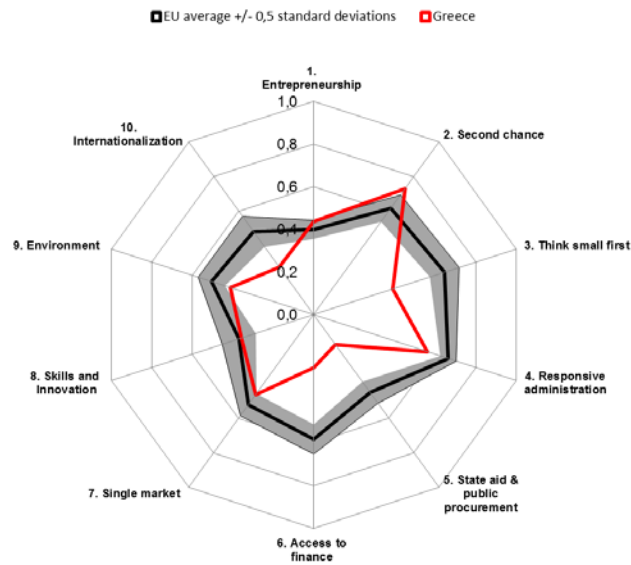


DIAGRAMME 3: GREEK SMES PERFORMANCE IN 2012

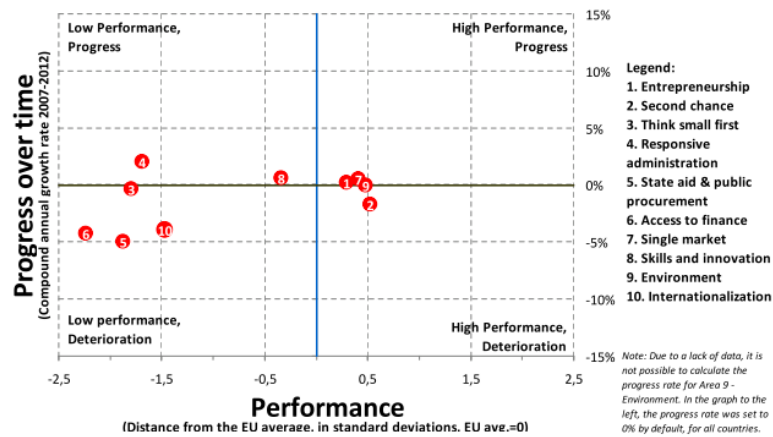
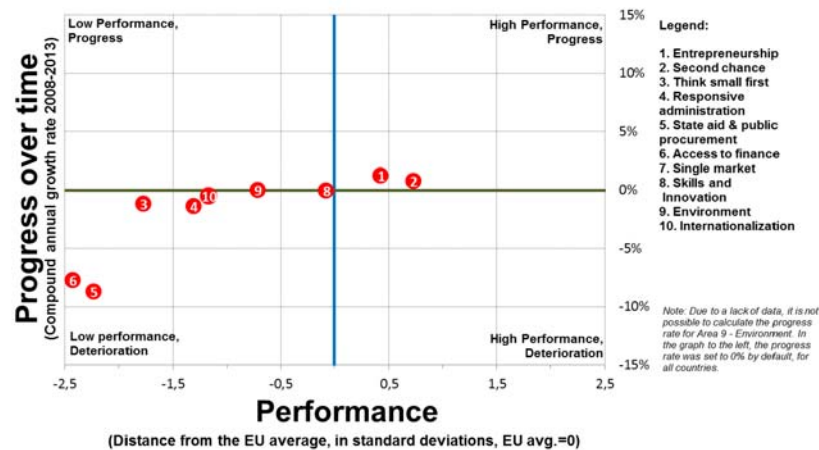


DIAGRAMME 4: GREEK SMES PERFORMANCE IN 2013



As it is reflected on the four diagrammes above, (the two spidergrames 1&2 and the two four-quadrant diagrammes 3 and 4) Greek SMEs profile with respect to the ten SBA principles present an overall weak profile, with a few relative strengths. Specifically, in the area of ‘Second chance’ Greek SMEs performance is well above the EU average, performance in ‘Entrepreneurship’ is on par with the EU average

while in all of the rest areas their performance is below the EU average with ‘State aid & public procurement’, ‘Access to Finance’ and ‘Internationalisation’ well below the respective EU average. This weak profile of the Greek SMEs notwithstanding, what seems to be more worrying is the trend of deterioration of their performance that becomes evident upon comparison of the figures above. Specifically, if we compare figures 3 and 4 depicting Greek SMEs progress with respect to the progress they made in SBA principles over the period 2012 -2013, except from Entrepreneurship and Second chance, Greek SMEs’ performance in the rest of SBA principles ranges from a very low performance level to a deteriorating performance rate.

These results are in line with the views stated by the General Confederation of Professionals, Craftsmen and Merchants of Greece GCPCM (ΓΣΕΒΕΕ) according to which:

- 75,4% of the Greek SMEs record a trend of performance deterioration in relation to the previous years of their operations. Specifically this deterioration comprises:
- a decrease in the average turnover for 75% of the Greek SMEs;
- a decrease in demand for 74.6 of the Greek SMEs;
- a decrease in SMEs investments of about 35%; and
- a reduction in orders up to 77,8% (GSEVEE 2013).

The Greek economy is in a deep recession if not an economic depression. The structural reforms have not yielded any meaningful results. According to the financial data presented by the companies, the liquidity ratio and the investment activity remains historically low. This is a self-reinforcing vicious cycle of disinvestment and lack of liquidity, which essentially deprives the private sector from its potential to develop a dynamic and autonomous ability to recover. All economic indicators of business retain negative values with 66.6% of businesses having declined in turnover, with the highest reduction recorded by very small businesses (81.7%). The average reduction in turnover for the second half of 2013 is 22.9%. Moreover, according to GCPCM 47.1% of businesses are at risk of closure in the near future with a net reduction of businesses for the next year estimated to be between 27.000 to 30.000 business units. One of the major issues that GCPCM research highlights is the problem of SMEs’ accumulated debts especially with respect to insurance liabilities to OAEE (about 40 %) (IME, 2014). Finally, SMEs entrepreneurs disapprove the effectiveness of the proposals of OECD since the vast majority of them consider the release of the product market and the opening of professions will neither result in price reductions nor will strengthen domestic business (Greek Ministry of Development and Competitiveness, 2014).

TABLE 1: RELATION OF EUROPE 2020 OBJECTIVES WITH SBA PRINCIPLES

EUROPE 2020 OBJECTIVES	RELATED SBA PRINCIPLES			
1. Employment	Second Chance	Responsive Administration	State Aid and Public procurement	Access to Finance
2. R&D/ Innovation	Skills and Innovation	Access to Finance	Responsive Administration	
3. Climate Change / Energy Efficiency	Environment	Access to Finance	State Aid and procurement	
4. Education	Skills and Innovation	State Aid and Procurement		
5. Poverty	State Aid and Procurement	Second Chance	Access to Finance	

On the basis of the above Table 1 was designed (by the author of the present paper) relating Europe 2020 objectives with the SBA principles so that the following conclusions can be drawn with respect to the ability of Greek SMEs to respond to Europe 2020 objectives effectively.

6. CONCLUSIONS AND RECOMMENDATIONS

In the light of all of the above, it is evident that over the last year five years the financial crisis that has severely hit the Greek economy and its SMEs, has also led the Greek State to implement policies that actually tried to address SBA principles and respective policies areas. Nevertheless, the policies and respective measures applied did not bring the expected results with Greek SMEs exhibiting a performance well below the EU average in four main SBA principles. Evidently Greek SMEs will be facing problems in order to meet Europe's 2020 targets since they are facing problems with the state aid, access to finance, the degree of administration responsiveness and their capacity for internationalisation. As far as, as innovation and entrepreneurship, Greek SMEs exhibit an average performance although Greeks' intellectual capital is conducive to innovative ideas and as a nation have always demonstrated a tendency for independent employment. However, according to the results of the research that Hofstede (2001) carried out on national cultural principles of 66 countries worldwide, Greece rated very highly (Greece rate 112 vs. mean 65) with respect to the uncertainty

avoidance principle, that indicates the extent to which a country's people tend to avoid risk taken.

Although EU SMEs which adopted and implemented SBA policies improved their performance, Greek SMEs (as it is reflected on the diagrammes above) present a deteriorating picture. Firstly because although a number of funding programmes are available by the EU, Greek banks which have been the critical medium but also a significant party for these programmes to materialise, could not provide this allocated finance to SMEs due to their own limited cash flow. Internationalisation, as it is also reflected above, is well below the EU average. The author attributes this reality to a culture of introversion that the Greek SMEs developed over the last two decades with their main volume of business depending on contracts with the public sector, establishing a high degree of confidence for their future as well as a rather relaxed attitude for the future of their businesses which in turn led them to avoid the uncertainty of exports. However, they have now realised that the public sector cannot act as a guarantee for their revenue through signing respective contracts with the Greek State. Moreover, even for the Greek SMEs wishing to expand their activities and go international, the required paperwork is rather cumbersome, hence acting as a deterrent factor to Greek SMEs internationalisation.

Consequently, in order for this climate to be improved and Greek SMEs to be motivated and able to meet most of Europe's 2020 targets, the author of this article would concisely recommend the following action to be taken:

- Develop Greek SMEs extroversion by the Greek State subsidising those SMEs that add value to the Greek economy with their exportation activity and further potential.
- Design and implement programmes that will reinforce Greek SMEs' entrepreneurial practice become independent of the Greek public sector.
- Reduction of the required paperwork for the Greek SMEs to operate, expand and develop Internationalising activities.
- Reduction, where possible, of the discharge time and debt settlement for honest Entrepreneurs after bankruptcy to three years maximum in 2013, offering also support services to companies for timely restructuring, tips to prevent bankruptcy and support SMEs in view of restructuring and their restart.
- Enabling effective restructuring of viable Greek SMEs with financial difficulties and provide honest entrepreneurs with a second chance, promoting in this way the entrepreneurship, investment and employment and contributing to reducing barriers to the smooth functioning of the internal market.
- Designing and development of programmes that will provide essential guidance to SMEs for efficient energy management.

Finally, it is the author's belief that the following measures with respect to the taxation of SMEs should be applied by the Greek State:

- Simplification of tax laws and procedures affecting SMEs.

- Creation of a more equitable and objective fiscal framework that takes into account the difficulties faced by SMEs with respect to the payment of taxes imposed on them, in this difficult economic climate.
- Creation of a task force in the Ministry of Finance and development of qualified staff that will offer helpful and valid taxation advice to SMEs.

Greek authorities are still viewed and perceived by entrepreneurs as authorities that impose more burdens for innovation and entrepreneurship than their European peers. Therefore, the above measures are very important to be implemented in order to improve Greek entrepreneurs' motivation for action as well as their drive for innovation and development and be in line with Europe's 2020 requirements in due time.

REFERENCES

- COM (2008). 394 final, Communication from the Commission to the Council, The European parliament, the European Economic and Social Committee and the Committee of Regions "Think Small First" A "Small Business Act" for Europe.
- COM (2011). *Small Business Act SBA for Europe*, Brussels, 2011.
- Commission of the European Communities (2010). *Think Small First: A Small Business Act for Europe*. Brussels, 2010.
- Economic adjustment programme for Greece (2013). Available at:
http://ec.europa.eu/europe2020/making-it-happen/country-specific-recommendations/2013/index_en.htm
- European Commission (2014). Europe 2020 targets. Available at:
<http://ec.europa.eu/europe2020/targets/eu-targets/>
- European Commission (2010). Lisbon Strategy Evaluation Document.
- European Commission (2012). *Small and medium sized enterprises in 2011: situations per EU Member States*.
- European Commission (2012). *Small and medium sized enterprises in 2011: situations per EU Member States 2010*.
- European Commission (2014). Europe 2020. Country Specific Recommendations. Available at: http://ec.europa.eu/europe2020/index_el.htm
- European Commission, Brussels, COM (2010) Communication from the Committee Europe 2020. *A strategy for smart, sustainable and inclusive growth*.
- European Commission. (2012). *Fact Sheet - Greece*, Enterprise and Industry, 2012.
- European Commission. (2013). *Fact Sheet - Greek, Enterprise and Industry*, 2013.
- Greek Ministry of Development and Competitiveness (2014). *Annual Ministerial Meeting of the OECD*, Paris, 2014.
- GSEVEE (2013). *Illusions Are Over: Increasing Intensity of Crisis for Greek SMEs*. Research, Available at:
http://www.eea.gr/system/uploads/asset/data/2996/GSEVEE_EREUNA
- Hofstede, G. (2001). *Cultures Consequences*. 2nd Ed. Sage Publications.
- IME (Greek Institute of Small Enterprises) (2013). *A Review of the Economic Climate for the Greek SMEs*, Athens, 2013.

- OECD, (2009). *The Impact of the Global Crisis on SME and Entrepreneurship Financing and Policy Responses*. Printing and Layout by BEL CANTO F92100 Boulogne.
- OECD. 'BOLOGNA+10' (2010). High Level Meeting on lessons from the global crisis and the way forward to job creation and growth. Paris, 17-18 November, 2010.
- Papadimoulis, D. (2011). A heralded failure: Rethinking the Treaty of Lisbon. Available at: [http://papadimoulis.wordpress.com/2011/01/17/%CE%BC%CE%B9%CE%B1%CF%80%CF%81%CE%BF%CE%B1%CE%BD%CE%B1%CE%B3%CE%B3%CE%B5%CE%BB%CE%B8%CE%B5%CE%AF%CF%83%CE%B1-%CE%B1%CF%80%CE%BF%CF%84%CF%85%CF%87%CE%AF%CE%B1-%CE%B1%CE%BD%CE%B1%CE%B8%CE%B5%CF%89/Small Business Act for Europe Available at: http://ec.europa.eu/enterprise/policies/sme/small-business-act/](http://papadimoulis.wordpress.com/2011/01/17/%CE%BC%CE%B9%CE%B1%CF%80%CF%81%CE%BF%CE%B1%CE%BD%CE%B1%CE%B3%CE%B3%CE%B5%CE%BB%CE%B8%CE%B5%CE%AF%CF%83%CE%B1-%CE%B1%CF%80%CE%BF%CF%84%CF%85%CF%87%CE%AF%CE%B1-%CE%B1%CE%BD%CE%B1%CE%B8%CE%B5%CF%89/Small-Business-Act-for-Europe-Available-at-http://ec.europa.eu/enterprise/policies/sme/small-business-act/)

AN UNOBSERVED COMPONENTS MODEL FOR US REAL GDP

CHRISTOS N. CHRISTODOULOU-VOLOS*

ABSTRACT

In this paper a basic univariate unobserved component model (UCM) is employed to decompose U.S. real GDP into the permanent (trend) and transitory components over the period 1947-2013. The main reason of using the UCM is because of its applicability on the order of integration, which is regardless even if the regressors are stationary. The results suggest that the movements in U.S. real GDP are largely permanent, that is, trend movements in real GDP are important for explaining overall fluctuations, the output gap follows an AR(2) process and the estimated coefficient suggest that most of the persistence of U.S. output GDP is captured in the trend component. Transitory movements provide some supportive evidence for models where the economy's movements are driven by real shocks with temporary adjustment to those shocks.

Keywords: Unobserved components; trend movements in real GDP; output gap; U.S.

1. INTRODUCTION

Several recent studies have used unobserved components models (UCM) to identify the unobserved features of an economy, such as potential (trend) output and the output gap (cycle). The output gap can theoretically be defined as the proportional deviation of actual or realized output from full employment or potential output. Potential output is the level of production that can be achieved with the existing level of factors of production without putting pressure on inflation and the output gap is that level of economic activity that does not exercise any deflationary or inflationary pressures. Since output's potential level cannot be observed in reality, obtaining the output gap is not straightforward in practice. From the viewpoint of time series analysis, the estimation of the output gap requires the decomposition of the observed output series into the non stationary trend and the stationary cycle component.

The standard way to deal with the unobservability of the full-employment level of output has always been to come up with output gap proxies, such as the labor income share or detrended or HP-filtered GDP. However as is for example set out in Galí and Gertler (1999) and Rudd and Whelan (2007), the use of these proxies is not undisputed as it often lacks theoretical foundations. In many other studies a variety of detrending techniques is used to carry out the trend-cycle decomposition (Canova, 1998). It is well known that these unobserved variables are difficult to measure and, as

* Associate Professor, Department of Economics and Finance, Neapolis University Pafos, Pafos, Cyprus

a consequence, estimates differ widely depending on the methods used (Canova, 1998). A number of approaches are often used because of their ease of computation.

In this study, an unobserved components model is employed for decomposing U.S. real GDP into the trend, cycle, seasonal and irregular components. An UCM attempts to capture the features of a time series by assuming that they follow stochastic processes that, when put together, yield the observations. As Harvey and Jaeger (1993) argue, this class of models provides a useful framework as they “are explicitly based on the stochastic properties of the data”. They are based on interpretable and well-defined models for the individual components and are very flexible in accommodating peculiar features of the time series and can be scrutinized by rigorous tests.

This paper is divided into four sections. Section (2) briefly introduces the unobserved components model (UCM) in time series. Section (3) presents the application of UCM and the empirical results for US real GDP from the first quarter of 1947 to the first quarter of 2013. The final section provides the concluding remarks.

2. THE UNOBSERVED COMPONENTS MODEL

The Unobserved Components Model (UCM) can be considered to be a multiple regression model with time-varying coefficients. It is based on the principles that (i) it is useful to view time series as being decomposable into trend, seasonal, and cycle components and (ii) time series models that give equal weight to both near and far distant observations (as in the deterministic trend model to be discussed later) are often not very useful. With respect to point (i) inefficient and inaccurate forecasting is likely to arise for anyone who ignores the salient characteristics of the time series to be forecast. With respect to point (ii) in many time series the adjacent observations are more closely correlated with each other than observations that are far apart. As a result time series models that are “local” in nature and weight recent observations more than observations in the far past, tend to predict better when applied to economic and business time series than models that treat time series data “globally” as in the deterministic time trend model.

The fully specified Unobserved Components Model is written as,

$$y_t = \mu_t + \gamma_t + \psi_t + r_t + \sum_{i=1}^p \phi_i y_{t-i} + \sum_{j=1}^m \beta_j x_{jt} + \varepsilon_t \quad (1)$$

In equation (1) y_t represents the time series to be modeled and forecast, μ_t the trend component, γ_t the seasonal component, ψ_t the cyclical component, r_t the autoregressive component, and ε_t the irregular component. All of these components are assumed to be unobserved and must be estimated given the time series data on y_t and x_{jt} . In addition

(1) allows the inclusion $\sum_{i=1}^p \phi_i y_{t-i}$ of the autoregressive regression terms and the explanatory regression terms $\sum_{j=1}^m \beta_j x_{jt}$ the former representing the “momentum” of the time series as it relates to its past observations and the latter representing the causal factors that one is willing to suppose affects the time series in question.

A trend-cycle model of output can be set up as,

$$y_t = \mu_t + \psi_t + \varepsilon_t, \varepsilon_t \sim NID(0, \sigma_\varepsilon^2) \quad (2)$$

where output y_t is decomposed into a trend, μ_t , an output gap, ψ_t , and an irregular component ε_t .

The trend component is modeled as a local linear trend (Harvey 1989). In this model the trend is characterized by the following level and slope equations

$$\mu_t = \mu_{t-1} + \beta_{t-1} + \eta_t, \eta_t \sim NID(0, \sigma_\eta^2) \text{ (level)} \quad (3)$$

$$\beta_t = \beta_{t-1} + \xi_t, \xi_t \sim NID(0, \sigma_\xi^2) \text{ (slope)} \quad (4)$$

Here μ_t represents the stochastic level of the trend while β_t represents the stochastic slope of the trend. Furthermore it is assumed that η_t and ξ_t are independent of each other. In the presence of both stochastic level and stochastic slope the data need not have a linear trend but can have a trend with the curvature (slope) of the data slowly evolving as well. Based on the above equations, μ_t is an $I(2)$ process.

The unobserved cyclical component or output gap, ψ_t , can be modeled as a stochastic trigonometric cycle. Following Harvey and Jaeger (1993), the first-order trigonometric cycle specification is used for the stochastic trigonometric cycle. The specification of a first-order stochastic cyclical model is

$$\begin{bmatrix} \psi_t \\ \psi_t^* \end{bmatrix} = \rho \begin{bmatrix} \cos \lambda & \sin \lambda \\ -\sin \lambda & \cos \lambda \end{bmatrix} \begin{bmatrix} \psi_{t-1} \\ \psi_{t-1}^* \end{bmatrix} + \begin{bmatrix} v_t \\ v_t^* \end{bmatrix} \quad (5)$$

where $0 \leq \rho \leq 1$ is a damping factor and the disturbances v_t and v_t^* are independently distributed as $N(0, \sigma_v^2)$ random variables. This model can capture quite complex cyclical patterns in economic and business time series without introducing an abundance of parameters. If $\rho < 1$, ψ_t has a stationary distribution with mean zero and

variance $\sigma_v^2 / (1 - \rho^2)$. If $p = 1$, ψ_t is non-stationary. Of course if $\sigma_v^2 = 0$ we revert to the deterministic cyclical model.

It is well known in the advanced time series literature that UC models can be thought of as being special cases of more general models called Gaussian State Space Models (GSSM). Once the specific UCM has been cast in State Space form the various unobserved components can be estimated using the Kalman Filter for maximum likelihood estimation of the parameters and the components.

Following Morley, Nelson and Zivot (2003), Clark (1989), and Watson (1986), each transitory component is modeled as an autoregressive process of order two (AR(2)). Including a third lag does not qualitatively change the results and a likelihood ratio test indicates that a third lag is not significant.

3. EMPIRICAL ANALYSIS

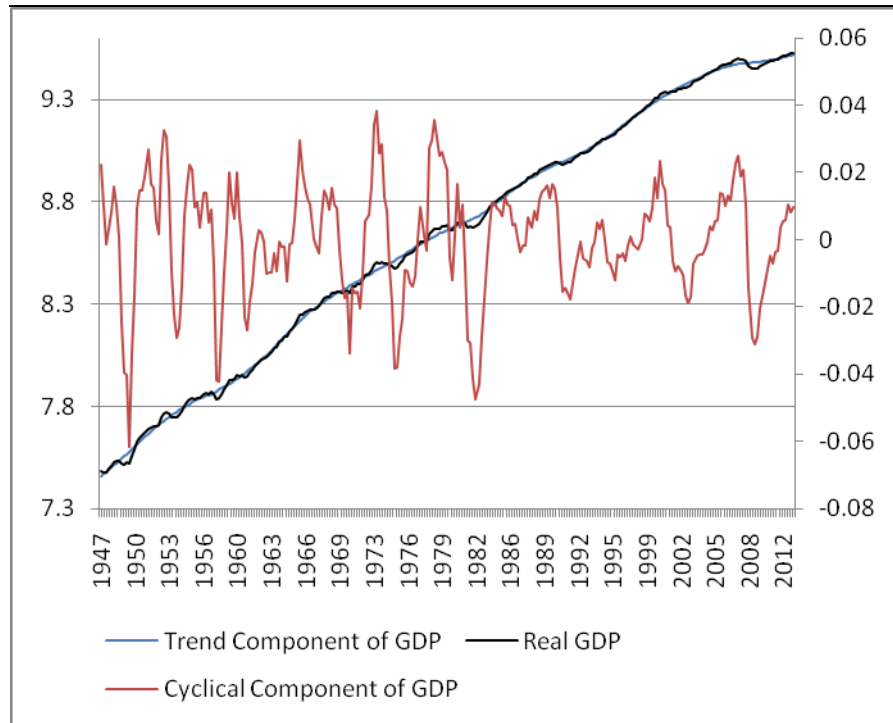
3.1. Data

The data used in this study consist of real GDP observations of quarterly frequency for the USA. The GDP series is represented in (natural) logarithms. The main motivation to work with logarithms instead of levels, is that they are usually stationary (covariance-stationary) and they represent the behavior of the conditional volatility of the series in a more intuitive manner. All data was obtained from the Bloomberg's database and span from the first quarter of 1947 to the first quarter of 2013.

Figures 1 and 2 present the estimated components of real GDP along with the observed series. Figure 2 is produced using the Kalman smoother, which uses all information available in the sample, thus providing a better in-sample fit as compared to the basic Kalman filter which uses only utilizes information available at time "t". The result of using the additional information is a less variable trend component and a more variable cycle component than using the basic filter.

Figures 1 and 2 track three variables namely, the log real GDP (output), the trend (permanent) component, and the cyclical (transitory) component. A visual inspection of these series reveals that during expansions, output has a trend growth rate of just over 1 percent per quarter. A recession begins with a drop to a lower growth rate, which continues (probabilistically) on average, for about five quarters. Following the beginning of the reduction in trend growth rate, a shorter sequence of discrete reductions to the level of the transitory component can reduce the level of the transitory component by about 4 percent in a typical recession, contributing a bit more to the movements in output than the discrete reductions to the growth rate of the permanent component. Finally, in the recovery phase the effect of the reductions to the transitory component gradually wears off.

FIGURE 1: REAL GDP (IN LOGS) AND THE ESTIMATED COMPONENTS USING THE BASIC KALMAN FILTER

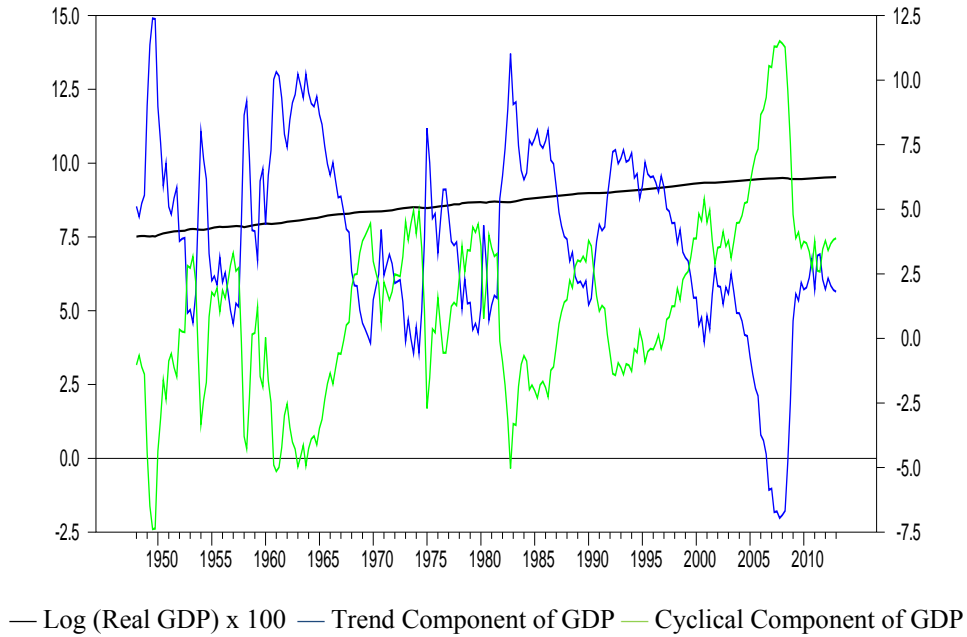


Source: Author's own calculations

The estimated components also suggest that real GDP has highly variable movements in their trend component that look similar to the raw series themselves. In addition, Fig. 2 reveals some important characteristics of the real GDP series which should be captured by a sensible model. First, the long-run growth rate (trend component) is certainly not constant over time. The most important break seems to occur around 1973, but other changes in the drift rate may happen in the late eighties and early nineties. Secondly, around the trend, there seems to exist a pronounced cycle with troughs in 1950, 1954, 1957, 1961, 1975, 1981, 1983, 1991, and 2008. The cycle movements are the difference between the raw data series and the trend component. These movements do not coincide with the NBER business cycle. Thirdly, the seasonal variation is time varying. And fourthly, U.S. output growth appears to have experienced a significant decrease in volatility in the early to mid-1980s. This “Great Moderation,” as it has come to be known, was discovered initially by Kim and Nelson

(1999) and McConnell and Perez Quiros (2000) and has since been confirmed by many others. The consensus in the literature is that the reduction in volatility occurred as a structural break in the first quarter of 1984 for U.S. GDP. In order to capture the volatility reduction in a parsimonious way, one additional “proportional parameter” for real GDP was added. The parameter is a scalar proportional change in the variance for the series¹.

FIGURE 2: REAL GDP (IN LOGS) AND THE ESTIMATED COMPONENTS USING THE KALMAN SMOOTHER



Source: Author's own calculations

3.2. Results

Table 1 presents summary statistics for the real GDP series. The min and max values are 7.48 and 9.53, respectively. The mean value of the logarithm of the real GDP is 8.625 with a standard deviation of .618.

TABLE 1: SUMMARY STATISTICS, (1947:1-2013:1)

Minimum	Maximum	Mean	Std. Deviation
---------	---------	------	----------------

Real GDP	7.48	9.53	8.6225	.61805
----------	------	------	--------	--------

The maximum likelihood estimates of the parameters in the UCM as well as the results regarding their statistical significance are all reported in Table 2.

TABLE 2: MAXIMUM LIKELIHOOD ESTIMATES OF MODEL PARAMETERS

Description	Parameter	Estimate	Standard Error	p-Value
Log Likelihood Value	mlv	852.8672		
S.D. of permanent component	$\sigma_{\eta y}$	0.0058	0.0009	0.000
S.D. of cyclical component	$\sigma_{\epsilon y}$	0.0007	0.0018	0.714
Real GDP Drift	M	0.0078	0.0005	0.000
Correlation between Components	$\rho_{\eta\epsilon y}$	0.008	0.4475	
1 st AR parameter	Φ_1	1.5074	0.0709	0.000
2 nd AR parameter	Φ_2	-0.5149	0.0716	0.000

Perron and Wada (2005) argue that it is important to include a structural break in the drift term in the first quarter of 1973 for U.S. real GDP. While the break in the drift term is statistically significant with a p-value less than 0.00005, including the break in the drift term does not have any qualitative effect on the rest of the results. Morley, Nelson and Zivot (2003) tested the restriction of zero correlation between the trend and cyclical components in U.S. real GDP and found that they could reject Clark's (1987) zero-correlation restriction. In contrast, Perron and Wada (2005), found that including a one-time break in the drift of real GDP results in estimates similar to those of Clark. The baseline model in the discussion that follows includes the break in the drift term for real GDP.

The estimates in Table 2 and the estimated trend component of real GDP presented in Fig. 2 clearly indicate the existence of a stochastic trend that is responsible for a large portion of the overall fluctuations in the series, even when allowing for structural breaks in the mean and variance of the growth rate. It is evident that movements in the trend component are highly variable.

In addition, the output gap follows an AR(2) process and the estimated coefficient are 1.507 and -.515, respectively. The estimates of the autoregressive parameters are relatively small, suggesting that most of the persistence of U.S. real GDP is captured in the trend component. Finally, the estimates indicate that the correlation between trend and cyclical innovations for real GDP is positive (0.008) but statistically insignificantly different from zero.

The estimate of the trend component, shown in Fig. 2, looks very similar to the real GDP series. This result is common to the Beveridge-Nelson (1981) decomposition of U.S. real GDP and the findings of Morley, Nelson and Zivot (2003) and Morley (2007a). Transitory movements do not correspond to the traditional view of a “cycle,” but provide some support for models where the economy’s movements are driven by real shocks with temporary adjustment to those shocks (e.g. Prescott, 1987, and Kydland and Prescott, 1982).

4. CONCLUSION

In this paper, we examined the trend and cyclical movements in U.S. real GDP as well as the relationships between them over the period 1947-2013. According to the results, there is supporting evidence of the existence of a stochastic trend that is responsible for a large portion of the overall fluctuations in the time series, allowing for structural breaks in the mean and variance of the growth rate.

The estimated components suggest that the real GDP has highly variable movements in their trend component that look similar to the series themselves. In addition, the innovations to the trend component and the cycle component are positively correlated. It is evident that movements in the trend component are highly variable. The output gap follows an AR(2) process and the estimated coefficient suggest that most of the persistence of U.S. real GDP is captured in the trend component. Transitory movements provide some supportive evidence for models where the economy’s movements are driven by real shocks with temporary adjustment to those shocks.

NOTES

1. Allowing for this structural break in the first quarter of 1984 does significantly improve the fit.

REFERENCES

- Basistha, A. and Nelson, C. R. (2007). New Measures of the Output Gap Based on the Forward- Looking New Keynesian Phillips Curve. *Journal of Monetary Economics*, 54(2), pp. 498 - 511.
- Beveridge, S. and Nelson, C. R. (1981). A New Approach to Decomposition of Economic Time Series into Permanent and transitory Components with Particular Attention to Measurement of the Business Cycle. *Journal of Monetary Economics*, 7, pp. 151-174.
- Canova, F. (1998). Detrending and business cycle facts. *Journal of Monetary Economics*, 43 (3), pp. 475 - 512.
- Clark, P. K. (1987). The Cyclical Component of U.S. Economic Activity. *The Quarterly Journal of Economics*, 102, pp. 797 - 814.

- Clark, P. K. (1989). Trend Reversion in Real Output and Unemployment. *Journal of Econometrics*, 40(1), pp. 15 - 32.
- Gali, J. (1999). Technology, Employment, and the Business Cycle: Do Technology Shocks Explain Aggregate Fluctuations? *American Economic Review* 89, pp. 249-71.
- Gali, J. and Gertler, M. (1999). Inflation dynamics: A structural econometric analysis. *Journal of Monetary Economics*, 44(2), pp. 195 - 222.
- Harvey, A. C. (1997). Trends, Cycles and Autoregressions. *Economic Journal*, 107(440), pp. 192 - 201.
- Harvey, A. C. (1989). *Forecasting, Structural Time Series Models and the Kalman Filter*. Cambridge and New York: Cambridge University Press.
- Harvey, A. C. and Albert, J. (1993). Detrending, stylized facts and the business cycle. *Journal of Applied Econometrics*, 8(3), pp. 231 - 247.
- Hodrick, R. J. and Prescott, E. C. (1997). Postwar U.S. Business Cycles: An Empirical Investigation. *Journal of Money, Credit, and Banking*, 29(1), pp. 1 - 16.
- Kim, C. J. and Murray, C. J. (2002). Permanent and transitory components of recessions". *Empirical Economics*, 27, pp. 163 - 183.
- Kim, C. J. and Piger, J. (2002). Common stochastic trends, common cycles, and asymmetry in economic fluctuations. *Journal of Monetary Economics*, 49, pp. 1189 - 1211.
- Kim, C. J., Piger J. and Startz R. (2007). The dynamic relationship between permanent and transitory components of U.S. business cycles. *Journal of Money, Credit and Banking*, 39, pp. 187 - 204.
- King, R. G., Plosser C. I. and Rebelo S. T. (1988). Production, growth and business cycles. *Journal of Monetary Economics*, 21, pp. 309 - 341.
- King, R. G., Plosser C. I., Stock J. H. and Watson M. W. (1991). Stochastic trends and economic fluctuations. *The American Economic Review*, 81, pp. 819 - 840.
- Kydland, F. E. and Prescott, E. C. (1982). Time to Build and Aggregate Fluctuations. *Econometrica*, 50(6), pp. 1345 - 1370.
- MacKinnon, J. G. (1996). Numerical Distribution Functions for Unit Root and Cointegration Tests. *Journal of Applied Econometrics*, 11, pp. 601 - 618.
- McConnell, M. and Perez-Quiros, G. (2000). Output Fluctuations in the United States: What has changed since the early 1980s? *American Economic Review*, 90(5), pp. 1464-76.
- Morley, J. C. (2007a). The Slow Adjustment of Aggregate Consumption to Permanent Income. *Journal of Money, Credit, and Banking*, 39, pp. 615 - 638.
- Morley, J. C., Nelson, C. R. and Zivot, E. (2003). Why Are the Beveridge-Nelson and Unobserved-Components Decompositions of GDP So Different? *The Review of Economics and Statistics*, 85(2), pp. 235 - 243.
- Orphanides, A. and Van Norden, S. (2002). The Unreliability of Output-Gap Estimates in Real Time. *The Review of Economics and Statistics*, 84, pp. 569 - 583.
- Perron, P. and Wada, T. (2005). Let's Take a Break: Trends and Cycles in U.S. Real GDP. *Journal of Monetary Economics*, Elsevier, 56(6), pp. 749 - 765.
- Prescott, E. C. (1987). Theory Ahead of Business Cycle Measurement. Carnegie-Rochester Conference on Public Policy 25, pp. 11 - 44.
- Rudd, J. and Whelan, K. (2007). Modelling inflation dynamics: A critical survey of recent research. *Journal of Money, Credit and Banking*, 39(1), pp. 155 - 170.

- Sinclair, T. M. (2009). The Relationships between Permanent and Transitory Movements in U.S. Output and the Unemployment Rate. *Journal of Money, Credit and Banking*, 41(2-3), pp. 529 - 542.
- Watson, M. W. (1986). Univariate Detrending Methods with Stochastic Trends. *Journal of Monetary Economics*, 18, pp. 49 - 75.
- Weidner, J. and Williams, J. C. (2009). How Big Is the Output Gap?" Federal Reserve Bank of San Francisco Economic Letter (June 12).

CULTURAL TOURISM AND OTTOMAN MONUMENTS IN CHIOS, GREECE

PANORAIA POULAKI* ,
DIMITRIOS LAGOS** and MARIA NTOUMI***

ABSTRACT

The cultural tourism has grown rapidly in Greece in the recent years. It is about a kind of tourism which has attracted the attention and the interest of many people. Cultural tourism is based on the search and the participation in spiritual, emotional and psychological experiences. People, who visit cultural attractions, aim at gathering new information and experiences in order to satisfy their cultural needs. The Ottoman Monuments play an important role in the cultural heritage of the island. They are great historical monuments which prove the history and the culture of other people of another era. The historical and cultural richness of the island combined with the increased turnout of Turkish visitors could contribute decisively to the tourism and economic development of the island. The objective of this paper is to examine and discuss the current situation of the cultural tourism in Chios. Moreover, we aim at the investigation of the contribution of Ottoman Monuments in tourism development. In order to satisfy the objectives of this survey we conducted a primary research through questionnaires. Although, the investigation revealed that the cultural tourism hasn't been developed satisfactorily in Chios, there are many possibilities – prospects to be developed. Prerequisites are the cooperation of all the officers and the implementation of a plan which will target at the promotion and development of tourism.

Keywords: Cultural tourism; ottoman monuments; development of tourism; Chios.

1. INTRODUCTION

Cultural tourism is defined as the movement of people to cultural attractions and cultural heritage resources of a place. When we refer to cultural heritage, we mean landscapes, historical - archaeological sites, religious sites, museums, traditional

* Ph.D. Student, Department of Business Administration, University of the Aegean, Chios, Greece

** Professor of Tourism Economics and Tourist Business Management, Department of Business Administration, University of the Aegean, Chios, Greece

***Adjunct Lecturer of Quantitative Methods, Department of Business Administration, University of the Aegean, Chios, Greece

villages, cultural events, etc. It is a kind of tourism of special interest and is based on the search and participation in aesthetic, spiritual, emotional and psychological experiences.

Culture and cultural heritage are concepts with great importance. This is not something static and fixed, but something that evolves over time. The process of evolution and change in which it subjects, is perfectly normal, and it continuously receives stimuli, pressures, attitudes and values that either accepts, rejects or integrates.

Culture is a system that includes the highly spiritual, material, intellectual and emotional features that characterize a society or a group. It does not include only the arts and letters, as many believe, but also the lifestyle, value systems, traditions and the culture of a society. In simple words, culture is intangible and tangible, mobile and stationary (Moutafi, 2002). Culture includes family patterns, folklore, social customs, museums, monuments, historic structures, artefacts, natural history, and even areas of wilderness (MacDonald and Jolliffe, 2003).

Cultural heritage is the power of tradition, fuelled by the presence of monuments in the everyday human environment. Undoubtedly, this presence is assured only through the appropriate institutions and appropriate projects and the creation of museums. In order to experience the natural heritage, the appropriate education system is required. Only then, under the appropriate circumstances, the person feels strongly and loudly the desire to protect his legacy as a truly conscious, sensitive and passionate guardian of it.

As far as the tourists who have special interests are concerned, they come into contact with a learning process associated with fun. More specifically, they know better the object; they discover the deeper meanings which are inherent therein and they enrich their knowledge. At the same time, they have the opportunity to come into contact with others who have common interests, which makes the visit more enjoyable and creative. By doing so, the value of this site is fully realized. (Moscardo, 1996).

The protection of the artefacts of culture and religion is not only a moral duty, but it is an interest because the cultural heritage is a great treasure. Undoubtedly, the monuments, which are the first elements of the civilization, are a source of prestige for the country and the key basis for handling various national affairs. The purpose of the cultural tourist is the experience of "culture", i.e. they are interested in the different lifestyles (Hughes, 1996). Visits to historical sites and museums, are related to historical tourism or heritage tourism (Smith, 1989).

It is generally accepted that culture and tourism are strongly linked and support each other, as those who travel to a destination often seek to know the culture. An important dimension of cultural tourism is that the tourists are interested in cultural monuments and cultural events mainly of religious content.

2. THE FRAMEWORK FOR THE DEVELOPMENT OF CULTURAL TOURISM IN GREECE AND INTERNATIONALLY

In recent years, a new trend which concerns a growing interest in history, culture and religion has been internationally observed. It happens due to globalization, as the world is becoming smaller and the culture is in a sense homogenized (Smith, 2003). The tourism of cultural heritage is the major attraction for international tourists and an important source of revenue. The management of cultural heritage is now a global phenomenon which is responsible for providing and maintaining cultural heritage and is important for the development and promotion of tourism. In this way the cultural heritage has become an important pillar of tourism's sustainable development.

Of course, the majority of cultural elements - symbols are used by various countries as tourist attractions. The recording of a region in the list of World Cultural Heritage converts it in an important tourist attraction. There have been several discussions about the exact size and growth of tourism always in relation to the cultural heritage.

According to UNESCO: "Cultural tourism encourages the revival and survival of traditions and restore sites and monuments. In contrast, the hasty and imprudent development of tourism can bring opposite results".

Cultural tourism is considered as the oldest form of tourism. In ancient Greece the first movements were recorded as tours during which people go to know other cultures. The visiting of historical sites and of cultural landscapes, the monitoring of specific facts and events and the visiting of museums were always part of the overall tourist experience.

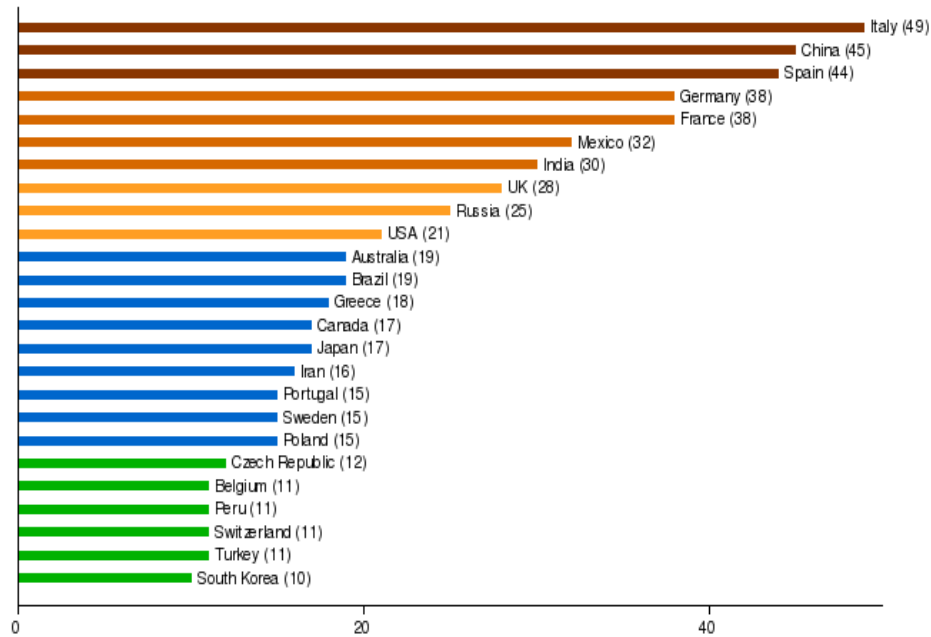
Greece is a country with significant cultural heritage which is called upon to harness the opportunity offered to elevate the cultural development in a top priority within the European Union. The remarkable cultural wealth can clearly be an important pole of attraction, both specialists and ordinary citizens, who can combine the enjoyment of these tourist destinations by visiting places of historical interest.

The elements of culture can be regarded the same time as tourist resources such as art forms, customs and traditions of the region related to local tradition, history, religion, structured environment, natural environment or mixed natural and structured environment and cultural events (Tsartas, 1996). It is generally accepted that the cultural heritage of Greece is a very powerful incentive tourist attraction for tourist destinations. The cultural heritage is an essential resource that should be strictly protected in order to safeguard the quality of life, the quality of the tourism experience and of course the future of historic cities.

It is important for each country to include in the list of UNESCO monuments and sites of the natural and cultural heritage. This commitment concerns the country that will protect itself and will operate management and protection plans and at the same time it ensures the assistance of the international community in these efforts. Greece

has included 18 seats in the list, of which six are religious - cultural monuments, such as Meteora, Mount Athos, early Christian and Byzantine monuments of Thessaloniki, the archaeological site of Mystras, the Monasteries of Daphni, Saint Loukas, Nea Moni and the historic center (Chora) with the Monastery of Saint John the Theologian and the Cave of the Apocalypse (Moiras, 2009: 159-163).

TABLE 1: UNESCO WORLD HERITAGE SITES



Source: UNESCO World Heritage Sites, 2013

To conclude, it has been observed that the protection of cultural heritage is the duty of both individuals and government agencies worldwide. There should be particular emphasis on the preservation of cultural heritage and they should aim to ensure the combination of tourism development with the policy for culture and diversity, resulting from the history of each place. The development of cultural tourism can give impetus to tourism development. Cultural - historical resources of the host sites ensure the attractiveness of tourist destinations and the special contribution to development.

Moreover, the natural beauty and the proper management of tourism resources of Greece can contribute to the development of cultural tourism, which was popular in the past. Cultural tourism can affect the local economy by creating new job

opportunities and increase the national income. Also, it can enhance the learning of residents, appreciation, awareness and national identity.

3. OTTOMAN MONUMENTS IN THE PREFECTURE OF CHIOS

Chios is the fifth largest island in Greece and is considered by many to be the island of Homer. It is known for its unique product, mastic, which is produced only in this part of the world. It keeps alive the culture through customs and traditions that are still part of everyday life. Byzantium, and the Genoese domination that followed, have bequeathed the island with very unique architectural monuments and settlements.

It is an island that has a particularly important and interesting cultural heritage. It disposes many Byzantine Monuments and many remarkable archaeological findings, rich exhibits at museums, castles, monasteries, churches, etc. The remarkable religious - cultural attractions, monasteries and churches are an integral part of the national heritage and attract tourists who may be part of the propellant development of the cultural tourism. Nea Moni of Chios, because of its exceptional importance in terms of the History of Art and Architecture, belongs to the monuments that have been declared as UNESCO World Heritage protected by UNESCO.

There are many elements that make up cultural tourism, such as: Churches, Monasteries, Museums, archaeological - historical sites, traditional villages, customs, traditions, traditional music, the art of pebble, the mosaic art etc.

TABLE 2: HISTORICAL AND RELIGIOUS MONUMENTS AND MUSEUMS OF CHIOS

Historical - Religious Monuments and Museums of Chios	
Orthodox Christian Monuments	Museums
Early Christian Basilica, Emporeios	Archaeological Museum of Chios
Early Christian Basilica St. Isidore (4th c.)	Byzantine Museum of Nea Moni
Nea Moni (1042) (World Heritage UNESCO)	Byzantine Museum "Palataki" Castle of Chios
Saint Georgios Sikousis (12th or 13th century)	Folklore Museum of Kallimasia
Krina Lady (1287)	Folklore Museum Public Library Chios' Adamantios Korais "
Holy Apostles Pyrgi (13th c.)	Museum Citrus (Kampos)
Lady Sicily (13th c.)	Maritime Museum, etc.
Holy Archangels Monastery (Nenita) (1305)	Catholic Christian Monuments

Agia Markella (Volissos) (1500)	S. Nicola Bari
Monastery Moundon (Diefcha) (1582)	S. Felice
Taksiarchis Anavatos (1882)	Catholic Cemetery (Kofinas), etc.
Holy Monastery of Panagia Myrtidiotissa (1887)	Ottoman Monuments
Metropolis of Chios (1888)	Metzitie Mosque or Sultan Metzit Mosque
Lady Evangelistria	Bairakli Mosque
Monastery of Our Lady Voitheias	Chamidie Mosque
Jewish Monuments	Baths (Castle of Chios)
Jewish Cemetery	Seminary (Castle of Chios)
Jewish Quarter (Castle of Chios)	Baths (Square of Chios)
Jewish Inscriptions, etc.	Fountains, etc.

Source: Poulaki, 2013

The Ottoman Monuments of Chios are quite impressive. These are monuments that remind us the history, the culture, the art and architecture of other people and another era. It is worth to mention some of the most important monuments, such as, Chamidie Mosque (built in 1892), the Osmanie Mosque, the Ottoman Baths, Square of Chios (now Municipal Gallery) and Land of Mufti as well as the following:

3.1. Metzitie Mosque or Sultan Metzit Mosque

Various monuments vouch the long possession of Chios by the Turks. In the eastern part of the square rises a Mosque which was built in 19th century and retains its minaret and the courtyard fountain. After the liberation, it was used as the Archaeological Museum and now it houses the Byzantine and post-Byzantine findings. In the town of Chios two more mosques are saved which are not maintained in good condition (Fig. 1).

FIGURE 1: METZITIE MOSQUE



3.2. Cemetery Ottoman (Turkish Cemetery)

In the Castle there is the old cemetery of prominent Ottomans. There, many important Turks are buried from 1822 until 1890, including Kara - Ali, Captain Pasha of the Turkish fleet whose flagship blew Constantine Kanaris in 1822. His tomb stands having a sarcophagus form with two columns. The graves of the cemetery have artistic value. They belong to the Turkish baroque, but they are influenced by the Modern Greek folk decorative (Monioudi Gavala 2001: 55), (Fig. 2).

FIGURE 2: CEMETERY OTTOMAN (CASTLE OF CHIOS)



3.3. Bairakli Mosque or Mosque Bairakli

It is located in the Byzantine Castle of Chios and was built in the early 20th century, at the ruins of an older mosque. The same position was a Genoese church. At the entrance, in front there is an Ottoman inscription (Monioudi Gavala 2001: 57).

3.4. Ottoman Baths, Castle of Chios (Fig. 3)

Also, at the Byzantine Castle of Chios the Turkish bath is rescued complex with the characteristic domed roofs. A second Turkish bath was found near the perimeter of the castle, southwest of the first (Monioudi Gavala, 2001: 59).

FIGURE 3: OTTOMAN BATHS (CASTLE OF CHIOS)



3.5. Ottoman Seminary or Medrese (The Turkish School)

The Ottoman School is located in the churchyard of St. George's Castle. Historical sources indicate that the functioned as Ottoman Seminary. However, an Arabic inscription above the entrance door indicates that the building functioned as a grammar school.

3.6. Melek Pasha Fountain (1768)

The existence of many fountains expresses the love of Ottomans for the water and its benefactions. The epigrams of this Fountain are the most basic characteristic of it. The west side of the Melek Pasha declares the Chian origin. The north side stresses that he is knowledgeable and admirer of Greek history and believes that Alexander the Great would resurrect when he drinks a glass of tap water. Finally, the eastern side

shows the sympathy to the people of Chios, because he found water and gave it to the people (Fig. 4).

FIGURE 4: MELEK PASHA FOUNTAIN (1768)



3.7. Fountain Abdul Hamid (Square of Chios, 19th c.)(Fig. 5)

FIGURE 5: FOUNTAIN ABDUL HAMID



3.8. Kampos' Fountains

Additionally, important elements of Chios's cultural heritage are cultural events, customs, cultural centers, historical - archaeological sites and traditional villages that are presented in Table 3.

TABLE 3: ELEMENTS OF CHIOS' CULTURAL HERITAGE

Cultural Events - Customs
Agas in many villages (Halloween)
Rouketopolemos in Vrontados (Easter)
Mostra Thymianon (Halloween)
Fairs in villages (Summer)
Santa Clause pushers (Eve), etc.
Cultural Centers
Central Public Library "Adamantios Korais"
Homeric Cultural Center of Chios
Center of Culture and Special Tourism "George Kaloutas" etc.
Historical - Archaeological Sites
Castles, watchtowers, medieval villages, traditional village Kampos
Daskalopetra (Homer's Stone)
Caves (St Galaktos., Olympoi, Lithium)
Leper or Lovokomeio, etc.

Source: Poulaki, 2013

To conclude, it is recorded that the elements that make up the cultural tourism in Chios are numerous and interesting. Its development can bring many economic benefits to the island while it enhances both the sense of local identity and intercultural approach of people.

4. THE IDENTITY AND THE CHARACTERISTICS OF EMPIRICAL RESEARCH

A research was conducted in order for the current situation of cultural tourism in Chios to be reflected quantitatively to highlight the role of the Ottoman Monuments therein, and development measures that can lead to the development of cultural tourism through the contribution of Ottoman Monuments of Chios.

To carry out the research, we used a closed questionnaire in order to collect the necessary primary data so as to investigate the objectives. This research consists of three stages:

The first stage involves the designing of the questionnaire, emphasizing the creation of questions, to allow the use of quantitative analysis. We used, mainly closed questions with strictly specified range of answers and questions scoring according to the five-point Likert scale. In some questions the option "other" is shown, enabling respondents to supplement other information as they deem necessary and believe that they can help in the investigation.

The second stage involves the distribution of the questionnaire. The sampling method, that was used, was the stratified random sampling in order to ensure the highest possible rate of representativeness of the sample, by separating the population

to basic categories of workers to independent homogeneous sub-populations, and the random selection of people from them. The empirical investigation was conducted during the period March - May 2014. Respondents were men and women aged from 18 years to 65+ employees in organizations involved with tourism in Chios. The basic aim was to gather a sufficient number of questionnaires that would allow the verification of affairs investigation.

The third stage involves the processing of data using the software SPSS 21.00 and Excel and of course the demanding statistical analysis of the results.

The respondents that were selected to participate in this survey were workers: at Chios Municipality and the Region of Northern Aegean (involved in tourism), at companies that rent cars, at companies that rent rooms, travel agencies and hotels on the island. 150 questionnaires were distributed, 93 of them were correctly and fully completed. The number of responses was considered satisfactory, to ensure both the effectiveness of statistical processing, and export reliable scientific conclusions.

The sample has the following features by category:

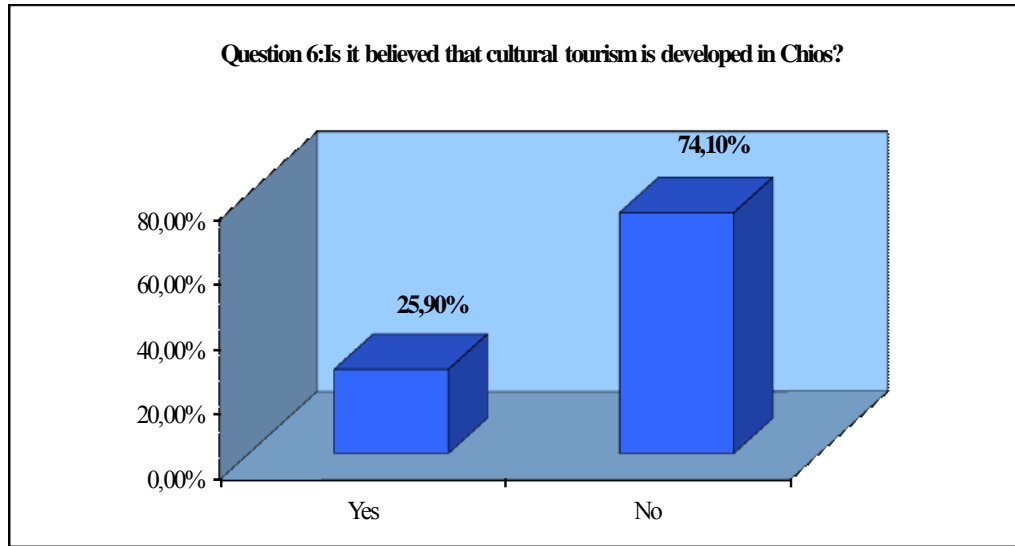
- As far as the institution to which the respondent is employed is concerned: 22.3% work at rented rooms, 21.4% at tourist offices, 20% at hotels, 18.8% at the municipality Chios, 10.5% at the North Aegean Region and 7% at car rental business.
- Regarding the gender: 37.6% of the respondents are men and 62.4 % are women. The majority of women are employed in tourist offices and rooms.
- As far as the age is concerned there are six age groups. The first age group includes people with age below 25 years and amounts to 4.7% of the sample. The second age group includes people aged 25-35 years and concentrates 30.6%. The third age group includes people aged 35-45 years and shows a percentage of 44.7% which is the highest. Below the age of 45-55 years we have a percentage of 8.2%. Then, we have the group of 55-65 years with a rate of 7.1% and finally respondents aged over 65 years who collect 4.7%.
- Regarding the educational level: both the secondary school graduates (42.4%) and university graduates (48.2%) have high rates and cover the 90% of the entire sample. In the sample there are primary school graduates with 4.7% and postgraduate qualifications holders with the same rate.

5. PRESENTATION OF THE RESULTS OF EMPIRICAL RESEARCH

From the questions that are included in the questionnaire we obtained data concerning the present state of cultural tourism in Chios and the role of the Ottoman Monuments. Moreover, policy measures are suggested as far as the development of cultural tourism in the contribution of these Monuments is concerned.

The present state of cultural tourism in Chios is reflected through four questions. Respondents believe that cultural tourism is not developed on the island (Figure 5.1).

FIGURE 5.1: THE CULTURAL TOURISM IN CHIOS



More specifically, the majority (74.1%) of the total sample considers that cultural tourism is not developed in Chios and only 25.9% that is developed (Figure 5.1).

Moreover, respondents estimate that this alternative form of tourism can be developed in their area (Figure 5.2).

The vast majority of the sample (92.5%) expressed the view that cultural tourism can be developed in Chios as opposed to a low percentage of 7.5% which supports the opposite view (Figure 5.2).

Also, regarding the question whether local authorities should invest in cultural tourism in order to increase overall tourism on the island or not, the highest percentage concerns the positive view (Figure 5.3).

The largest percentage (88.2%) of the total sample agreed that local authorities should occupy with cultural tourism and only the 11.8 % held the opposite view (Figure 5.3).

The responsibility for the development of cultural tourism is allocated. Respondents were asked to answer about the degree of responsibility for the development of cultural tourism between the State, local authorities, local and tourist agents (Figure 5.4).

FIGURE 5.2: THE ABILITY OF DEVELOPMENT OF CULTURAL TOURISM IN CHIOS

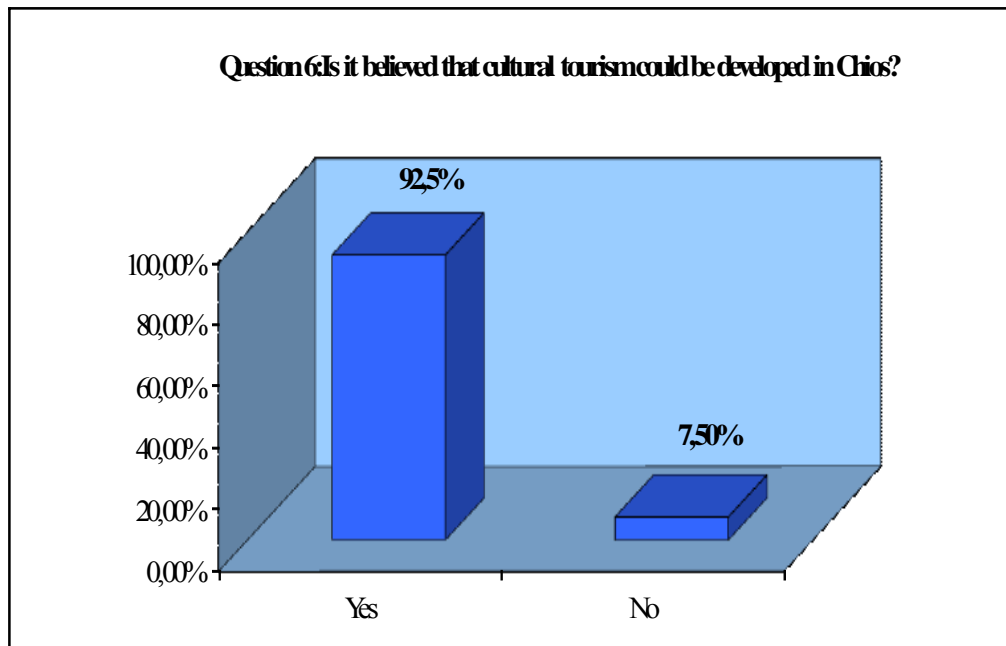


FIGURE 5.3: THE ROLE OF LOCAL AUTHORITIES

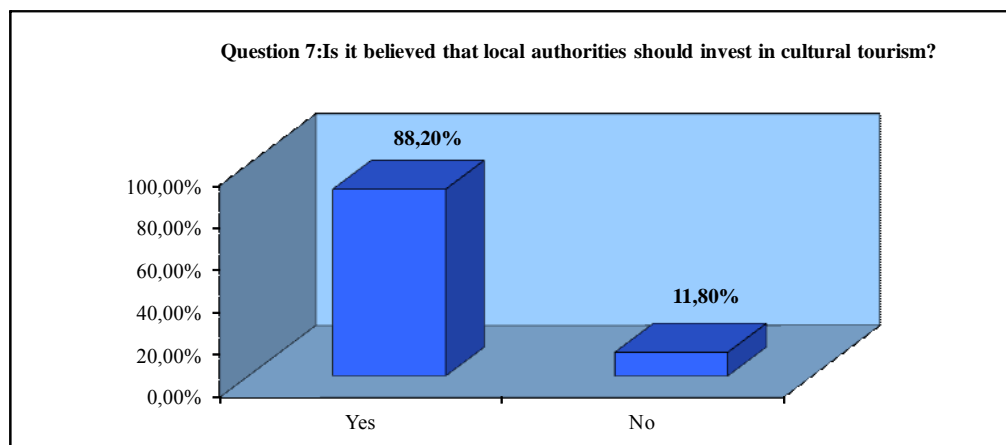
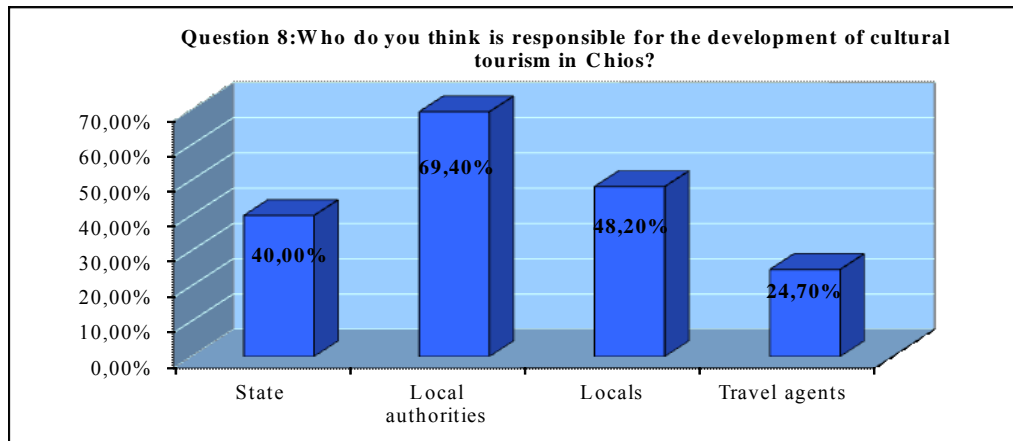


FIGURE 5.4: THE RESPONSIBLE FOR THE DEVELOPMENT OF CULTURAL TOURISM



According to the respondents the main responsibility (69.4%) belongs to local authorities. The State and the locals exhibit about the same percentage (40%) concerning liability of travel agents it occupies 24.7% (Figure 5.4)

The role of Ottoman Monuments in the cultural tourism of the island is reflected through four questions. Respondents believe that the Ottoman Monuments can contribute to the development of cultural tourism on the island (Figure 5.5).

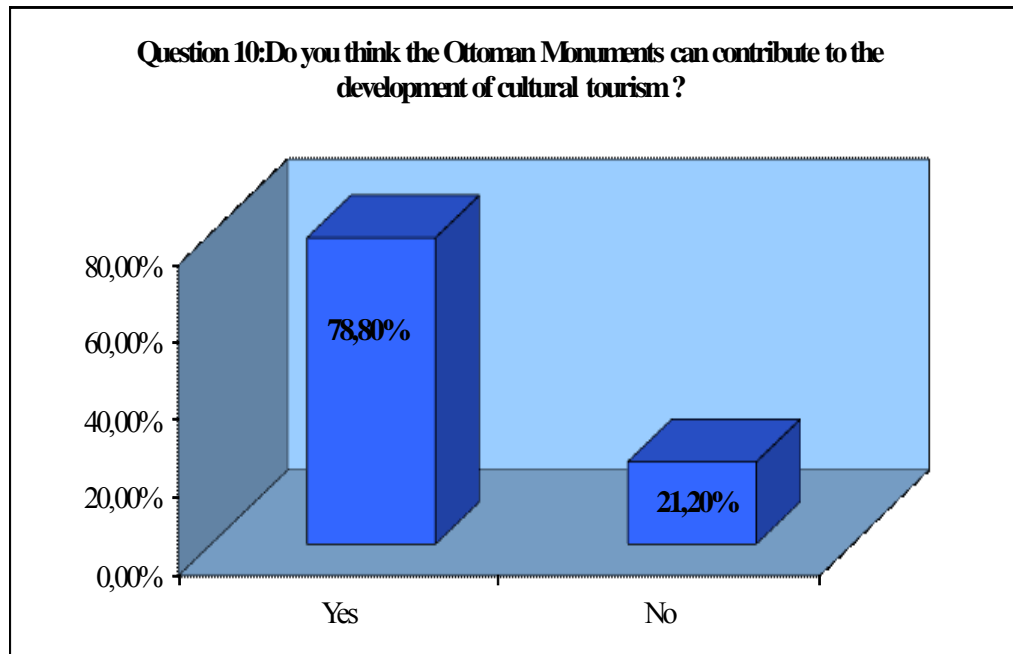
The majority (78.8%) of the entire sample is positive regarding the contribution of the Ottoman Monuments and only the 21.2% of them have a negative view (Figure 5.5).

As far as the importance of Ottoman Monuments of Chios is concerned, the paradox that arises is that respondents were unaware largely of the existence of all these Monuments (Figure 5.6).

According to respondents, the most important Ottoman Monument is Metzitie Mosque (74.1%). Then, we have the Bairakli Mosque (62.4%), the Ottoman Cemetery (51.8), the Ottoman Baths of the Castle (49.4%) and the Ottoman Seminary (27.1%). The lowest positions were occupied by Fountains of the island and the Land of Mufti (Figure 5.6). It is worth noting that the first in importance are considered the Ottoman Monuments located in the town of Chios and are more prominent.

Respondents argue that there should be an active state and local intervention in order to highlight the Ottoman Monuments (Figure 5.7).

FIGURE 5.5: THE POTENTIAL OF OTTOMAN MONUMENTS



The largest percentage of 60.7% of the total sample considers that the active intervention concerns mainly the Metztie Mosque. Below we have the Bairakli Mosque (53.6%), the Ottoman Baths of the Castle, the Ottoman Cemetery (47.6%) and the Ottoman Seminary (45.2%). Lower rates are occupied by the fountains of the area (Figure 5.7).

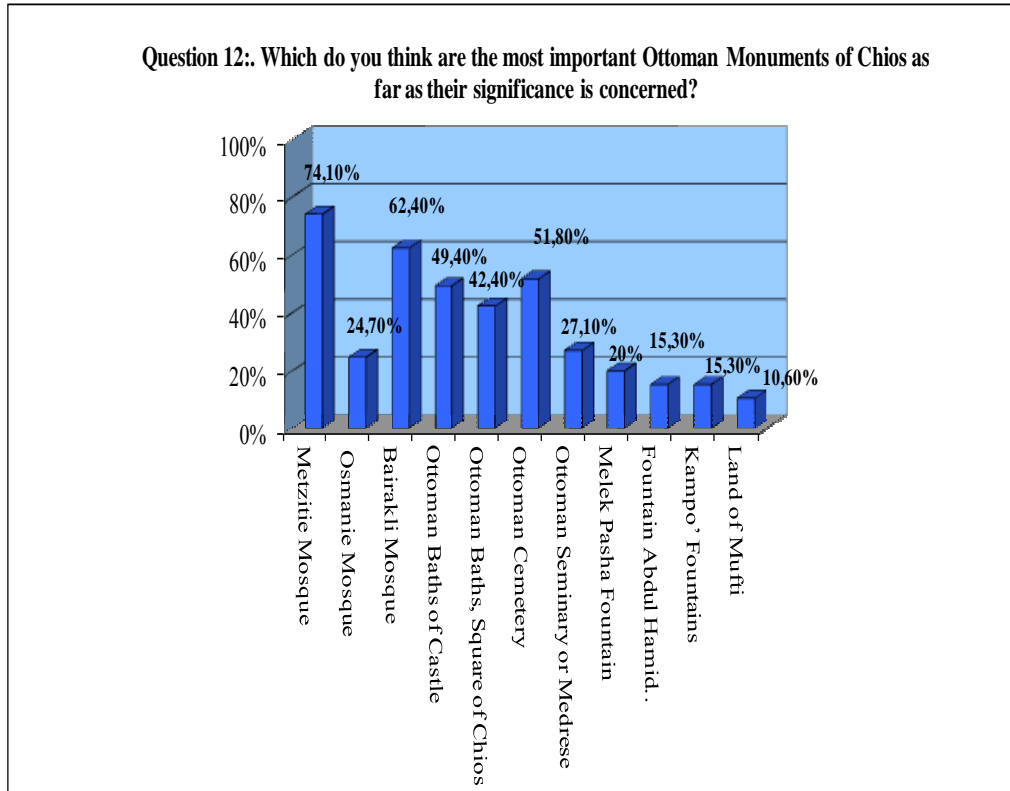
Measures regarding the development of cultural tourism in Chios with the contribution of Ottoman Monuments are presented through three questions in the questionnaire.

As far as the measures which should be taken for the development of cultural tourism in Chios are concerned, it was noted that 71.8% of all respondents believe that the way of exploiting the monuments should be changed. The 65.9% of them support that the promotion of Monuments should be enhanced, while 32.9% believe that it is necessary to improve the existing infrastructure. Also, both the culture and education regarding cultural tourism must be changed (36.5%) and the disposition of the locals (24.7%). Finally, 15.3% of the respondents believe that it is necessary to adjust the values.

As it was noted in the previous paragraph, the use of Monuments is one of the key policy measures that can support the development of cultural tourism. Regarding the

Ottoman Monuments, which are the subject of this research, the ways in which these Monuments can contribute substantially to the development of cultural tourism in Chios were investigated.

FIGURE 5.6: THE IMPORTANCE OF THE OTTOMAN MONUMENTS

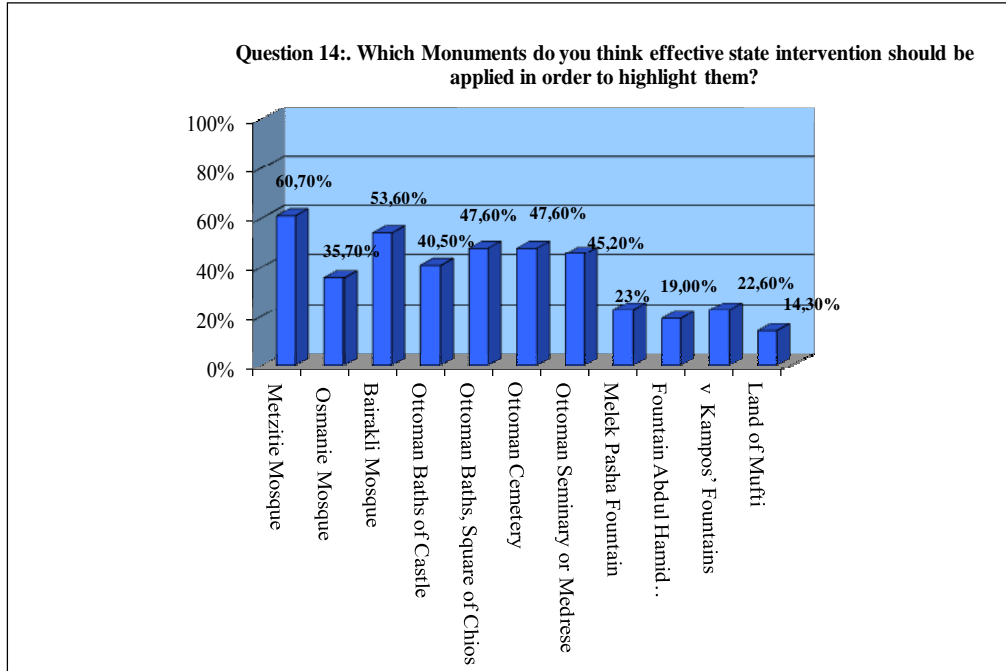


Concerning the ways in which Ottoman Monuments contribute to the development of cultural tourism in Chios estimates of respondents vary. More specifically, the majority of the sample (36.4%) estimates that the promotion of monuments will contribute substantially. In addition to this view, we have to add that important role advertising plays (23.5%), the use of monuments (15.8%), the preservation (13.5%), and events related to cultural tourism (10.1%) and the change of culture (0.7%).

An essential element for the completion of the survey was considered the evaluation of existing measures of the conservation, the recovery of Ottoman Monuments and the organization of relevant cultural events and opening hours.

As far as the majority of the respondents are concerned, the answer “very much” at both five options exceeds 50%. A greater proportion (67.1%) gathers both the use of monuments and the promotion - advertising. Much smaller percentages, mostly single digits, indicate the options "not at all" to "moderate." Noteworthy is the fact that respondents have identified the need for immediate intervention at all levels regarding the Ottoman Monuments in order to be a key growth engine for cultural tourism in Chios.

FIGURE 5.7: MONUMENTS THAT NEED GOVERNMENT INTERVENTION



6. CONCLUSIONS AND POLICY MEASURES

The systematic processing of the results which went before as far as the research's objectives led to the following conclusions:

Regarding the current situation of cultural tourism in Chios, it was estimated according to the respondents that cultural tourism is not developed. Responsible for this very little development of this alternative form of tourism are the State, local authorities, locals and tour operators.

However, it was ascertained that there is an urgent need for the development of cultural tourism on the island given that it has a unique cultural heritage and numerous great Ottoman Monuments that can contribute towards it. Undoubtedly, local authorities must be activated targeted as they have the greatest part of responsibility. The measures that must be taken must include both the development of Monuments of the region, and their promotion. In addition to these, the creation of appropriate infrastructure, the reduction of services' price, the susceptibility and the culture of the locals can contribute decisively.

The Ottoman Monuments of the island possess a significant position among others and, of course, they can play a key role at the development of cultural tourism. However, in order to gain a dynamic role they should be displayed more – to be promoted - be maintained, be developed at the best possible way and to be included in cultural events which are held during the year on the island.

In conclusion, we have to highlight that in order to achieve a successful outcome of all the above, it is crucial, on the part of the stakeholders, to inform themselves about the existence of these monuments and the situation in which they come. Undoubtedly, knowledge of the strengths of Monuments of Chios will lead to the development of cultural tourism.

REFERENCES

- Angelis, V. (2004). *Ειδικά θέματα Ποσοτικής Ανάλυσης I* [Special Topics in Quantitative Analysis I] Academic Tradition, Chios, Department of Business Administration.
- Angelis, V. (2004). *Ειδικά θέματα Ποσοτικής Ανάλυσης II* [Special Topics in Quantitative Analysis II] Academic Tradition, Chios, Department of Business Administration.
- Angelis, V. (2009). *Μη Παραμετρική Στατιστική* [Non Parametric Statistics] Academic Tradition, Chios, Department of Business Administration.
- Avgerinos - Cologne, S. (2000). *Ο ρόλος του τουρισμού στην διατήρηση και ανάπτυξη των ιστορικών πόλεων* [The role of tourism in the preservation and development of historic cities] in Tsartas P. (ed.), *Tourism Development: Multidisciplinary Approaches*, Athens, Sextant.
- Bachleitner, R., and Zins, A. (1999). Cultural Tourism in Rural Communities: The Residents' Perspective. *Journal of Business Research*, 44, 3, pp 199 - 209.

- Baloglu, S. and McCleary, K. W. (1999). A model of destination image formation. *Annals of Tourism Research*, 26, 4, pp. 868 - 897.
- Beerli, A., Martin, J. D. (2004). Factors influencing destination image. *Annals of Tourism Research*, 31(3), pp. 657 - 681.
- Boniface, P. (1998). Tourism culture. *Annals of Tourism Research*, 25, 3, pp. 46 - 749.
- Briassoulis, H. (2002). Sustainable tourism and the question of the commons, *Annals of Tourism Research*, 29(4), pp. 1065 - 1085.
- Bowitz, E. and Ibenholt, K. (2009). Economic impacts of cultural heritage – Research and perspectives. *Journal of Cultural Heritage*, 10, pp. 1 - 8.
- Coccossis, X., Tsartas, P. Grimpa, El. (2011). *Ειδικές και Εναλλακτικές Μορφές Τουρισμού* [Special and alternative forms of tourism] Athens, Kritiki SA.
- Coccossis, C. and Tsartas, P. (2001). *Βιώσιμη Τουριστική Ανάπτυξη και Περιβάλλον, Τουρισμός και Αναψυχή* [Sustainable Tourism Development and the Environment, Tourism and Recreation] Athens, Kritiki SA.
- Coccossis, H. and Mexa, A. (2004). *The Challenge of Tourism Carrying Capacity Assessment*, Ashgate Publishing: Aldershot.
- Drule, A. M. et al. (2012). A new perspective of non-religious motivations of visitors to sacred sites: evidence from Romania, *Procedia - Social and Behavioral Sciences*, 62, pp. 431 - 435.
- Fleischer, A. (2000). The tourist behind the pilgrim in the Holy Land. *International Journal of Hospitality Management*, 19, 3, pp. 311 - 326.
- Galani - Moutafi, B. (2002). *Research on Tourism in Greece and Cyprus*, Athens, Propompos.
- Gartner, W. C. (1994). Image formation process. *Journal of Travel & Tourism Marketing*, 2(2-3), pp. 191-216.
- Gee, C. Makens, J., and Dexter, C. (2001). *Travel and tourism industry*, Athens, Ellin Publisher.
- Gesler, W. (1996). Lourdes: healing in a place of pilgrimage, *Health & Place*, 2(2), pp. 95 - 105.
- Getz, D. and Carisen, J. (2005). Family Business in Tourism State of the Art. *Annals of Tourism Research*, 32, pp. 237 - 258.
- Go, F. Lee, M. R. and Russo. A. P. (2003). E-heritage in the globalizing society: enabling cross-cultural engagement. *Information Technology & Tourism*, 6, pp. 1 - 14.
- Greek National Tourism Organization. (2003). *In the footsteps of Paul the Apostle in Greece*, Athens.
- Gunn, C. (2000). *Tourism planning: basics, concepts, cases*, Routledge: New York and London.
- Gursoy, D., Jurowski, C., and Uysal, M. (2002). Resident attitudes, A structural modeling approach. *Annals of Tourism Research*, 29(1), pp. 79 - 105.
- Haberle, S.G. and Chepstow Lusty, A. (2000). Can Climate Influence Cultural Development? A View through Time. *Environment and History*, 6(3), pp. 349 - 369.
- Halkia - Stephanou P. (2003). *Τα Μοναστήρια της Χίου* [The Monasteries of Chios], Athens, Eptalophos.
- Harrison, J. Museums and Touristic Expectations. *Annals of Tourism Research*, 24(1), 1997, pp. 23 - 40.
- Igoumenakis, N. (1991). *Πολιτική του Τουρισμού* [Tourism policy], Athens, Interbooks.

- Igoumenakis, N. (2000). *Τουρισμός και Ανάπτυξη* [Tourism and development], Athens, Interbooks.
- Javeau, C. (2000). *Η έρευνα με ερωτηματολόγιο. Το εγχειρίδιο του καλού ερευνητή* [The questionnaire survey. The handbook of good researcher] Tzannone - Georgie, K. (ed. – trans.), Athens, Typothito, Dardanians.
- Jenkins, O.H. (1999). Understanding and Measuring Tourist Destination Images, *International Journal of Tourism Research*, Int. J. Tourism Res. 1, pp.1-15.
- Kyriazi, P. (1999). *Η κοινωνιολογική έρευνα* [The sociological research], Athens, Greek Letters.
- Lagos, D. and Christogianni, P. (2006). *Η ανάπτυξη του θρησκευτικού τουρισμού στην Ελλάδα* [The development of religious tourism in Greece] in Vogiatzis A. (ed.), *Festschrift Mary Negreponi - Delivanis*, Thessaloniki, University of Macedonia.
- Lagos, D. (2005). *Τουριστική Οικονομική* [Tourism Economics], Athens, Kritiki SA.
- MacCannell, D. (2001). *The commodification of culture*, in Smith (ed), *Hosts and Guests Revisited*.
- McKercher, B. and du Cros, H. (2003). Testing a Cultural Tourism Typology. *International Journal of Tourism Research*, 5, pp. 45 - 58.
- Monioudi – Gavala, D. (2001). *The Castle of Chios, the fortifications and the walled city from the Middle Ages to the present day*, Papiros, Chios.
- Moira, P. (2009). *Θρησκευτικός Τουρισμός* [Religious Tourism], Athens, Interbooks.
- Morinis, E.A. (1992). Pilgrimage in the Hindu Tradition: A Case Study of West Bengal, Delhi. *Annals of Tourism Research*, 19, pp. 51 - 67.
- Morrison, A. M. (2001). *Στρατηγικός σχεδιασμός τουριστικού μάρκετινγκ* [Strategic Planning Tourism Marketing] 2th ed., Athens, Ellin.
- Nicholas, L. N., Thapa, B. and Y. J. Ko. (2009). Residents' perspectives of a world heritage site. The Pitons Management Area, St. Lucia. *Annals of Tourism Research*, 36(3), pp. 390 - 412.
- Nolan, M.L. and Nolan, S. (1992). Religious sites as tourism in Europe. *Annals of Tourism Research*, 19, pp. 68 - 78.
- Polyzos, S. (2010). *Ο Θρησκευτικός Τουρισμός στην Ελλάδα: Χωρική ανάλυση και συμβολή στην ανάπτυξη των μειονεκτικών περιοχών* [Religious Tourism in Greece: Spatial analysis and contribution to the development of disadvantaged regions], *Series Research Papers*, 16(9), pp. 203 - 222.
- Poulaki, P. (2013). *Προοπτικές ανάπτυξης του Θρησκευτικού Τουρισμού στον Νομό Χίου* [Prospects for the development of Religious Tourism in the Prefecture of Chios], Thesis, Graduate Program “Design, Management and Tourism Policy”, Chios, University of the Aegean.
- Raptis, Ch. (2007). *Θρησκευτικός Τουρισμός: ευκαιρίες και προοπτικές ανάπτυξης στην Ελλάδα* [Religious tourism: opportunities and growth prospects in Greece] Thesis, Volos, EKKDA.
- Rodosthenous, P. (2012). *Θρησκευτικός και Προσκυνηματικός Τουρισμός στην Κύπρο. Ποιμαντική Προσέγγιση* [Religious and Pilgrimage Tourism in Cyprus . Pastoral Approach] PhD Thesis, Thessaloniki, Aristotle University of Thessaloniki, School of Theology - Faculty of Theology.
- Shepherd, R. (2002). Commodification, culture and tourism, *Tourism Studies*, 2, pp.183.

- Silberberg, T. (1995). Cultural tourism and business opportunities for museums and heritage sites. *Tourism Management*, 16(5), pp. 361 - 365.
- Stebbins, R. A. (1996). Cultural Tourism as Serious Leisure. *Annals of Tourism Research*, 23(4), pp. 948 - 950.
- Stephanou, A. (1963). *Τα μνημεία της Χίου* [The Monuments of Chios], Piraeus, Zenon 28, pp. 135-140.
- Terkenli, T. (2002). Landscapes of tourism: towards a global cultural economy of space? *Tourism Geographies*, 4(3), pp 227 - 254.
- Tsartas, P. (2010). *Ελληνική τουριστική ανάπτυξη: χαρακτηριστικά, διερευνήσεις, προτάσεις* [Greek tourism development: Features, investigations, recommendations], Athens, Kritiki SA.
- Tsartas, P. (1996). *Τουρίστες, ταξίδια, τόποι: κοινωνιολογικές προσεγγίσεις στον τουρισμό* [Tourists, travels, places: sociological approaches in tourism], Athens, Exantas.
- UNESCO. (2002a). *Cultural Landscapes. The Challenges of Conservation*, Ferrara, Unesco World Heritage Center.
- UNESCO. (2004). *Monitoring World Heritage*, Paris, Unesco World Heritage Center.
- UNWTO. (1995). *Tourism 2020 Vision*, Madrid.
- Venetsanopoulou, M. (2006). *Η κρατική συμβολή στον τουρισμό, εναλλακτικές μορφές τουρισμού* [The State Contribution to Tourism, Alternative Tourism], Athens, Interbooks.
- Werthner, H. and Ricci, F. (2004). E-Commerce and Tourism. *Communications of the ACM*, 47(12), pp. 101 - 105.
- World Economic Forum. (2011). The Travel and Tourism Competitiveness Report 2011, Managing in a Time of Turbulence, *World Economic Forum*, Geneva, Switzerland.
- World Economic Forum. (2013). The Travel and Tourism Competitiveness Report 2013, Managing in a Time of Turbulence, *World Economic Forum*, Geneva, Switzerland.
- Zolotas, G. (1921-1928). *Η ιστορία της Χίου* [History of Chios], Volume C2, Athens. Sakellariou.

REGIONAL INNOVATION AND INDUSTRIAL POLICY IN THE EUROPEAN UNION: A TECHNICAL EFFICIENCY APPROACH

AIKATERINI KOKKINO^{*}

ABSTRACT

Taking into consideration the slowdown and the effects created by the current financial crisis, this paper aims to provide insights into the level of technical efficiency and policy planning in an attempt to reach a better understanding of the contribution of alternative policies to technical efficiency growth. At the same time it focuses on one of the key factors influencing the competitiveness of European Union, namely efficiency enhancement, mainly through innovation and industrial activity. Moreover, this paper investigates the impact of industrial and innovation policy at strengthening the competitiveness of producers by promoting competition, ensuring access to markets and establishing an environment which is conducive to innovation and R&D, taking into consideration that lack of innovative capacity stems, not only from deficiencies in the research base and low levels of R&D expenditure in European Union, but also from weaknesses in the links between research centers and businesses, and slow adoption of information and communication technologies.

Keywords: Technical efficiency; policy planning; efficiency function; productivity; innovation policy; industrial policy.

1. INTRODUCTION

More recently, the role of regional efficiency of the economic growth and competitiveness enhancement has become even more important, taking into consideration the slowdown in the European Union economy, and the effects on the business environment created by current financial crisis. Thus European regions have a very important role in creating opportunities making an important contribution to economic growth and development. Overcoming any shortages or laggings and increasing efficiency has become critical for competitiveness and economic growth.

However, European Union regions are characterized as being very heterogeneous since they differ from their endowments of resources, as well as from the characteristics involved in their productive activities. For this reason, it is of great

^{*} Post-Doctoral Researcher, Economic Geography, Regional Development and Territorial Planning Laboratory, Department of Geography, University of the Aegean, Mytilene, Lesvos, Greece

Acknowledgement: This paper has been completed under the "IKY Fellowships of Excellence for Postgraduate Studies in Greece – Siemens Program".

importance on the one hand to analyze their efficiency level and potential, and on the other hand to analyze the factors which determine their efficiency potential.

Efficiency measures can be defined as relative productivity over time or space, or both. More specifically a measure of evaluating the performance at producer level is productive efficiency through production frontier, a concept which compares the transformation process of converting input into output. As Reifschneider and Stevenson (1991) declared, if the occurrence of inefficiency is not totally random, then it should be possible to identify factors that contribute to its existence. In this case estimating these efficiency measures involves estimating the unknown production frontier. Each production process involves a production frontier: the current state of technology in the industry, representing the maximum output attainable from each input level called the efficiency frontier (Coelli et al., 2005). A producer operating on the efficiency frontier is productively efficient. One of the core methods to estimate and analyze efficiency levels is through the stochastic frontier approach.

One important aspect of the recent empirical literature on efficiency measurement is the analysis of production frontiers, the relationship between input and output and the adjoining sources of efficiency. Better understanding of the process of generating efficiency, requires studying the deeper determinants and factors which explain the differences in efficiency growth. In response to this most important research issue, particularly at regional level, and with the increase in regional data availability, also in the European Union economic literature has shown a resurgence of interest in testing and quantifying various theories of explaining regional efficiency growth and examining the corresponding relationships:

1. What are the reasons for diverging efficiency among different regions?
2. Which factors contribute to regional efficiency differences?
3. How does the efficiency of a region evolve over time, with respect to technical progress and other related determining factors?

This paper considers a European Union perspective efficiency analysis to increase the information base and derive broader conclusions about European Union productive performance. This issue is of particular research relevance because empirical evidence shows that even though the European Union regions are widely analyzed with respect to performance, yet little attention has been paid to the estimation of technical efficiency.

Within this framework it is of great importance to examine which determinants are significant. However, it is also important, to examine whether the interactions between technical progress and the process of the integration into the economy, has any implications for technical efficiency. Special emphasis is given to the review of two of the main heterogeneity determining factors, namely innovation policy (as a proxy of knowledge creation environment) and industrial policy (as a proxy of knowledge dissemination environment).

2. TECHNICAL EFFICIENCY: THE CONCEPT AND THE BASIC MODEL

Efficiency represents the degree of success by which producers achieve allocating the inputs they have at their disposal and the outputs they produce in an effort to meet their objective. The objective of producers might entail the production of given outputs at minimum cost or the utilization of given inputs to maximize revenues or the allocation of inputs and outputs to maximize profit. Nevertheless in real economic life, producers are hardly fully efficient (contrary to the neoclassical approach assumptions). Two otherwise identical firms never produce the same output, and costs and profit are not the same. This difference in output, cost, and profit can be explained in terms of technical and allocative inefficiencies, as well as a range of unforeseen exogenous shocks. Given the resources (inputs), a producer is said to be technically inefficient if he/she fails to produce the maximum possible output.

Within the economic growth process therefore, efficiency of resources becomes a critical element in economic growth, through utilising available resources more productively. Within this framework, economies increase their productivity in two ways: microeconomic and macroeconomic. Microeconomic gains take place within an enterprise as it invests, trains workers, innovates and competes, whereas macroeconomic gains occur when the overall economy reorganizes, and shifts resources, so they produce more than before.

Therefore, efficiency or productivity of resources becomes a critical factor in economic growth for ensuring sustainable increase in the production of goods and services; and productivity theory literature has emphasized factors such as technological spillovers, increasing returns, learning by doing, and unobserved inputs (e.g. human capital), whereas the empirical industrial organization literature has emphasized the degree of openness of countries to imports and industry structure (Koop, 2001).

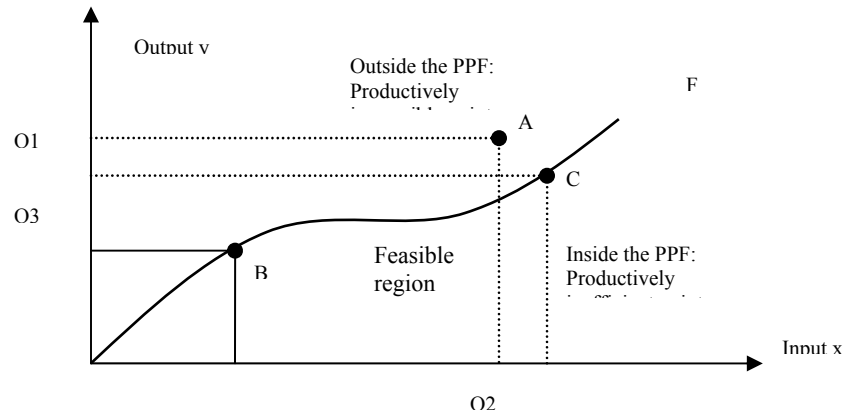
Figure (1) represents a simple production process. A single input (x) is used to produce a single output (y). The production frontier is OF showing the relationship between input and output, namely the maximum output attainable from each input level, regarding the state of technology.

The feasible production set is the set of all input – output combinations which are feasible. It consists of all points between production frontier OF' and the x -axis. All the points on the production frontier are technically efficient, whilst all the points below or lying to the right of the efficient frontier are technically inefficient (Wang et al., 2002). If what a producer actually produces is less than what it could feasibly produce then it will lie below the frontier. The distance by which a producer lies below its production frontier or above its cost frontier is a measure of the producer's inefficiency (Bera and Sharma, 1999). The further below the production frontier a producer lies, the more inefficient it is. The points along the production frontier define

the efficient sub-set of this feasible production set and they show the technically efficient combinations of input and output. On the other hand, the points beneath the production frontier show the non – technically efficient combinations, respectively. In this figure, e.g. point (A) is inefficient; points (B) and (C) are efficient points.

Technological change, innovation and technology creation and diffusion are important factors to economic progress. This involves advances in technology that may be represented by an upward shift in the production frontier. This is presented in the following figure (2) by the movement of the production frontier from 0 to 0F₁ in period 1:

FIGURE 1: PRODUCTION FRONTIERS AND TECHNICAL EFFICIENCY



Source: Based on Coelli et al. (2005)

In period 1, all firms can technically produce more output from each level of input, relative to what was possible in period 0.

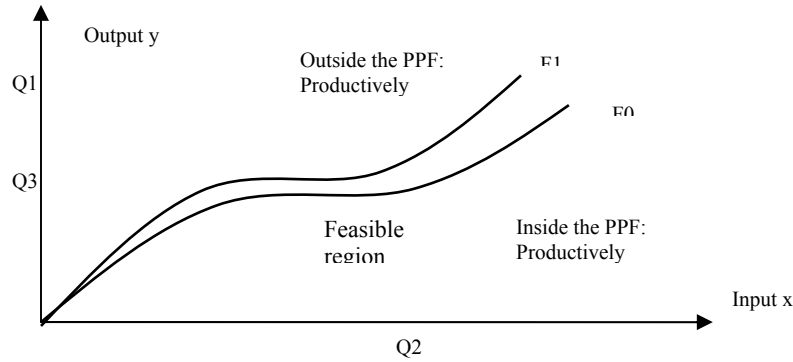
When we observe that a producer has increased productivity from one period to the next, the improvements may not have come from efficiency improvements alone, but may have come due to a technical change or the exploitation of scale economies, or by a combination of these three factors (Coelli et al., 2005). Based on Wang (2007), if R&D resources are not used effectively, additional investment may be of little help in stimulating economic growth.

Generally, the stochastic production function model takes the form:

$$\ln y_i = x_i\beta + v_i - u_i \quad (1)$$

Where, v_i is a symmetric random error to account for statistical noise.

FIGURE 2: PRODUCTION FRONTIERS AND TECHNICAL EFFICIENCY



Source: Based on Coelli et al (2005)

Statistical noise arises from the unintended omission of relevant variables from the vector \mathbf{x}_i , as well as from measurement errors and approximation errors associated with the choice of functional form. The model is called stochastic frontier production function because the output values are bounded from above by the stochastic (random) variable $\exp(\mathbf{x}_i \boldsymbol{\beta} + v_i)$. The random error v_i can be positive or negative and so the stochastic frontier outputs vary about the deterministic part of the model, $\exp(\mathbf{x}_i \boldsymbol{\beta})$.

The component (v) is a symmetric normally distributed error term, that represents factors that cannot be controlled by production units, measurement errors, and left-out explanatory variables. On the other hand the component (u) is a one-sided non-negative error term representing the stochastic shortfall of producer i 's output from his/her production frontier due to technical inefficiency. In this context, technical efficiency reveals the maximum amount by which output can be increased using the same level of inputs and technological conditions.

The most common output – oriented measure of technical efficiency is the ratio of observed output to the corresponding stochastic frontier output:

$$TE_i = \frac{y_i}{\exp(\mathbf{x}_i \boldsymbol{\beta} + v_i)} = \frac{\exp(\mathbf{x}_i \boldsymbol{\beta} + v_i - u_i)}{\exp(\mathbf{x}_i \boldsymbol{\beta} + v_i)} = \exp(-u_i) \quad (2)$$

This measure of technical efficiency takes a value between zero and one. It measures the output of the i^{th} firm relative to the output that could be produced by a fully – efficient firm using the same input vector. The first step in predicting the technical efficiency TE_i , is to estimate the parameters of the stochastic production

frontier model. Inefficiency as a measure of the magnitude of sub-optimal performance, is represented by the asymmetric error term in the stochastic frontier model. As technical efficiency enhancement becomes an increasingly important issue, production must draw on a wide range of production ideas, component technologies and complementary capabilities. Within this framework it is rather difficult for any single industry to incorporate and take advantage of the relevant technological advances, as well as the underlying industrial and innovation policies. This means that the actions of industries involve the targeted development of specialized knowledge assets that are integrated from a wider range of knowledge areas (Kessler, Bierly, and Gopalakrishnan, 2000).

3. PRODUCTIVE EFFICIENCY AND INSTITUTIONAL CONTEXT: INDUSTRIAL AND INNOVATION POLICY IN EUROPEAN UNION

Growth and competitiveness become contingent on the ability of firms to compose, establish and maintain external interfaces (Nicholls-Nixon and Woo, 2003), to choose the right mode of governance (Fey and Birkinshaw, 2005) and to link these effectively to internal knowledge accumulation and capability development.

European industrial, technology and innovation policies are no longer exclusively in the hands of national authorities: increasingly, national initiatives are supplemented by or even competing with regional innovation policies or transnational programmes, in particular the activities of the European Union. At the same time, industrial innovation increasingly occurs within international networks. Research, technology and innovation policies of European countries clearly reflected the profiles of their national (and regional) 'innovation systems', understood as the various institutions, corporate actors and processes contributing to industrial and societal innovation.

The innovation policies of the European Union (Guzzetti, 1995) played a noticeable, but not yet a dominant role in the national contexts, at least not in the bigger member states (Kuhlmann, 2001).

The spectrum of implemented instruments of research, technology and innovation policy is widely differentiated in the meantime, reflecting the scope of institutions and interests involved: it stretches from public funding of research institutions over various forms of financial incentives to the conducting of research and experimental development in public or industrial research labs, up to the design of an innovation-oriented infrastructure, including the institutions and mechanisms of technology transfer. In many European countries, these instruments dominated the practice or research and technology policy for the last three decades. Further instruments, are efforts to guide public demand, measures in education and further training and the regulatory possibilities available. In the 21st century, though the national and (regional) innovation systems are experiencing revolutionary shockwaves: the growing pull of internationalising economic relationships has mixed up traditional

regional or national divisions of work between industrial enterprises, educational and research institutions as well as administration and politics, and it debased many of their traditional strengths. Internationalisation however, has so far not led to a uniformity of the national innovation systems, which would finally mean their abolition. The various national and regional innovation cultures and related policy arenas react very differently, which partly leads them into crises, partly stabilises, but also partly reveals unexpected, novel chances in a transformed international context. At the same time, European transnational innovation policies have been entering the stage, increasingly since 1985, nowadays covering the whole range of instruments (Kuhlmann, 2001).

4. INDUSTRIAL POLICY AND TECHNICAL EFFICIENCY

Sustainable development is a key concept within the industrial policy of the European Union. The key elements for the sustainable development policy concern the efficient use of resources encouraging the development of new productive technologies, extending the use of productivity and efficiency enhancement schemes and encouraging both innovative and productive activities. Within this context, the main role of industrial policy in the European Union is to provide the appropriate framework conditions and to make the European Union an attractive place for industrial development and employment creation.

One of the core targets of industrial policy is to influence the volume and composition of the European Union industrial output, primarily the manufacturing output, aiming to increase the volume of production and/or employment (Baldwin and Martin, 2006). More specifically, industrial policy refers to structural policies designed to strengthen the efficiency, scale and international competitiveness of industrial sectors within a country bringing about economic growth and development (Soete, 2007).

Industrial policy has been a cornerstone of economic policy in the European Union. During the 1970s and 1990s industrial policy shifted mostly towards support of high-tech industries. There is also a close relationship between the effectiveness of industrial policy and the level of development within an economy. Advanced countries have witnessed over the 1990s a major acceleration in the process of deindustrialisation with a more rapid growth in services following the diffusion of information and communication technologies (Petit and Soete, 2001).

However the first unitary concept of an industrial policy for the European Union appeared after the European Commission's proposal from the 1990s report 'Industrial Policy in an Open and Competitive Environment: Guidelines for a Community Approach', as a confirmation on the necessity of adopting industrial policy measures in a free trade economy. In 1993, the Commission published the white paper on

Growth, Competitiveness and Employment, underlining the meaning of the European economy's competitiveness in the new conditions, and the legal frame for European Union industrial policy was settled through the Treaty of Maastricht (Nica and Cuza, 2010). The incentives for an overall approach over an industrial policy of the European Union were the differences registered as compared to the economies of the United States and Japan, regarding growth rates, investment rates, R&D and innovation, and international trade, as well as the rise of the new competitors from South-East Asia.

Within this period the dominance of the industrial sector within European Union remains structurally very different between European member states, such as Germany or France which are still dominated by strong industrial presence. On the other hand there are cases of small member states which have witnessed rapid deindustrialisation over the 1990s but at the same time, nevertheless witnessed rapid growth in the industrial value added, such as Austria or Finland. However while applying certain measures at national level, the actions might become selective by aiming certain industries or industrial objectives. Certain industrial sectors are more vulnerable internationally, due either to market characteristics or to the insufficient development of the European industry compared to the world level. As a consequence, industrial policies were defined, aiming mainly to the competitive growth of the European industry, focusing on the following objectives (Nica and Cuza, 2010):

- Accelerating the adaptive process of the industry to the structural changes;
- Developing an environment in the favour of initiative and development of enterprises;
- Encouraging the favourable environment for business cooperation;
- Favouring the industrial potential of the research, technologic development and innovation policies (Dachin, 2006).

One of the main aims of industrial policy regards the encouragement of innovation, knowledge and research the European Union industrial policy builds a framework which aims to encourage private investments in R&D, and insure an optimal use of the public resources for industrial research. Furthermore encouraging investments in intangible assets and human capital is crucial, in order to maximize the efficiency of the current technology and its effects. In addition supporting entrepreneurship and developing industrial sectors is an objective that goes beyond the limits of the industrial policy, by joining actions of the educational policies, internal market, financial services and tax policy (Nica and Cuza, 2010). Certain fields require specific intervention, in order to improve the internal market, such as the financial or services markets, where the technical barriers and the legislative differences limit the free trade, in order to improve the economic environment, with special attention in areas which present the fastest technological progress. However the development objectives set at a European level cannot be reached without a tight interconnection of the industrial policy measures with those of some complementary policies, such as the

commercial policy, the single market policy, transport and energy policies, research and development policies, competition policy, regional and macroeconomic policies. While in these fields the policies are already coordinated, the sustainable development requirements, with the three development pillars: economic, social and environmental, require supplementary measures for coordinating the industrial policy with the associated policies and requirements. Thus the European Union must insure the balance between the different policies, and this balance must be followed at national level, within the limits of competency of the different member states (Nica and Cuza, 2010). On the other hand cohesion policies amount to an efficiency-based long-run strategy of 'catch-up growth', in which the interventions aim to accelerate catch-up growth and achieve cohesion policies, rendering industrial policy aims into increased growth and employment and the improved international competitiveness of European industrial sectors.

The nature and intensity of European industrial policy has drastically changed since the Rome Treaty (1957). This is due to the deepening of economic integration since the 1970s, the widening of its scope and the enlargement of the Union (Pelkmans, 2006). More specifically, the Rome Treaty (1957) did not have a clear industrial approach (apart from transport policy). Until reaching a unitary concept, the approaches on the European industrial policy passed through several stages. In the first stage during 1958-1975, national policies prevailed. During 1975-1985 a general tendency favouring the interventionist policies was observed. The Community measures were aiming to encourage the national efforts, and varied from subventions for the steel industry until granting funds for research and development projects and introducing commercial barriers in the trade with the countries from the rest of the world. In 2000 the Lisbon European Council set the objective of transforming the European Union in the most dynamic and competitive economy of the world. In 2004 EU's enlargement through the integration of the Central and Eastern European states represented a challenge for the European Union industrial policy, as the newly integrated states were to align to the industrial level of the European Union while maintaining and increasing the competitiveness of EU at a general level. After the first enlargement of the European Union in 2004 the Commission established the main action lines of the industrial policy in the new geopolitical conditions, through the communication titled 'Fostering structural change: an industrial policy for an enlarged Europe' (Nica and Cuza, 2010).

Currently competition, the efficiency of public and private services, and infrastructure are important determinants of industrial competitiveness in the European member states. In many member states, increasing competition in the network industries remains a challenge. Lengthy permitting procedures and public acceptance also constitute important obstacles to the development of infrastructure. A stronger enforcement of competition rules is necessary to reduce competition

distortions. Moreover today the competitiveness of European industry crucially depends on the quality and efficiency of the energy, transport and communication infrastructure services, with the upgrading and modernisation of these networks being rather essential. Transport networks need to be improved to overcome any related obstacles and improve cross-border connections. These improvements will require massive investments and the development of innovative financing solutions. According to the European Commission (2010), a new industrial innovation policy is needed to encourage the development of productive processes of goods and services, as well as the enhancement of productive efficiency.

Industrial policy of the European Union must offer solutions for industrial development. Such challenges concern globalization, the technological and organizational changes, the increasing role of innovation and entrepreneurship. Strategy framework for industrial policy must put technical efficiency and competitiveness of European industry at centre stage (European Commission, 2010):

- to adopt policies that have an impact on the cost, price and innovative competitiveness of industrial sectors, such as standardisation or innovation policies, or industrial policies targeting e.g. the innovation performance;
- to speed up the adjustment of industry to structural changes;
- to encourage an environment favourable to cooperation and development of firms throughout the Union;
- to foster better exploitation of the industrial potential of policies of innovation, research and technological development; and
- to consider the competitiveness effects of all other policy initiatives such as transport, energy, environmental or social and consumer-protection policies (Pelkmans, 2006).

European industry must also strengthen the knowledge base to remain competitive and to invest in research and innovation for a sustainable and inclusive economy. Most importantly science, technology and innovation play a significant role in increasing technical efficiency and are a driving force in international competition. Innovation policy is a broad concept that contains research and technology policy and often overlaps with industrial policy.

5. INNOVATION POLICY AND TECHNICAL EFFICIENCY

Innovation policy seeks to help firms or industries improve their capacity to innovate. This includes the provision of scientific infrastructure in research and education and direct and indirect support for research and technological development. It also includes a wide range of policies which aim to build networks, to make markets more conducive to innovation, to facilitate the transfer of technology, to help firms to acquire relevant capabilities, and to provide a supporting infrastructure in areas such as standards and intellectual property. Public innovation policy aims to strengthen the

competitiveness of an economy or of selected industries and to increase societal welfare through economic success (Kuhlmann, 2001). The European Union has made innovation a top priority through several strategies, funding opportunities and assessments. The pressures of globalisation have brought innovation to the fore as a key element in increasing productivity along with technical efficiency and underpinning industrial competitiveness, taking into consideration the under-investment in business R&D and other innovative activities, strongly linked to the fragmented condition of European markets.

Innovation policy is essential for the European Union's productive efficiency and an important driver in enabling the European Union to enhance competitiveness, increase efficiency and growth and consequently to compete on a global scale. However policy-makers also underlined the need for interaction between innovation policy and other policy areas to improve the environment for innovative enterprises (Nilsson, 2004, Chesbrough, 2002, Georghiou, 2006). After the Second World War, and increasingly since the 1970s, with the acceleration of high technologies, the industrialised countries developed a broad spectrum of technology policy intervention measures (Roobeek, 1990, Ergas, 1987). However neither industrial policy nor innovation policy was among the areas covered in the 1957 Treaty of Rome. By the early 1980s however, both had found a place among the European Commission's directorates (Guzzetti, 1995). The first research and technology development (RTD) programmes were designed and implemented in the early 1980s (Nelson and Winter, 1982; Dosi et al., 1988). This included broad programmes such as the European Strategic Programme for Research and Development on Information Technologies (ESPRIT) whose main goals were: i) to promote intra-European industrial cooperation through pre-competitive R&D; ii) to thereby furnish the European industry with the basic technologies that it needed to bolster its competitiveness through the 1990s; and iii) to develop European standards (European Commission, 1987) and the Basic Research in Industrial Technologies (BRITE) programme designed to help the European manufacturing industry to become more competitive (Mytelka and Smith, 2001). Since the 1980s the Community was trying to foster the creation of strategic industries, in line with the individual member states' efforts to promote national champions. In fact the objective was to foster cooperation, innovation and commercialization processes, where the role of Community institutions was mainly to enable and coordinate policies rather than dictate their contents (Triulzi, 1999).

Until the middle of the 1980s the Community had a research and technology policy of its own that more or less complemented national policymaking with a transnational dimension in order to create a European Research Area. The rationale behind this approach is that European economic integration in combination with the opportunities associated with the enlargement of the European Union and the challenges of economic and technological globalisation, functionally leads to an

integrated innovation policy approach in European Union. On top of the national and regional efforts and in parallel with Europe's economic and political integration, the emergence of a European innovation policy-making system can be traced. Its main pillar is the Framework Program, the first of which was established in 1984 and concentrated on industrial technologies, information technology, telecommunications and biotechnology. Each subsequent FP has been broader than its predecessor in its scope of technologies and research themes, with correspondingly higher expectations of its impact on the economy and society. The Framework Programmes are the instruments through which the Commission implements its scientific and technological research policy. The system of innovation approach lays emphasis on the interactive process in which enterprises in interaction with each other and supported by institutions and organisations – such as industry associations, R&D, innovation and productivity centres, standard setting bodies, university and vocational training centres, information gathering and analysis services and banking and other financing mechanisms – play a key role in bringing new products, new processes and new forms of organisation into economic use.

Into the 1990s Community innovation programmes sought to promote technology transfer across industries and regions in Europe, aiming at achieving competitiveness and productive efficiency. A few years later enhancing innovation became a cornerstone of the strategy to meet the target agreed by the European Council in Lisbon in March 2000 of the Union becoming the most competitive and dynamic knowledge-based economy in the world by the end of the decade, drawing attention to the interfaces between industries and financial markets, R&D and training institutions, advisory services and technological markets (Nilsson, 2004). The Lisbon European Council (2000) was an important milestone for the Community's approach to innovation policy. The so-called Lisbon strategy required the Union to become by 2010, "the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion". With the Lisbon strategy innovation gains increasing importance in the EU policy framework; the argument that firms' competitiveness in a globalized economy is increasingly dependent on the introduction of new products and services is emphasized. Innovation policies, previously framed within the context of research policy, begin to be considered as essential components of industrial policy strategies.

In 2002 the Barcelona European Council set a twofold objective requiring the Union to reach, by 2010, a level of R&D expenditure equal to 3% of European GDP (compared with 1.9% recorded in 2000), within which the level of private funding should increase up to two thirds of community R&D investments. Today innovation in EU is distributed right across the system in all European countries. European-level networking of key players in the innovation process links national innovation systems. On the national level the member states are expected to build national innovation strategies. Innovation system was considered to be a measure to build dynamic

clusters based on technologies with large growth potential. Innovation became a new industrial policy along with research policy, industrial policy, energy policy, or labour market policy. However policy-makers also underlined the need for interaction between innovation policy and other policy areas to improve the environment for innovation and technical efficiency (Nilsson, 2004). Nowadays within the European Union innovation policy framework, current trends and the resultant emerging industrial innovation activities focus mainly on Information and Communication Technologies (ICT) related topics. Information and Communication Technologies (ICT) enable the development of new services and increase the efficiency of existing services. Globalisation and internationalisation of innovative industries is important, as is the convergence between the technologically intense sectors and other sectors. Maintaining and strengthening Europe's industrial base is fundamental to securing the foundation and transformation of the EU economy and ensuring employment, social progress and cohesion.

On the other hand Europe's national innovation systems as well as their innovation performances differ substantially. Therefore member states have undertaken great efforts to improve their innovation support measures by investing in research and implementing new or better instruments in support of innovation. This level of financial engagement is at risk in the current global economic crisis and as a direct impact, the innovation gap in the EU is widening again. The implication of this is that innovation policy must consider the needs of a wide set of industries – policy initiatives need not be confined to a small group of highly innovative sectors. The European Union is challenged in the global arena by emerging economies when it comes to capturing and capitalising on knowledge and technology in the context of innovation. In the past few years, the budget for R&D has been increased and several initiatives have been launched to strengthen Europe's competitiveness. So far however these efforts have not made the EU more competitive. On the contrary, a decline can be seen and the EU is recognised as becoming less internationalised (Anvret, Granieri, and Renda, 2010). However the innovation policy of the large European member states has not yet taken the step towards a conscious and comprehensive international integration and co-ordination of their measures. The majority of public initiatives is still mainly developed in national policy arenas offered by national institutions, and addressed to national beneficiaries, borne by the implicit assumption that the research institutes, universities and enterprises involved, carry out their innovation activities entirely or for the most part within national boundaries, or at least with a significant relation to the own economy (Kuhlmann, 2001).

The majority of public initiatives are still mainly developed in national policies and are offered by national institutions. While for the last years member states increasingly tended to compete with each other in the field of innovation policy (Porter, 1990; Roobeek, 1990), strong industrial or financial capital actors have been

appearing more frequently on the scene - multinational enterprises, international strategic alliances of national enterprises - who act globally and across the national innovation systems (Meyer-Krahmer and Reger, 1999). In the member states of the EU this policy initially took the form of initiatives for stimulating research, improving innovation financing and promoting technology absorption and innovation management. Additional priorities like intensifying the cooperation between research, universities promote ‘clustering’ and other forms of cooperation among enterprises and other organisations involved in the innovation process and encouraging the start-up of technology - based companies were added to the national innovation policy (Nilsson, 2004).

Consequently, as part of the Europe 2020 strategy, the Commission launched in 2010 an ambitious new industrial policy that highlighted the actions needed to strengthen the attractiveness of Europe as a place for investment and production, including the commitment to monitor Member States competitiveness policies. The changing nature and scope of global innovation activities creates very significant consequences for the EU innovation policy, requiring a substantial review of the pillars of the EU innovation policy, involving both the scope and the governance of innovation at the EU and national level (Anvret, Granieri, and Renda, 2010). The European Union has identified the following key areas where the competitiveness of the EU economy could be further strengthened in order to make significant progress towards the Europe 2020 goals:

- facilitating structural changes in the economy, in order to move towards more innovative and knowledge-based sectors that have a higher productivity growth and which have suffered less from global competition;
- enabling innovation in industries, in particular by pooling scarce resources, by reducing the fragmentation of innovation support systems and by increasing the market focus of research projects;
- promoting sustainability and resource efficiency, in particular by promoting innovation and the use of cleaner technologies, by ensuring fair and undistorted pricing of energy and by upgrading and interconnecting energy distribution networks;
- improving the business environment, in particular by reducing the administrative burden on businesses and by promoting competition among service providers that use broadband, energy and transport infrastructure;
- benefiting from the single market, by supporting innovative services and by fully implementing the Single Market Regulation, in particular the Services Directive; and
- supporting small and medium-sized enterprises (SMEs). In particular, by favouring access to finance, by facilitating internationalisation and access to markets.

The EU industry must accelerate its efforts to adopt these technologies to keep its competitive edge in the world with research and innovation driving productivity growth and industrial competitiveness.

6. CONCLUDING REMARKS AND POLICY IMPLICATIONS

A transition towards a sustainable, resource efficient economy is paramount for maintaining the long-term competitiveness of European industries. Overall, European member states have made significant progress in defining and implementing consistent national legislative frameworks for stimulating efficiency. However some lack the experience and the administrative capacity to do this and for these countries the framework legislation at the EU level can provide guidance and support.

The quality and availability of infrastructure (energy, transport, and broadband) make an important contribution to an efficiency promoting environment. Industrial sectors need a modern public administration, able to deliver efficient and high quality public services. Coordinating clusters and networks improve industrial competitiveness and innovation by bringing together resources and expertise, and promoting cooperation among businesses, public authorities and universities. The EU industrial and innovation policies should aim to overcome existing market failures and funding gaps, especially to supply the bridge between technical efficiency and productivity enhancement.

European governments are in need of a more coherent and more coordinated approach towards industrial technical efficiency support. However, the pressure on public budgets adds to the urgency of this matter in different policy areas of industrial and innovation policy. The range of explicit innovation policies being applied is very much concerned with the supply side and even more with R&D support of various types, ranging from funding of science in public institutions through to fiscal incentives for firms to increase R&D spend. A comprehensive approach to industrial and innovation policy can be achieved by supporting markets for innovative goods and services and excellence in research in new technologies, including information and communication technologies (ICT), introducing a more focused strategy to facilitate the creation of areas for action, and in particular introducing a more focused strategy to facilitate the creation and marketing of new innovative products and services. Within the domain of industrial and innovation policy, regulatory reform is seen to affect innovation indirectly through affecting the funds available for investment, and directly through its impact upon the promotion of technical efficiency and productivity.

An open, efficient and competitive business environment is a crucial catalyst for growth in a global context. Improving the business environment covers policies in areas ranging from improving infrastructure to shortening the time needed to obtain a building license. In many cases, better institutional mechanisms need to be functioning as a single research area, business environment and innovation system. There need to be strategic approaches, which not only promote closer interaction among sectors but also among policy-makers (from different policy fields and different levels of

government). European innovation and industrial policy is therefore recommended to develop strategic approaches which integrate R&D, innovation and industrial policy along with a more coherent EU strategy for innovative competitiveness, giving special attention to ICT in innovation and industrial policy.

A new generation of policies has to overcome the limitations and failures of past experiences, such as collusive practices between political and economic power, heavy bureaucracy, lack of accountability and entrepreneurship. They have to be creative and selective, with decision-making mechanisms that are more democratic and inclusive of different social interests. These new approaches to industrial and innovation policies could play a key role in pulling Europe out of the current crisis. Industrial and innovation policy programmes and projects claim to contribute to technical efficiency. This implies that policies should concentrate on areas in which there is expansion and therefore good prospects for growth, community businesses are supposed to become more competitive and scientific and technological progress is expected to offer a medium - or long-term potential for dissemination and exploitation. An open, efficient and competitive business environment is a crucial catalyst for growth in a global context. Rising to these challenges can improve the competitiveness of European manufacturing industries, and the Commission aims to help the member states to use their limited resources efficiently in order to increase the global competitiveness of their industries. Addressing these challenges will improve the growth prospects of industries. A competitive industry can lower costs and prices, create new products and improve quality, contributing thus decisively to wealth creation and productivity growth throughout the economy.

The difficult fiscal environment sets limits to policy action, but robust growth will reduce the burden of public deficit and debt, in line with the goals of the Stability and Growth Pact. For this an environment that favours new ideas and new businesses is required. Innovation is the primary driver of a successful and sustainable industrial policy. A strong lead in R&D and innovation is Europe's key competitive advantage and of central importance in finding solutions to economic challenges. To achieve a truly sustainable, positive effect for manufacturing industry and the workforce it employs, the EU and its Members States should aim to avoid the relocation of manufacturing activities and related services (e.g., R&D, ICT) and support the permanent upgrading of European manufacturing industries.

Under this perspective, growth policies should focus on creating a favourable environment for the co-operation between firms and institutions that support the development and exploitation of knowledge and innovation and technical efficiency. 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.

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. Such cooperation and the networks that are formed, help to translate knowledge into efficiency opportunities. 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. This however, needs to happen not just in central regions where productivity and employment are higher and innovative capacity more developed but throughout the Union. Countries and regions need assistance in overcoming their structural deficiencies and in developing their comparative advantages. This means among others that encouraging the development of knowledge-based economic activities and innovation and that particular attention needs to be given to (ETEPS, 2011):

- 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 industries 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 technical efficiency and include among others the capacity of a regional economy to generate, diffuse and utilize knowledge and so maintain an effective production system.

REFERENCES

- Baldwin, R. and Martin, P. (2006). *Coordination of industrial policy in the European Union*, EIB PAPERS Volume 11, N°1: 135.
- Bera, A.K. and Sharma, S. C. (1999). Estimating Production Uncertainty in Stochastic Frontier Production Function Models. *Journal of Productivity Analysis*, 12, pp. 187 - 210.
- Chesbrough, H. (2002). *Open Innovation: The new Imperative for Creating and Profiting from Technology*. Harvard Business School Press.
- Coelli, T.J., Rao, D.S.P., O'Donnell, C.J. and Battese, G.E. (2005). *An Introduction to Efficiency and Productivity Analysis*. 2nd Edition. Springer.

- Dachin, A. (2006). Orientări în politica industrială – de la teorie la practică în Uniunea Europeană. *Revista de Economie Teoretică și Aplicată*, 10.
- Dosi G. (1988). Sources, procedures, and microeconomic effects of innovation. *Journal of Economic Literature*, vol. XXVI: 1120 - 1171.
- Ergas, H. (1987). Does technology policy matter? In: Guile, B.R., Brooks, H. (Eds.). *Technology and Global Industry. Companies and Nations in the World Economy*. National Academy Press, Washington, DC. pp. 191 - 245.
- European Commission. (2010). *An Integrated Industrial Policy for the Globalisation Era. Putting Competitiveness and Sustainability at Centre Stage*, COM (2010).
- European Commission (2005). European Commission Directorate General Joint Research Centre and Directorate General Research. *Monitoring Industrial Research: the 2005 EU Survey on R&D Investment Trends in 10 Sectors*, <http://iri.jrc.es/>
- Fey, C. F. and Birkinshaw, J. (2005). External sources of knowledge and performance in R&D organizations. *Journal of Management*, 31(4), pp. 597 - 615.
- Georgiou, L. (2006). *Effective innovation policies for Europe – the missing demand-side*. PREST, Manchester Business School, University of Manchester.
- Guzzetti, L. (1995). *A Brief History of European Research Policy*. Office for Official Publications of the European Communities. Brussels.
- Kessler, E., Bierly, P. and Gopalakrishnan, S. (2000). Internal vs. External Learning in New Product Development: Effects on Speed, Costs, and Competitive Advantage. *R&D Management*, 30(3), pp. 213 - 223.
- Koop, G. (2001). Cross – Sectoral Patterns of Efficiency and Technical Change in Manufacturing. *International Economic Review*, 42(1), pp. 73 - 103
- Kuhlmann, S. (2001). Future governance of innovation policy in Europe-three scenarios. *Research Policy* 30, pp.953 - 976.
- Meyer-Krahmer, F. and Reger, G. (1999). New perspectives on the innovation strategies of multinational enterprises: lessons for technology policy in Europe. *Research Policy* 28, pp. 751 - 776.
- Mytelka, L K. and Smith, K. (2001). *Innovation Theory and Innovation Policy: Bridging the Gap*. Paper presented to DRUID Conference, Aalborg, June 12-15 2001.
- Nelson, R.R. and Winter, S.G. (1982). *An Evolutionary Theory of Economic Change*. Cambridge University Press. Cambridge, MA.
- Nica, P. and Cuza, A. I. (2010) *Industrial Policy in the European Union*. CES Working Papers, II, (2), 2010: 22.
- Nicholls-Nixon, C. L. and Woo, C. Y. (2003). Technology sourcing and output of established firms in a regime of encompassing technological change. *Strategic Management Journal*, 24(7), pp. 651 - 666.
- Nilsson, J. E. (2004). *Innovation Policy as an Alternative to Institutional Changes*. Hagbarth Publications, Bollschweil.
- Pelkmans, J. (2006). *European Industrial Policy*. Bruges European Economic Policy Briefings, BEEP briefing n° 15, <http://www.coleurop.be/eco/publications.htm>
- Petit, P. and Soete, L. (2001). *Technology and the Future of European Employment*. Edward Elgar: Cheltenham, 2001.
- Porter M.E. (1990). *The Competitive Advantage of Nations*. London (Macmillan).
- Reifschneider, D. and Stevenson, R. (1991). Systematic Departures from the Frontier: A

- framework for the Analysis of Producer inefficiency. *International Economic Review*, 32 (3), pp. 715 - 723.
- Roobeek, A. J. M. (1990). *Beyond the Technology Race. An Analysis of Technology Policy in Seven Industrial Countries*, Amsterdam et al. (Elsevier).
- Soete, L. (2007). From Industrial to Innovation Policy. Springer Science + Business Media. LLC 2007, *J Ind Compet Trade*, 7, pp. 273 - 284.
- Triulzi, U. (1999). *Dal mercato comune alla moneta unica*. SEAM, Roma.
- Wang, E. C. (2007). R&D efficiency and economic performance: A cross-country analysis using the stochastic frontier approach. *Journal of Policy Modeling*, 29(2), pp. 345 - 360.
- Wang, T., Song, D. W. and Cullinane, K. (2002). The Applicability of Data Envelopment Analysis to Efficiency Measurement of Container Ports. *Proceedings of the International Association of Maritime Economists Conference*, Panama. pp. 13 - 15 November.

INCENTIVES FOR PARTICIPATION OF ARTISANAL FISHERMEN IN THE REGULATION AND CONTROL OF FISHERIES PROTECTION AREAS: A CASE STUDY FROM GREECE

GEORGE O. TSOBANOGLOU* and EIRINI IOANNA VLACHOPOULOU**

ABSTRACT

Self-regulation has a significant impact on managing effectively Fisheries' Protection Areas by gaining access to local expertise, resources and developing working relationships between the fisheries' professionals and the local control and regulation authorities. In Greece, 18.8% of the territory consists of insular areas, enhancing thus the significance of fisheries communities for social cohesion. However, the notion of participation in regulation and control is still not widespread in the fishing communities as it is only practiced sporadically. Thus, creating incentives for fisheries professionals' participation in regulation and control of the fishing activity is pivotal for the realisation of self-regulation.

Keywords: Fisheries; communities; management; incentives.

1. INTRODUCTION

Fisheries provide humankind with multiple ecosystem services, the majority of which are highly irreplaceable. Apart from food security, with a 16% contribution to the global human diet and a 30% contribution to animal protein intake, fish stocks constitute a major pillar that supports employment in coastal areas, both in the developed and the developing world (UNEP-WCMC, 2006; UNEP, 2006). Direct fisheries employment provides livelihoods for over 38 million people globally, while indirect fisheries employment, such as recreation and near-shore tourism, supports an even larger proportion of the human population (UNEP-WCMC, 2006).

Furthermore, fish stocks are the providers of a wide range of cultural amenities, contributing significantly thus, in the social intertwining of the near-shore communities and nature (UNEP-WCMC, 2006). They are linked with various cultural aspects of the fishing communities' everyday life, such as religion and education. As a result, the communities rely heavily on their relationship with the sea for community cohesion and development (UNEP-WCMC, 2006). It is a frequent phenomenon for

* Professor, Sociology of Labour Academic Laboratory, Department of Sociology, University of the Aegean, Mytilene, Lesvos, Greece

** Ph.D. Candidate, ERGAXIA, Sociology of Labour Academic Laboratory Department of Sociology, University of the Aegean, Mytilene, Lesvos, Greece
Researcher, Graduate School of Environment and Information Sciences, Yokohama National University, Yokohama, Japan

fishing communities to have developed religious rituals related to fisheries and the marine environment, as they consider them central point of the community life (e.g. United Nations University (2009) and United Nations University Institute of Advanced Studies Operating Unit Ishikawa/Kanazawa (2011)).

Fisheries management has concerned the scientific community, as well as the policy makers for a long time. Especially after the publication of Garrett Hardin's (1968) "Tragedy of the Commons", which presented fish stock conservation in the context of common pool resources as a lost case, there have been multiple attempts to overturn the state of affairs in fisheries management. Importantly, the notion of the "Tragedy of the Commons" inspired Elinor Ostrom (1990) to challenge contemporary policy analysis. The players in the policy arena in reality are far more complicated than depicted by policy analysis, and this fact makes rule-making a difficult procedure which would be unsuccessful if multiple factors, apart from science, were not taken into consideration (Ostrom et al., 1994). Ostrom (1999) also stressed out the fact that organization does not require central direction. The last point is very important as it supports the movement of self-organisation in fisheries management.

Community involvement and participation in fisheries management is widely accepted as a crucial factor in successful fisheries management (Fiske, 1992; Kaza, 1988; Rigney, 1990; Sumaila et al., 2000; Wolfenden et al., 1994). However, proactive behavior from the part of the fishing communities, although important and commendable, is rare (Jentoft, 2005; Sumaila et al., 2000). In order for the communities to develop the habit of participation, social work to empower the locals is vital (Jentoft, 2005). Empowerment plays such an important role in fisheries management because it leads to co-management, by allowing the communities to gain access to information and resources, and to organize themselves (Petersen, 1994). Co-management, in effect, allows the communities to influence the governance of the resource on which they rely for their livelihoods, giving them the opportunity to become competitive and achieve sustainability (Raakjær Nielsen et al., 2003).

Even though bottom-up initiatives are the key for sustainable fisheries management, the state cannot be completely removed from the process. The fishermen cannot be expected to give up on their personal interests in order to accommodate the needs and interests of the general public (Jentoft, 2005). This role is for the state to play; stakeholder democracy can only complement citizen democracy, and not become its alternative. In addition, the state is the only actor with the power and resources to produce legislation, develop infrastructure and provide educational support, all of the above being essential elements for a successful fisheries management plan (Jentoft, 2005). It is important for the central government to maintain a distinct governing body, accessible to the fisheries stakeholders.

Empowering a fishing community, however, encourages participation, promoting thus fisheries co-management. Consequently, the members of an artisanal community that are actively engaged in co-management, further advocate in favor of community

cohesion and empowerment (Jentoft, 2005). As a result, a positive feedback cycle is initialized.

2. THE GREEK CASE

Community reliance on fish stocks is especially evident in the case of Greece, as 18.8% of the territory is insular, with more than 35000 people employed in the fishing sector (European Commission, 2010; Tzanatos, 2006; Tsobanoglou and Vlachopoulou, 2013). However, there is minimal space for stakeholder participation in the decision-making process, even though fishing associations exist. A range of reasons is responsible for the absence of real participation. First of all, collaboration between the various associations and the communities is practically non-existent, eliminating thus, their capacity for lobbying and gaining leverage. In addition, the state has created very limited legislative background on cooperation, participation and self-organisation. As a result, even if the communities and the associations wanted to collaborate among themselves, they would be unable to, as they would be missing the legal framework. Finally, the Greek governing system is defined mostly by centralisation and does not allow for the local governing bodies and communities to undertake the responsibility of local, tailored-made decision-making (Tsobanoglou, 2011; Tsobanoglou and Vlachopoulou, 2013).

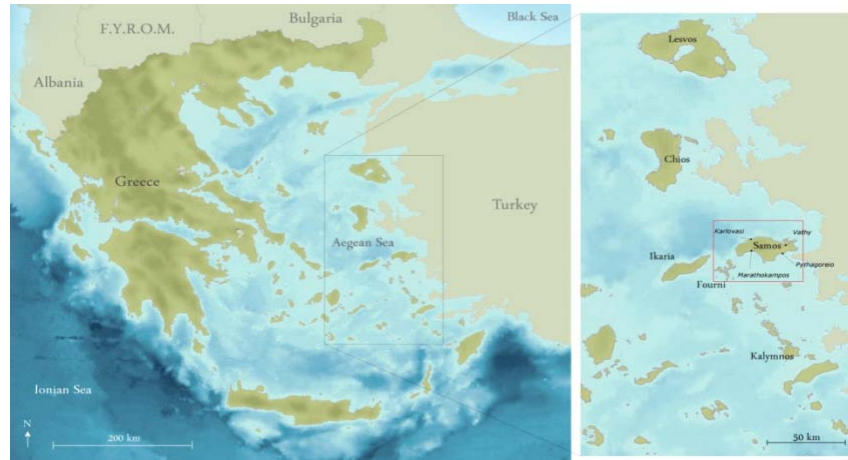
Even though there have been suggestions on the creation of Marine Protection Areas (MPAs), and some have been established, the notion of community management is still not widely known to the state, the stakeholders and the general public. In the cases where MPAs have actually been established (i.e. around Alonissos Island), the participatory approach has not been adopted, resulting in the exclusion of the local population from the decision-making processes (Tsobanoglou and Vlachopoulou, 2013). In addition to the above, the data for the current status of the various MPAs is not accessible to the public. In a 2008 study on the status of MPAs in the Mediterranean, 4 MPAs were identified in the Greek territory (Alonissos, Messolonghi, Schinias – Marathonas, Zakynthos) and the researchers managed to contact only two of them (Abdulla et al., 2008).

3. METHODOLOGY

This research is based primarily on an extensive literature review. More specifically, the researcher drew the Japanese and Malagasi case studies, as well as the general background information, from a vast array of bibliographical resources. However, the Greek case studies, as well as the conclusions, were drawn from previous field research performed by the researcher during May – July 2011. The researcher conducted interviews and personal observations in the areas of Ormos, Samos, Greece and Fourni, Greece, during the aforementioned period (Fig. 1).

24 open-ended, semi-structured interviews were conducted with local stakeholders in groups of up to 4 persons, according to Corbetta (2003) and Yin (1994), with focus on the current status quo of the local fishing communities and the fishing activity.

FIGURE 1: MAP OF AREAS UNDER EXAMINATION



Source: TAMMI (2011) on Vlachopoulou, et al (2013)

4. TYPES OF INCENTIVES

The state actors give the fishermen incentives to participate in the conservation of fish stocks. The most common type of incentives is the economic ones, and, more specifically, the various fishing rights. The majority of global fisheries are managed as common pool resources with free access for their users (Costello et al., 2010; Ostrom et al., 1994). Open access to fish stocks provides incentives for the users to fish as much as possible in a short amount of time, in order to secure the largest amount of gains possible in the short term, beating their competitors to their race for exploitation of a limited amount of fish. This constant competition which leads to an inevitable collapse of the resource is called “race to fish” (Costello et al., 2010; Hilborn et al., 2005). However, a 25% of global fisheries by volume and a 2% by stock are managed through catch share systems, i.e. Individual Transferrable Quotas (ITQs) and Territorial User Right Fisheries (TURFs), often coupled with the establishment of fisheries cooperatives (Costello et al., 2010). All of the aforementioned incentives aim at breaking the “race to fish” and allowing for sustainable and profitable management of the fish stocks (Hilborn, et al., 2005).

According to Costello et al. (2010), ITQs “allocate to their owner the right to harvest a specified quantity of fish every year in perpetuity.” Operating as a percentage of the Total Allowable Catch (TAC) of a fishery, ITQs constitute a valuable method to limit access to the resource, maintaining thus its catch at a sustainable yield level. TURFs, on the other hand, define property rights over spatial areas of the sea (Costello et al., 2010). This method works best with sedentary species, as they tend to move within certain limits of the sea bed. Such is the case with the “ama” divers of Hegura Island, Japan, that fish traditionally for abalone (*Heliotis* spp.) (United Nations University, 2009; United Nations University Institute of Advanced Studies Operating Unit Ishikawa/Kanazawa, 2011).

Both methods work best if they are complemented by the introduction of a fisheries cooperative in the area of operation. Fisheries cooperatives are the most efficient way to overcome the problems that arise from the introduction of the aforementioned limitations. Both of the methods have endogenous disadvantages that may jeopardize the cause. More specifically, ITQs allow for by-catch, especially when the rule focuses on a specific target species. The fishermen do not have incentives to avoid by-catch of non-target species, reducing thus the abundance of resources that are available (Squires et al., 1998). On the other hand, TURFs do not operate efficiently for species that are not sedentary, as they tend to move between adjoining TURFs. The solution would be to create large enough TURFs that would encompass the area in which the species move. This, however, would create another problem: in such large areas, there is high probability of multiple users’ operation and it would be difficult to avoid a “race to fish” within the boundaries of the TURF (Costello et al., 2010). By establishing a fisheries cooperative, the users undertake the responsibility to enforce the rules within their area of operation. Often, the cooperative itself sets strict rules for enforcement and penalties structures (Uchida, 2007). Fishermen are willing to form cooperatives for they recognize the potential for profitability from abundant fish stocks within an environment of regulated competition (Costello et al., 2010). In the long term, the sustainable management of the fishery will maximize the profitability of the fishermen (Hilborn, et al., 2005).

In addition to economic incentives, a vast array of other, infrastructure-oriented methods can be deployed in order to promote stakeholder participation in achieving fisheries sustainability. Indicatively, the fishermen in insular areas who are occupied in small-scale activities need ways of accessing the markets (Tsobanoglou and Vlachopoulou, 2013). In Greece, the majority of artisanal fishermen sell their catch locally, as it would not be profitable to send it to a more central market, due to the fact that the quantity of each individual catch is relatively small (Tsobanoglou and Vlachopoulou, 2013; Vlachopoulou, 2011). In addition, the local fishermen do not own vessels suitable for fresh product transportation (Tsobanoglou and Vlachopoulou, 2013). The use of large vessels-refrigerators would not be profitable for such small quantities; the maintenance cost would greatly exceed the profits gained by selling the

produce in a central market. However, in the case of a community owned vessel-refrigerator, the members of the community would be able to share the acquisition and maintenance costs and achieve increased profitability. The Greek state, with the support of the EU, could support financially the acquisition of vessels in order to connect the local fishermen with the central markets through the National Strategic Reference Framework (NSRF). Nonetheless, the development of infrastructure is highly likely to cause an increase in fishing effort and such strategies should be accompanied by rules that will promote sustainable use of the resource, such as the formation of a fisheries cooperatives with TAC and ITQ limitations (Apostolaki et al., 2002; Hannesson, 1998; Hilborn et al., 2005; Stefansson and Rosenberg, 2005).

Moreover, education plays a significant role in the empowerment of local communities and the promotion of participation. In Velondriake, Madagascar, the NGO Blue Ventures is running a project on the conservation of the local marine environment with a special focus on the returns for the local communities (Cripps and Harris, 2009). Initially, the NGO provided information to the community about the plan and assisted them in establishing an MPA, by providing training and guidance. As the first stage was deemed successful and the catches increased significantly, the community was rewarded with a significant increase of its income. The surrounding communities followed its lead and the MPA expanded significantly, further increasing the benefits for the local communities. This increase in income has enabled the communities to provide scholarships for children to gain higher education. The newly educated children return to their communities and support with their skills the amelioration of the living standards of their homeland, with many of them getting employment related to the MPA (Cripps and Harris, 2009).

The provision of education and training can act as a very powerful incentive, especially in communities with fishing tradition. Many artisanal fisheries communities in Greece pass their knowledge about fishing on to their children, maintaining thus their long tradition of interaction with the sea, along with their experience with traditional fishing tools and methods (Tzanatos, 2006; Vlachopoulou, 2011). However, the older generation is afraid that their children will not be able to survive by fishing and are urging them to abandon the traditional way of living. The need to protect the tradition can only be accommodated by safeguarding the survival of the fishing communities.

5. ENFORCEMENT

There is a significant obstacle in the promotion of conservation via use of incentives. Even though the fishermen may assume part of the conservation responsibility and participate in the decision-making processes, the need for enforcers of the law and the decisions still remains. The most obvious answer would be that authorities such as the Port Police should undertake the task. However, in the Greek

case, the Port Police lacks training and equipment and is understaffed. In addition to that, they shoulder a range of responsibilities, apart from fisheries regulation, that reduce significantly the time that they can spend on the issue at hand (Vlachopoulou, 2011; Vlachopoulou, et al., 2013).

By establishing an engaged stakeholder network, it is highly possible to solve the problem of enforcement. The local stakeholders will adopt methods of proactive self-regulation as long as they do not hinder their income source (Sumaila, et al., 2000). Fisheries cooperatives responsible for MPAs, for example, tend to manage their allocated area with strict internal regulation, penalties and, most significantly, social pressure (Uchida, 2007). Such an arrangement may prove much more efficient than the case of external enforcers, as it is based on communal relationships which are the cornerstone of a flourishing community.

6. DISCUSSION

As Coward et al. (2000) state, “Nothing raises the issues of justice more acutely than conditions of scarcity. When resources are abundant [...] there is little question of how they should be managed.” As the fisheries are still largely perceived as common pool resources, and their abundance -or lack thereof- is difficult to calculate, mostly due to mobility, the question of effective management still remains widely unanswered. This phenomenon is even more evident in areas like the insular territory of Greece, where there is limited communication and collaboration between stakeholder groups. The fishermen are aware of the continuous decline of the numbers of fish stocks, but they believe that they are unable to take action in order to preserve their income source (Vlachopoulou et al., 2013). However, the majority of artisanal fishermen have not made any attempt to participate in the decision-making process, the enforcement of the legislation or the habitat conservation. Striking is the case of Ormos (Fig. 1), a small village on the island of Samos, where the fishermen, on a personal level, understand and declare the need for cooperation towards sustainable management, but, on community level, they refuse to collaborate among themselves as they are engaged in intra-communal micro-conflicts, seeing each other as rivals (Vlachopoulou, 2011).

Attempts for participation promotion in such context need a background of developing new social roles and relations in order to be successful (Jentoft, 2005). The NGO Archipelagos has deployed a campaign to urge fishing communities of the eastern Aegean Sea to adopt self-regulation of the local fish stocks. The outcomes showed that communities with low cohesion and high level of mistrust, such Ormos, are unlikely to put aside their personal conflicts and work together, even with the involvement of external actors. However, the fishermen of Fourni, an island located in close proximity to Samos (Fig. 1), have been forced to overcome their differences and

mistrust as the level of fish stock depletion in their area of operation has almost reached the point of no return (Vlachopoulou, 2011).

As the two areas under examination are located in the same area, the environmental parameters that define the fishing activity (i.e. specific habitats, targeted fish stocks) are the same. However, Ormos faces more limited illegal fishing activity due to better control and enforcement of the legislation by the authorities, compared to Fourni.

As the two areas have similar environmental circumstances, the cause of the difference in community behavior should be searched for within the social parameters of each area. Fourni is a smaller community with higher levels of social cohesion. The community's leader is a highly respected and trusted person that leads by example and the locals tend to follow him gladly. In addition, the community members have developed strong bonds between themselves and trust each other. However, in the past, they tended to avoid extensive collaboration with each other. It was the depletion of the local fish stocks, mostly by illegal fishing activity in their waters that urged them overcome their differences and unite in order to protect their common income source.

On the other hand, in Ormos, the community members still do not trust each other and tend to ignore any efforts for collaboration. Even though they have a leader that they trust, however with mild reservation, they put first their personal conflicts and grudges and refuse to collaborate with other community members that they perceive as rivals. It is also possible that they lack motivation for collaboration because of the higher levels of fisheries abundance. As the illegal fishing activity in the waters of Samos is lower, in comparison to Fourni, the fish stocks are in a relatively healthier state. It may be that if the fish stocks drop below a certain level, the Ormos community members will turn to each other for support and develop collaboration.

As there is extensive social conflict over the control of fish stocks among the various groups, participation would provide the stakeholders with a mechanism to influence fisheries management (Jentoft, 2005). However, it should develop gradually, allowing for the participants to gain confidence in their ability to impose self-regulation and develop relationships with the other stakeholder groups. Empowerment of the community sets the framework in which the seed of participation can be planted and grow. In its turn, participation can further enhance community cohesion and a positive feedback cycle can be established.

In order for the Greek communities to adopt participation, they need to develop community confidence and trust. The need for empowerment is evident, as the locals tend to avoid collaboration, rendering the establishment of fisheries cooperatives impossible. Even if the state provided other incentives, such as fishing rights or provision of infrastructure, they would have no significant impact on either the fisheries or the communities as the two most important elements for successful fisheries management would be missing: trust and cooperation.

REFERENCES

- Abdulla, A., Gomei, M., Maison, E. et al. (2008). *Status of marine protected areas in the Mediterranean Sea*, Malaga: IUCN and WWF.
- Apostolaki, P., Milner Gulland, E.J., McAllister, M.K. et al. (2002). Modelling the effects of establishing a marine reserve for a mobile fish species. *Canadian Journal of fisheries and aquatic sciences*, 59, pp. 405 - 415.
- Corbetta, P. (2003). *Social research: theory, methods and techniques*, London: SAGE Publications Ltd.
- Costello, C. Lynham, J. Lester, S.E. et al. (2010). Economic incentives and global fisheries sustainability. *Annual Review of Resource Economics*, 2, pp. 299 - 318.
- Coward, H., Ommer, R. and Pitcher, T. (2000). *Just fish: ethics and Canadian marine fisheries*. St John's, Newfoundland: ISER Books, 304.
- Cripps, G. and Harris, A. (2009). *Community creation and management of the Velondriake marine protected area - Blue Ventures Conservation report*, London: Blue Ventures Conservation.
- European Commission. (2010). *Facts and figures on the Common Fisheries Policy - basic statistical data*, Luxembourg: Publications Office of the European Union.
- Fiske, S.J. (1992). Sociocultural aspects of establishing marine protected areas. *Ocean and Coastal Management*, 17, pp. 25 - 46.
- Hannesson, R. (1998). Marine reserves: what would they accomplish? *Marine Resource Economics*, 13, pp. 159 - 170.
- Hardin, G. (1968). The tragedy of the commons. *Science*, 162, pp. 1243 - 1248.
- Hilborn, R., Orensanz, J.M. and Parma, A.M. (2005). Institutions, incentives and the future of fisheries. *Philosophical Transactions: Biological Sciences*, 360, pp. 47-57.
- Jentoft, S. (2005). Fisheries co-management as empowerment. *Marine Policy*, 29, pp. 1 - 7.
- Kaza, S. (1988). Community involvement in marine protected areas. *Oceanus*, 31, pp. 75 - 81.
- Ostrom, E. (1990). *Governing the commons: the evolution of institutions for collective action*, Cambridge: Cambridge University Press.
- Ostrom, E. (1999). Coping with the tragedies of the commons. *Annual Review of Political Science*, 2, pp. 493 - 535.
- Ostrom, E., Gardner, R. and Walker, J.M. (1994). *Rules, games and common-pool resources*, Ann Arbor: University of Michigan Press.
- Petersen, A. (1994). Community development in health promotion. *Australian Journal of Public Health*, 18, pp 213 - 217.
- Raakjær Nielsen, J., Degnbol, P., Kuperan Viswanathan, K. et al. (2003). Fisheries co-management: an institutional innovation? Lessons from South East Asia and Southern Africa. *Marine Policy*, 28, pp. 151 - 160.
- Rigney, H. (1990). Marine reserves - blueprint for protection. *Australian Fisheries*, 49, pp. 18 - 22.
- Squires, D., Campbell, H., Cunningham, S. et al. (1998). Individual transferable quotas in multispecies fisheries. *Marine Policy*, 22, pp. 135 - 159.
- Stefansson, G. and Rosenberg A.A. (2005). Combining control measures for more effective management of fisheries under uncertainty: quotas, effort limitation and protected areas. *Philosophical Transactions: Biological Sciences*, 360, pp. 133 - 146.

- Sumaila, UR., Guenette, S., Alder, J. et al. (2000). Addressing ecosystem effects of fishing using marine protected areas. *ICES Journal of Marine Science*, 57, pp. 752 - 760.
- Tammi, I. (2011). GIS maps prepared for Archipelagos, Institute of Marine Conservation. Samos: Archipelagos.
- Tsobanoglou, G. (2011). The value of the social economy: issues and perspectives. *The social economy as an answer to the eco-socio-economic crisis*. The Greens/EFA in the European Parliament.
- Tsobanoglou, G. and Vlachopoulou, EI. (2013). Participation and insularity: challenges in a European framework at a time of financial crisis - a case study from Greece. *Participatory local welfare, citizenship and third sector organizations. What is at stake?* Pisa: The Volunteering and Participation Foundation.
- Tzanatos, E. (2006). Structure, characteristics and management of small-scale fisheries in Greece. *Department of Biology*. Patra: University of Patra.
- Uchida, H. (2007). Collective fishery management in TURFs: the role of effort coordination and pooling arrangements. *Department of Agricultural Resource Economics*. Davis: University of California.
- UNEP-WCMC. (2006). *Marine and coastal ecosystems and human well-being: A synthesis report based on the findings of the Millennium Ecosystem Assessment*: UNEP.
- UNEP. (2006). *Our precious coasts - Marine pollution, climate change and the resilience of coastal ecosystems*, GRID-Arendal: UNEP.
- United Nations University. (2009). Where the sea whistle echoes: Ama, the legendary women divers of Japan facing climate change and an uncertain future. Kanazawa: UNU.
- United Nations University Institute of Advanced Studies Operating Unit Ishikawa/Kanazawa. (2011). *Biological and cultural diversity in coastal communities, exploring the potential of satoumi for implementing the ecosystem approach in the Japanese archipelago*, Montreal: Secretariat of the Convention on Biological Diversity.
- Vlachopoulou, EI. (2011). Enforcement of the European Union legislation about illegal fishing practices in the eastern Aegean Sea and its impact on the *Posidonia Oceanica* meadows. *School of GeoSciences*. Edinburgh: University of Edinburgh.
- Vlachopoulou, EI., Wilson, AM. and Miliou, A. (2013). Disconnects in EU and Greek fishery policies and practices in the eastern Aegean Sea and impacts on *Posidonia oceanica* meadows. *Ocean and Coastal Management*, 76, pp. 105 - 113.
- Wolfenden, J., Cram, F. and Kirkwood, B. (1994). Marine reserves in New Zealand: a survey of community reactions. *Ocean and Coastal Management*, 25.
- Yin, RK. (1994). *Case study research: design and methods*, Thousand Oaks: SAGE Publications Inc.

The Cyprus Journal of Sciences

NOTES FOR CONTRIBUTORS

The Cyprus Journal of Sciences is a refereed e-Journal publication with an international character and a broad perspective. The journal aims to cover a wide spectrum of areas of interest, including among others, Humanities and Social Sciences, Pure and Applied Sciences, Economics and Management. It will publish empirical, theoretical and methodological articles. Survey research, commentaries and book reviews are also of interest. Papers submitted to *TCJS* should not be under concurrent consideration at another journal.

Manuscripts should begin with a cover page indicating the title of the paper and the full address (i.e., author's name, status, affiliation, address, telephone number and email address) for each author. The second page should repeat the title and contain an abstract of no more than 100 words. The text should begin on page 3 and as far as possible should not exceed 7,000 words. Affiliations and acknowledgements should appear as a footnote at the bottom of the first page and should be preceded by an asterisk. Where possible, affiliations should include the author's department and institution. Footnotes should be labeled NOTES and should appear at the end of the main text. Bibliographies should be labeled REFERENCES and should be listed alphabetically at the end of the main text. Authors should adopt the following style:

Einav, L. and Levin, J. (2010). Empirical Industrial Organization: A Progress Report. *Journal of Economic Perspectives*, 24(2), pp. 145 - 162.

Enders, W. (1995). *Applied Econometric Time Series*. John Wiley & Sons, Inc.

In the text itself, these should be cited either:

Einav and Levin (2010) and Enders (1995) or (Einav and Levin, 2010) and (Enders, 1995).

Appendices should appear after the notes but before the references. The typeface for notes, appendices and references should be smaller than that used in the main text. Further authors' guidelines can be downloaded from the journal's website (<http://www.ac.ac.cy/easyconsole.cfm/id/344>). Authors may submit their papers electronically to the editor at the email address, charalambos.louca@ac.ac.cy in Microsoft Word format. The attachment must be ONE file that includes all components of the manuscript (i.e., title page, abstract, paper, endnotes, appendices and references). Alternatively manuscripts can be submitted via mail. If mailed, authors should include a copy of the manuscript on standard A4 paper and a disk containing ONE file that includes all components of the manuscript. Papers are acknowledged upon receipt.

Manuscripts should be submitted to:

Charalambos Louca, Editor
The Cyprus Journal of Sciences
American College
2 & 3 Omirou Avenue
Eleftheria Square
P.O.Box 22425
1521 Nicosia
Cyprus

ISSN 2357-1527



AMERICAN
COLLEGE

2 & 3 Omirou Avenue, Eleftheria Square, P.O. Box 22425, 1521 Nicosia, Cyprus
Telephone: +357 - 22661122, Facsimile: +357 - 22665458, Email: college@ac.ac.cy
Website: www.ac.ac.cy