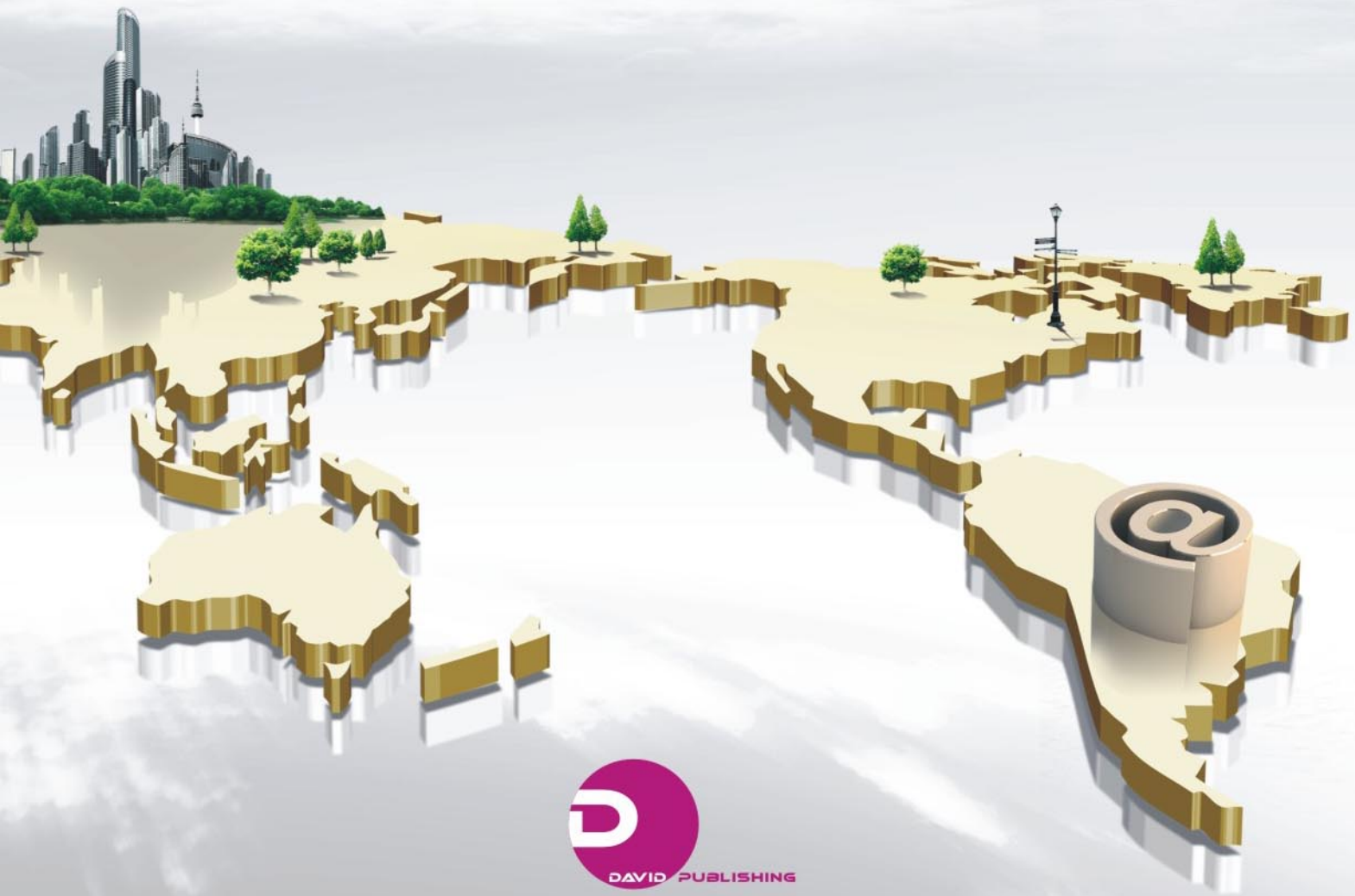


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ISSN 1537-1514 CBSN 270B0070

China-USA Business Review

Volume 11, Number 5, May 2012



David Publishing Company
www.davidpublishing.com

China-USA Business Review

Volume 11, Number 5, May 2012 (Serial Number 107)



David Publishing Company
www.davidpublishing.com

Publication Information:

China-USA Business Review (ISSN 1537-1514) is published monthly in hard copy and online by David Publishing Company located at 9460 Telstar Ave Suite 5, EL Monte, CA 91731, USA.

Aims and Scope:

China-USA Business Review, a monthly professional academic journal, covers all sorts of researches on Economic Research, Management Theory and Practice, Experts Forum, Macro or Micro Analysis, Economical Studies of Theory and Practice, Finance and Finance Management, Strategic Management, and Human Resource Management, and other latest findings and achievements from experts and scholars all over the world.

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Subscription Information:

Print \$600 Online \$480

Print and Online \$800

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The Relationship Between Crude Oil Prices and Exchange Rates

Andre Assis de Salles

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Crude oil prices are influenced by several events that occur randomly, for example, the weather, the available stocks of oil, the economic growth, the variation in the industrial production, political or geopolitical aspects, exchange rate movements, and so on. Oil price volatility brings uncertainties for the world economy. Despite the difficulty in working with oil price time series, a lot of researches have been developing ways to better understand the stochastic process which represents oil prices movements. This work introduces an alternative methodology, with a Bayesian approach, for the construction of forecasting models to study the returns of oil prices. The methodology introduced here takes in consideration the violation of homoskedasticity and the occurrence of abnormal information, or the non-Gaussian distribution, in the construction of the price forecast models. Moreover, this work examines the relationship between crude oil prices and exchange rate through a cointegration test. The data used in this study consists of the daily closing exchange rate of US dollar to Euro, and oil prices of WTI, West Texas Intermediate, and Brent types, from January 2005 to March 2009. The results do not show the acceptance of cointegration hypothesis. With the presented models, it is possible to infer that the exchange rate is important to explain the oil barrel returns.

Keywords: crude oil prices, exchange rate, cointegration, forecast models

Introduction

Crude oil price is an important and sometimes determinant variable, for the economic policy makers of countries that have this commodity as a main source of energy, as well as in those where crude oil price is part of their energy matrix. The volatility of crude oil prices influences directly the international financial market, and consequently the changes in the financing and the investments of productive activities. This was observed in the crises, in the seventies, and more recently in the significant movements of the oil prices in 2008.

As Wang, Yu, and Lai (2005), and Xie, Yu, Xu, and Wang (2006) observe that crude oil prices are influenced by several events which occur in an irregular form, for example, the weather, available stocks, income, industrial production, and political or geopolitical aspects. In a paper by Panas and Ninni (2000), on the volatility of the crude oil prices, they highlight that oil prices market has the highest volatility when compared to other financial markets. Thus, the academic and the practical professionals recognize the difficulty and complexity in obtaining a forecast model of crude oil prices. As the volatility of oil prices implies

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uncertainties for global economy, it is necessary to minimize uncertainties regarding future oil prices, and in spite of the already mentioned difficulty to work with the oil prices in time series, a lot of research has been carried out with the aim to establish a stochastic process that, in a better way, represents the movements in the oil prices, or the returns or the variations of these prices.

Another relevant variable that directly influences the international financial market is the exchange rate, specially the US\$-Euro exchange rate. Thus this variable must have some relation with the crude oil prices. So it's important to verify the relationship between crude oil prices and exchange rates. Some research about this has been done, for example, S. Chen and H. Chen (2007) and Sadorsky (2000). With the aim to obtain forecast models for oil prices, this work verifies the cointegration between crude oil prices and the exchange rate. This is done from the series of oil prices returns of each main types, WTI and Brent, and the US\$-Euro exchange rate. Besides that this research proposes a multivariate model to study the contribution of the exchange rate for forecasting crude oil prices.

Regarding the procedures of statistical inference, this work introduces an alternative methodology, different from the models presented in the literature. In the construction of the forecast models of oil prices, the methodology introduced here takes into consideration the following: the heteroskedasticity; and the occurrence of abnormal information, or the outliers in the time series of the oil prices or of the returns of these prices. Thus this work proposes an alternative methodology, with a Bayesian approach, in the construction of forecast models for returns of oil prices. It is considering the heteroskedasticity and the non-Gaussian distribution.

The objective of this work is presented in next section. And the remaining of this work is organized as follows: section 3 introduces the methodological approach used here; section 4 describes the sample used; section 5 presents the results obtained; while the section 6 refers to the final remarks and finally the references used in this work.

Objective

The objective of this work is to propose a methodology for the construction of forecast models for returns of crude oil prices, considering the heteroskedasticity and the non-Gaussian distribution. Besides that this work investigates the cointegration between time series of crude oil prices and the exchange rate, with a stochastic unit root model. It also verifies the performance of a multivariate model for forecasting crude oil prices using the exchange rate as an explanatory or antecedent variable.

The methodological approach used in this work in order to achieve this objective is described in section 3, as follows.

Methodological Approach—An Alternative Proposal

To reach the objective, models were constructed to study the movements of the returns of the closing quotations of crude oil prices spot market: for the West Texas Intermediate (WTI) and the Brent types, negotiated in the New York Mercantile Exchange (NYME) and in the London Market, respectively. These models consider the characteristics found in the financial assets return series: as the non-normality that generally happens and the heteroskedasticity of these return series. The student's t distribution was chosen as an alternative to the normal distribution, in other words, to accommodate the abnormal observations of weekly return series of the WTI and the Brent types oil prices. The t distribution has been broadly used, as the methodological approach which uses the daily and weekly returns of financial assets, because of the

attractiveness presented by the form variations given by the number of degrees of freedom. Initially the heteroskedasticity of the returns was dealt with heteroskedasticity models, in which a variance law was based on the Autoregressive Conditional Heteroskedastic Model—ARCH Model presented in the econometric literature by Engle (1982). In this way autoregressive models were built, in a Bayesian approach, for the average returns with the variance of returns changing with time. The first model used, designated by model 1, was an AR(1)-ARCH(1) model, an autoregressive model for the average and an ARCH model for the variance, described in the following form:

$$(R_t | I_{t-1}) \sim Student(\mu_t; \sigma_t^2, \nu)$$

$$\text{Model 1: } \mu_t = aR_{t-1}$$

$$\sigma_t^2 = \alpha_0 + \alpha_1 e_{t-1}^2$$

where:

R_t = return of the closing quotation of oil price at time t ;

I_t = available information until the time t ;

μ_t = average of returns at the time t ;

σ_t = standard deviation of the returns at time t , and $e_t = (R_t - \mu_t)$.

The model 1 is constructed in two ways: 1(a), with intercept in the variance equation, and 1(b), without intercept in the variance equation. The other two models used in this work were also built with a Bayesian approach. One of these models, designated in this work by model 2, was constructed from a Stochastic Unit Root Model—STUR model, to examine the cointegration between crude oil prices and the exchange rate. The other model, designated here by model 3, was constructed from a Seemingly Unrelated Regressions Model—SUR model, as used in Salles (2007), for forecasting the returns of crude oil prices types using this multivariate model with the exchange rate as an antecedent variable, or regressor, at the same time t of the returns and with lag 1, or at time $t - 1$.

The model 1 used here was developed from the description of Generalized Autoregressive Conditional Heteroskedasticity—GARCH model, in particular the GARCH (1, 1) model presented in Akgiray (1989). The model 2, presented next, was constructed from a stochastic unit root model, the STUR model as suggested by Granger and Swanson (1977), to test the cointegration between crude oil prices and the exchange rate, respectively, the types of crude oil prices selected and the US\$-Euro rate.

$$R_{it} \sim Normal(\mu_{Rit}; \sigma_{Rit}^2; \nu_{Ri})$$

$$R_{it} = a_{it} + b_{it} ExchangeRa te_{it}$$

$$\text{Model 2: } \sigma_{Rit}^2 \sim Gama$$

$$\nu_{Ri} \sim Uniforme$$

$$e_{it} = R_{it} - (a_{it} + b_{it} ExchangeRa te_{it})$$

$$e_{it} \sim Normal(\mu e_{it}, \sigma_i^2)$$

$$\mu e_{it} = \rho_{it} \mu e_{it-1}$$

$$\rho_{it} = \exp(\omega_{it})$$

$$\omega_{it} \sim Normal(\mu_{\omega}, \sigma_{\omega}^2)$$

$$\mu_{it} = \mu_{\omega} + \varphi(\omega_{it-1} - \mu_{\omega})$$

For each i type oil, as shown in the model, the negative values for μ_{it} , indicate an expected ρ_{it} value lower than 1 which suggests a unit root process as observed by Congdon (2001). In this way a series of the variable e_i is stationary. Therefore the returns of oil prices and the variation of the exchange rate are cointegrated.

The third model is constructed to forecast crude oil price returns in a multivariate form using the exchange rate as an exogenous variable, at time t and time $t - 1$, respectively, for model 3 in its 3(a) and 3(b) forms which are mentioned in section 5. This model is constructed from a SUR model with time varying parameters and takes the following form:

$$\begin{aligned} R_{it} &\sim Student(\mu_{it}; \sigma_{it}^2; \nu_i) \\ \mu_{it} &= \alpha_{it} + \beta_{it} ExchangeRate_{t-1} \\ \text{Model 3: } \alpha_{it} &\sim Student \\ \beta_{it} &\sim Student \\ \sigma_{it}^2 &\sim Gama \\ \nu_i &\sim Uniforme \end{aligned}$$

For the determination of every posterior distribution of parameters, numeric methods based on Monte Carlo Markov Chain (MCMC) were used. The developed models were implemented in the BUGS (Bayesian Inference Using Gibbs Sampler) Software, in the WinBUGS 1.4 version, elaborated by Spiegelhalter, Thomas, and Best (2003), to obtain the posterior distribution using MCMC via Gibbs Sampling. The prior distributions used in all models were vague, in other words, the variances of the priors were high. For a better understanding of the procedures of the Bayesian inference used in this work the reader can resort to Migon and Gamerman (1999).

After accomplishing the simulations with the models described previously this work compares models 1 and 3, through models selection criteria. The main selection criteria used in the models were the DIC criteria, besides that the Mean Square Error (MSE) was calculated. The Deviance Information Criterion (DIC) proposed in Spiegelhalter, Best, Carlin, and Linde (2002) and implemented in the software used in this work, is a generalization of the Akaike Information Criterion (AIC). The selected model must minimize DIC obtained in the simulations for the determination of the posteriori of the interest parameters. Another selection model criterion used was the Root Mean Squared Error (RMSE).

For the implementation of the models the information used are described as follows.

The Data Used—The Sample

The information used for oil prices is the weekly prices collected on the Energy Information Administration (EIA), Official Energy Statistics from the U.S. government website. From these data the weekly returns, for each type of crude oil price, was calculated with the equation below in the following form:

$$R_t = \ln \left(\frac{price_t}{price_{t-1}} \right)$$

where R_t = return of the price at time t , $price_t$ = quote the price at time t , $price_{t-1}$ = quote price at time $t - 1$. The weekly time series of the exchange rate used here was collected from the European Central Bank web site. The weekly variation of the exchange rate was calculated in the same way of the oil price returns. All data was collected from January 2005 to March 2009.

Results

The posterior distributions were obtained from the implementation of previously introduced models in the WinBUGS software. As previously observed, these posterior distributions were obtained through stochastic simulations based on Markov chain Monte Carlo (MCMC) via Gibbs Sampling. All results presented were obtained using vague prior distributions that is using high variances for the prior distributions of parameters. Moreover, it must be highlighted that the results were obtained after running 25,000 iterations and discarding additional 5,000 iterations as burn in period.

The figures above and the figures that follow show the results of model 1, an AR(1)-ARCH(1), that were estimated in two ways: the model 1(a) and the model 1(b). These models differ in variance equation, with and without intercept. Figure 1 and Figure 2 show plots with the oil weekly returns time series versus the returns forecasts obtained from model 1(a) for WTI and Brent types, respectively. The plots show to see that the observed returns differ from the forecasted returns of the two crude oil types studied with the methodological approach used here. While for the time series of WTI type had a MSE close to 0.0248, the Brent type 0.0309. Regarding the model 1(b), without intercept in the equation of the variance, the results reveal significant improvement regarding the model 1(a), as it can be observed in the plots in Figure 3 and Figure 4. For the model 1(b) the MSE is close to 0.0091 and 0.0041, for the WTI and Brent types, respectively.

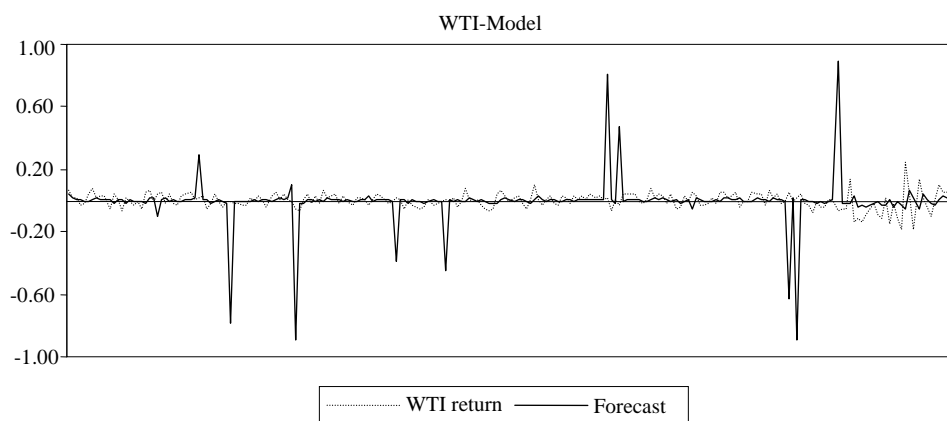


Figure 1. Results of model 1(a)—AR(1)-ARCH(1)—WTI return and forecast.

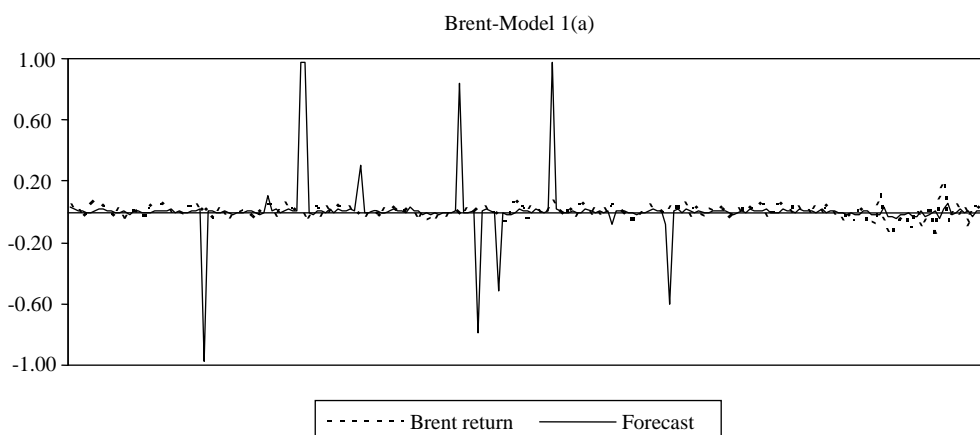


Figure 2. Results of model 1(a)—AR(1)-ARCH(1)—Brent return and forecast.

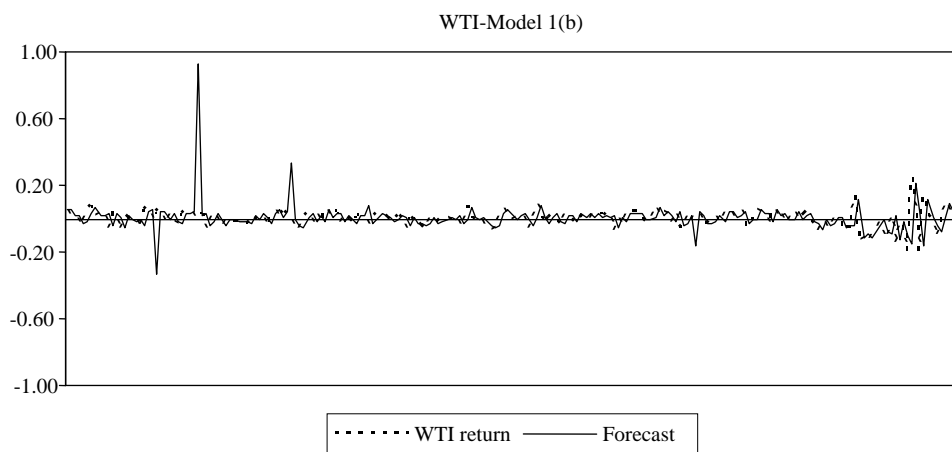


Figure 3. Results of model 1(b)—AR(1)-ARCH(1)—WTI return and forecast.

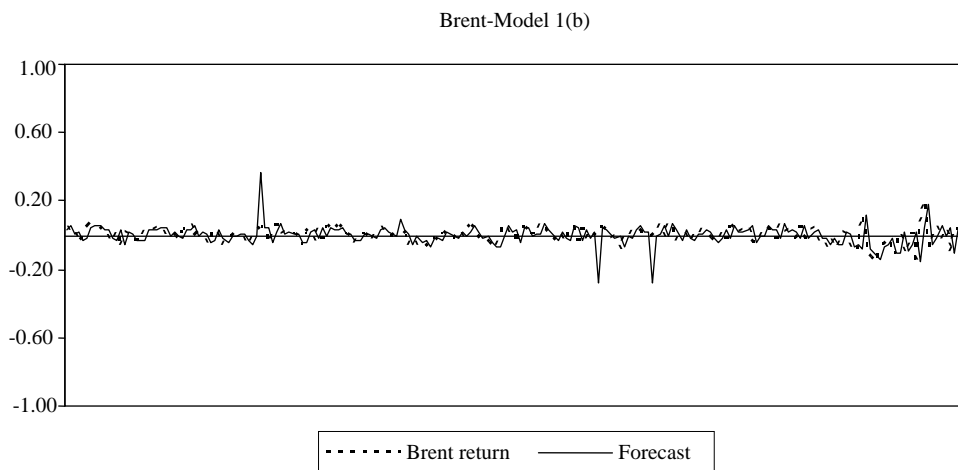


Figure 4. Results of model 1(b)—AR(1)-ARCH(1)—Brent return and forecast.

The results of the cointegration test applied to examine the long-run comovements between crude oil prices returns and the exchange rate are presented in the Tables 1 and 2 as follows. In these tables it's possible to see that the mean and standard deviation of the posteriori distribution of the $\mu.\omega$ parameter related in the STUR model; and the probability of this parameter to be negative. This probability is given by PR whose average and the median are also listed in these tables.

Table 1

Results of Cointegration—Crude Oil Returns and Exchange Rate Variations

	WTI	Brent
$\mu.\omega$	0.000 (0.000)	0.000 (0.001)
PR mean	0.4	0.5
Median	0.0	1.0
DIC	-572.72	-635.17

From Table 1 it's possible to infer that the average probability of the cointegration between weekly returns of crude oil prices and the variation of the exchange rate is close to 0.4 and 0.5 to the WTI and Brent types,

respectively. The median probability of this cointegration obtained in the stochastic simulation was 0 and 1, for returns of WTI and Brent types, respectively. In the same table it must be highlighted the median of the cointegration probabilities obtained for the weekly oil prices of Brent type are the only indication of cointegration between the oil price returns and the variations of exchange rate. Thus it cannot be affirmed from this test that there is cointegration of these variables: oil prices returns and the exchange rate. Regarding the association of these two variables with product-moment correlation coefficient, a classical measure of association, shows that the returns series and the exchange rate are weakly associated, 0.27 and 0.32 for returns of WTI and Brent types respectively, with statistical significance.

Table 2

Results of Cointegration—Crude Oil Prices and Exchange Rates

	WTI	Brent
mu.omega	0.005 (2.104)	0.000 (0.001)
PR mean	0.7	0.5
Median	1.0	1.0
DIC	768.12	289.72

Table 2 shows the results for inferences of the cointegration between the weekly oil prices series and the exchange rate, as well as these variables correlation. As shown in Table 1 and Table 2, the observations for the parameter mu.omega are the same or similar. The average probabilities of PR presented an indication of cointegration between oil prices of WTI type and the exchange rate in the period studied but this does not occur with the Brent type. The product-moment correlation coefficient however suggested a strong association between the exchange rate and oil prices of WTI and Brent types are 0.88 and 0.89 respectively, with statistical significance.

Figure 5 and Figure 6 show the results of model 3(a) through plots which compare the observed and forecasted values of returns when the variable exchange rate is used as an independent variable in the same time of the return, as shown in the model. The MSE is close to 0.0169 and 0.0215 for the returns of the crude oil prices of WTI and Brent types, respectively. In this way this model presented a better performance than the model 1(a), but worse than the model 1(b).

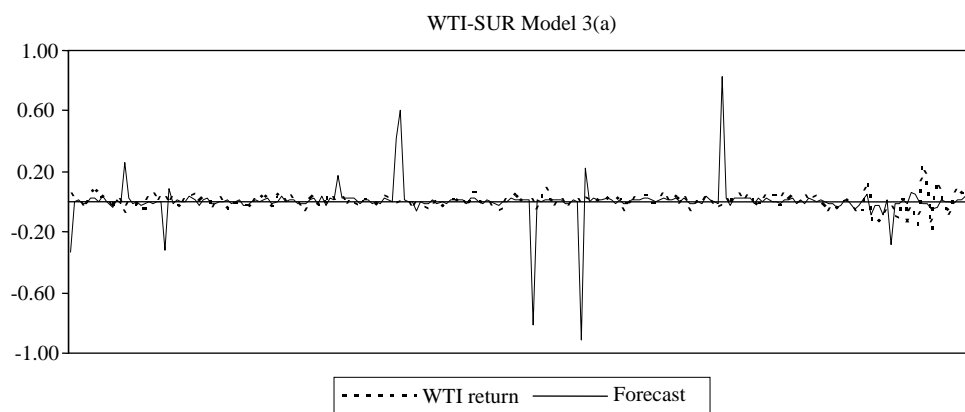


Figure 5. Results of SUR model 3(a)—WTI return and forecast.

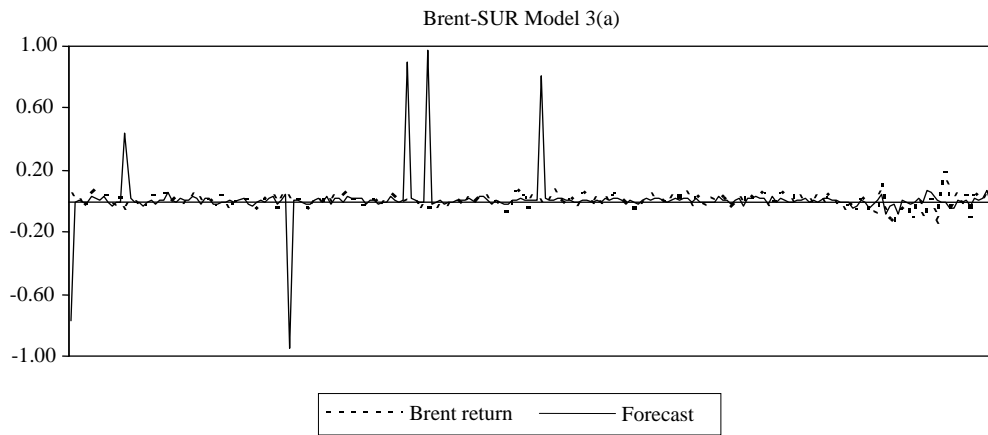


Figure 6. Results of SUR model 3(a)—Brent return and forecast.

In Figure 7 and Figure 8 the model 3(b) results are presented, that is, the results of model 3 using the exchange rate with lag 1 as an explanatory variable and the MSE performance indicator was 0.0268 and 0.0081 for the returns of oil barrel prices of types WTI and Brent, respectively. So when the explanatory variable changed, the MSE increased for returns of the WTI type and decreased for the Brent type.

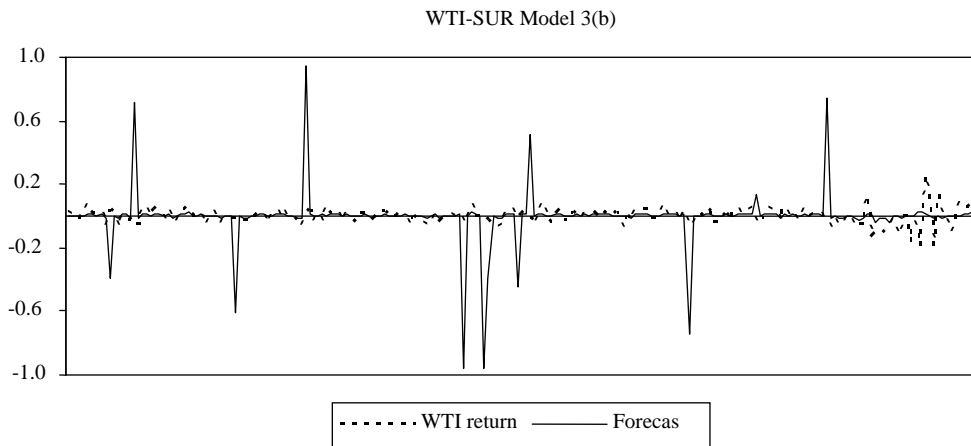


Figure 7. Results of SUR model 3(b)—WTI return and forecast.

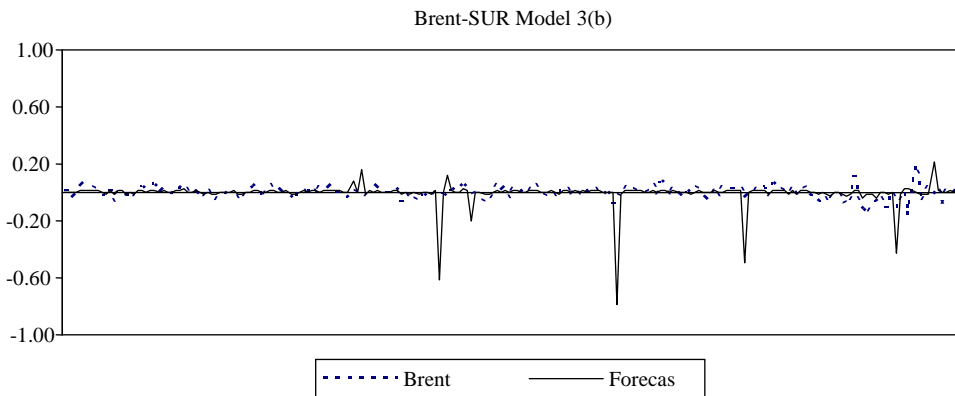


Figure 8. Results of SUR model 3(b)—Brent return and forecast.

Finally, Table 3 presents the summary of performance results of the models for forecast oil prices constructed in this work. It must be highlighted that the model presented better performance to forecast crude oil future returns was the AR(1)-ARCH(1) in the formulation 1(b).

Table 3

Summary of Models Performance

Model	WTI	Brent
AR(1)-ARCH(1) (a)	0.0248	0.0309
AR(1)-ARCH(1) (b)	0.0091	0.0041
SUR Model (a)	0.0169	0.0215
SUR Model (b)	0.0268	0.0081

In the following section the final remarks of this work is presented.

Final Remarks

The aim of this work was to verify the relevance of the exchange rate for crude oil price forecast models. In this way the construction and estimation, of forecast models for returns and oil prices, using the exchange rate as an explanatory variable were implemented.

The results do not show the acceptance of cointegration hypothesis between oil prices, or returns, and exchange rate. It was observed that the exchange rate does not improve, nor turns the forecast models better. The best forecast performance was obtained with an autoregressive model. And the exchange rate does not improves, or turns better, the forecast models. With the presented models it is not possible to infer that the exchange rate is important to explain the oil barrel returns. The best forecast performance was obtained with an autoregressive model, that is, the best performance among these models was reach with a model that did not use the exchange rate as an explanatory variable.

This work hopes to make a contribution for the discussion of the theme that was dealt here. It is important to mention that the inferences can be enlarged with the utilization of other models, other methodologies or other samples. Given the relevance of the theme dealt here, oil price forecast, which is useful for those who participate directly in the market, that is, crude oil negotiators, or those who participate indirectly like firm and government planners, other researches should be conducted to contribute to the related areas literature like finance and energy economics.

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The Visualization and Grouping of European Union Member States According to Structural Indicators: A Data-Driven Approach*

Jasna Soldic-Aleksic
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The main idea presented in this paper concerns the visual exploration of the convergence of European Union member states in the light of structural indicators (SI) defined by the European Commission. The structural indicators list 79 indicators which cover the following six domains: general economic background, employment, innovation and research, economic reform, social cohesion and environment. The relevant data are provided by EU statistical office (EUROSTAT). For the purpose of visualization and grouping of 27 EU member states, the technique of Kohonen self-organizing map (SOM) is applied. This technique belongs to the group of unsupervised neural networks models. Prior to the SOM application an exploratory data analysis for all SI domains is performed. It reveals the presence of a higher variability among EU states in the area of economic reform, general economic background and I&R indicators comparing to the environment, employment and social cohesion indicators. The SOM application is carried out in two stages. In the first stage, the Kohonen SOM algorithm is applied on each group of SI dataset separately, and in the next stage, the general map of European Union states based on all indicators is presented. The general map suggests the “natural” grouping of the European Union countries in three clusters, but, the other cluster solutions are also presented to illustrate the clustering tendency of European Union states and their regional cohesion. It is remarkable that geographic location of many countries is reflected in the final map organization, with some exceptions, notably Ireland and Luxembourg. But this “geography factor” doesn’t apply in the same extent to all SI domains. “Geography” matters the most regarding the general economic background and I&R, but the least regarding the employment area. Finally, the four-cluster profile analysis is generated. It reveals the divisions among EU states in detail.

Keywords: Kohonen self-organizing map, EU states, visualization, clustering, European commission structural indicators, group profile analysis

Introduction

At the Lisbon meeting of the European Council in 2000, the so-called Lisbon strategy was formulated,

* **Acknowledgement:** This paper is prepared with the support of the Ministry of Education and Science of the Republic of Serbia, Grant No. OH 179005. The author is also thankful to the participants at the *24th European Conference on Operational Research* held in Lisbon (July 2010) for their useful remarks on some part of the paper which was presented during this event.

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aimed at achieving the European Union strategic goal for the next decade "... of becoming 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"¹. As a part of this strategy, the initiative was put forth for the introduction of the specific set of social and economic indicators for European Union (EU) member states. The relevant indicators were defined as structural indicators (SI) and have been used as an objective measure of the progress that EU has made towards the Lisbon objective. Currently, the list of structural indicators comprises 79 indicators which cover the following six domains: general economic background, employment, innovation and research, economic reform, social cohesion and environment.

Considering this on-going historical process and facing the end of the decade when the Lisbon objective was set, the main idea of the paper is to provide a comprehensive image of the current status and the relative positions of EU member states according to the structural indicators. For this purpose, Kohonen self-organizing map (SOM) algorithm is applied. This algorithm belongs to the group of data mining tools (Bozdogan, 2004; Keating, 2008) which are appropriate for visualization and clustering purposes.

The paper is organized as follows. After an introduction, the second part offers a literature review. The third part provides a description of data used for SOM application. The next section deals with exploratory data analysis where multiple box plots and coefficients of variation for particular datasets are presented. The fifth section describes the main characteristics of the applied algorithm. This section is followed by the sixth crucial part of the paper which discusses the empirical results of the visualization and grouping of EU states by SOM algorithm. Finally, the concluding remarks are presented.

Literature Review

Generally the problem of studying the convergence and grouping structure in the EU area is a topic that attracts great attention of economists and other researchers. One strand of studies relates to the domain of economic growth theory and encompasses a large amount of literature. A great number of authors, to mention only a few, Chatterji (1992), Quah (1996), Corrado, Martin, and Weeks (2005), Mora (2005, 2008), Sassi (2006), Dall'erba and Le Galo (2008) focused on the idea concerning a phenomenon known as the "club convergence hypothesis" and the existence of "convergence clubs" among European countries and regions. In recent years, this idea was empirically investigated by many researchers and a great deal of research effort was devoted to developing appropriate econometric tools for testing the hypothesis and exploring the phenomenon. The other approach, which brought not only a remarkable contribution to the idea of convergence and cluster structures in EU area, but also provided a contribution to the clustering methodology, is proposed by Gligor and Ausloos (2006, 2007, 2008a, 2008b, 2008c). These authors considered the European countries as interacting agents of a complex system. They recalled the properties of the minimal spanning tree (MST) method, which had been used by Hill (2001) as a methodology for linking countries in a way that international price and quantity indexes can be chained. To research the clustering structures in the EU area, Gligor and Ausloos (2008b) proposed the application of the MAMLP (moving-average-minimal-length-path) method. The principal findings of these authors concerned the empirical verification of the decreasing of the mean statistical distance between EU countries.

¹ European Commission, EUROSTAT, Structural Indicators, May 2010. Retrieved from http://epp.eurostat.ec.europa.eu/portal/page/portal/structural_indicators/introduction.

On the other side, from the perspective of the idea of visualization, Kohonen SOM algorithm appeared as an appropriate method in many studies. The author indicates here a few studies that employed Kohonen algorithm, as a visualization and cluster-extracting method. One of the early socio-economic applications of the Kohonen map was made by Varfis and Versino (1992), who compared the results of the SOM algorithm to some well-known statistical techniques (principal component analysis and hierarchical clustering). They mainly focused on the techniques' properties making comparisons between them and noted that the Kohonen algorithm is a worthy alternative to well-established statistical techniques. The authors provided the Kohonen map of European Statistical Territorial Units and discovered that units on the map cluster into distinct European geographic areas. Also, interesting results are presented by Kaski and Kohonen (1996) who used the Kohonen algorithm in creating the "welfare map" of the countries of the world. Among the remarkable findings of this article, concerning the identification of welfare and poverty structures among the countries of the world, one was of a particular importance. That was the fact that, although no geographical factors were applied in computing the map, the organization of the countries on the map reflects their geographical positions.

Similar conclusions regarding the influence of "geography" on economic factors can be found in the exploratory study provided by Haughton, Deichmann, Eshghi, Sayek, Teebagy, and Topi (2003) where 25 Central and Eastern European and Central Asian states ("transition economies") were investigated in order to group according their abilities to attract foreign direct investment (FDI). The authors employed Kohonen map to determine the extent to which the distribution of foreign direct investment in different regions reflects the geographic organization of the countries. The resulting map based on a set of 21 macroeconomic indicators, showed that the distribution of the FDI determinants closely approximates the geographic grouping of the countries in the region.

The other study realized by Mattosco, Colantonio, Carlei, and Furia (2009) analyzed clusters and distances among the EU's member states in terms of health standards and economic development. The Kohonen map in this analysis revealed some well-defined groups of countries. Also, the authors derived a conclusion that differences among countries in the identified groups are based on just a few variables of the whole set used in the analysis, which can be summarized in terms of current expenses and investments.

Interesting findings regarding the application of the modified Kohonen algorithm is provided by Aaron, Perraudin, and Rynkiewicz (2003) who studied the convergence of EU countries within the Maastricht criteria framework for the period 1980-2002. They used cross-country time-series data for four economic variables: deficit in GNP, debt in GNP, inflation rate, and long-term nominal interest rate. The approach which they proposed related to the quantification of the trajectory of each country, where each trajectory was considered as a multivariate function of time. They applied the SOM algorithm to obtain a classification of the functions. Further on, they showed that this approach allowed the tracking of the individual evolution of each country with respect to the chosen criteria. Their results "confirmed the convergence of the European countries to Maastricht criteria, since the number of classes has diminished since 1980" (Aaron, Perraudin, & Rynkiewicz, 2003, p. 330).

In the context of the previous broad literature, the objective of this paper is to explore the relative positions and grouping of 27 EU countries in the light of the Lisbon strategy and to provide empirical comparisons to some earlier studies.

Description of the Data

The data considered in this study is provided by EU statistical office (EUROSTAT) and may be found at EUROSTAT web portal². The complete SI list is divided in six domains: general economic background (GEB), innovation and research (I&R), economic reform, employment, environment and social cohesion. These indicators were defined as a part of broader set of EU policy indicators. In addition to the structural indicators, EU policy indicators include principal European economic indicators (Euro Indicators PEEIs), sustainable development indicators and employment and social policy indicators. In this paper, only the data on structural indicators for EU member states are analyzed. Therefore, the results of this study should be considered only in that respect.

In the following the list of structural indicators that have been treated in the application is presented.

Economic reform indicators are supposed to reflect the EU member states' capacity for coherent development of economic environment with regards to: effective competition and trade, price convergence, government's initiatives for supporting entrepreneurship in the EU and providing the healthy business environment for job creation and poverty reduction, market integration by different types of trade activity (eliminating barriers to the free movement of goods, services and people within the EU). This set of structural indicators includes the following³:

- Business demography;
- Business investment;
- Comparative price levels;
- Electricity prices by type of user;
- Gas prices by type of user;
- Market integration by type of trade activities;
- Market integration-foreign direct investment (FDI) intensity;
- Market share of the incumbent in fixed telecommunications by types of call;
- Market share of the leading operator in mobile telecommunication;
- Market share of the largest generator in the electricity market;
- Price of telecommunications by type of call;
- Public procurement;
- State aid by type of aid.

In the area of employment the general objective of the EU employment policy has been defined in the form of concrete figures—as the achievement of an average employment rate of 70% for the EU overall and at least 60% for women by 2010. The indicators in this domain address one of the vital issues of prosperous economic and social development of any country, i.e., the issue of adequate and balanced utilization of the human capital as an essential economic resource. The list of 11 indicators is defined as follows⁴:

- Employment rate by gender;
- Employment rate of older workers by gender;
- Average exit age from the labor force by gender;
- Gender pay gap in unadjusted form;

² Retrieved from http://epp.eurostat.ec.europa.eu/portal/page/portal/structural_indicators/indicators.

³ Retrieved from http://epp.eurostat.ec.europa.eu/portal/page/portal/structural_indicators/indicators/economic_reform.

⁴ Retrieved from http://epp.eurostat.ec.europa.eu/portal/page/portal/structural_indicators/indicators/employment.

- Tax wedge on labor cost;
- Fatal accidents at work;
- Implicit tax rate on labor;
- Life-long learning by gender;
- Tax rate on low wage earners by marginal effective tax rates on employment incomes;
- Unemployment rate by gender;
- Serious accidents at work by gender.

In the context of EU economic and social development, special attention has been dedicated to the environmental issues dealing with greenhouse gas emission, renewable energy sources, efficient usage of the disposable resources, waste reduction and recycling, etc.. To monitor the progress in this sphere the following indicator list has been proposed⁵:

- Car share of inland passenger transport;
- Combined heat and power generation;
- Electricity generated from renewable sources;
- Energy intensity of the economy;
- Farmland bird index;
- Greenhouse gas emissions;
- Healthy life years at birth by gender;
- Municipal waste generated
- Municipal waste by type of treatment;
- Resource productivity;
- Road share of inland freight transport;
- Sufficiency of sites designated under the EU habitats directive;
- Implicit tax rate on energy;
- Urban population exposure to air pollution by ozone;
- Urban population exposure to air pollution by particulate matter;
- Volume of freight transport relative to GDP;
- Volume of passenger transport relative to GDP.

Structural indicators on general economic conditions provide the basis for structural reform and monitor a country's economic prosperity. They include the following indicators⁶:

- GDP per capita in purchasing power standards (PPS);
- Employment growth by gender;
- General government debt;
- Inflation rate;
- Labor productivity per hour worked;
- Labor productivity per person employed;
- Public balance;
- Real GDP growth rate;
- Real unit labor cost growth.

⁵ Retrieved from http://epp.eurostat.ec.europa.eu/portal/page/portal/structural_indicators/indicators/environment.

⁶ Retrieved from http://epp.eurostat.ec.europa.eu/portal/page/portal/structural_indicators/indicators/economical_context.

The area of innovation and research is considered to be the key driver for developing European information or knowledge-based society. The following list of 16 indicators is defined to follow the progress in this domain⁷:

- Broadband penetration rate;
- E-commerce via Internet;
- E-government on-line availability;
- E-government usage by enterprises;
- E-government usage by individuals by gender;
- Gross domestic expenditure on R&D (GERD) by source of funds;
- Gross domestic expenditure on R&D (GERD);
- High-tech exports;
- ICT expenditure by type of product;
- Level of internet access—households;
- Patent applications to the European Patent Office (EPO);
- Patents granted by the United States Patent and Trademark Office (USPTO);
- Science and technology graduates by gender;
- Spending on human resources;
- Venture capital investments by type of investment stage;
- Youth education attainment level by gender.

In the field of social cohesion, the main EU objective is “to significantly reduce the number of persons at risk of poverty and social exclusion by 2010”. The achievement of this objective should be evaluated by monitoring a list of 10 indicators⁸:

- Early school leavers by gender;
- Formal child care by duration and age group;
- Inequality of income distribution;
- Jobless households—children;
- Jobless households by gender;
- Long-term unemployment rate by gender;
- At-risk-of-poverty rate before social transfers by gender;
- At-risk-of-poverty rate after social transfers by gender;
- Dispersion of regional employment rates by gender;
- Persistent-at-risk-of-poverty rate by gender.

The complete SI list includes 79 indicators. However, since the data on three indicators are not available for single states⁹, the application is based on previously cited 76 indicators. The analyzed datasets are yearly data.

One of the problems that frequently appeared in practical data mining analysis, which also appeared in this study, is the problem of missing data (J. W. Grzymala-Busse & W. J. Grzymala-Busse, 2005). This problem

⁷ Retrieved from http://epp.eurostat.ec.europa.eu/portal/page/portal/structural_indicators/indicators/innovation_and_research.

⁸ Retrieved from http://epp.eurostat.ec.europa.eu/portal/page/portal/structural_indicators/indicators/social_cohesion.

⁹ The following three indicators are not included in the analysis: price convergence between EU member states, convergence of interest rates by type of loan and fish catches from stocks outside of “safe biological limits”.

brings severe concerns also when traditional methods are used (Tabachnick & Fidell, 2007). However, due to the fact that the SOM is a very robust algorithm, this problem was overcome in a relatively simple way: as the crucial part of the SOM algorithm is the choice of the best-matching node on the map for each input vector, in the case of missing value(s) for some input vector attribute(s), the process of looking-up the best-matching node on the map is limited to the available values, i.e., the look-up is conducted in a reduced map. After the training process is completed and the map is generated, the missing value(s) for particular attribute(s) can be replaced by the corresponding SOM nodes' value(s)¹⁰.

Exploratory Data Analysis

Exploratory data analysis usually appears as an initial phase of many data analysis assignments (Giudici & Figini, 2009). Very often it sets the stage for further analysis and is fundamental for understanding what might be discovered through the application of some sophisticated data analysis technique, such as data mining techniques (Hand, Mannila, & Smyth, 2001). In this study, the basic objective of the initial (explorative) data analysis is to describe the main features of the six SI datasets regarding, in particular, their variability. For this purpose the multiple box plots are used. They are particularly useful for making efficient comparisons between distributions of different univariate datasets (Myatt, 2007; Myatt & Johnson, 2009). Having in mind that particular structural indicators are measured in different scales and that great discrepancy of the original SI data values is dominant, data are standardized prior to the graphical presentation. Figure 1 shows the relative image of SI datasets in each of the six groups.

The box plots presented in Figure 1 reveal the general central tendency and variability of the particular structural indicators datasets, as well as the shape of the distributions. It is evident that some distributions are skewed positively, others negatively, and for some indicators the outliers and/or extreme values are recorded.

In the area of economic reform structural indicators, three of them: namely indicator number 7 (market integration-foreign direct investment intensity), number 9 (market share of the leading operator in mobile telecommunication) and number 12 (public procurement) show strong positive skewness with outliers and extreme values to the right of the distributions.

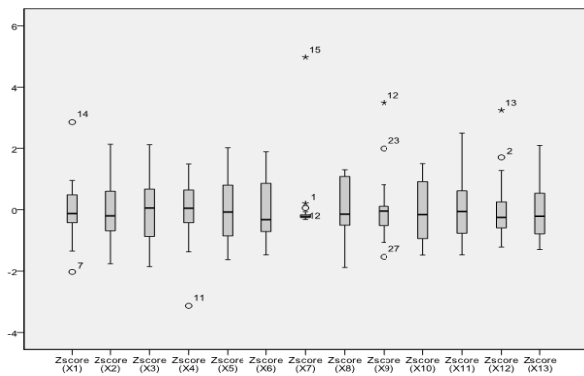
In the group of employment structural indicators several indicators, such as: number 5 (tax wedge on labor cost), number 8 (life-long learning by gender), number 9 (tax rate on low wage earners by marginal effective tax rates on employment incomes), number 10 (unemployment rate by gender) and number 11 (serious accidents at work by gender) also show moderate or substantial departure from normal distribution.

The environment structural indicators show the most versatile data distribution shapes with a lot of outliers and/or extreme values. In particular, this is the case with the following indicators: number 1 (car share of inland passenger transport), number 2 (combined heat and power generation), number 3 (electricity generated from renewable sources), number 4 (energy intensity of the economy), number 12 (sufficiency of sites designated under the EU habitats directive), number 15 (urban population exposure to air pollution by particulate matter) and number 17 (volume of passenger transport relative to GDP).

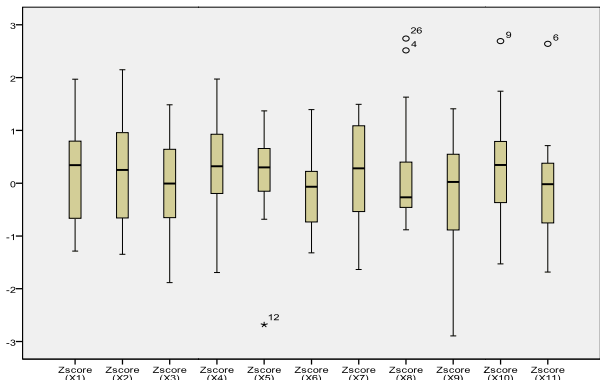
In the domain of GEB structural indicators, the presence of outliers can be observed in relation to indicator

¹⁰ Viscovery SOMine 5.1., User manual and guide (2009). More on the subject of dealing with missing data with neural networks methodology may be found in the papers of Piela (2002, 2003) and related articles based on the research conducted under the EUREDIT project (<http://www.cs.york.ac.uk/euredit>). The most important method used in this research project is tree-structured self-organizing map, or TS-SOM.

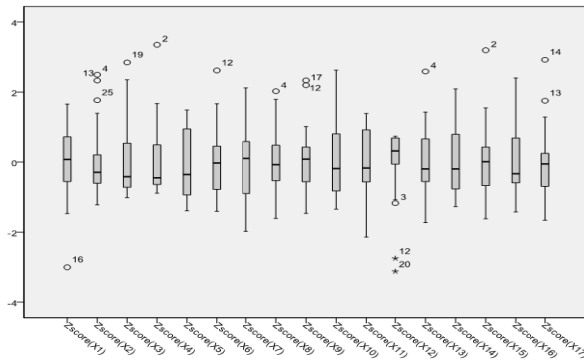
number 1 (GDP per capita in PPS), number 4 (inflation rate) and number 6 (labor productivity per hour worked), as well as the skewness of distributions.



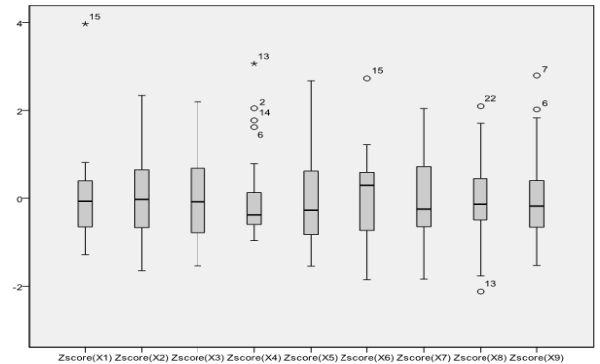
(a) Economic reform indicators



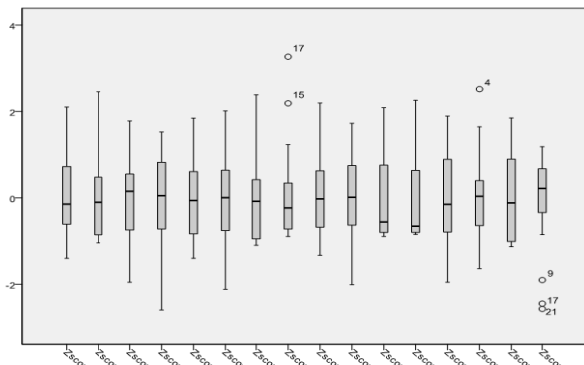
(b) Employment indicators



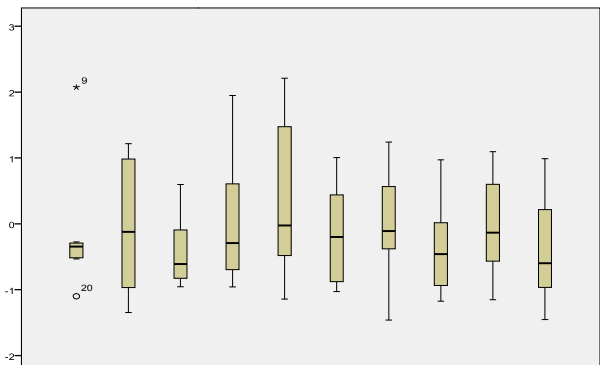
(c) Environment indicators



(d) GEB indicators



(e) I&R indicators



(f) Social cohesion indicators

Figure 1. Box plots of six SI datasets (standardized values).

Among the 16 structural indicators on innovation and research a few of them: number 5 (e-government usage by individuals by gender), number 11 (patent applications to the European Patent Office), number 12 (patents granted by the United States Patent and Trademark Office), number 14 (spending on human resources) and number 16 (youth education attainment level by gender)—have outliers and substantial departures from normal distribution.

Regarding the group on social cohesion indicators, the most remarkable is the behavior of the first indicator (early school leavers by gender) with a substantial positive skewness and outliers. Also, indicator number 3 (inequality of income distribution), number 4 (jobless households—children) and number 5 (jobless households by gender) show positive skewness.

The previous results are very indicative and helpful in making decisions on the potential data transformations which are usually considered in the early stage of the Kohonen map processing.

In addition to the box plots, the graphical presentation of coefficients of variation for each SI dataset is examined and the most interesting findings are presented in the Figure 2.

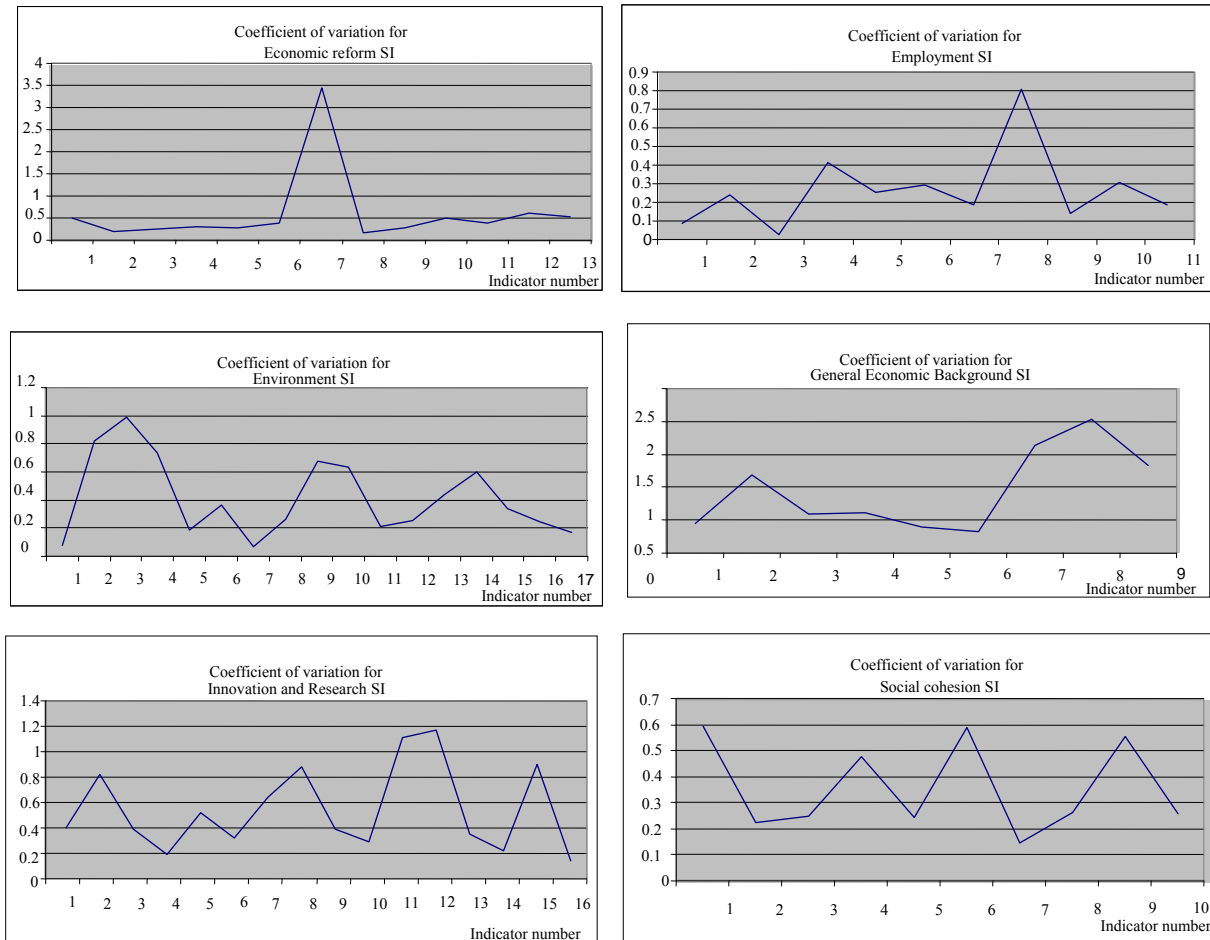


Figure 2. Coefficients of variation for each SI dataset.

Coefficients of variations for structural indicators concerning the employment, environment and social cohesion are generally in the range of 0.0-1.0, while the coefficients of variation for structural indicators on innovation and research, general economic background and economic reform are spread in wider ranges: 0.131-1.159, 0.324-2.036 and 0.169-3.445 respectively.

It is interesting to note that in the group of economic reform structural indicators, most coefficients of variation take values in the 0.168-0.602 interval. However, there is a peak on the variability of indicator number seven, i.e., on market integration—foreign direct investment (FDI) intensity (average value of inward and outward FDI flows divided by GDP—in percent). The coefficient of variation for this indicator has an

extreme value of 3.445 due to the high value of this indicator for Luxembourg (234%), while the other indicators from this group have moderate variability.

The values of coefficient of variation for employment indicators are spread from 0.025 to 0.804, having the peak on indicator number 8 (life-long learning by gender)—0.804. When this value is excluded the upper limit in this SI group is 0.411.

In the group of environment structural indicators the minimal value of coefficient of variation is found for indicator number 7—healthy life years at birth by gender (0.067) and maximal value for the third indicator—electricity generated from renewable sources (0.986). Also, there is a high variability for the second and the fourth indicator: combined heat and power generation and energy intensity of the economy with coefficients of variation equal to 0.830 and 0.731 respectively.

Concerning the general economic background structural indicators, a few of them present extremely high variability (indicator numbers 2, 7, 8, and 9). These are indicators on annual percentage change in total employed population, public balance, real GDP growth rate and real unit labor cost growth. The coefficients of variation for these indicators are: 1.196, 1.635, 2.036, and 1.325 respectively.

In the I&R group, two indicators (numbers 11 and 12: patent applications to the European Patent Office (EPO) and patents granted by the United States Patent and Trademark Office—USPTO) have the coefficient of variation value above 1.0, i.e., 1.101 and 1.159. The coefficients of variation for the other I&R indicators take the values from the 0.131-0.886 interval.

Finally, the group of Social cohesion indicators demonstrates the lowest variability across the EU states. The respective coefficient of variation values fall within the 0.146-0.592 interval.

General Characteristics of the Kohonen Self-organizing Map Algorithm

The Kohonen SOM algorithm is a well-known learning one that belongs to the group of unsupervised neural networks models. Historically the SOM method was originally proposed as an explanation for biological phenomena. The fundamental idea of SOM map was introduced by Marlsburg (1973) and Grossberg (1976), but later on Kohonen (1981) proposed the model which was successfully applied to a number of pattern recognition and engineering applications (Cherkassky & Mulier, 1998). The main feature of the SOM algorithm, which makes it helpful for this study, is that the relations between data items from the original data space become explicit on the SOM map due to a non-linear projection from a high-dimensional space onto a two-dimensional display¹¹. Different aspects of the Kohonen algorithm were extensively analyzed by many authors and, also, numerous examples of SOM applications may be found in literature¹².

To avoid turning this paper into a technical-oriented one, here only the essentials of the SOM technique are presented (Deboeck & Kohonen, 1998, pp. 163-164). The SOM map consists of units (nodes or neurons) which reflect the general form of the input data space. After net training, each unit represents a group of individuals with similar features, i.e., individuals with similar features correspond to the same unit or to neighboring units on the map. Assuming that the observation space is n -dimensional, the real sample vectors $x(t)$, $t = 1, 2, \dots$ are:

$$x(t) = [x_1(t), x_2(t), \dots, x_n(t)] \quad (1)$$

¹¹ Two-dimensional maps are mostly used in practice. However, one-dimensional and multi-dimensional maps are also possible.

¹² The extensive list of the bibliography of SOM algorithm applications can be found at the following web address: <http://www.cis.hut.fi/research/refs/>.

where $t = 1, 2, \dots$, refers to the index of the sample.

Similar to the sample vectors, there are n -dimensional model vectors:

$$m_i(t) = [m_{i1}(t), m_{i2}(t), \dots, m_{in}(t)] \quad (2)$$

which are associated with each node on the map. The values of the model vectors are adjusted in response to samples $x(t)$, $t = 1, 2, \dots$. At each step of the algorithm, primarily the index of the “winner node” is identified in the following manner:

$$\|x(t) - m_c(t)\| = \min_i \{\|x(t) - m_i(t)\|\} \quad (3)$$

where the index c refers to the “winner neuron”. This is followed by the adjustment of the model vectors $m_i(t)$:

$$m_i(t+1) = m_i(t) + \alpha(t) h_{ci}(t) [x(t) - m_i(t)] \quad (4)$$

For the purpose of convergence it is necessary that $h_{ci}(t) \rightarrow 0$ when $t \rightarrow \infty$. This is a unique feature of SOM algorithm that neighborhood width gradually decreases as iterations progress (Cherkassky & Muiler, 1998). More details on a set of practical issues relevant for application of SOM algorithm are discussed, among the others, by Kaski, Venna, and Kohonen (2000) and Kohonen (2001).

Major Results: The Visualization and Grouping of EU Member States

In this section major results of SOM application are presented. The section consists of two parts. In the first part the particular solutions for each SI dataset are presented¹³. These particular mapping solutions are followed by the general SOM map of EU states based on all structural indicators.

Kohonen Maps of EU States—Particular Solutions for Each SI Dataset

As explained in the previous section, during the SOM training process the nodes of the map gradually adapt to the intrinsic shape of data distribution. But, prior to the training of the SOM algorithm each dataset forwarded into SOM algorithm passes through a pre-processing data procedure (Deboeck & Kohonen, 1998). As SI datasets show substantial differences regarding the appropriate measurement level and variability, indicators are scaled by the appropriate standard deviation (Berry & Lindoff, 1997). The other issue relevant to the data preprocessing phase is the transformation of the particular SI datasets. Data transformations are based on the exploratory data analysis results (presented in the section 4). For substantial positively skewed distributions, with outliers and/or extreme values, the square root or log transformation are considered and applied, while for substantial negatively skewed data with outliers, the relevant transformations for positive skewness are conducted on the reflected original datasets (Tabachnick & Fidell, 2007). Finally, regarding the priority of the particular indicators, all indicators are treated equally, i.e., the same priority factor equivalent to number 1 is assigned to each of them¹⁴.

The respective maps in Figure 3 show visual images of EU states and the appropriate intrinsic grouping in clusters. Due to the general SOM property of topology preserving, the closer the positions of two countries in a map, the similar their profiles regarding the respective structural indicators.

Along with the projection of the EU states in the map, Figure 3 provides the appropriate clustering solutions. Distinctive clusters are painted in different colors which are automatically generated by the concrete

¹³ The Kohonen maps were created using the software package *Viscovery SOMine* (Version 5.1.) from Eudaptics, Software GmbH, Inc., Austria.

¹⁴ If a particular indicator has a priority factor less than 1, it means that such an indicator is less relevant for the training process and, vice versa, if a particular indicator has the priority factor greater than 1, the indicator is more dominant.

program solution¹⁵. The specific regions are determined by the number of the clusters, as well as, by the chosen granularity of the map. While the number of the SOM nodes, as an input program value, may be arbitrary chosen and entered by the user at the beginning of the SOM processing, the number of map clusters is not predetermined. Namely, the choice of the concrete cluster solution is based on some objective criteria used in the clustering procedure. Here it is the cluster indicator which is explained in the next part and presented in the Figure 4. The previous presented clustering solutions should be considered as initial options for particular SI structure, and are usually expanded with more in-depth analysis of the concrete map.

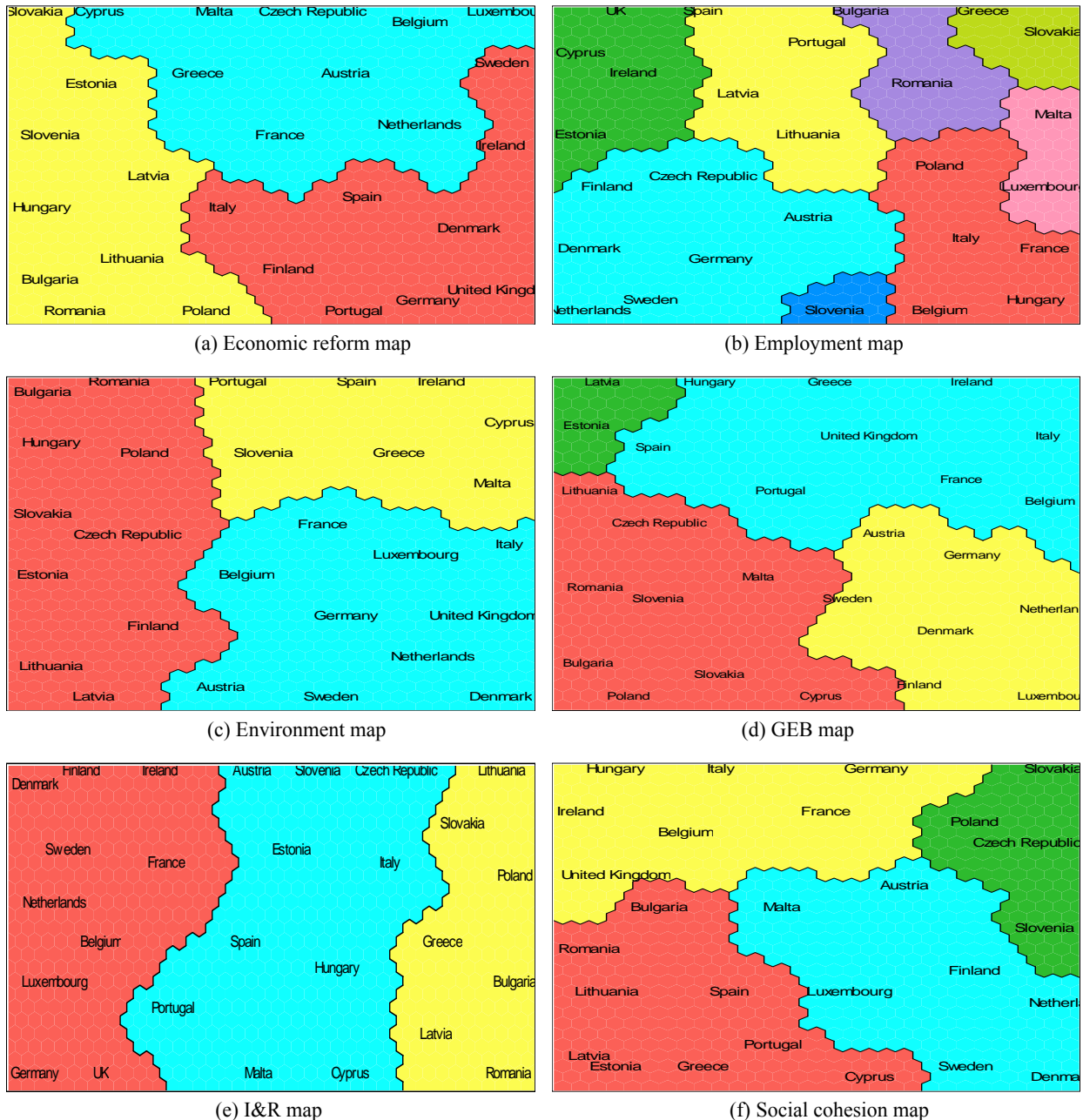


Figure 3. Initial Kohonen maps of EU states based on the particular SI datasets.

¹⁵ Viscovery SOMine (Version 5.1.), *User manual and guide* (2009), Viscovery Software GmbH, Vienna.

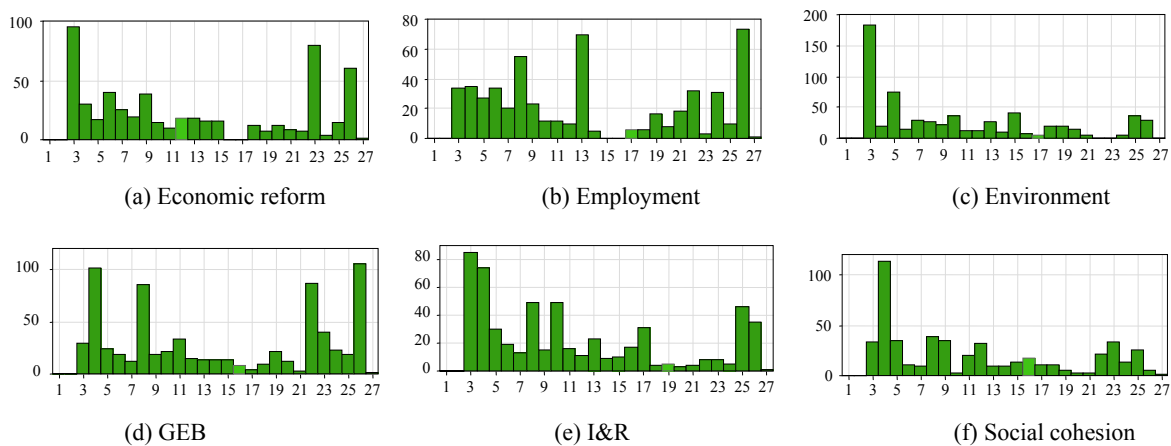


Figure 4. Cluster indicator graphs for six SOM maps.

With regards to the clustering procedure, the SOM-Ward-clustering method is applied. This method combines the well-known Ward's algorithm (standard hierarchical cluster procedure) and the local order information of the map. This combination assumes that the algorithm starts as a Ward's method (Hair, Black, Babin, Anderson, & Tathan, 2006), where each node forms a cluster, and continues with combining two clusters at each step of the algorithm. The main principle of the Ward's method is focused on minimizing the total within-cluster sum of squares which is used as the measure of within-clusters homogeneity. Thus, at each algorithm step, clusters are combined in such a way that the resulting cluster solution has the minimal within-cluster sums of square across all variables in all clusters. However, in addition to this classical Ward's procedure, SOM-Ward-clustering method takes into account the positions of the clusters in the map, allowing only neighboring clusters to be combined.

Having in mind the explorative nature of SOM algorithm, the number of clusters is not predetermined. Actually, it was experimenting with different cluster numbers by fine-tuning the map parameters, to provide, as much as possible, the optimal partition of data items. Also, it is used a specific operative measure for determining the cluster number-cluster indicator which is calculated at each step of the clustering procedure on the base of the difference between two neighboring SOM-Ward sums of square¹⁶. This indicator is used as a heuristic measure for a possibly good clustering: Its high value for a particular cluster count is a marker of good "natural" clustering, and vice versa, its low value suggests a predominantly "artificial" clustering. Therefore, by following the values of this indicator on the cluster indicator graph, some interesting clustering solutions may be observed. The cluster indicator histograms are given in Figure 4.

The cluster indicator histograms reveal different clustering tendencies in the domains of six SI datasets. Thus, it may be observed that:

- The clustering tendencies of EU states regarding the economic reform and General Economic Background (GEB) are more or less alike. Considering the structural indicators on economic reform, the highest quality of EU states clustering is provided for three clusters and then for 23 and 26 clusters. Regarding the General Economic Background (GEB) the interesting cluster-number may be: four, eight, 22 and 26 clusters. Having in mind that the EU consists of 27 states, solutions with more than 20 clusters have no practical relevance. However, this also reveals that EU states are highly differentiated in the domain of economic reform and

¹⁶ Ibid., pp. 116-117.

general economic background;

- Considering employment indicators, the optimal cluster number may be 13 and eight. Again, the option with 26 clusters is not considered as a relevant one;
- In the domain of environment and social cohesion, cluster indicator histograms have similar shape: High cluster indicator values are recorded for three and four clusters and very low values for the other cluster solutions;
- Considering the I&R structural indicators, a possible clustering solution for EU member states may be the partition into three or four clusters, then eight or 10 clusters.

For the purpose of understanding the clustering tendencies of EU states, it is experimented with different cluster number solutions in each SI field. Only the case of GEB structural indicators is discussed here. According to the cluster indicator histogram (see Figure 4. (d)) the optimal cluster number is four, but if there is a need for more detailed analysis, the second best solution is eight clusters (partitions into 22 and 26 clusters were excluded for practical reasons).

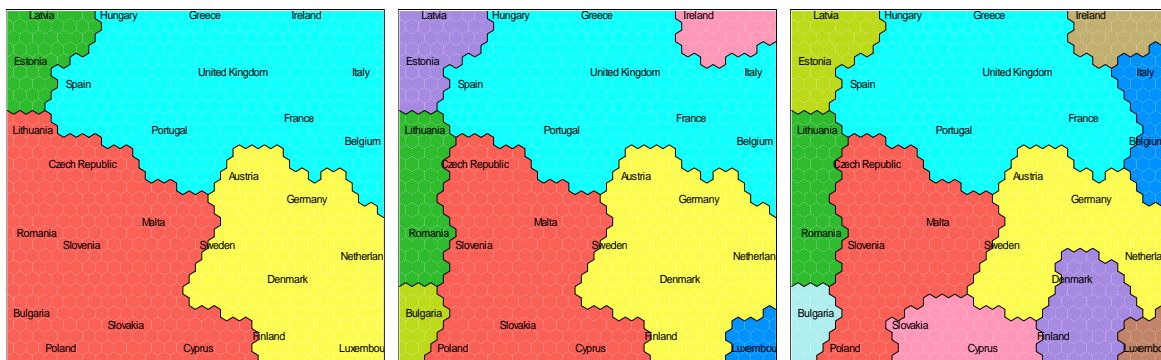


Figure 5. GEB maps: Four-, eight- and eleven-cluster solution.

In addition to the visualization and grouping procedure, the final evaluation of the Kohonen map involves the inspection of the appropriate component planes¹⁷ which usually accompany the map. These planes provide information on the relative distribution of a particular input variable (indicator) and its influences on the final map. Furthermore, they provide information on dependencies among the indicators themselves. Here, only one set of component planes is presented, i.e., component planes for GEB indicators, which illustrate the contribution to the respective map (see Figure 6).

The component planes positioned at the right-hand side of the picture in Figure 6 show the contribution of each GEB structural indicator to the respective Kohonen map (left-hand side of the picture). The scale at the bottom of each plane goes from the lowest values to the highest values for each indicator¹⁸. Comparing the component planes of the nine contributing economic indicators it can be observed that some of them are demonstrating similar structure and contribution to the final map. Looking at the component planes X5 (labor productivity per hour worked) and X6 (labor productivity per person employed), it is obvious that they are very similarly colored, indicating similar influences of those two components on the final map. Also, the first plane (indicator X1-GDP per capita in PPS-purchasing power standards) shows obvious similarity with

¹⁷ A component plane is a picture which displays the distribution of values of the respective component (indicator) over the map, thereby representing a cross-section through the map.

¹⁸ Different colors are used to indicate lower and higher values. Thus, the contribution of a particular indicator to the map and the correlation between indicators may be easily observed.

planes X5 and X6. These three component planes are very much alike, showing the largest value at the lower left part and generally larger values at the left-hand side, compared to the right side of the plane. Similar behavior of respective indicators may be confirmed with high values of Pearson coefficient of correlation (see Table 1).

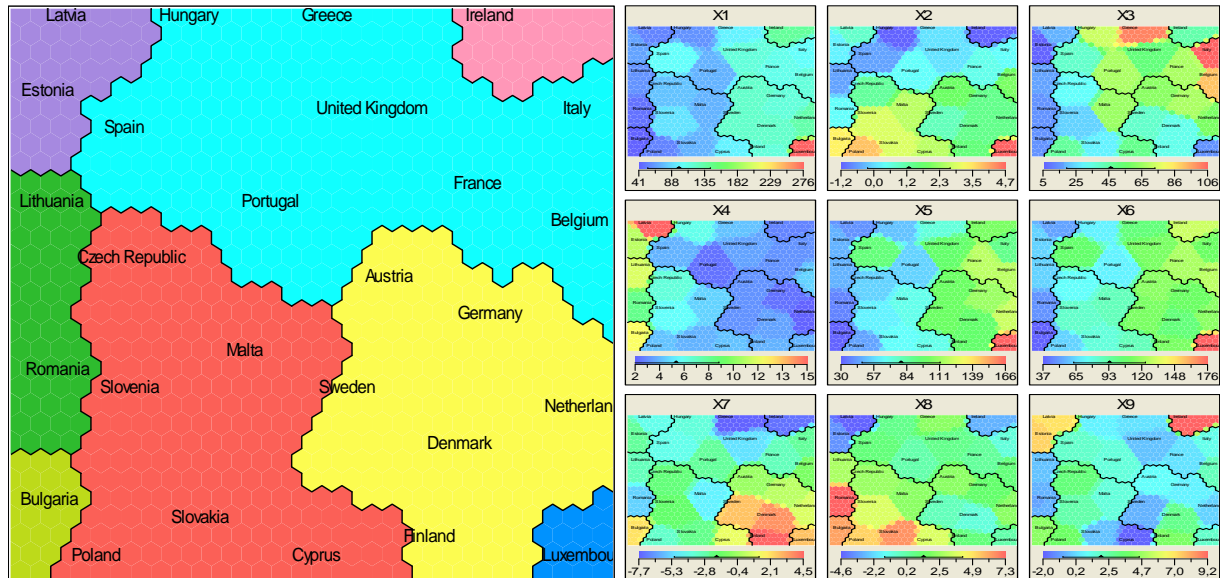


Figure 6. SOM on GEB structural indicators and component planes.

Table 1

Coefficients of Correlation for GEB Structural Indicators

	X1	X2	X3	X4	X5	X6	X7	X8	X9
X1	1	0.283	0.055	-0.493	0.909	0.918	0.380	-0.305	-0.061
X2	0.283	1	-0.232	-0.063	0.150	0.108	0.523	0.426	-0.078
X3	0.055	-0.232	1	-0.557	0.282	0.337	-0.250	-0.118	-0.311
X4	-0.493	-0.063	-0.557	1	-0.639	-0.670	-0.129	-0.068	0.381
X5	0.909	0.150	0.282	-0.638	1	0.969	0.349	-0.305	-0.161
X6	0.918	0.108	0.339	-0.670	0.969	1	0.237	-0.343	-0.109
X7	0.380	0.523	-0.250	-0.129	0.349	0.237	1	0.048	-0.114
X8	-0.305	0.426	-0.118	-0.068	-0.305	-0.343	0.048	1	-0.523
X9	-0.061	-0.078	-0.311	0.381	-0.161	-0.109	-0.114	-0.523	1

Although the Pearson coefficient of correlation measures only the linear correlation between variables, it also provides precious knowledge on GEB indicators’ dependences. Remarkable values of the coefficient are observed among several pairs of GEB indicators: indicators X1 (GDP per capita in PPS-purchasing power standards) and X5 (labor productivity per hour worked) and between indicators X1 and X6 (labor productivity per person employed) with a coefficient of correlation equal to 0.909 and 0.918 respectively. Also, there is a large coefficient of correlation between indicators X5 (labor productivity per hour worked) and X6 (labor productivity per person employed)—0.969, which is in compliance with the visual image of the relevant component planes in Figure 6. It is obvious that these indicators have similar distributions. In contrast, the following pairs of component planes: X1 (GDP per capita in PPS-purchasing power standards) and X4 (Inflation rate), X3 (general government debt) and X4 (inflation rate), X4 (Inflation rate) and X5 (labor

productivity per hour worked), as well as the pair X4 (inflation rate) and X6 (labor productivity per person employed), present images of more or less inverse distributions. The visual perception of their distributions on the appropriate component planes can be confirmed with the negative values of the respective correlation coefficients in Table 1.

An Overall Kohonen Map—An Atlas of EU States Based on All SI Datasets

Whilst the previous section describes the visualization and grouping of EU states based on each of six SI datasets separately, this section deals with the visualization of EU states based on all 76 structural indicators. Having applied the same procedure of mapping as it was previously described, including the pre-processing data phase. The following results are obtained (see Figures 7 and 8).

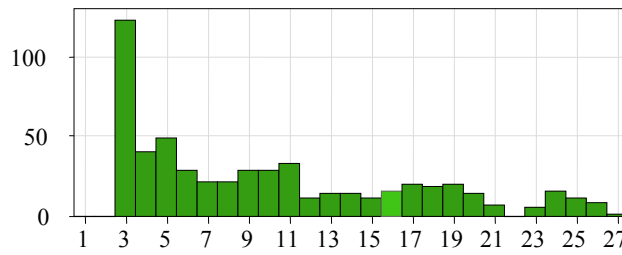


Figure 7. Cluster indicator histogram for a general SOM map.

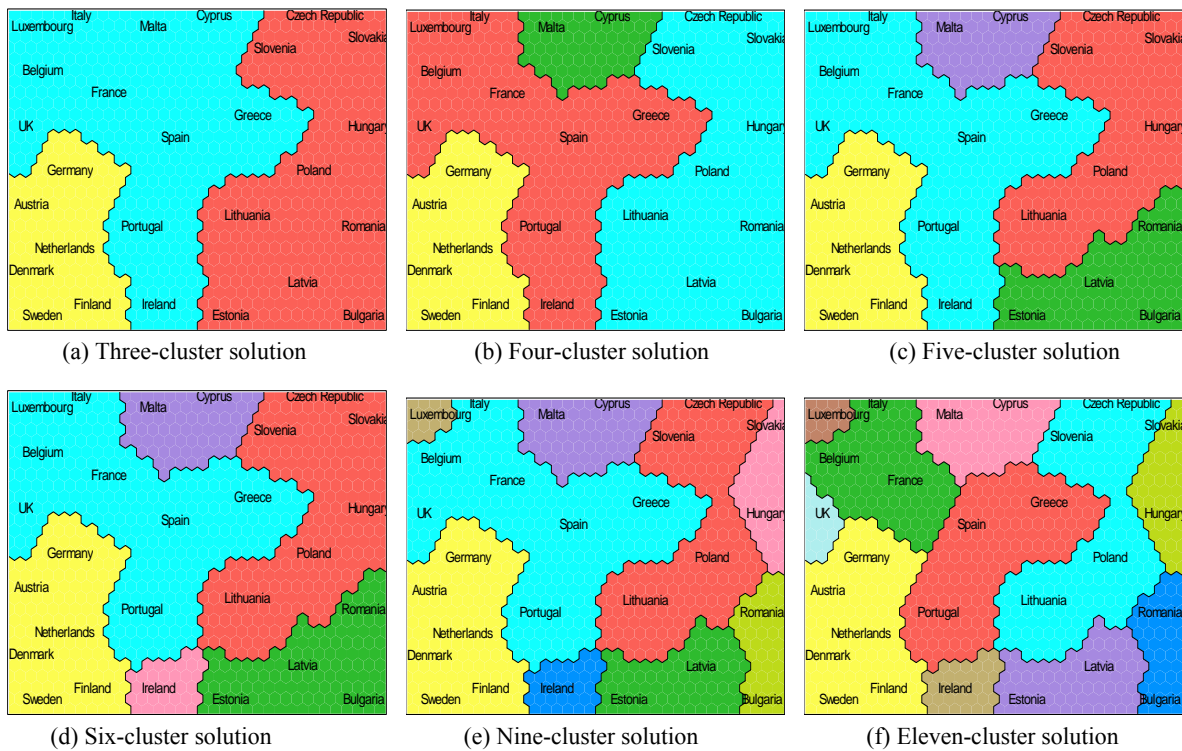


Figure 8. General map of EU states based on all SI datasets: Different cluster solutions.

The cluster indicator graph in Figure 7 demonstrates that the most relevant grouping of EU states is in three clusters. Apart from this most striking cluster solution, some additional partitions are applied to illustrate the clustering tendency of EU states. The respective results are given in Figure 8.

The map partitions presented in Figure 8 provide a general view of the clustering tendency of EU states

(from three to 11 clusters) based on all structural indicators.

The proposed groupings of EU member states may be the subject of further analysis, primarily of a group profile analysis. Here presented the results of the profile analysis referring to the four-cluster solution. The appropriate profile analysis for other cluster solutions may be carried out in a similar fashion.

The second map in Figure 8 shows the grouping of EU states in four clusters as follows:

- Cluster 1: Belgium, Ireland, Greece, Spain, France, Italy, Portugal, United Kingdom and Luxembourg;
- Cluster 2: Bulgaria, Estonia, Latvia, Lithuania, Poland, Romania, Slovenia, Czech Republic, Hungary and Slovakia;
- Cluster 3: Denmark, Netherlands, Austria, Germany, Finland and Sweden;
- Cluster 4: Cyprus and Malta.

The graph in Figure 9 shows the relative image of the four clusters with each cluster described by the appropriate SI mean values. The concrete height of a bar in the bar charts is given in the relative terms: It shows the deviation of a particular cluster SI mean value from the entire data set SI mean value.

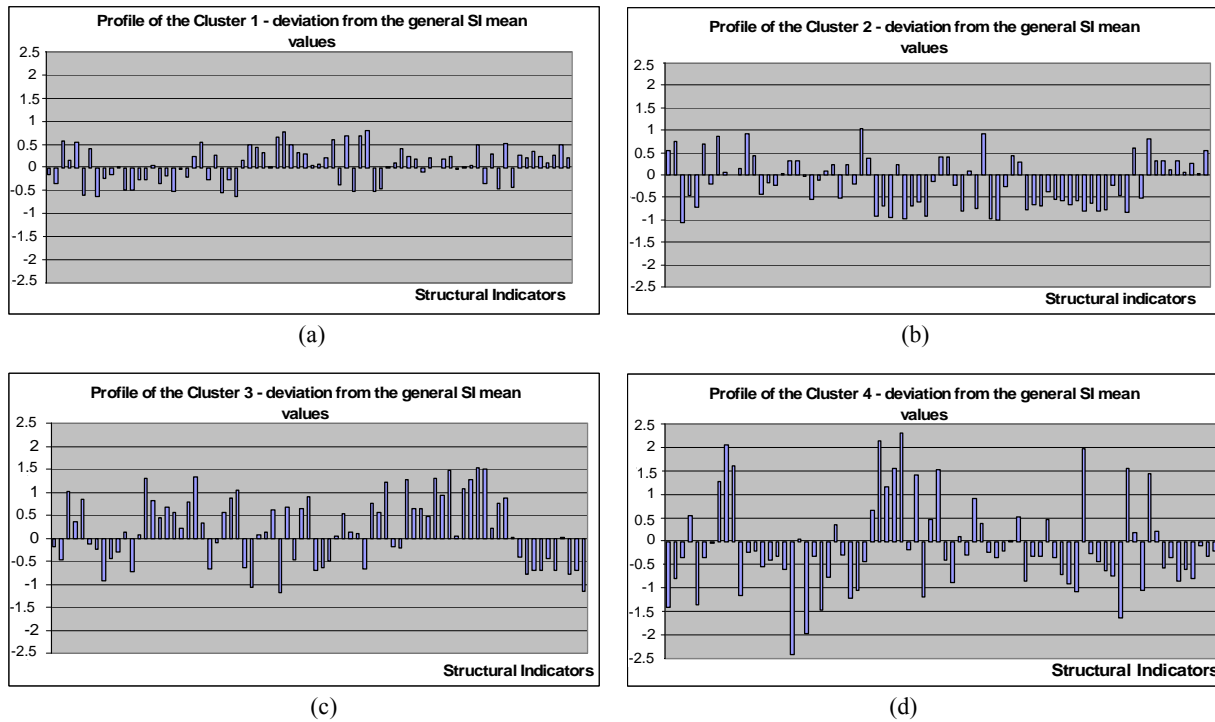


Figure 9. Relative profiles of the four clusters—Based on all SI values.

As all deviations are measured by the same unit, i.e., standard deviation of the SI values for entire dataset, the previous bar charts provide a good solution for the comparison of cluster profiles. Thus, in comparing four clusters, the following points emerge:

- Going from the first to the last cluster there is a strong tendency of increasing deviations of the particular cluster’s SI means from the entire dataset mean values;
- The profile of the first cluster, consisting of Belgium, Ireland, Greece, Spain, France, Italy, Portugal, United Kingdom and Luxembourg can be considered to be an “average” cluster profile, since deviations of its SI mean values from the general average values are the ones closest to zero;

- Most of SI means for the second cluster (Bulgaria, Estonia, Latvia, Lithuania, Poland, Romania, Slovenia, Czech Republic, Hungary and Slovakia) show negative deviations from the general SI mean values for all EU states. They fall in the range of -1.0 and 1.0 standard deviations around the zero line;
- Unlike in the second cluster, the SI mean values for EU states belonging to the third cluster (Denmark, Netherlands, Austria, Germany, Finland and Sweden) mainly show the positive deviations from the general average values for all EU states;
- The fourth cluster comprising just two states—Malta and Cyprus, shows substantial differences on both sides (positive and negative) from the general EU average of all structural indicators. The deviations are spread in the interval of -2.5 to 2.5 standard deviations around the general mean values.

In addition to the previous profile analysis where all seventy six structural indicators are applied and the respective comparisons between clusters are made, in the next part a more in-depth profile analysis of each cluster is proposed. Actually, a four-cluster solution in each group of the structural indicators is profiled, where SI standardized values serve as clustering variables. Figure 10 provides the respective graphical results.

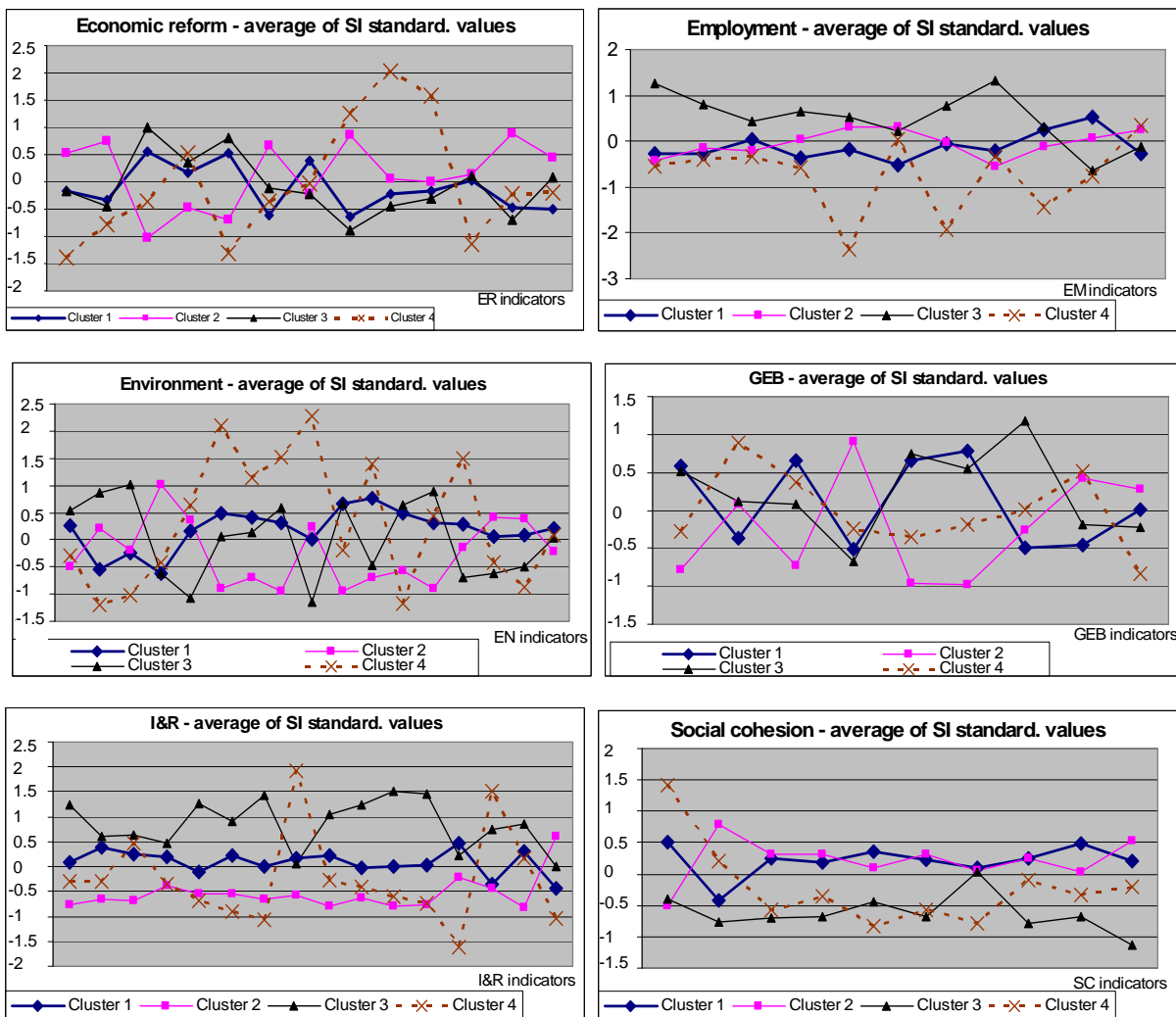


Figure 10. Profile analysis of standardized SI datasets for the four-cluster solution.

Generally, these graphs confirm some of the previous conclusions. For almost all SI groups, except for GEB indicators and economic reform, the first cluster takes the role of the “average” cluster with the lowest variability of SI values. On the other hand, the fourth cluster shows the largest variability of average standardized SI values around the zero line, but again with the exception of GEB indicators. Cluster number three has clearly distinctive standardized values for the group of social cohesion, I&R and employment indicators, which is not the case for the other three SI groups (general economic background, environment and economic reform) where a lot of intersections with other clusters’ SI values are observed. The second cluster consisting of east European states (Bulgaria, Estonia, Latvia, Lithuania, Poland, Romania, Slovenia, Czech Republic, Hungary, and Slovakia), that have gone through the process of economic and social transformations, reveals specific behavior patterns regarding the GEB and economic reform indicators, but follows the first cluster’s values for employment, social cohesion and I&R indicators.

In addition to the above observations, Figure 10 indicates a different level of separation between four clusters for particular structural indicators. On the one side, in the domain of social cohesion, employment and I&R indicators, clear clusters’ separations exist, while on the other side, with regards to GEB, environment and economic reform indicators, a lot of clusters intersections dominate.

Concluding Remarks

This paper demonstrates how the Kohonen SOM algorithm can be used to provide a visual presentation of the relative position of EU member states according to the specific set of economic and social indicators defined by the European Commission as structural indicators (SI). Apart from the general map of EU states (based on all SI datasets), separate maps are presented for each particular SI domain: general economic background, employment, innovation and research, economic reform, social cohesion and environment. Since the SOM algorithm combines the goals of both projection and clustering, the paper also discusses a clustering tendency of the EU states based on all structural indicators.

Prior to the SOM application an exploratory analysis is performed by the usage of multiple box plots and graphical presentations of the coefficients of variation for each particular SI dataset. It reveals the presence of a higher variability for the economic reform, general economic background and I&R indicators comparing to the environment, employment and social cohesion indicators. The principal findings of SOM application can be summarized as follows:

(1) The resulting maps provide intuitive and helpful graphical images of complex SI datasets. Regarding the clustering procedure, it is shown how an optimal cluster number is determined by the data itself. For this purpose, a specific operative measure—the cluster indicator—is used. Based on cluster indicator values, the three-cluster solution appears as the most relevant for the general map of EU countries (cluster 1—Belgium, France, United Kingdom, Luxembourg, Italy, Spain, Greece, Portugal, Ireland, Cyprus and Malta; cluster 2—Bulgaria, Estonia, Latvia, Lithuania, Romania, Poland, Hungary, Slovenia, Slovakia, and Czech Republic; cluster 3—Denmark, Netherlands, Austria, Germany, Finland, and Sweden);

(2) Considering the clustering solutions for the general map (based on all 76 structural indicators) it is remarkable that geographic location of many countries is reflected in the final map organization, with some exceptions, notably Ireland and Luxembourg. This observation complies with the results of some earlier studies that are discussed in the second part of the paper;

(3) The previous conclusion concerning the relevance of “geography factor” doesn’t apply in the same extent to all Kohonen maps in six SI domains. Going through clustering solutions in these areas, “geography” matters more regarding the general economic background, innovation and research, and less in the domain of economic reform, environment and social cohesion and the least regarding the employment area;

(4) Also, it is observed that two country groups—Eastern European countries and Scandinavian countries (Sweden, Finland) with Denmark and Netherlands, appeared as more homogenous and stable groups across all six SI domains comparing to other EU countries;

(5) Finally, the profile analysis (for the four-cluster solution) reveals the main clusters’ features and also presents different divisions among clusters regarding particular SI datasets. Whilst in the sphere of employment, I&R and social cohesion, a clear separation between clusters of EU member states is recorded, on the other side, more intertwined trends between clusters dominate in the case of environment, GEB and economic reform indicators.

This paper presents only a static picture of EU countries within the scope of predefined SI datasets. As the Lisbon strategy may be considered as an ongoing historical process which assumes a dynamic dimension, the great challenge for future work is to expand this picture through a time-horizon, and explore the change of individual country positions in that respect.

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The “Rose” Revolution: Did It Bring Change to Kyrgyzstan?

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Twenty years have passed since the collapse of the USSR. Newly independent states have been faced with numerous problems that have affected their social, economic and political spheres. Some of these countries have overcome troubled times, some have not. The Kyrgyz Republic is one of the countries still struggling to resolve economic problems and ensure political stability. Recent political turmoil has led to even worse conditions in the country. Changes in governance have not brought adequate reforms to this country. This study attempts to identify socio-economic and political conditions in Kyrgyzstan after more than a year has passed since the “Rose” revolution in 2010. In particular, this paper examines the import and export markets of the country as well as the manufacturing and banking industries to develop insights into how the country may address its various problems. The authors have employed data from the country as well as personal insights to conclude that the future prospects for Kyrgyz Republic depend heavily on its ability to harmonize the political culture of the republic.

Keywords: Kyrgyzstan transition economy, “Rose” revolution, colourful revolutions, post-independence economy, Kurmanbek Bakiev, structure of Kyrgyzstan’s economy

Introduction

Countless articles and news releases start with the sentence “After the collapse of the USSR...” that it has become a cliché. Twenty years have passed since the collapse of the USSR. This period of time seems to be sufficient for the economic development of new independent states and for the transition to “market” economy, but in reality, it did not happen. In reality, after the collapse of the USSR some independent states went through “colorful” revolutions: Georgia (2003), Ukraine (2004), Kyrgyzstan (2005), Belarus (2006), Armenia (2008), Moldova (2009), and again, Kyrgyzstan (2010).

The Kyrgyz Republic declared its independence on August 31, 1991. The country joined the Commonwealth of Independent States in 1991, and elected its first president Askar Akaev (Kyrgyzstan Country Review, 2011). It was internationally recognized as a sovereign state. Kyrgyzstan was the most promising country among other independent Central Asian countries. This country compared to its neighbors customized general elections, adopted a democratic form of government, it did not prevent opposing political parties from performing political activities and tried to provide freedom of the press.

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Kyrgyzstan embraced the “Silk Road Diplomacy” (an official document dated 17 September 1998 and adopted by the United Nations) doctrine in order to obtain its position in the international arena (Askar Akaev, 1999). According to the ex-president Akaev, owner of the idea, implementation of the doctrine would have resulted in stability and security in the Central Asia region and Kyrgyzstan would have developed according to the “Swiss model”. Therefore, Kyrgyzstan at that time was defined as an “island of democracy” or as the “Switzerland of Central Asia”. Today, the country can be named as an island of revolutions. Just five years passed between two revolutions that took place in 2005 and 2010. Mr. Akaev fled from the country as the “Tulip Revolution” took place in 2005. Ex-president Akaev is a professor in physics at the Moscow State University (Moscow, Russia) at the present time.

In 2005, the “Tulip Revolution” Bakiev-lead opposition promised to bring a parliamentary system while overthrowing ex-president Akaev. Kyrgyzstan’s parliament tried to change the Constitution that was ensuring a parliamentary system several times, but it failed to pass. Thus, the Kyrgyz administration spent a long time on the power struggle and it was not interested in increasing standards of life and developing the economy. Therefore, people struggled with poverty. Privatization of state property led to enormously increasing prices. The Kyrgyz people had become dissatisfied with the living standards. In addition, the Kyrgyz Republic had the problem of corruption in all government departments. Bakiev and his government failed to establish authority that resulted in increases in crime and violence, affecting production levels (Challenges Beyond Politics, 2006). The Kyrgyz people accused Bakiev’s government of setting up a dictatorship and protecting the interests of his family.

One of the main reasons for the outbreak of the crisis in 2010 in Kyrgyzstan and perhaps the most important one was the uncertain political situation in the country. Ex-president Bakiev was overthrown in April 2010. Then, the temporary president of Kyrgyzstan formed an interim government headed by Roza Otunbayeva. The country held a referendum on the constitution on 27 June 2010 and parliamentary elections took place on 10 October 2010. The new government was formed in December 2010.

The current three-party coalition tries to work closely together on political and economic reforms. Political stability is not yet ensured in the country therefore most investors utilise a “wait-and-see policy” towards coming back to this country (Macroeconomic Outlook, 2011).

Socio-economic and Political Conditions in Kyrgyzstan After the Revolution in 2010 Socio-economic Conditions

Kyrgyzstan’s economy is based on general sectors such as agriculture, livestock, industry, gold mining and tourism. However, all these sectors are underdeveloped. For example, in agriculture, available lands are not used efficiently. In addition, 80% of land is the mountainous area of the country. But the forestry is not developed. Underdevelopment of these sectors led to the country’s dependence on imports. The remaining application from the period of Soviet Union central planning is the utilization of rich water resources in order to generate electricity. Therefore, electric energy as an item of export holds a relatively high share. However, the old technologies are still used in the production of electrical energy and it reduces the efficiency. Because relations between countries broke due to the dissolution of the Soviet Union, the sectoral structure of the industry of the country has undergone negative changes. In recent years, industrial engineering, light industry and manufacturing sectors experienced a sharp decline in the share of total Gross Domestic Product. Tourism is at the new development stage.

When it comes to gold mining, in the next few years, gold production is expected to decline in the economy and this can lead to undesirable results.

Kyrgyzstan was a raw material supplier in the USSR and was sending these sources to other parts of the USSR for processing. The ownership of production factors belonged to the state and economic activities were planned by a central authority during the Soviet era. Central planning was planning production units and prices. Kyrgyzstan was not able to export and import and conduct economic relations with other states until 1992. In the middle of the 1990s the government began actively negotiating trade agreements with other countries and companies to establish joint ventures in various fields. However, the transition to a market economy was very painful. In 1992 (in comparison with 1991) national income fell by 26%, industrial production by 27% and agriculture by 14% (Ekonomika Kyrgyzstana, 2001). Among the reasons for this situation are inflation, migration of skilled personnel, high corruption, decline in key business sectors including industry, etc., and lack of resources. The growing economic crisis caused the country to drift and foreign loans was limited and ran out quickly. In order to provide necessary capital for the development of the country conditions for foreign investments, such as security, political stability and legal assurance, should be ensured. However, the required conditions were not provided in the country.

One of the most important features of Kyrgyzstan is keeping the family or clan interests over national interests. For example, during privatization in the era of independence large parts went to Akaev's and Bakiev's families and ministers or administrators. They had the mechanisms to justify their gains because politicians in Kyrgyzstan have the right to have their own business. Therefore, they can justify non-official revenues. This corruption-based system also includes the audit system. In sum, the country has fallen in employment and poverty has risen because of corruption and it cannot make progress and move forward.

Revolutions that took place in the country in 2005 and in 2010 made the situation even worse. Most of the social facilities were destroyed during the uprising, and inventories of the key enterprises were plundered. Commercial enterprises have gone bankrupt due to losses in their stocks. After a two-day “revolution” workers did not go to work for weeks because of fear. All this has created a very negative impact on the economy of Kyrgyzstan.

The overall state of Kyrgyzstan's economy is shown in Table 1.

Table 1

Main Macro-economic Indicators of Kyrgyz Republic (as % of the Previous Year)

Indicator	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Gross domestic product	94.6	107.1	109.9	102.1	103.7	105.4	105.3	100.0	107.0	107.0	99.8	103.1	108.5	107.6	102.3	98.6
Industrial production	75	104	140	105	96	106	105	89	117	105	88	90 ^a	107	115	93.6	109.8
Agricultural production	98	115	112	103	108	103	107	103	103	104	96	102	102	100.8	107.4	97.2
Capital investments	182	119	96	64	122	137	86	90	93	102	106	155	105	106	119.7	90.2
Freight carried	70	108	94	99	115	105	97	105	109	104	91	99.8	116	121	106.8	101.1
Retail trade turnover	94.0	101.8	108.8	110.8	100.8	107.4	106.2	108.3	110.1	114.7	113.6	115.8	113.8	109.0	99.9	97.5
Industrial producers price index	143	132	130	109	151	130	110	106	107	109	103	115	111.9	126	112.0	122.9
Consumer price indices	143	132	123	110	136	119	107	102	103	104	104	106	110	125	106.8	108.0
Export to CIS countries	121	146	81	72	79	113	81	100.1	119	137	110	125	150	104	67.25	104.7

(Table 1 continued)

Indicator	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Export to other countries	119	80	254	99	96	110	104	103	120	117	83	113	137	152	108.9	105.6
Import from CIS countries	169	138	90	101	59	115	86	126	127	142	117	146	154	144	78.63	99.7
Import from other countries	157	208	78	147	85	75	82	126	116	117	117	172	123	149	70.09	114.3

Note. ^a Source: Interstate Statistical Committee of CIS. Retrieved July, 2011, from <http://www.cisstat.com/rus/macro/kir.htm>.

Analysis of significant trends of the Kyrgyz economy has shown that although there are satisfactory results at the macroeconomic level, balances at the structural level are not provided. Low pace of Gross Domestic Product growth in the country, large budget deficits, high rates of public debt and high credit interest rates, as well as an increase in public spending, high unemployment and unequal development of regions of the country are current issues of this country.

There are data on inflation and GDP below that provides an overview of effects of political turmoil on Kyrgyzstan's economy.

As shown in Figure 1, there is an increase in inflation and a rise in political turmoil that the country experienced in 2002, 2005, 2006, and 2010.

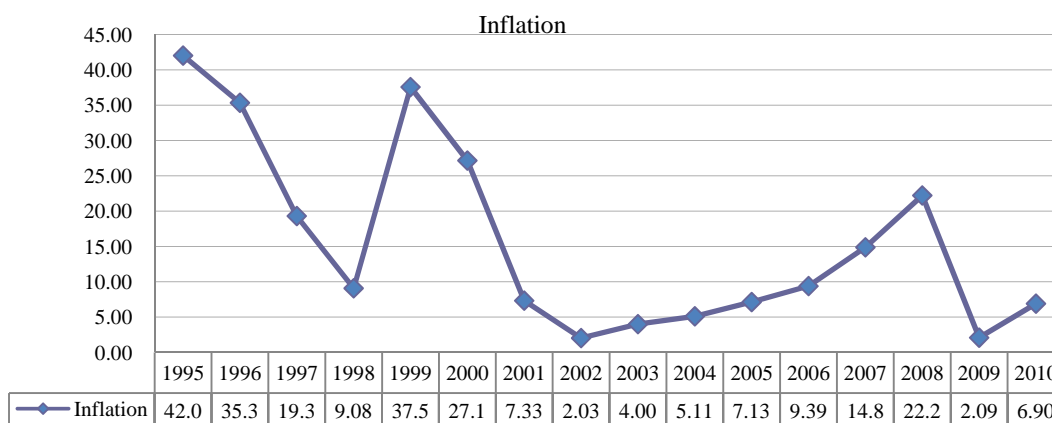


Figure 1. Inflation (GDP deflator (annual%))—Kyrgyz Republic. Source: Data and Statistics for Kyrgyz Republic (2010); IMF Country Report No. 11/155, p. 101.

Decline in GDP after the events in Kyrgyzstan can be observed in Figure 2.

Reforms in recent years have caused a slight increase in GDP and investment, but the results lose significance due to increasing inflation. Increases in import prices are the main cause of inflation. Especially as import prices of items such as grain, fuel, food and metal items increase, inflation is getting negatively affected. Another factor is the increase in inflation associated with monetary policy implemented in the country. In addition, the rapid growth in government spending affects inflation negatively. The high rate of the dollar (USD \$) against the som (Kyrgyz money unit) leads to an uncompetitive situation for products manufactured in Kyrgyzstan compared with other countries' products. Inflation is being addressed with the wrong methods. The high rate of inflation indicates the ineffectiveness of policy implemented by the Central Bank of Kyrgyz Republic (only inflation-focused control policies are applied). Government provides loans to create conditions for productive investment rather than increase, the economy instead of ensuring conditions in order to increase investment in manufacturing.

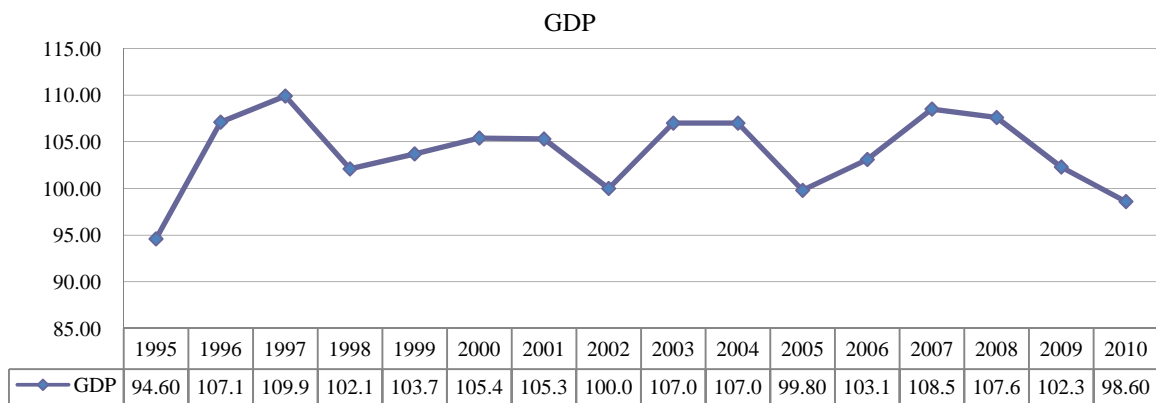


Figure 2. GDP-Kyrgyz Republic (as % of the previous year). Source: Interstate Statistical Committee of CIS. Retrieved July, 2011, from <http://www.cisstat.com/rus/macro/kir.htm>.

The government has begun to work upon several projects to rebuild the economy. Projects mainly include plans to develop the agricultural sector, tourism and hydropower generation. However, political instability is still an important obstacle in realizing these reforms. Kyrgyzstan does not have prominent oil reserves and is dependent on neighboring countries to keep growth alive during this transition period. Therefore, Kyrgyzstan may be falling behind other economies in the region. The Asian Development Bank expects a 20% drop in GDP growth in Kyrgyzstan over the next 10 years (Macroeconomic Outlook, 2011).

Political Conditions

According to the Constitution of the Kyrgyz Republic, the Kyrgyz Republic is a democratic state established according to sovereign, independent, legal and secular state guidelines (Article 1).

Kyrgyz Republic Government Forces, the President, Jogorku Kenes (Legislative Assembly and People’s Representative Assembly), Government is carried out by the Local Government Bodies and Courts of the Kyrgyz Republic (Article 7). Parliament (Jogorku Kenes) is the Kyrgyzstan’s highest legislative body. The country’s highest executive body is the government; the highest judicial body is the Constitutional Court. However, there was a monarchy in the country. For example, the President had power to appoint and remove judges including Constitutional Court judges too. Therefore, the independence of the judiciary was under question there.

After the “Tulip Revolution” Kurmanbek Bakiev came to power and promised reforms in order to overcome such drawbacks. However, he did not keep his promise. He assigned his sons, relatives and close friends to all important positions in order strengthen his own position, i.e., Adil Bakiev’s (brother)—Economic Affairs and Investment Consultant of the Ambassador in China; Janis Bakiev (brother)—President of the State Security Committee; Marat Bakiev (brother)—Ambassador to Germany; Marat Bakiev (son)—Advisor to the President of the State Committee for National Security; Maksim Bakiev (son)—Chairman of the Board of Investment and Development). However, the Kyrgyz people began to reveal their discomfort when Kyrgyzstan’s most important assets were shared among family members and their followers in the “privatization” process. According to the Kyrgyz political scientists, Bakiev’s family was holding all the power in their hands and they were taking decisions ignoring the opinions of the public, foreign partners and opposition.

The Kyrgyz constitution can be considered as partly liberal. However, activities of the ex-president Bakiev who was head of the Executive Branch made it ineffective. More precisely, the constitution was used by those in power to establish an authoritarian order. Opposition was always under suppression. During ex-president Bakiev period the election laws were changed in favor of those in power (each party to collect at least 0.5% of votes in order to send their deputies) and during the elections in Jogorku Kenes representatives of opposition parties could not enter Parliament. There was no fair electoral system in the country. For example, ex-president Bakiev had the authority to determine electoral commission. Therefore, he was gaining elections by putting pressure on members of electoral commissioners.

Increased activity of the United States in Central Asia led to paying attention to Kyrgyzstan relations with the US. In fact, the US did not perceive Kyrgyzstan as a strategic partner for a long time because of the small size of this country. However, the USA was among the first countries to recognize the independence of Kyrgyzstan (December 27, 1991). The United States did not play an important role in regional policy of Kyrgyzstan in the first half of the 1990s. But since 2000, U.S. policy has become more active in Central Asia because of the operation in Afghanistan. Transit of U.S. military forces through Central Asia was both more comfortable and safer.

The presence of U.S. bases reinforces long-term existence of the United States in the region. Such bases can be useful in a case of conflict with Iran. At the same time the U.S. presence in the region reduces the effect of Russia and China. The main reason to place the air base in Kyrgyzstan was that the United States wanted to ensure the stability of the region. As a matter of fact, the Kyrgyz side also accepts that the U.S. operation in Afghanistan led to deterioration of the infrastructure of the Taliban and played an important role in the removal of the external threats over this country (Dundich, 2010).

U.S. and Russian governments may declare that neither of them is interested in the political crisis in Kyrgyzstan, but the situation reveals the contrary. The presence of U.S. and Russian military bases in the region is the best support of this fact. The Kyrgyz government was always trying to ensure a balance between the interests of Washington and Moscow, but both the U.S. and Russia are not satisfied with this statement. The United States and Russia's influence can be seen in two uprisings that took place in 2005 and 2010.

Conclusion

Kyrgyzstan gained independence 20 years ago and it was the first among the countries of Central Asia in its efforts to adopt democracy. Kyrgyzstan has been involved with numerous socio-economic problems since its independence but it continuously tried to transit to a market economy. Socio-economic problems affected transition to a liberal economic system in a very negative way. Moreover, these problems block investments and particularly foreign investments that are the main elements of a free economic system. Investments which are the fundamental basis of economic development are proportional to the political stability. However, today necessary resources are not available from the state budget, public or private sectors due to political and social instability that occurred after political crises in 2005 and 2010 in Kyrgyzstan. Therefore, foreign investment is a very important but controversial situation of Kyrgyz's "real sector" and creates problems for investors. Stability is one of the main assets that investors look for in order to invest in a particular country.

Kyrgyzstan had serious economic losses during the revolutions, but it seems that their more devastating losses may occur in the future. The Kyrgyz economy lost its attractiveness as a state for investments and collaboration for neighboring and world countries having witnessed the revolt of the uncontrolled forces in the

country. However, this cooperation is very important for the country's prosperity because Kyrgyzstan does not have either gas, or the financial capital, or high technology in order to enter the world market. State-owned industries are agriculture, trade, energy, gold, uranium resources, and tourism in Issyk-Kul. Almost all of these vital sectors of Kyrgyzstan's economy depend on external factors. The country's resources could not be transformed into economic prosperity because of the shortage of capital and knowledge resources, mismanagement and inadequate legal regulation.

There were positive expectations related to ex-president Bakiev as he came to power after the 2005 “Tulip Revolution”. People were tired of economic problems and wanted change in their lives. However, Bakiev did not do anything in order to solve both the internal problems, i.e., the clan system, corruption, unemployment, the distinction between north and south, as well as regional issues, i.e., border issues, water issues, drug trafficking, terrorism, etc., in his 5-year presidential period. Moreover, a further deterioration of the country's economy in 2010 led to the second uprising. In April 2010 after the “Rose Revolution” (some resources name the revolution after the opposition party leader Roza Otunbayeva (roza means rose in Russian)) Roza Otunbayeva came to power and formed a government. But in the future in Kyrgyzstan in terms of political developments what may be very curious about these developments is the economic angle. Coups were attempted during the severe economic losses, but considering the future status of the Kyrgyz economy it seems more devastating losses that may occur.

Kyrgyzstan has a very important geopolitical position therefore it has strategic importance to the United States and the Russian Federation. Furthermore, there are many prerequisites that will play an important role in the economic future of Kyrgyzstan. Kyrgyzstan is the only country in the region that does not have any problem with a shortage of water resources. According to scientists depletion of water resources in neighboring countries such as Uzbekistan and Kazakhstan can take place within the next few years. In addition, the problem of drinking water for Central Asia is always very current.

Kyrgyzstan as a geographic area holds an importance in terms of global competition among the USA, Russia and China. China's access to Central Asia is possible only through this region. Also, Russia's and the U.S. military presence in the territory of Kyrgyzstan may lead to exacerbation of competition in various areas in the near future (Knyazev, 2011, p. 55).

The main goal of all conducted reforms was a transition to a market economy. However, institutional reforms have not been succeeded by copying developed countries' models. Reforms were aimed at privatization, liberalization and loose monetary policy. However, economic conditions steadily have worsened because of the country's low industrial level, the lack of products ready for export, resource conservation and poor management of the economy.

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Regional Tourism Authorities and Tourism Policy

Monitoring: The Case of Greek RTOs

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The increasing contribution of tourism to a country's growth renders imperatively the need for state intervention. The state tourism agencies' efficiency depends, however, on a well-organized decentralized tourism structure; the decentralisation form varies according to the amount of competencies assigned to regional or local authorities. Decentralisation though can only be effective when Regional Tourism Offices (RTOs) are sufficiently staffed with qualified and experienced workforce and operate under a solid and trustworthy legal framework. The aim of this article is to study the operation and the efficiency of Regional Tourism Offices (RTOs) in Greece. Therefore a primary survey was conducted by the authors, and all offices were called to answer a written questionnaire whereas an interview with their directors provided additional information. The questionnaire investigates their competencies, their structure, the percentage rate of the local agencies' employees inspecting the tourist enterprises in their area of competence as well as the problems they are facing. The results of our survey as well the data given by the Directorate of Control of the Regional Tourism Offices reveal that the most important problems the RTOs facing are the lack of personnel, the legal uncertainty, the bad administrative practice, and issues of minor importance as the inappropriate buildings housing the agencies, the insufficient equipment and the inadequate financial resources. This article is concluded with certain proposals on the improvement of the agencies in terms of efficiency and effectiveness aiming furthermore at the improvement of the Greek national tourism product.

Keywords: Regional Tourism Offices (RTOs), management, Greek National Tourism Organization, tourism policy

Introduction

The increasing economic, social and cultural contribution of tourism to a country's growth renders imperatively the need for state intervention. It is generally acknowledged that tourism should not form a market forces-driven economic activity (Elliott, 1997, pp. 2-4; Zacharatos, 1999, p. 34). Considering tourism's huge economic benefits, the governments seek to influence its forms and the direction of its development (Airey, 1984, p. 269; Lickorish & Jenkins, 2004, p. 258). For this purpose, the state established public authorities to control and monitor the tourism activity. In fact when tourism became massive, state intervention gradually began to increase. It has actually been observed that the more contributes tourism to a country's economy, the bigger the state intervention is (Jenkins & Henry, 1982, p. 506).

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The role of the state authorities consists among others in the design of tourism development, in the promotion of tourism, in the coordination of tourist enterprises and in the monitoring of their activity, in the establishment of tourist enterprises construction and operation rules, in the protection of the environment and in the reinforcement of safety and hygiene guidelines. Last but not least the state guarantees that tourist enterprises are well equipped with specialized staff. (IOUTO, 1974, p. 68; Hall & Jenkins, 1995; Hall & Page, 1999, p. 258)

Various administrative bodies as ministries, public entities, public organizations, and local government organizations are responsible for the administration and supervision of the tourism sector (Airey, 1983, pp. 234-244; Elliot, 1997, p. 8; Mylonopoulos-Mentis & Moira, 2003, pp. 229-239).

The administrative structure of public sector tourism agencies influences considerably their effectiveness: their size, their legal framework, their staffing, the workforce's continuing training, as well as a quick and effective decision-making procedure are parameters that determine significantly their efficiency. The public sector's efficiency also depends on a well-organized decentralized tourism structure (Zacharatos, 1999, p. 40). The form of the decentralization varies according to the number of competencies assigned to the local authorities (regional tourist boards, regional tourism offices etc.). However, the tourism decentralization policy may change through the years depending on the respective political and socioeconomic conditions (IOUTO, 1974, pp. 66-72).

In Greece, tourism sector lies under the supervision of a public entity, the Greek National Tourism Organisation (GNTO), which for many decades was the ruling state agency in tourism sector; therefore the tourism development of the last 60 years in Greece is closely related with GNTO.

The Greek National Tourism Organization (GNTO)

First Period of Operation (1914-1949)

The first official state intervention in Greek tourism sector took place in 1914 through the establishment of a Tourism Office. By virtue of the article 15 of the law 241/1914 (Government Gazette 111/A) "Amendment of the law ΓΨΚΔ' concerning the establishment of the Ministry of Finance", there established an independent office. This office was responsible to take measures not only to attract foreign visitors but also to extend their stay in Greece, to support and supervise associations, unions, committees or public entities organizing feasts, contests, excursions or those aiming at the embellishment of landscapes and sightseeings, to facilitate the establishment of modern hotels, to facilitate the Greek participation in international exhibitions and to hold commercial and industrial exhibitions in Greece. This office was under the supervision of the Ministry of Finance. During First World War, the office's operation was abruptly interrupted. In 1918, the Law 1698/1919 (GG 11/A) "Re-operation of the independent Office of Foreigners and Exhibitions established by the law 241" came into force.

GNTO was first established in 1929 by virtue of the law 4377/1929 (GG 285/A). Article 1 in particularly establishes an organization under the name "Greek National Tourism Organization", an independent public entity under the supervision of the Ministry of Finance and more specifically under the supervision of the Directorate of Foreigners and Exhibitions. The aim of the organization is to promote tourism in Greece through the coordination of all authorities (State, Municipal or Communal), private organizations and companies related to inbound or outbound tourism. GNTO is directed by a Board consisting of various state agencies', private organizations', and enterprises' representatives.

In 1936 GNTO was abolished by virtue of article 2, paragraph 2 of the Emergency Act 45/1936 (GG 379/A) "Establishment of the Sub-Ministry of Press and Tourism"; therefore the competencies of the Directors'

Board were assigned to the new Sub-Ministry. The Sub-Ministry of Press and Tourism was abolished however in 1941 and its competencies were assigned according to the law 19/1941 (GG 160/A) to the Ministry of Finance and more specifically to the Directorate of Spa Towns and Tourism.

In 1945, by virtue of the Emergency Act 588/1945 (GG 160/A), was established a General Directorate of Tourism in the Government's Presidency, to which were transferred all tourism related competencies.

Second Period of Operation (1950-2000)

In 1950 GNTO was re-established by virtue of the Emergency Act 1565/1950 (GG 255/A) "Establishment of the GNTO". According to article 1 more specifically, there established an independent public entity under the name "Greek National Tourism Organization" whereas its head office is located in Athens. GNTO lies under state supervision, exercised by the Minister of Finance. Scope of the Organization is the promotion of tourism in Greece through the wise use of all its resources and assets. During the following decades GNTO was under the supervision of various Ministries, like the Ministry of Coordination (1968), the Ministry of the Presidency (1974) and the Ministry of Finance (1985).

In 1989 eventually, GNTO and other public entities in tourism sector (Hellenic Chamber of Hotels etc.) were placed under the supervision of the Ministry of Tourism, established by the law 1835/1989 (GG 76/A). After two years the Ministry of Tourism was abolished through the presidential decree 417/1991 (GG 153/A) and its supervision was assigned once again to the Ministry of Finance.

In the 1990s, the GNTO supervision was offered to the Ministry of Tourism, which was re-introduced by virtue of the presidential decree 459 (GG 193/A). In 1996, the supervision has assigned to the Ministry of Development, established by virtue of the presidential decree 27/1996 (GG 19/A) "Amalgamation of the Ministries of Tourism, Industry, Energy, Technology and Commerce into the Ministry of Development". In 2000 was introduced in the Ministry of Development a General Directorate of Tourism by virtue of the law 2837/2000 (GG 178/A) "Regulation of Competitiveness matters, Regulatory Authority for Energy and tourism matters and other provisions".

Third Period of Operation (2001-2010)

In 2004 the Ministry of Tourism was re-introduced through the presidential decree 122/2004 (GG 85/A) "Re-establishment of the Ministry of Tourism" and took up the competencies of the Directorate General of Tourism under the Ministry of Development. This legal status changed once again in 2004, when according to the law 3270/04 (GG 187/A) was established the Ministry of Tourism and GNTO fell consequently under its competence.

In 2009, through the presidential decree 186/2009 (GG 213/A), the Ministries of Culture and Tourism amalgamated into a single Ministry of Culture and Tourism. In 2010 however, by virtue of the presidential decree 15/2010 (GG 35/A), there established, in the Ministry of Culture and Tourism, the General Directorate of Tourism that took over all the competencies foreseen by article 1 of the law 3270/2004 and by the presidential decree 149/2005, as they have been amended and put into force.

Regional Tourism Offices (RTOs)

GNTO

Regional Tourism Offices were initially established to monitor the tourism activity all over the country. Although there is no official record, it seems, according to our survey, that the first regional tourism office was

founded in 1957 in Thessaloniki, operating in fact as an information office. Probably the choice of the city of Thessaloniki was related to the respective International Fair taking place there every year. Under this office's jurisdiction was the management of GNTO's legacy and the participation into tourism events.

In the 1970s, there established more Regional Tourism Offices (RTOs) throughout the country in the framework of a wider decentralization of competencies.

In implementation of the presidential decree 683/1971 (GG 226/A) "Organization of the Directorates and distribution of GNTO's workforce", article 1, are established RTOs under the supervision of GNTO. Regional Tourism Offices are structured into Tourism Directorates, Departments and Information Offices. According to article 6 the RTOs are: (1) Attica and Islands Regional Tourism Office, located in Athens; (2) Central and Western Macedonia RTO, located in Thessaloniki; (3) Peloponnese and Western Continental Greece RTO located in Pátras; (4) Thessaly RTO located in Larissa; (5) Crete RTO located in Irakleion; (6) Epirus RTO located in Ioannina, and (7) East Macedonia and Thrace RTO located in Kavala.

In 1972 by virtue of the decision 525887/1972 (GG 454/B) of the Minister of Finance "Devolution of Central Service competencies to the RTOs" were clearly defined all the competencies assigned to the RTOs related to supervision, inspection, legacy management and tourism development.

In 1976 the Presidential Decree 884/76 (GG 325/A) "Regulation on GNTO structure and personnel matters" defines in article 1 that GNTO is structured into the Central Service, the RTOs and the Tourism Offices Abroad.

More specifically, article 26 defines that the Regional Tourism Offices are structured into Tourism Directorates, Tourism Offices, and Information Offices; they are assigned to all central service competencies related to the supervision and implementation of tourism policy, the information of the stakeholders, the cooperation with the local administration, and the professional associations etc..

Region

After the establishment of the region as a single administrative structure (aiming at its economic, social, and cultural development) as well as the administrative division of the country into 13 regions, the GNTO competencies were transferred to the regions.

In 2001 by virtue of article 14 of the presidential decree 313/2001 (GG 211/A), the GNTO competencies were transferred to the regions. The competencies are related with tourism accommodation facilities, travel agencies and thermal spa facilities as well as with general inspection, tourist enterprises, and tourism ports inspection, monitoring of the tourism legislation implementation, administrative penalties to tourism enterprises or tourism sector professionals.

In implementation of article 15, there established Tourism Directorate in each region, located in the capital of each region², in order to exercise the assigned competencies. The Tourism Directorate lies under the Directorate General of the prefecture (see Figure 1). Its jurisdiction consists of the performance of the duties bestowed upon the regions; it is structured into the following departments (only in the regions of Central Macedonia, Western Greece, Attica, Crete, Ionian Island, and South Aegean): (1) tourist facilities; (2) tourist professions; (3) inspection and control; and (4) tourism development. In the regions of Eastern Macedonia and Thrace, of Western Macedonia, Epirus, Thessaly, Central Greece, Peloponnese, and North Aegean the

² With the exception of the Tourism Directorate of Thessaly, it is located in Volos instead of Larissa. In South Aegean region there established two separate directorates: one located in Syros exercising its power in Cyclades Prefecture, and the other located in Rhodes exercising its authority in Dodecanese Prefecture.

Directorates are structured into the following departments: (1) tourist facilities and professions; (2) inspection; (3) control; and (4) tourism development.

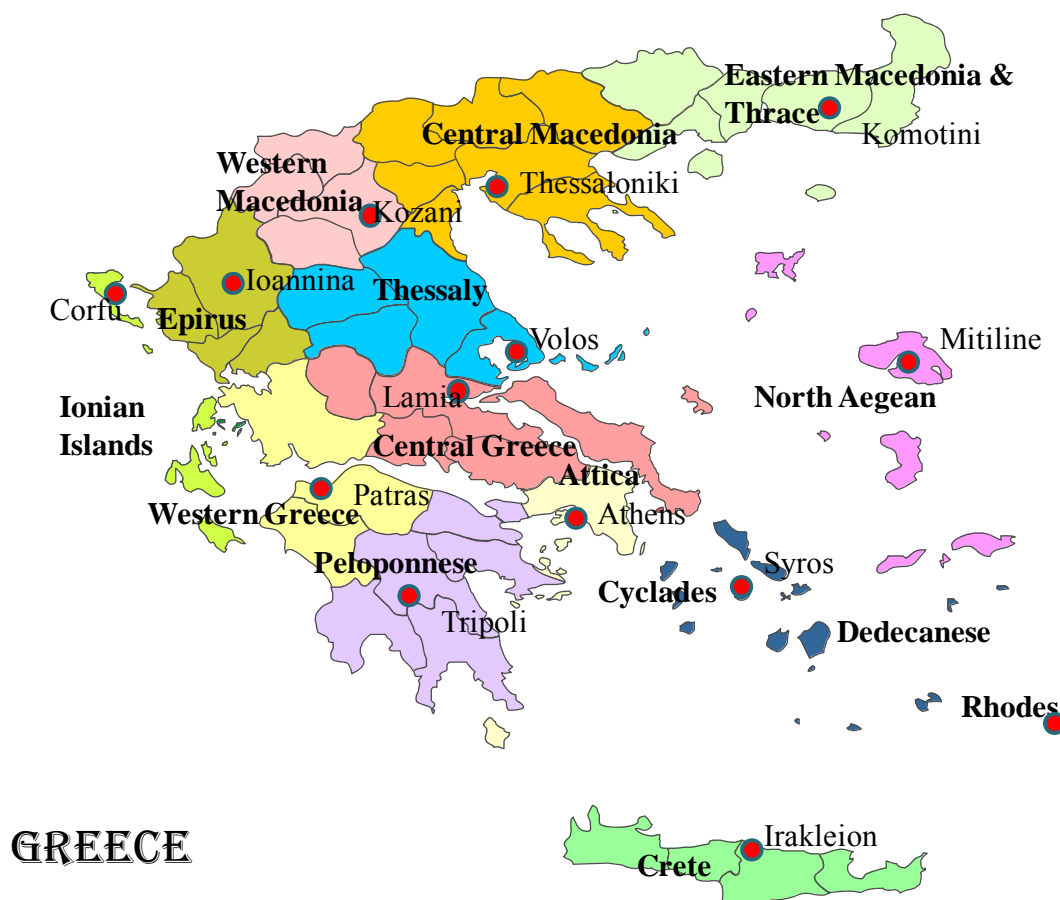


Figure 1. Regional Tourism Offices and prefectures in Greece. Source: Polyxeni Moira.

Reintegration of RTOs in GNT0

In 2005 the law 3270/2004 (GG 187/A) “Competencies of the Ministry of Tourism and other tourism issues”, and more specifically article 4, paragraph 6, establishes in each Region Regional Tourism Offices under GNT0 (in implementation of article 15, presidential decree 313/2001, GG 211/A provisions). RTOs are structured into Directorates, Departments and Tourism Offices and are bestowed with all competencies related to tourism. The Directorates, the Departments and the Tourism Offices of GNT0 share exactly the same organizational structure, staffing, positions, seat, substantial, and spatial competencies with the abolished tourism agencies of the regions.

The RTOs are also mentioned in the law 3498/2006 (GG 230/A) “Development of thermal tourism”, in the article 32 “Provisions on GNT0 RTOs”, more specifically, the directorate of the Regional Tourism Offices Control is established in GNT0. GNT0 jurisdiction lies in the general inspection, the coordination and in the legality check of RTOs acts. GNT0 is also responsible for their administrative organization, i.e., their housing, their technical infrastructure, their staffing, their support in legal matters, and is in generally responsible to safeguard their efficient operation.

The Regional Tourism Offices' Operation

Survey Method

In order to study the operation and the efficiency of Regional Tourism Offices (RTOs) a primary survey was conducted, between April and May 2010. All 14 RTOs received a questionnaire, which they were called to answer; then followed an interview with their directors (see Table 1).

Table 1

Regional Tourism Offices

Regional Tourism Offices	City/Seat	Prefectures
Thessaly	Volos	Magnesia, Trikala, Karditsa, Larissa
Crete	Iraklion	Chania, Rethimno, Iraklio, Lasithi
Central Macedonia	Thessaloniki	Thessaloniki, Chalkidiki, Pella, Imathia, Pieria, Serres, Kilkis
Epirus	Ioannina	Ioannina, Arta, Thesprotia, Preveza
Ionian Islands	Corfu	Corfu, Leukada
Western Macedonia	Kozani	Kozani, Kastoria, Florina, Grevena
Eastern Macedonia	Komotini	Drama, Kavala, Xanthi, Rhodope, Evros and Thrace
Central Greece	Lamia	Viotia, Evia, Fthiotida, Fokida and Erytania
North Aegean	Mitiline	Lesvos, Chios, Samos
Western Greece	Patras	Achaia, Iliia, Aitolokarnania; temporarily (even though this has been established the last 15 years) it has under its jurisdiction the Prefectures of Kefallonia, Zakynthos and Ithaki. It also has some jurisdiction in the Prefectures of Arcadia, Corinth, Argolida and Laconia.
Dodecanese	Rhodes	Dodecanese
Cyclades	Syros	Cyclades Islands
Peloponnese	Tripoli	Messinia, Arcadia, Laconia, Argolida, Corinth
Attica	Athens	Attica

Note. Source: GNTO.

Considering that all RTOs answered the questionnaires (apart from the Regional Tourism Office of Attica), the survey conducted was inventory. There used however useful data that derived from a secondary survey, this information was provided from the directorate of the Regional Tourism Offices Control. The questionnaire consists of the following parts:

(1) The first part of the questionnaire intends to investigate the structure and the competencies of RTOs. The requested topics were: when the agencies first operated, their administrative structure, their spatial competency and the number of tourist enterprises under their supervision (hotels, rooms to let, holiday self-catering apartments, camping, guesthouses, travel agencies, and rent a car agencies);

(2) The second part investigates the general staffing of each agency. The information requested concerned the number of the employees, their age, their role, the type of their employment, their studies, their specialization in tourism, and their foreign languages and computer knowledge;

(3) The third part investigates the administrative practice of the agency. More specifically, the directors were asked: if the agency draws up an annual work flow report; what is the average time to settle a citizens' demand; to describe the work flow; if they cooperate with others agencies to carry out the tourist enterprises' inspection; which administrative penalties are imposed and to report which are the most important problems they are confronting;

(4) In the last part of the questionnaire the directors were free to draw general observations and put forward proposals on the improvement of the agency in terms of efficiency and effectiveness.

Survey Findings

The results of our survey as well the data given by the directorate of Control of the Regional Tourism Offices reveal that the most important problems facing the RTOs are the following:

(1) Lack of personnel. The results of our survey as well the data given by the directorate of Control of the Regional Tourism Offices reveal that the personnel of the agencies are inadequate (as far as the number of employees and fields of specialization are concerned) to carry out the duties bestowed upon the local agencies (see Table 2). In all cases, apart from Crete and Western Macedonia directorates, the number of the employees is lower than the one defined by the presidential decree 313/2001. This number can be a bit deceptive though as it includes employees that are not permanent as well, like contract staff members. It is rather impressive that if those employees did not exist, the agencies would operate with half of their current staff! It is also quite surprising that in regions like Cyclades, one of the greatest tourist resorts in Greece, the permanent staff amounts to only five people, which actually inspect 15.71% of the tourist enterprises in Greece!

This huge problem affects negatively the ability of carrying out independently core competencies like inspection. For instance, inspections that should be carried out by the local agencies of Peloponnese and Western Macedonia are performed instead by the central agency, due to a lack of personnel. In directorates like Cyclades, Epirus, Northern Aegean, and Eastern Macedonia the inspections are carried out in cooperation with the central agency due to the same reason.

Apart from the lack of personnel, it is easy to conclude that there is an important lack of technical specializations like engineers. In the majority of the agencies, the work is done by contract staff but the negative effects are evident in their operation since they are left for long periods of time without engineers until their contract is renewed. The only solution left is the accomplishment of the architectural plans approval by the central agency. A further problem is that there is no even distribution of the employees, as far as their educational status is concerned. For instance, the employees of high school education exceeds by far the number foreseen by the presidential decree 313/2001 whereas the employees holding a university degree (administrative staff and Engineers) fall behind the number foreseen by the above mentioned decree. This certainly causes efficiency problems in the operation of the RTOs rendering them unable to perform sufficiently their duties.

In addition, although many RTOs may seem adequately staffed, it is easy to observe that they are “aged” services. The majority of them last employed permanent staff around 1988! Their staffs are renewed since then through occasional and certainly not targeted contracts, like transfers and seasonal employment contracts.

Furthermore, it is quite interesting to study the percentage rate of the local agencies’ employees controlling the respective supervised tourist enterprises. The largest amount of tourist enterprises (15.7%) is under the supervision of the Cyclades directorate, and then follows Crete (12.50%) and Central Macedonia (11.53%) whereas the lowest share has Western Macedonia (only 0.65%). The Crete Tourism directorate has the greatest percentage rate of hotels to inspect (15.43%) and then follow the directorates of Central Macedonia (11.93%) and Cyclades (10.98%). Cyclades however comes first as far as complimentary accommodation is concerned (21.25%) following the Directorates of Ionian Islands (13.72%) and Central Macedonia (11.52%).

Table 3 depicted the proportion between the employees and the tourist enterprises under their supervision (although not all of them participate in the inspections), more specifically Table 2 indicates how many tourist enterprises correspond to the employees of each RTO in terms of inspection. In this way, we can easily deduce that the personnel are remarkably inadequate to keep the workload under control. Considering on top of this that the number of the employees corresponds only to the period of time that the survey was conducted (as long as it comprises the seasonal staff as well) combined with a huge lack of specialties, the work load is unbearable for the majority of the local agencies, something that is totally reflected on efficiency and effectiveness.

Table 2

Positions of Permanent and Temporary Employees in the RTOs

	Directors	Higher education graduates/administrative staff	Higher education graduates/engineering staff	Technological education graduates	Secondary education graduates	Primary education graduates	Total	Directors	Higher education graduates/	Higher education graduates	Technological education	Secondary education graduates	Primary education graduates	Others	Total
Attica	1	8	7	23	12	5	56	1	5		4	26	2		38
Eastern Macedonia and Thrace	1	3	2	6	3	2	17	1		2		4	1	3	11
Central Macedonia	1	5	5	15	7	3	36	1	2	5	9	12		4	33
Western Macedonia	1	2	2	6	3	2	16	1	1		4			5	11
Epirus	1	2	3	6	3	2	17	1	1	1	1	6		4	14
Thessaly	1	3	2	7	3	2	18	1	3		8	3		4	19
Ionian Islands	1	5	3	6	6	3	24	1	6		7	7		4	25
Western Greece	1	3	3	7	4	3	21	1	3	4	14	15	1	9	47
Central Greece	1	4	2	7	5	2	21	1	4	2	2	6		4	19
Peloponnese	1	3	2	6	4	3	19	1	1		3	2		6	13
North Aegean	1	4	2	3	4	2	16	1	3		2	3	1		10
Cyclades								1	1	1	1	1		6	11
S. Aegean	2	9	6	9	14	6	46								
Dodecanese								1	3		6	4		2	17
Crete	1	6	5	13	6	6	37	1	7	3	16	8		8	43
Total	14	57	44	114	74	41	344	14	40	18	77	97	6	59	311

Note. Source: GNT0.

(2) Legal uncertainty. It is generally acknowledged that the legislation used by the RTOs is quite anachronistic considering that many laws have not been revised for many decades. As a result, they are insufficient to serve the needs of the tourism sector. The administrative penalties legislation for instance have not been revised since 1993, and the amount of money to be paid as a fine remains so low that the tourist enterprises prefer to pay for it rather than take measures to solve the problem. The procedure of imposing a penalty is also very time-consuming, whereas it does not provide for any specific procedure in case of an emergency requiring immediate intervention, for instance in case that a tourist enterprise should be immediately closed (Mylonopoulos & Nikolaou, 2008, pp. 22-31).

Besides, the legislation is quite complicated, vague, and controversial. Many regulations are characterized by important legal vacuums—like the recent law for the “hotel functional settlement”. Further issues, like the severity of the imposed penalties, the leniency in the approval of architectural plans or the necessity to close temporarily a hotel in case that there has been already imposed a fine, still remain unsettled. As a result, those matters are confronted in a totally different way by each Regional Office causing therefore uncertainty of law and administrative practice diversity.

Table 3

RTOs and Supervised Tourist Enterprises

RTO	Number of employees (May 2010)	Total sum of tourist enterprises	Proportion
Attica	38	4.427	1/116
Peloponnese	8	1.855	1/232
Cyclades	7	8.253	1/1179
Dodecanese	15	3.563	1/237
Western Greece	36	4.490	1/125
Northern Aegean	11	2.245	1/204
Central Greece	18	2.419	1/134
Eastern Macedonia & Thrace	10	1.689	1/169
Western Macedonia	12	344	1/29
Ionian islands	25	5.784	1/231
Epirus	15	1.594	1/106
Central Macedonia	37	6.059	1/164
Crete	43	6.572	1/153
Thessaly	19	3.261	1/172

Note. Source: GNTO.

Another drawback causing negative effects on effectiveness and certainty of law is overregulation (Mylonopoulos & Nikolaou, 2008, pp. 22-31; Mylonopoulos, 2009, pp. 194-195). There is not one single legal text that the employee can consult; on the contrary, there are hundreds of legal texts that are not only scattered in various legal texts of different ministries but also constantly revised.

Another difficulty mentioned by the majority of the regional agencies is the inadequate support on behalf of the central agency, especially in terms of facing legal matters. The central agency support is considered to be inadequate in case of crises and emergencies, especially when those cases are not foreseen in any legal texts (for instance when a hotel should be immediately closed for reasons of public health). RTOs have no other choice but to act on their own responsibility when such cases emerge.

Due to the fines they imposed to tourist enterprises, RTOs are often called to participate in judicial proceedings in the court of law. When such cases are judged in Administrative Courts, the RTO director has to submit the necessary documents but not to attend the proceeding himself or herself. However, when the case is judged in Civil Courts the director is obliged to attend the proceeding. In most cases, there is no kind of support offered by the central agency, including financial support; hence the director has to bear the cost himself. Considering that such incidents occur quite often, it is no wonder that qualified and experienced civil servants do not wish to assume high-ranking positions.

(3) Administrative practice. Due to a lack of a common administrative practice, each RTO tends to follow its own administrative practice to deal with the difficulties emerging from the uncertainty of law and the insufficient staffing. As a result, the citizens all over the country are not treated on equal terms. The workload, the amount of which varies from one office to another, has a negative impact as well. Almost no office draws an annual work report with statistics neither exists a citizens demand accomplishment report on a weekly or a monthly basis. On the contrary, most of the agencies have estimated that the average time to accomplish a citizen's demand is three to 10 days. We will now put forward a dysfunction example deriving from a bad administrative practice: Western Greece RTO, located in Patras, performs officially its powers in the Prefectures of Achaia, Iliia and Aitolokarnania. However, it also supervises the Prefectures of Kefallonia and

Zakinthos, although they belong to the Ionian Islands RTO located in Corfu, whereas it is also assigned with some competencies in the Prefectures of Arcadia, Corinth, Argolida, and Laconia although they officially belong to the Peloponnese RTO located in Tripolis.

(4) As issues of minor importance were reported by some RTOs, the inappropriate buildings housing the agencies, the insufficient equipment and the inadequate financial resources.

Conclusion

The aim of this survey was to study the operation of RTOs, to highlight the problems they are facing and to point out their importance in the improvement of each region's tourism product.

The survey confirms that it is impossible for the central agency to be fully aware of the problems facing each region, therefore, it is neither rational nor effective to handle such matters without taking into consideration the distinctive characteristics of each region.

The revision of the current tourism policy is fundamental in order to adjust to the modern competitive environment whereas the RTOs should strengthen their role in tourism policy design. A vital condition to achieve this would be their sufficient staffing with employees that will manage to keep up with the excessive workload contributing therefore to the region's sustainable tourism development.

Greek National School of Public Administration and more specifically the Tourism Economy and Development Department have an essential role to play through the training of qualified executives that will later staff not only GNTTO but the RTOs as well. Last but not least, a permanent legal framework that will not be under constant revision causing therefore legal uncertainty and work insecurity to the employees is crucial for the effective operation of RTOs.

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The Casual Effects of Service Quality, Brand Image, Customer Satisfaction on Customer Loyalty in the Leisure Resort Enterprise

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Owing to the growth of economic, people have more demand for leisure activities. How to improve customer's loyalty has become a key strategy for service management. The purpose of this study was, taking leisure resort enterprise as an example, to explore the casual relationships between service quality, brand image, customer satisfaction, and customer loyalty. A total of 300 subjects from Taiwan population were voluntarily participated in this study. The LISREL (Linear Structural Relationship) model verification results showed that the overall goodness-of-fit indices (GFI) was 0.952 and χ^2 was 128.639 ($df=95$), which indicated an empirically good fit with the model. It was concluded that the service quality, brand image and customer satisfaction of leisure business have a direct relation with loyalty, and the service quality has an indirect effect on loyalty through customer satisfaction. These findings would be a reference for marketing management in the leisure enterprises.

Keywords: service quality, brand image, customer satisfaction, customer loyalty, leisure enterprises, LISREL (Linear Structural Relationship)

Introduction

Leisure enterprise is the segment of service industries, which offers people leisure resort activity. Recent years of flourishing development in the enhancement of national income and for the full implementation of two-day weekend system in Taiwan, people have more time for leisure resort activities. Leisure resort service has become the potential extremely the emergent enterprise. Leisure resort enterprise has also become continued to flourish in the world. As the same time, leisure resort enterprise has also increased competition in the service trades. Systematic view of how to develop business strategies of the leisure enterprise, to strengthen industrial competitiveness is the topic which the entrepreneur needs to take seriously. To remain competitive in the market requires detailed sets of management marketing strategies.

Leisure Service Management

Induction of a lot of the domestic and foreign related literatures discovered that in the various trades and occupations, the service quality, brand image, customer satisfaction and customer loyalty were related to a greater degree of presence and interaction (Liao, 2007; Liao & Li, 2011). For example, promoting service

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quality, brand image and customer satisfaction are important management strategies that will affect the customer loyalty. Business that can offer high quality service, set up excellent brand image and provide satisfaction to their customers will remain competitive and boast high numbers of customer retention (Parasuraman, Zeithaml, & Berry, 1996; Grewal, Krishnan, Julie, & Norm, 1998; Etzel, Walker, & Stanton, 2001; Jo. Lee, Ja. Lee, & Feick, 2001). However, in the leisure resort business there are little literature attention has been paid to the service quality, brand image, customer satisfaction and customer loyalty among the four variables relationships. Systematic exploring the casual relationships between service quality, brand image, customer satisfaction and customer loyalty on the leisure resort enterprise is therefore important. The high competition levels in the leisure service trades are focused on customer retention; therefore, constant improvements to service quality, brand image, and customer satisfaction are addressing the issue. When the customer is satisfied, they will continue repurchasing a service. Therefore, to distinguish the relationships among the four variables, service quality, brand image, customer satisfaction, and customer loyalty is very important as it can offer references for enterprises when planning marketing and management strategy.

Aims of Study

This research used Linear Structural Relationship (LISREL) method to probe the relationships of service quality and brand image to customer satisfaction, then identify their joint influence on consumer's loyalty. The aim of study addresses the following questions:

(1) What are the casual relationships between service quality, brand image, and customer satisfaction and customer loyalty that people experience in the leisure activity in Taiwan?

(2) Hypotheses of this research are as follows:

H1: Service quality is correlated with customer loyalty.

H2: Brand image is correlated with customer loyalty.

H3: Customer satisfaction is correlated with customer loyalty.

H4: The casual relationship model among service quality, brand image, customer satisfaction, and customer loyalty is proposed in Figure 1.

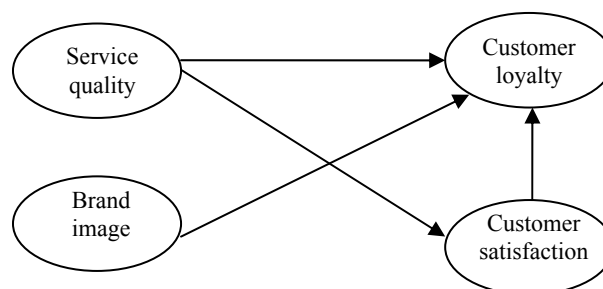


Figure 1. Proposed linear structural relationship model.

Review of the Literature

Overviews of Leisure Enterprise

Leisure, a multi-billion dollar global enterprise, looks set to make major inroads into the world economy and contribute significantly to the world economy. The leisure enterprise is the segment of business focused on entertainment, recreation, and tourism related products and services (Klaus & Christine, 2004). In whole world, because of the economic growth with the national income enhancement, the humanity increases day by day to

the leisure traveling demand, from the sightseeing population, the output value, the disbursement and so on related statistical data can be seen, the leisure enterprise has become the potential extremely the emergent enterprise. For the full implementation of two-day weekend system, people have more time for leisure activities, making the enterprise continued to flourish in Taiwan. The leisure enterprise has become the trend of international trends in important activities.

One of the areas of the economy where there has been a relatively rapid growth of small businesses in recent years is in the sport and leisure enterprise, especially, in leisure resort enterprise (Tim, Thomas, & Trevor, 1993). How to improve customer satisfaction, in order to effectively master the source, will be the focus on developing business opportunities, but also to compete with other industries, and the key to winning.

Customer Loyalty of Leisure Enterprise

For all of the competitive business strategies, maintaining customer loyalty is properly the most important factors (Reichheld, 1996). Customer loyalty is the customer continuous purchasing behaviors of the merchandise or services of a certain company (Day, 1977; Griffin, 1996). Reichheld (1996) thought if a customer was satisfied with companies' commodities or services they would want to offer positive word-of-mouth promoting that company. Improving customer loyalty in the service enterprises will increase economic benefits. Therefore, keen competition in service and improved management and marketing strategies must be aimed at retention not acquisition (Dwyer, Schurr, & Oh, 1987). Regarding evaluation of customer loyalty, Parasuraman, Zeithaml, and Berry (1994) thought that items, which should be included, were behaviors, intent to repurchase, people's recommendations through positive word-of-mouth. There are many factors affecting the customer loyalty, e.g., service of quality, excellent brand image, and overall customer satisfaction (Liao, 2007). Jones and Sasser (1995) sorted customer loyalty to three main categories—customer repurchase intent, primary behavior, and secondary behavior. Griffin (1996) sorted customer loyalty to four main categories—customer repurchase intent, word-of-mouth, participation product activity, and selection of participation product activity. This research adopted four observed variables as indicators to determine the customer loyalty of leisure business in Taiwan (Griffin, 1996; Jones & Sasser, 1995).

Service Quality in Leisure Services

Fierce competitive circumstances highlight service quality as the main survival component and competitive weapon in the service enterprise (Parasuraman, Zeithaml, & Berry, 1985; Reichheld & Sasser, 1990). Service is the interaction process between a customer and the service provider (Grönroos, 1998). Kenneth, Judith, and David (1995) indicated that cues used by leisure travelers in the evaluation of the more "intangible" purchase criteria were security, dependability, service quality, convenience, and reputation identified. Service quality was one of important criteria factor for repurchase intent. In order to deliver high quality services, leisure facility managers have focused on the expectations of paying customers, to the exclusion of other customer groups. When leisure services are viewed as a whole, quality management appears an appropriate strategy for the management of leisure facilities (Leigh, 2001). Basing on the notion that leisure quality management embraces efficiency and effectiveness. Effectiveness indicators based on the principles of customer service quality measure customers' expectations compared to their perceptions of the centre's actual performance (H. Gary, James, C. Gary, & Ian, 2001).

Instruments for measuring the quality of services, such as SERVQUAL and its modifications, have been used by several organizations in the service enterprise (Lutz, 1986; George, Eleni, Mario, & Panagiotis, 2004;

Bindu, Chandrasekharan, Prakash, & Ram, 2009). Saravanan and Rao (2007) found that certain important aspects of service quality were not covered in SERVQUAL model. Another instrument SERVPERF is now considered as the best and most correct method for determining service quality (Grönroos, 2003). Bindu et al. (2009) used SERVPERF as an example to study the service quality in tourism. They proposed a conceptual framework and an instrument for measuring the customer-perceived service quality. The perceived service quality of public utility services has a multi-level, multi-dimensional structure with three primary dimensions: outcome, environment and interaction (Changhong, Fujun, Ye, & Joe, 2008). This research took the SERVPERF method as the norm in order to determine the service quality of the Taiwanese leisure service businesses. Service quality dimensions are tangibles, reliability, responsiveness, assurance, and empathy (Parasuraman et al., 1985; Bindu et al., 2009).

Brand Image Affects Customer's Purchase

The brand is one kind of name, design, and symbol, or also perhaps the mark of the combination of three. It can be confirmed by entrepreneur's product or the service, in order to distinguish the differences with other competitors (Aaker, 1994). Similarly, brand quality is more valuable for firms facing increasing competition, i.e., unanticipated decreases in industry concentration (Sundar, Kapil, & Andre, 2011). Chiang and Jang (2007) studied the leisure travelers purchased the hotel intention online. They found that brand image significantly affects quality and trust perceived by consumers. Overall, trust perception appears to play an important role in improving long-term customer value in online dynamics. This study also suggests that if leisure travelers perceive that a price offered by a hotel is more affordable than their internal price standard or competing prices, they tend to believe that quality might be low, but they tend to have high consumer value and are more likely to have greater purchase intention. Hence, brand image may probably be a factor that affects the customer loyalty on the leisure enterprise. Biel (1992) indicated that the brand image had three essential factors, namely, manufacturer image, product image, and competitor brand image. All of the three factors will affect the customer regarding the brand image cognition, but only the brand image will influence the user's image.

Customer Satisfaction, Service Quality, and Customer Loyalty

The definition of satisfaction refers to a person's approval or disappointment when comparing their personal opinion of services received with their original service expectations (Kotler & Keller, 2006). Customer satisfaction is a customer's rational and emotional perception, which is based on service experiences (Mackenzie & Spreng, 1992; Matthew & Christine, 2000). Martin, Ugur, and Dirk (2003) concluded that consumer satisfaction with leisure services was a function of both cognitive and affective evaluations where the affective evaluations dominate. In a leisure service context, quality and value are proposed as antecedents of satisfaction, with their effects on loyalty mediated by satisfaction (Xiang & James, 2010). Jennifer and Tom (2007) concluded that Herzberg's theory was capable of expressing service quality dimensions and a better way to address human satisfaction. For leisure service, overall satisfaction has a bearing on visitor's positive word-of-mouth revisit intentions (Antti & Ugur, 2005). Robert (2001) also showed that tangible elements of the service were thought by customers to be the most important elements. These tangible elements also had the greatest impact on that variation in overall satisfaction. Monica (2009) indicated recognizing the need of more research on the meanings of leisure and tourism in diverse social and cultural contexts. It can be argued that cultural patterns and social structures have greatly influenced the development of Chinese leisure and tourism—how they have been lived, felt, and made sense by Chinese people. Conclusively, customer

satisfaction may probably be the factor that affects the customer loyalty on the leisure enterprises.

How to determine the customer satisfaction is one of the important roles in this research. Customer satisfaction determination included total satisfaction of service performance as well as the consumer views and national conditions (Singh, 1991; Manfred & Grund, 2000; Dermanov & Eklöf, 2001; Chang & Yuan, 2002). Kuo (2004) used Kano's two-way quality model to categorize web-community service quality dimensions and their elements and understand the demands of users. He found the increase of satisfaction and the decrease of dissatisfaction in the analysis of improvement on certain quality elements, and used the result as a reference for future improvements on services provided to the web-community. David and Dominiek (2008) studied the retirement community resident satisfaction, and finally, they concluded that satisfaction contained five different domains, including the built environment, the financial environment, the service delivery environment, the social environment, and the spiritual environment. Combining the above literatures, this research adopted four aspects to determine customer satisfaction, namely, the personnel service standard, soft hardware equipment, board and lodging, and whole experience feeling (Singh, 1991; Dermanov & Eklöf, 2001; David & Dominiek, 2008).

Methodology

Framework of Research

According to literature view, this article sets up a structured framework, as shown in Figure 2. This framework expressed the causality relationships among service quality, brand image, customer satisfaction, and customer loyalty. The structural framework explored the relationships of four latent variables and 16 observed variables. The four latent variables were service quality (Sq), brand image (Bi), customer satisfaction (Cs), and customer loyalty (Cl). The 16 observed variables were tangibles (TAN), reliability (REL), responsiveness (RES), assurance (ASS), empathy (EMP), product image (PRI), manufacturer image (MAI), competitor brand image (CBI), personnel service standard (PSS), soft hardware equipment (SHE), board and lodging (BAL), whole experience feeling (WEF), intent to repurchase (ITR), purchase frequency (PUF), recommendation product wish (RPW), and times of participation product activity (TPPA).

The framework supposes that service quality is not only directly influencing customer satisfaction and customer loyalty, but also through customer satisfaction indirectly influencing customer loyalty. Brand image is directly influencing on customer loyalty.

Sample and Data Collection

The effective numbers of subject for this study in LISREL testing were 300 which were drawn from Taiwan population. Subjects were voluntarily participated in this study. They had been traveled at least one of the following domestic leisure resorts, Nun-Yuan Garden Resort Farm, Tsou-Ma-Lai Leisure Farm, Hu-Tou Pei Scenic Area, Wusanto Reservoir Scenic Area, and Jianshanpi Resort. Data were collected by questionnaire that designed according to a combination of past research studies (Parasuraman, Zeithaml, & Berry, 1988; Cronin & Taylor, 1992; Jones & Sasser, 1995; Chang & Yuan, 2002). The contents of the questionnaire consisted of five portions, namely, service quality, brand image, customer satisfaction, customer loyalty, and subject information. The central goal of the questionnaire was for understanding the general situation of the overall leisure resort travel experiences that their responses to service quality, brand image, conscientious satisfaction, and customer loyalty. Questionnaire was scored by means of a Likert 5-point scale. The

questionnaire consisted of 42 items, including, 10 service quality items, eight brand image items, eight customer satisfaction items, six customer loyalty items, and 10 subject information items.

Data Analysis

Data analysis used SPSS 17.0 and LISREL 8.8 (Jöreskog & Sörbom, 1998) statistical software to analyze the data. Analyzed contents were categorized into reliability, validity, subject information, correlation, and LISREL model testing. The LISREL structural model is written in the following matrix equation:

$$\eta = B\eta + \Gamma\zeta + \zeta \tag{1}$$

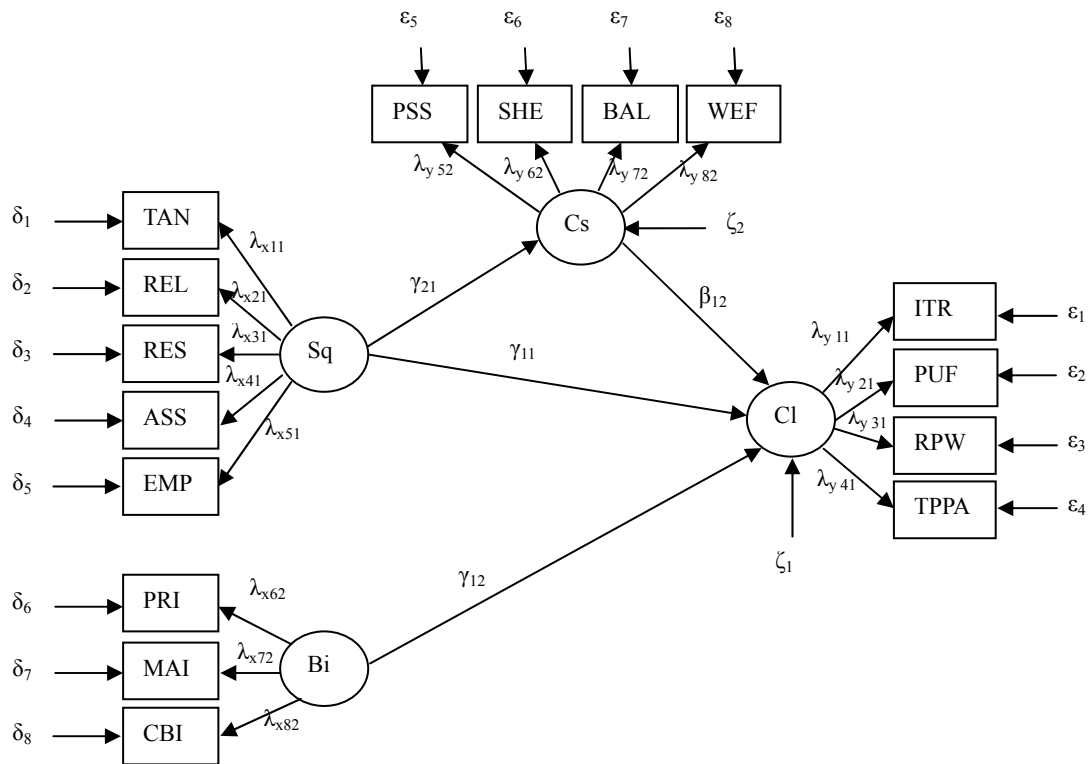


Figure 2. Framework of the linear structural relation model.

The latent dependent variables are denoted by η (eta) as a vector ($m \times 1$) of m such variables. The latent independent variables are denoted by ζ (xi) as a vector ($n \times 1$) of n such variables. The relationships among the latent variables are denoted by B (capital beta) and Γ (capital gamma). The error term ζ is a vector that contains the equation prediction errors or disturbance terms. The LISREL measurement models are written in the following set of matrix equations:

$$Y = A_y \eta + \varepsilon \tag{2}$$

for the latent dependent variables and:

$$X = A_x \zeta + \sigma \tag{3}$$

for the latent independent variables. The observed variables are denoted by the vector Y ($p \times 1$) for the measures of the latent dependent variables η ($m \times 1$), and by the vector X ($q \times 1$) for the measures of the latent independent variables ζ ($n \times 1$). The relationships between the observed variables and latent variables are denoted by the ($p \times m$) matrix A_y for Y_s ; and by the $q \times n$ matrix A_x for X_s . Finally, the measurement errors for Y_s are denoted by $p \times 1$ vector ε and for X_s by the $q \times 1$ vector σ .

Reliability of questionnaire expressed by Cronbach's alpha (α) to judge the consistency of items. Questionnaire validity was created by item content validity. Subject information showed the distribution of subject's demography. Correlations expressed by Pearson-product moment correlation coefficient to discuss the relevant relationships among the service quality, brand image, customer satisfaction, and customer loyalty.

Results

Reliability and Validity

The reliability coefficients of internal consistency of four sub-questionnaires, service quality, brand image, customer satisfaction, and customer loyalty, were 0.877, 0.813, 0.830, and 0.845, respectively. All reliabilities were higher than 0.70. More specifically, the reliability of sub-questionnaires was seemingly excellent (Nunnally, 1967). Validity of questionnaire would adopt the content validity to present the item validity. Researchers used Two-way Detailed Catalogue Table (TDCT) method to construct questionnaire content validity. The processes of TDCT method were firstly defined the meaning of the variables of service quality, brand image, customer satisfaction, and customer loyalty, and then listed the corresponding items of questionnaires. Finally, checked and refined the definitions and items by three experts to finish the reasonable content validity.

Subject Information

Subject information was described by the subject's demography and basic descriptive statistics. These contents comprised of gender, age, academic credentials, average income, and leisure expenses. The total number of samples was 300 (144 male and 156 female). Age levels between 25-34 years accounted for the most, constituted 32.7%; 35-44 years accounted for 24.0%. Distribution of age levels was to be found lie between 18-65 years. Distribution of subject's academic credentials; undergraduate level accounts for the most, constituting 40.3%; junior college level accounted for 20.2%. Average income; 40,000-59,999 NT dollars per month showed the most, constituting 31.7%; 20,000-39,999 NT dollars was second, constituting 28.7%. Leisure expenses, below 5,000 NT dollars per year was the most, constituting 32.3%; 5,001-10,000 NT dollars per year was second, constituting 28.0%. As the subject's demography shown, the distribution of samples based on gender, age, and academic credentials were seemingly balanced. It was comprised of various levels of population; the sample seemingly satisfied statistical demands. It was suitable for use on the linear structural relation model testing.

Correlations

Correlation analysis adopted the Pearson's correlation coefficient to illustrate the relevant relationships among the four variables—service quality, brand image, customer satisfaction, and customer loyalty. All correlation coefficients were shown in Table 1, which showed the correlation coefficient of service quality and customer loyalty was 0.653 ($p < 0.01$), depicting the two factors to be positively related. This result entirely conformed to hypothesis (H1). The correlation coefficient of brand image and customer loyalty was 0.642 ($p < 0.01$), identifying the two factors as positively related. This entirely conformed to hypothesis (H2). The correlation coefficient of customer satisfaction and customer loyalty was 0.755 ($p < 0.01$), showing the two factors to be positively related. This entirely conformed to hypothesis H3. In conclusion, the three hypotheses—H1-H3, that the article proposed, have been proved.

LISREL Model Testing

LISREL analysis inquired about the reciprocated and complementary influence effect of four variables, service quality, brand image, customer satisfaction, and customer loyalty (Jöreskog & Sörbom, 1993a). Concerns

about multifactor causality relationships were suitable for utilizing the LISREL instrument (Jöreskog & Sörbom, 1993b). LISREL outputs were described as below, including the overall model and internal model fitting, as well as analysis of the discussion of test result. In addition, discussion of the actual example was presented.

Table 1

Correlation Coefficient of Service Quality, Brand Image, Customer Satisfaction and Customer Loyalty

	Service quality	Brand image	Customer satisfaction	Customer loyalty
Service quality	-	0.719 (**)	0.743 (**)	0.653 (**)
Brand image		-	0.725 (**)	0.642 (**)
Customer satisfaction			-	0.755 (**)
Customer loyalty				-

Note. ** Significant at the 1% level.

The Overall Model-Fitting Test

The overall model-fitting test adopted the maximum likelihood method to carry out the LISREL program (Jöreskog & Sörbom, 1998). The output of the overall model-fitting diagram was shown in Figure 3. As shown in the outputs, the fit indices of this model, chi-squared (χ^2) was 128.639 with 95 degrees of freedom; goodness-of-fit index (GFI) was 0.952; normalized fit index (NFI) was 0.986, comparative fit index (CFI) was 0.996, adjusted goodness-of-fit index (AGFI) was 0.931, and root mean square error of approximation (RMSEA) was 0.0301. Hence, this model fits the data very well (Jöreskog & Sörbom, 1993a; Hair, Black, Babin, & Anderson, 2010). In conclusion, the fit estimates were all ranged within a reasonable scope (Schumacker & Lomax, 1996).

The Internal Structure Model-Fitting Test

The output of the internal structure model-fitting test could be expressed by estimates and *t*-values (see Table 2). The parameter of Gamma (γ) and Beta (β) expressed the relationship between latent variable and latent variable. The parameter of Lambda (λ_x) and Lambda (λ_y) expressed the relationships between latent variable and its observed variables respectively.

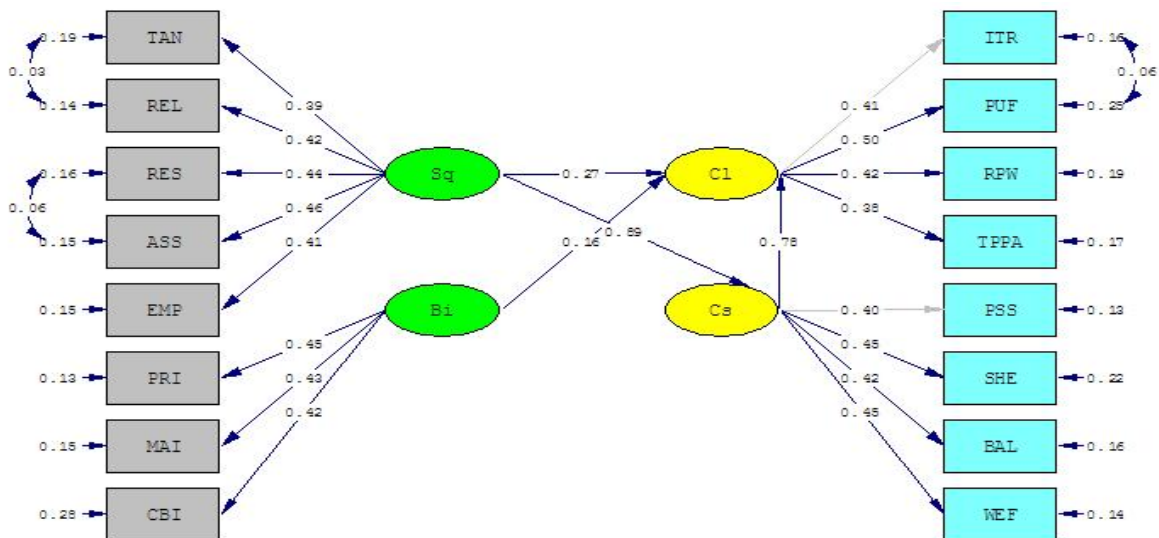


Figure 3. Diagram of LISREL model testing output.

As Table 2 shows, all of the parameters' estimates and t -values were all greater than 2.58 and $p < 0.01$, Hence, all these variables displayed extremely high expectations. The internal structure model fits the data very well. As the output shown, all parameter coefficients of completely standardized solutions very nearly fitted the indices. Otherwise, all the error covariances were positive, the t -value of error covariances was significant, and all the estimated parameters were large than 2.58 ($p < 0.01$). Thereby, indicating the internal structure model fits the data very well.

Table 2

Parameter Estimates of LISREL Model

LISREL parameters	Estimate	t -value
Gamma (γ_{21}) (Sq→Cs)	0.89	12.72
Gamma (γ_{11}) (Sq→CI)	0.27	4.71
Gamma (γ_{12}) (Bi→CI)	0.16	4.12
Beta (β_{12}) (Cs→CI)	0.78	5.20
Lambda (λ_{x11}) (Sq→TAN)	0.39	12.49
Lambda (λ_{x21}) (Sq→REL)	0.42	14.29
Lambda (λ_{x31}) (Sq→RES)	0.44	14.25
Lambda (λ_{x41}) (Sq→ASS)	0.46	14.79
Lambda (λ_{x51}) (Sq→EMP)	0.41	13.88
Lambda (λ_{x61}) (Bi→PRI)	0.45	12.95
Lambda (λ_{x71}) (Bi→MAI)	0.43	12.28
Lambda (λ_{x81}) (Bi→CBI)	0.42	10.26
Lambda (λ_{y11}) (CI→ITR)	0.41	14.47
Lambda (λ_{y21}) (CI→PUF)	0.50	14.39
Lambda (λ_{y31}) (CI→RPW)	0.42	11.98
Lambda (λ_{y41}) (CI→TPPR)	0.38	11.72
Lambda (λ_{y52}) (Cs→PSS)	0.40	13.87
Lambda (λ_{y62}) (Cs→SHE)	0.45	11.71
Lambda (λ_{y72}) (Cs→BAL)	0.42	13.36
Lambda (λ_{y82}) (Cs→WEF)	0.45	13.31

Brief Summary

The study used the LISREL method to test the proposed model. As the output shown the overall model-fitting test and the internal structure model-fitting test were all fit the data well. In summary, the hypothetical model (see Figure 1) that this study has proposed, tested by LISREL method, concluded a correct verification. This result entirely conformed to hypothesis (H4). That means the casual relationship model among service quality, brand image, customer satisfaction, and customer loyalty is like as Figure 1 shows.

Otherwise, from the internal structure model-fitting test output shown service quality adopted the tangibles, reliability, responsiveness, assurance, and empathy as observed variables being suitability; customer loyalty adopted the intent to repurchase, purchase frequency, recommendation product wish, and times of participation product activity as the observed variables being suitability; brand image adopted the product image, manufacturer image, and competitor brand image as observed variables being suitability; and customer satisfaction adopted personnel service standard, soft hardware equipment, board and lodging, and whole experience feeling as observed variables being of suitability.

Conclusions and Implications

Conclusions

This research intended to take Taiwan domestic leisure resorts as its example; comprised of 300 subjects in the Taiwan area as samples; to discuss the leisure company's service quality, brand image, customer satisfaction and customer loyalty causality relationships. Researchers utilized LISREL method to test the hypothesized model. The verification results of LISREL testing showed that the overall model fitted the data very well (chi-square was 128.639 with 95 degrees, goodness-of-fit index (GFI = 0.950)). The internal structure model-fitting test corresponded as suitable ($t > 2.58$, $p < 0.01$). This result indicated that the theoretical structure of the framework of this research proposal had been verified by the data. Based on the above results, it was concluded that the service quality, brand image and customer satisfaction of leisure business had a direct relation with customer loyalty. These findings were in accord with the results of studies by preceding authors (Reichheld & Sasser, 1990; Anderson & Sullivan, 1993; Leigh, 2001; Martin, Ugur, & Dirk, 2003; Antti & Ugur, 2005; Chiang & Jang, 2007; Liao, 2007; David & Dominiek, 2008; Bindu et al., 2009; Xiang & James, 2010; Liao & Li, 2011).

At the same time, the study also found that the service quality could have an indirect effect on customer loyalty through customer satisfaction. Therefore, this research inferred that service quality might be the prominent factor of customer satisfaction. In a leisure service context, wherever, service quality might be proposed as antecedents of satisfaction, with their effects on loyalty mediated by satisfaction. These finding were consistent with the results of following authors (Cronin & Taylor, 1992; Yieh, Chiao, & Chiu, 2007; Subhash, Dennis, Mehves, Ekrem, & Selim, 2010; Xiang & James, 2010).

Implications

In conclusion, drawn from the results of this research, which showed the service quality in the leisure resort enterprise was an important factor influencing customer satisfaction and customer loyalty. Therefore, the results of the present study could be provided a reference for the leisure service enterprise marketing management. The majority of finding of this study implied that improving service quality was the most important issue for leisure service enterprises, especially tangibles, reliability, responsiveness, assurance, and empathy of employees to be of the highest quality, therefore the leisure service enterprise should strengthen service quality (Robert, 2001; Su, Lin, & Chiang, 2008).

In addition, the results of this research showed that the customer satisfaction also influenced the customer loyalty in the leisure service business. If a service enterprise wants to maintain the customer loyalty, it needs to focus on satisfying the customers' expectations and actual experiences.

Implication of this study suggests that leisure service enterprise managers require offering an excellent management strategy to improving service quality and customer satisfaction. Those strategies might be the total quality control (TQM), the Plan-Do-Check-Act (PDCA) cycle. When the service quality and customer satisfaction were aggressively improved, the leisure service business would be able to maintain their current customers and loyalty.

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Analyzing the Relationship Between the Level of E-banking and Customer Satisfaction From E-banking Service Quality in Iran

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In order to dominate the environmental rapid changes and obtain the flexibility, using e-banking is vital and inevitable today. The purpose of this research is to analyze e-banking changes and its level of customer satisfaction in Iranian Banks in a four-year period and the measurement of customer satisfaction of e-banking service quality in Iran. In order to achieve this goal, a survey conducted in two phases. Firstly, four-year data was gathered from the electronic banking project. Secondly, a sample of research including 19 private and public banks in Iran was selected, a questionnaire was designed, distributed, collected and analyzed. All data for these banks was taken from Central Bank of the Islamic Republic of Iran. The methodology of research was factor and correlation analysis. The results imply that increasing the level of e-banking in Iran has a positive relationship with customer satisfaction from e-banking service quality.

Keywords: e-banking, correlation, customer satisfaction, e-banking service quality

Introduction

Rapid technological advances have introduced significant changes in the global economic and business environment (Hway & Yu, 2003). In this regard, trend of electronic commerce (e-commerce) has become a very important technological advancement for businesses in changing business practices (Brodie, Winklhofer, Coviello, & Johnston, 2007; González, Dentiste, & Rhonda, 2008; Lichtenstein & Williamson, 2006). This has experienced a tremendous growth in recent years as a result of new business initiatives utilizing these technologies (Barwise & Farley, 2005).

In particular, industries that are information-oriented such as banking services and securities trading sectors are expected to experience the highest growth in e-commerce (Ibrahim, Joseph, & Ibeh, 2006; Hughes, 2002). Inevitably, this phenomenon has sparked a lot of attention in the academic literature lately (such as Gan, Clemes, Limsombunchai, & Weng, 2006; K. Pikkarainen, T. Pikkarainen, Karjaluoto, & Pahnla, 2006;

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Shamdasani, Mukherjee, & Malhotra, 2008).

Considering this, all banking service industries in Iran are affected by the advancement of the technological innovation as well. In banking industry, branches alone are no longer sufficient to provide banking services to cater the needs of today's sophisticated and demanding customers. The provision of banking services through electronic banking, namely, ATMs, POS, and e-cart has provided an alternative means to acquire banking services more conveniently. With the proliferation of computers usage, the electronic delivery of banking services has become ideal for banks to meet customer's expectations. Compatible with the revolutionary components of the electronic marketplace, Iran has actively developed e-banking services since mid-2000. Public awareness of e-banking among users has been increased and thus people are ready to migrate to technology applications.

Furthermore e-banking provides higher degree of convenience that enables customers to access internet bank all the time and in all places. Apart from that, the accessibility of computers is perceived as a measure of relative advantage (Devlin, 1995; Ainscough & Lockett, 1996; Daniel, 1999; Black, Lockett, Winklhofer, & Ennew, 2001; Polatoglu & Ekin, 2001; Suganthi, Balachandher, & Balachandran, 2001; Gerrard & Cunningham, 2003; Wong et al., 2008). In fact, it has become the main means for banks to market and sell their products and services (Amato-McCoy, 2005) and is perceived to be a necessity in order to stay profitable and successful (Gan et al., 2006; Wong et al., 2008)

So the implementation of e-banking, such as internet banking and the use of computer-based office banking software hold several obvious advantages for banks. It improves profit level through the reduction of both variable and infrastructure costs, provides a source of differentiation and competitive advantage, provides global reach, adds another communication and feedback channel, increases customer satisfaction through the reduction of waiting times, and thus improving service performance, or otherwise enabling bank to more fully realize its sales potential through the achievement of higher sales volume (Lichtenstein & Williamson, 2006; Fox, 2005; Hernandez & Mazzon, 2007; K. Pikkarainen, T. Pikkarainen, Karjaluoto, & Pahlila, 2006; Shamdasani et al., 2008; Schaggnit, 1998; Schneiderman, 1992; Wong et al., 2008).

With these explanations, the focus of this research is on the customer satisfaction by receiving a high service quality since the other advantage of e-banking are derived from customer satisfaction of services delivered to them.

Furthermore, given the fact that banks invest billions in the internet infrastructure (Deutsche Bank invests approximately half a billion US dollars per year), customer satisfaction and customer retention are increasingly developing into key success factors in e-banking. Most importantly, profitable e-banking requires a strong focus not only on the acquisition of new customers, but also on the retention of existing customers, since the acquisition costs in online banking exceed that of traditional off-line business by 20-40 percent (Reibstein, 2002; Reichheld & Schefer, 2000). This study poses a very important question: What is the relationship between level of e-banking and customer satisfaction from e-banking service quality in Iran? To answer this question, one needs recognize the level of e-banking services and customer satisfaction and scales used for measurement.

Overview of the Latest E-banking Changes in Iran and Main Questions

The published information by Central Bank of the Islamic Republic of Iran refers to this fact that e-banking encountered with a positive growth in every component of e-banking. Figures 1-3 show the positive

growth in ATM, e-cart and POS in Iranian Banks in the period of 2006 to 2010 (Islamic republic of Iran central bank report)

Figure 4 shows that the average of e-banking growth in this period has been more than 25 percent. However, the important question is that, whether this growth caused customer's satisfaction from e-banking services as the main factors of long term profitability and successes.

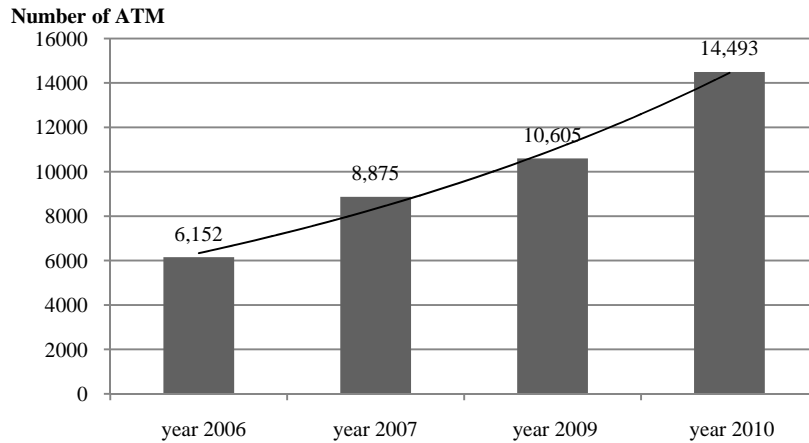


Figure 1. Number of ATM in Iranian Banks in 2006-2010. Source: Retrieved from <http://www.cbi.ir/>.

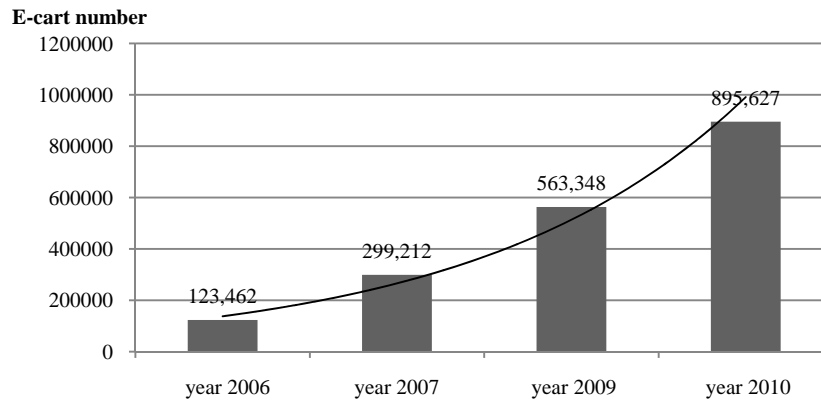


Figure 2. Number of e-cart in Iranian Banks in 2006-2010. Source: Retrieved from <http://www.cbi.ir/>.

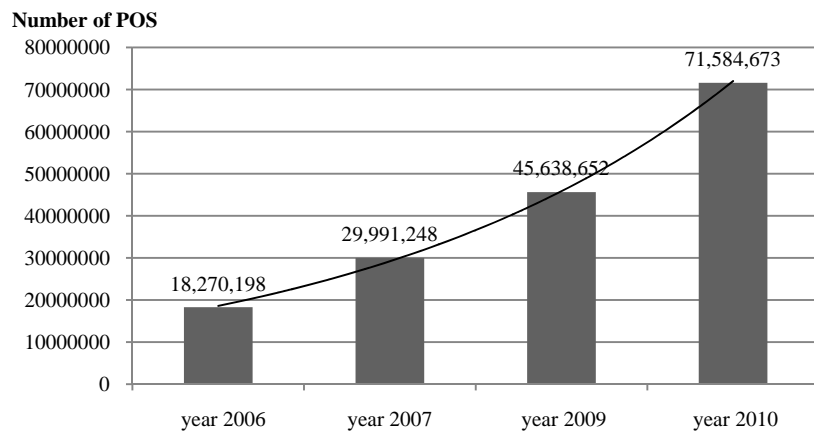


Figure 3. Number of POS in Iranian Banks in 2006-2010. Source: Retrieved from <http://www.cbi.ir/>.

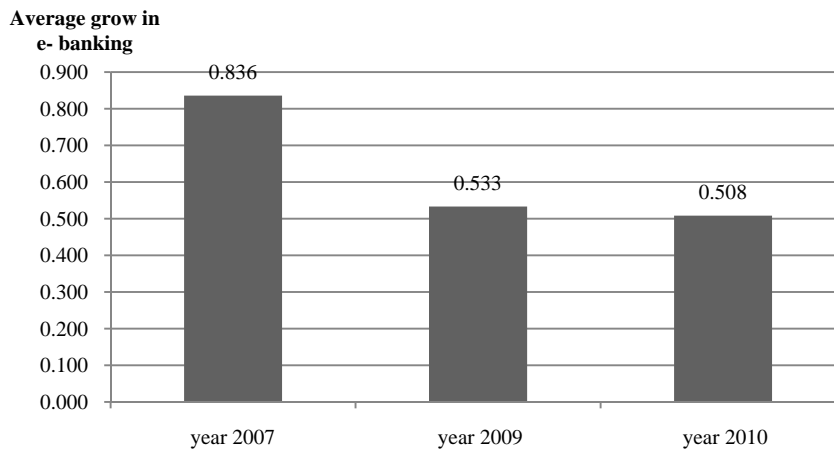


Figure 4. Average e-banking growth in Iran 2007-2010.

Literature Review

E-banking Service Quality

There is a long history of research on e-banking, customer satisfaction and service quality. In this section, we try to explain these concepts and their probable relationship. In literature, service quality is a very important determining factor of customer satisfaction. Service quality attributes in e-banking industry is the main service delivery and communication channel. Offering high quality services to satisfy consumers' needs at lower costs, is potential competitive advantage of e-banking. Some studies show that e-banking has successfully reduced operating and administrative costs (Siriluck & Speece, 2003; Devlin, 1995).

To sustain a long-term relationship, banking institutions have to embrace the concept of customer satisfaction. As supported by McMahon (1996), for banks to survive in e-banking era, they will have to earn consumer loyalty through product features and services excellence (Wai-Ching Poon, 2008).

These issues encountered in electronic service delivery have thus prompted a proliferation of research into how service quality may be measured and managed for electronic service deliveries (such as Parasuraman et al., 1991, 2005; Zeithaml et al., 2000, 2001, 2002; Yang & Jun, 2002; Bauer et al., 2005; Ibrahim et al., 2006; Shamdasani et al., 2008; Wai-Ching Poon, 2008).

Fassnacht and Köse (2007) and Wai-Ching Poon (2008) found that high electronic service quality in web-based services had an important role in building overall customer trust for service provider. Indeed, it seems that e-banking and traditional banking, though very different in their bases of customer interaction, are inseparable facets of the banking system, and should be seen as complimentary rather than substitutable ways on banking. It follows then that the customer's experiences with e-banking may have an influence on changing their expectations and perceptions of traditional banking services.

Satisfaction

Customer satisfaction is often seen as a long-term success factor to an organization's competitiveness (Hennig-Thurau & Alexander, 1997; Wai-Ching Poon, 2008). Satisfaction refers to the consumer's emotional evaluation of their experiences with the consumption or ownership of specific goods and services (Westbrook, 1981; Wai-Ching Poon, 2008).

Literature on process definitions of satisfaction is more wide spread and generally more accepted in academic circles. The central theme of the process definition is the expectancy disconfirmation paradigm (Ruyter & Bloemer, 1999). According to this paradigm, a consumer's feeling of satisfaction results from comparing a product or service's perceived performance in relation to his or her expectations. If the performance falls short of expectations, negative disconfirmation occurs, resulting in a feeling of dissatisfaction. If the performance exceeds the expectations, positive disconfirmation occurs, and the consumer is highly satisfied. If the performance just matches expectations, the consumer's expectations are confirmed, and the consumer is just satisfied (Wai-Ching Poon, 2008).

Thus, both service quality and satisfaction are constructs resulting from the comparison of expectations and performance. Indeed, empirical research by Parasuraman et al. (1985) have found several examples where consumers satisfied with a service still did not think that it was of high quality. Oliver (1993) has also suggested that customers require experience with the product or service to determine how satisfied they are with it, while quality can be perceived without actual consumption experience (Wai-Ching Poon, 2008).

E-banking Service Quality Measurement

After recognition of customer satisfaction and service quality concepts, determining the method for measuring these concepts is the main issue.

Many studies focus on measuring these concepts. For example, Kano's (1984) method for measuring customer-defined quality suggests three fundamental quality demands relevant to quality evaluation: basic demands, performance demands and enthusiasm demands. These demands are fulfilled by three types of performance elements. Basic performances are regarded as obligatory (must-be services) and are therefore, not explicitly voiced. Spoken attributes are typically voiced, while surprise attributes are again rarely voiced (as they are unexpected) and can therefore, achieve high levels of satisfaction in sense of excitement (Bauer et al., 2005).

The service model by Berry (1987) and the penalty-reward-approach by Brandt (1988) follow a similar logic but suggest two generic categories of service elements: minimum elements or routine services include all factors and processes that entail demerits if the provider fails to fulfill customer requirements. Value-enhancing services or non-routine-services encompass all elements that exceed customer expectations and are rewarded with bonus points (Bauer et al., 2005).

As a consequence of the increasing importance of modern information and communication technologies for delivery of financial services, the analysis of e-banking quality issues becomes an area of growing interest to researchers and managers (Hughes, 2003; Jayawardhena, 2004; Bauer et al., 2005).

The study presented by Gounaris and Dimitriadis (2003) and Bauer et al. (2005) is the first attempt to investigate the service quality of e-banking portals. Based on the SERVQUAL, the authors identify three quality dimensions, namely customer care and risk reduction benefit, information benefit and interaction facilitation. These dimensions are represented by only 14 items, a fact that has to be criticized. The following studies are focused on specific service delivery aspects of conventional, simple banking web sites and therefore consider particular service quality dimensions. Broderick and Vachirapornpuk (2002) and Jun and Cai (2001) employed qualitative techniques. By using the critical incident technique, Jun and Cai (2001)

identified 532 critical incidents in online banking, which are grouped into three central quality categories namely that of customer service quality, online systems quality, and banking service products quality (Bauer et al., 2005).

In this study, we use the method (Ibrahim et al., 2006) for measuring the e-banking service quality and customer satisfaction. Their study has drawn on a sample of 135 UK retail banking customers in exploring the key dimensions of the relatively new electronic service quality (e-SQ) construct, and evaluating how the survey respondents perceive their respective banks' performance on those critically regarded e-SQ dimensions. Using an exploratory factor analysis procedure, it uncovered six composite dimensions of electronic service quality, including the following factors as a questionnaire (Ibrahim et al., 2006):

- All my banking needs will be included in the electronic banking menu options;
- All my electronic banking transactions will be performed accurately;
- Electronic banking services will be easy to use;
- Electronic banking services will have convenient hours of operation;
- All my electronic banking transactions will be processed efficiently;
- Accurate records of all my electronic banking transactions will be provided;
- There will be no waiting time involved in obtaining electronic banking services;
- All my electronic banking transactions will be guaranteed;
- Electronic banking will provide secure and reliable services;
- Electronic banking will provide additional options for some customers (non-English speaking, disabled and elderly);
- Electronic banking will have ATMs accessibly located Electronic banking will adequately satisfy my complaints either on the spot or within 24 hours;
- Electronic banking will provide a friendly environment, including musical entertainment, to customers in the queue;
- Electronic banking will provide a friendly environment, e.g., adverts of bank's services, to customers waiting in the queue to be served;
- Electronic banking will provide other relevant information about financial services to customers waiting in the queue;
- Electronic banking service will be personalized;
- Electronic banking will acknowledge me by name on the screen during the transaction;
- Electronic banking will enable me to set up accounts and perform transactions immediately;
- Electronic banking will provide brochures to educate;
- Me on how to use services electronic banking service will have a personal/friendly electronic banking service will have a user-friendly system;
- Electronic banking service will provide online directions;
- Electronic banking will provide customer feedback services;
- Electronic banking will provide special services for the elderly;
- Electronic banking will provide additional options for some customers (non-English speaking, disabled and elderly);
- Electronic banking will have adequate menu options for everyday banking.

Methodology

Data Collection

In this research, required data have been obtained from two sources: First, source was the reports from Central Bank of the Islamic Republic of Iran and another source was questionnaires, which were distributed among Iranian Banks customers. The reports of Irani Central Bank contain information of 19 private and public banks. Data presented here were extracted from ATM, e-cart and POS in every year from 2006-2010. These data contain 70 cases as time series. The questionnaire contains the e-banking service quality factors that demonstrate the banking customer satisfaction. These factors have mentioned in literature review. The number of questionnaires is 2,276 that given to Iranian banks customers.

Data Analysis and Results Conclusion

A factor analysis was conducted to develop constructs that will help to analyze the questionnaires' responses and to evaluate factors that influence customers' perceived e-banking service quality. Factor analysis assists in condensing a large set of variables into a smaller number of basic components, which include some connected variables. The factor analysis in this study has implemented for customer data that collected by questionnaires for measuring the e-banking service quality and customer satisfaction. According to Table 1 KMO-Bartlett test that sample size is adequate for this study. As showing in Table 2, three components can show more than 61 percent of variation and Table 3 shows that all of 24 questionnaires variables have more correlation with component 1 so it can be resulted that all of them categorized to only one component.

Table 1

KMO-Bartlett Test for Sample Size

Kaiser-Meyer-Olkin measure of sampling adequacy		0.892
	Approx. chi-square	844.419
Bartlett's test of sphericity	<i>df</i>	2,275
	Sig.	0.000

Table 2

Total Variance Explained

Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total		Total
1	11.357	47.320	47.320	11.357	47.320	47.320	5.970	24.874	24.874
2	2.002	8.342	55.662	2.002	8.342	55.662	5.375	22.395	47.269
3	1.320	5.500	61.162	1.320	5.500	61.162	3.334	13.893	61.162
4	0.971	4.046	65.209						
5	0.796	3.317	68.525						
6	0.727	3.028	71.554						
7	0.674	2.807	74.361						
8	0.625	2.606	76.967						
9	0.591	2.464	79.431						
10	0.558	2.323	81.755						
11	0.481	2.003	83.757						
12	0.435	1.814	85.571						
13	0.413	1.721	87.292						
14	0.404	1.682	88.974						
15	0.384	1.599	90.573						

(Table 2 continued)

Component	Initial eigenvalues			Extraction sums of squared loadings		Rotation sums of squared loadings	
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total
16	0.366	1.526	92.099				
17	0.341	1.420	93.519				
18	0.299	1.245	94.764				
19	0.271	1.131	95.895				
20	0.252	1.049	96.944				
21	0.215	0.894	97.838				
22	0.204	0.851	98.690				
23	0.187	0.779	99.468				
24	0.128	0.532	100.000				

Table 3

Rotated Component Matrix

Variable	Component		
	1	1	1
1 All my banking needs will be included in the electronic banking menu options	0.624	-0.303	0.226
2 All my electronic banking transactions will be performed accurately	0.608	-0.408	0.349
3 Electronic banking services will be easy to use	0.675	-0.358	0.151
4 Electronic banking services will have convenient hours of operation	0.715	-0.215	0.046
5 All my electronic banking transactions will be processed efficiently	0.719	-0.380	0.085
6 Accurate records of all my electronic banking transactions will be provided	0.702	-0.398	-0.053
7 There will be no waiting time involved in obtaining electronic banking services	0.691	-0.175	-0.128
8 All my electronic banking transactions will be guaranteed	0.732	-0.322	-0.100
9 Electronic banking will provide secure and reliable services	0.794	-0.334	0.011
10 Electronic banking will provide additional options for some customers (non-English speaking, disabled and elderly)	0.501	0.079	-0.181
11 Electronic banking will have ATMs accessibly located electronic banking will adequately satisfy my complaints either on the spot or within 24 hours	0.758	-0.128	-0.141
12 Electronic banking will provide a friendly environment, including musical entertainment, to customers in the queue	0.801	0.127	0.074
13 Electronic banking will provide a friendly environment, e.g. adverts of bank's services, to customers waiting in the queue to be served	0.545	0.473	0.436
14 Electronic banking will provide other relevant information about financial services to customers waiting in the queue	0.574	0.477	0.498
15 Electronic banking service will be personalized	0.719	0.285	0.315
16 Electronic banking will acknowledge me by name on the screen during the transaction	0.661	0.143	-0.163
17 Electronic banking will enable me to set up accounts and perform transactions immediately	0.688	0.339	-0.022
18 Electronic banking will provide brochures to educate me on how to use services	0.787	0.053	0.015
19 Electronic banking service will have a personal/friendly Electronic banking service will have a user-friendly system	0.696	0.293	-0.241
20 Electronic banking service will provide online directions	0.665	0.252	-0.312
21 Electronic banking will provide customer feedback services	0.659	0.315	-0.311
22 Electronic banking will provide special services for the elderly	0.673	0.059	-0.425
23 Electronic banking will provide additional options for some customers (non-English speaking, disabled and elderly)	0.743	0.215	-0.112
24 Electronic banking will have adequate menu options for everyday banking	0.688	0.112	0.132

After factor analysis for questionnaires, in the next stage, level of e-banking correlates to the e-banking service quality. As mentioned in this study level of e-banking in Iran is divided to three variables that are ATM number, e-cart and POS number in Iranian Bank. This study correlates these variables to level of e-banking

service quality to test following hypotheses:

H1: There is a positive relationship between number of ATM and e-banking service quality.

H2: There is a positive relationship between number of e-cart and e-banking service quality.

H3: There is a positive relationship between number of POS and e-banking service quality.

Table 4

Correlation Analysis

Hypothesis	H1	H2	H3
Pearson Correlation	0.384	0.113	0.236
Sig. (2-tailed)	0.012	0.232	0.041

In order to test the relationship of factors for each hypothesis, the Spearman Rank correlation coefficient is conducted. Spearman Rank correlation coefficients, ranging from +1 to 1, estimate the magnitude and direction of relationship for the factors for hypotheses. The coefficient's sign signifies the direction of relationship. A positive sign means that the factors are moving in the same direction, whereas a negative coefficient signals otherwise. The absence of a relationship is indicated by an approximate zero coefficient. At 5 per cent level of significance, Table 4 gives the correlations and sig. the variables included in the analyses. Number of ATM was linked to e-banking service quality ($r = 0.284$, $p < 0.012$). Thus, we conclude number of ATM significantly related to e-banking service quality. Number of e-cart was related to e-banking service quality ($r = 0.113$, $p < 0.232$) and number of POS was related to e-banking service quality ($r = 0.236$, $p < 0.041$).

Discussion

Data analysis shows that in Iranian banks if we diffuse more and more ATM and POS number, We can expect that e-banking service quality can be proceeded better and better by e-banking customer so this resulted to enhance the customer satisfaction. Diffusing the ATM and POS have a positive relationship by e-banking service quality since these are facilitating banking services and help customers to keep their banking requisition easier .

Also the analysis shows that there is no positive relationship between diffusing the e-cart and e-banking service quality and then customer satisfaction. The sig. in related test shows this relationship cannot be accepted. This result shows that the Iranian banks in diffusing e-carts do not consider the needs of customers and they focus only on quantitative growth to demonstrate great and good performance. The Iranian banks should be diffusing the e-carts parallel to other developments in e-banking.

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The Possible Convergence Between Business Marketing and Territorial Marketing: The “Land of Value” (LOV) Case

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An interesting issue in management literature refers to the relation between territorial system and strategies operated by industrial firms in order to enhance the “value” of a territory. By referring to an Italian case study (an industrial small-medium enterprise), we investigated how this company has set up a network that integrates different territorial components—agriculture, tourism, culture, accommodation and catering services, commerce. The basic idea is that providing a welcoming environment can combine the aims of business with the peculiar features to the geographic area. This study allows pointing out the relevance of territory as a communication tool which might help relational capital growth for enterprises. In fact, the project has received a favorable evaluation from business visitors, as well as from internal collaborators, so it allows the company to develop stronger relationships with these stakeholders. In addition, territorial system has advantages especially reaped in terms of increased visibility, enhancement of local products and services, improvement of accommodation services. The study therefore empirically validates the possible convergence between business marketing and territorial marketing.

Keywords: territorial marketing, business marketing, relational marketing, local enterprise, SMEs

Introduction

For some time now territorial marketing has been the object of numerous studies and debates which have not only emphasized its growing relevance, but also brought to light some issues connected to its realization.

As concerns the first aspect, it is widely recognized that marketing represents a valid support tool for the governance of territories or single geographical areas which find themselves more and more in competition with one another with regard to attracting and retaining the loyalty of resources necessary for their development (Boisot, 1990; Kotler, Haider, & Rein, 1993; Caroli, 1999, 2006; Silvestrelli & Agazzani, 2002). As a matter of fact, there have been multiple cases in which the principles and tools of marketing have been used in order to create synergetic supply systems enable them to attract new territorial components and capable of enhancing existing ones, including business enterprises and their productions.

As for the second aspect, one point to be underlined is just how difficult it is to integrate the various players (both public and private), and it is necessary to carry out more effective and efficient promotional

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actions. Another critical area concerns the definition of an organizational configuration that can manage the promotional intervention and that can satisfy the need for coordination (Golfetto, 2000; Gregori, 2005). In this regard, mention can be made of some positive experiments that came to light in several studies, although there is still ample room for improvement.

It should be noted, moreover, that in the scientific literature which deals with territorial marketing the focus has often been placed only on certain aspects, such as lumber and sustainable development, entrepreneurial incentivitation and the capacity to attract investment (Aiello & Donvito, 2007), or promotion of tourist destinations and territorial brands (Baker & Cameron, 2008; Rodríguez-Díaz & Espino-Rodríguez, 2008; Wang, 2008; Pencarelli & Gregori, 2009; Haugland, Ness, Grønseth, & Aarstad, 2011). It cannot escape notice that the perspective often adopted is that of local public administrators.

The present paper favors the local business enterprise perspective, with the intent of highlighting the potential of same which can be expressed through an adequate awareness of its role within the territorial system and an appropriate management of its relationships with the other players that are part of it, with a view to foster mutual optimization.

To this end, the case for proposed study is “Land of Value” (LOV), a project carried out by the “Loccioni Group” which is a Marche region, medium-sized enterprise in the high technology sector, and LOV stands out as a “virtuous” example of integration between business strategy and territorial marketing. In fact, the company has created a transversal network in a multi-dimensional approach to the territory (hospitality, tourism, culture, nature, food industry production, etc.), so as to offer its visitors—be they clients, suppliers or other partners—a welcoming environment and a positive experience during their stay, with an effort to share the values of the area. By using the positive experience as a lever, the company is thus putting into motion a relationship marketing strategy, as it contemporaneously promotes the image of the reference territory, its productions and its local services.

Here follows the principal objectives of this analysis:

- Examine the organizational problems and modes of intervention inherent to the development of a similar integration project;
- Highlight the derived benefits to the territory;
- Underline the impact such a project has on company performance, through a cost-benefit analysis over the long term;
- Emphasize the role that could be played by SMEs in territorial marketing.

Regarding the methodology adopted, a number of personal interviews were conducted with the owner and managers of the company under study; particular attention was placed on the points of view expressed by the heads of the marketing and communication areas, by the promoters and by the coordinators of the project. The present contribution can therefore be positioned in the field of research on relationship marketing and territorial marketing; in addition, reference is made to business network theories (Håkansson & Snehota, 1995).

The paper as follow is divided into three main sections: Firstly, an analysis of the territorial marketing evolution is proposed and, adopting the business perspective, the main results of several studies made on the relation between companies and territory are examined. Secondly, the territory is considered as a network of relationships and in this sense, some theoretical considerations are made about the linkage between relational marketing and the “marketing” component of the territory. Finally, by analyzing the LOV case study, we will try to discover if a connection between business marketing and the territorial marketing is present.

Territorial Marketing From a Business Perspective

In recent years, a number of studies have been conducted on the topic of territorial marketing for which, nevertheless, no single shared conception has come about (Gregori, 2005). In fact, a variety of different theoretical approaches leading to diverse interpretations are observed, depending on the objectives established and the territorial context used as a reference.

One widely accepted view sees territorial marketing as a technique based on the principles and tools that are typical of a business function, i.e., marketing—with the aim of augmenting the value of a territory or of an area where action is intended by transforming its resources and features into a competitive advantage. As stated by Caroli (2006, p. 85), the territorial marketing function must fulfill the task of facilitating the evolution of the tangible and intangible factors at work in a geographical area towards the goal of strengthening the capacity of that area to attract and retain within it those components of territorial demand (segments of physical persons and of financial organizations) that are best suited to foster the sustainable development of the area itself. Furthermore, the author points to a process of analysis, formulation and activation of a supply strategy aimed at satisfying the needs of a market “internal to” and one “external to” the area of interest.

For territories and single geographic areas, there exists, in fact, an ever more pressing need to think out and plan, keeping the laws of competition in mind (Caroli, 1999), and it would seem opportune and essential that these areas adopt a “proactive” approach in dealing with the “market”¹.

It is in this context, then, that territorial marketing is garnering particular attention from the scientific community, but not only.

From a theoretical point of view, the concept has been affected by an important evolution denoted by the passage from a “transactional” view to a “relational-network” view (Aiello & Donvito, 2007).

Whilst in the first case, the territory tends to be considered as a complex product with which one aims to satisfy both the current and potential demands², and in the second case, it is considered to be a network of relationships, where, in particular, the interactions among the various players—both internal and external—are analyzed. It can be further stated that, in every geographical context, the relationships among the players represent an absolutely primary aspect of that context, for they strongly influence the social dynamics and the competitiveness of the economic activities carried out within it (Caroli, 2006, p. 25).

Therefore, the relational-network approach appears to be best suited to fully appreciate the problematic issues and the opportunities for development of territorial marketing because it makes it possible to see how the interactions among the various players could be reflected in the attraction capacity of a given territory.

On this subject, it is worth noting the following points:

(1) For the territorial marketing actions to be successful, it would be useful and necessary to involve both public and private entities, as well as to overcome conflictive and competitive attitudes in order to enhance and safeguard the territory, a shared asset (Ferrari, 2000, p. 262);

¹ They are, in fact, more and more involved in growing competition to attract and retain the resources necessary for their growth, which process has already begun (Marenga, 2005) by the progressive physical transferability of tangible and intangible resources; the breaking down of barriers to the physical movement of individuals and businesses who periodically look for areas which would allow them to carry out their business in the most favorable conditions.

² Based on this line of reasoning, territorial marketing consists, therefore, of a process aimed at increasing the attractiveness of an area, by defining its (Kotler, Haider, & Rein, 1993): features in terms of combination of facilities and services; “price policy” which essentially coincides with a system of incentives in favor of current and potential users of existing services and infrastructures; distribution methods for local services and products; communication and promotion activities aimed at creating a positive image for potential users.

(2) It is quite commonly recognized as auspicious the idea of aiming for a greater integration among the various territorial contexts (nature, culture, production system, tourism, etc.) in order to obtain a better overall effect, especially with reference to communication and promotion activities³.

This leads us to affirm that it is the degree to which the various components of the area are able to collaborate and cooperate which makes a difference, in terms of effectiveness and efficiency, when talking about territorial marketing actions.

One would ask, then, what roles the various actors can play in achieving an enhancement of the territory, in consideration of the fact that they are part of relationship networks that interact, in turn, with other networks, and they are also involved in a trade relationship with the territory itself.

Hence, we believe that it would be interesting to adopt the local business perspective and analyze the value these businesses attribute to the territory, from the standpoint of their competitive development strategies. This, particularly in light of the important economic and social function they carry out, in an awareness that they can not only be the recipients of territorial marketing actions, but they can also take an active part in them.

The fact that the competitiveness of a business depends more and more on the competitiveness of the economic, social and territorial systems in which they are collocated is certainly nothing new. According to the resource-based view, in fact, the specific tangible and intangible resources presented in a given area can represent significant sources of competitive advantage⁴.

These concepts assume added significance, however, when seen in light of the on-going intensification of the globalization process and the increasing mobility of individuals and companies.

On this point, it must be noted that in a context of progressive growth of international trade and relations, a number of companies have adopted strategies in which they re-locate their production activities abroad, moved by the need or the opportunity to operate in conditions deemed more "favorable", compared to those available domestically. For territories which undergo such processes there is therefore the need to compensate for the loss of businesses which had been located there by attracting new ones (Rullani, 1999).

Other enterprises, especially SMEs, are strongly bound instead of the territory where they were founded, as they grow in symbiosis with it and contribute to its attractiveness, by investing in and developing significant intangible resources, such as cognitive and relational systems, work culture and professional vocations, quality culture and a more widespread tendency to innovate. This occurs with the heightened awareness of the important added value that the territorial system is capable of giving to what they are offering.

Hence, it is in this sense that enterprises and territories co-evolve in the search for competitive advantage, as each one reciprocally represents a critical resource for the competitiveness of the other (Valdani & Ancarani, 2000, p. 23).

It would be wise, then, to investigate the strategic relationship between local enterprise and territory, from the viewpoint of mutual enhancement.

Local enterprises, in much the same way as to other internal actors, represent both resource and user in

³ Integration of the territorial components, even transversally vis-à-vis the various dimensions or contexts, would indeed appear to be increasingly indispensable to the fulfillment of the needs and expectations of the variegated demand in a territory. By way of example, the evolution of demand in the tourism sector has led to a situation in which it is increasingly less likely that expectations can be satisfied by offering a single attraction.

⁴ As observed by Varaldo (1995, p. 41), when choosing a business location a more integrated vision takes into account the fact that it is no longer just the natural or physical features, but also the intangible ones (qualified personnel, area universities, technological competencies, advanced services, etc.) that affect the effectiveness and efficiency of a local business enterprise and of a non-local business that operates in a certain area.

their own territory and their interdependence and interactions, even with external subjects, and have an effect on the attraction capacity of the territory itself. Following this line of reasoning, it can be said that the object of territorial marketing should not only be to sell the “territory-product” to external clients—usually identified as multinationals which display a certain amount of indifference, however, towards the territories—but, in the words of Rullani (1999, p. 27), it should, first of all, look after the relationships with internal clients, by turning to the business enterprises that are already present in the territory to be enhanced. Besides attracting “external clients”, territorial marketing should therefore facilitate the development and retention of internal clients, who could otherwise see an advantage in leaving. Thus, the aim of territorial marketing is that of keeping the system vital⁵, in the interest of both internal and external demands.

Not to be overlooked is the fact that, often, territorial areas appear to be operating with what is known as a product-based approach, whereby attention is mainly focused on creating and improving the infrastructures. Furthermore, the competitive challenge between territories tends to shift towards incentives, typically fiscal in nature, which nevertheless offer short term advantages and are at risk of degenerating into dangerous price spirals so characteristic of the hypercompetitive dynamics associated with both enterprises and territories (Valdani & Ancarani, 2000, p. 37).

So, we can plausibly affirm that geographical areas, rather than compete on available facilities and cost advantage, should enhance their specific intangible resources by putting effect into a strategy of qualitative differentiation. More specifically, it would seem most advantageous to develop systems of relationships because it is from these that derive those sought-after resources, i.e., knowledge, competencies and synergies, so it is necessary to create more defensible competitive differentials in a knowledge economy, not only for the territories but for the enterprises located there, as well⁶.

The Relationship Between Relational Marketing and Territorial Marketing

Relational marketing offers a concrete response to the newly emerging needs of markets, especially the industrial ones, because it takes a long term perspective and provides tools suitable for managing the interactions between suppliers and clients (Grönroos, 1994). From the standpoint of the theoretical underpinnings which characterize relational marketing, it has been the sociological, economic and organizational disciplines which have contributed to laying down a substratum, although it cannot yet be called as actual, shared marketing paradigm (Coviello, Milley, & Marcolin, 2001; Palmer, 1996). Relational marketing places its primary focus on studying the relationship between business enterprises in more or less industrial contexts, but to treat it as a paradigm would imply associating it with an interpretative schema theory (Aijo, 1996) which, to date, seems not to have yet been conceived. One sure element that emerges, however, is how central and interactive the relationships are that develop between the parties, seeing as both players involved carry out an active role in the transactions that are created. So then, the primary task of marketing, at a strategic level, should be that of establishing, developing and maintaining the relationships with clients, rather than focusing on the management of the marketing mix-variables (Ford, 1980). What has just been said about

⁵ Golinelli (2002, p. 15) qualified a territory as a “vital system”, defining it as that system which pursues the goal of survival through the production of economic and social value for supra-systems which create expectations and exert pressure in terms of settlement and spatial location.

⁶ On this point, it must be noted, though, that the value created by territory-product for its users derives not so much from the potential of the single elements which constitute it, but rather, and above all, from the synergies that are activated (either naturally or, more often, as a consequence of deliberate strategies) among the tangible and intangible components existing inside the territorial system and in those systems to which it is connected (Caroli, 2006, p. 146).

managing client relations leads to the necessary evaluation of each relationship from the point of view of its potential, of the resources that it requires and therefore, of the efforts needed.

Basically, the entire organization should develop the ability to understand the “objectives” of each of the single relationships that have come about, and this implies an efficient and effective management of the company’s relational assets (Costabile, 2001). The complexity in which firms operate, besides pushing them to study those relational assets that are directly ascribable to the company itself, has also meant extending the field of analysis to include a study of the multitude of relationships that grow up between players external to the company (Håkansson & Snehota, 1995). The reason for the birth of the network approach to studying relationships is to be found in just such a context where it is difficult to fully understand each single relationship taken out and isolated from the rest of the ties that the company establishes in a business context (Campbell, 1984; Smith & Easton, 1986). Even though the relationships are nearly dyadic, one must consider how they fit as part of network mechanisms far more ample and complex to be analyzed.

The key dimensions of relationships inside a network are:

- The players;
- The activities;
- The resources.

Each player acts within what is defined as the networks context (Håkansson & Snehota, 1989), that is, a space in which the player builds relationships with other players (who, in turn have other relationships), exchanges resources and carries out activities, with the objective of reaching a “position” within the network. The degree of complexity of such a mechanism is very clear, intuitively, for a player’s level of knowledge about the breadth of his network or, his business horizon (Ford et al., 1998), can vary significantly.

The main aspect that emerges and must necessarily be central to our conceptualization regards both the complexity of the context and the possible presence of relationships that are external to the central one and which could influence the entire network system.

Clearly, a non-controllable environment such as the network takes on particular importance vis-à-vis the territorial dimension in which the company itself is naturally involved.

Having taken into consideration the observations made regarding the rise of relational marketing and particularly of its substance, it would appear obvious then that the relational dimension, when speaking of a territory, can be a highly significant one. As asserted by a number of scholars (Caroli, 1999; Vescei, 2001), given the systemic nature of the territorial supply which derives from infrastructures but also from interdependent intangible assets (relationships), the actors like, for instance, business enterprises, are obviously called upon to interact in the territory itself. Knowing how to manage and nurture such relationships thus turns into a fundamental asset for any organization.

The relational dimension which is reinstated and utilized in a territorial context rests on certain basic, rather interesting assumptions. The organizational management of relationships both internal and external to the company, in particular, presupposes an effort made by the company to also utilize management tools as sources of possible competitive advantage. In this view, it could prove necessary to adopt new approaches to managing the relationships that a business enterprise owns in a territory. Furthermore, the analysis of information coming from the territory could also prove to be strategic, in consideration not only of the direct and contemporary relations among the various companies, but also of the relationships afferent to the network in which the company operates.

The points of contact between relational marketing and the “marketing” component of the territory would appear to be quite strong, therefore, and could be ascribable to:

- The complexity of the relationship and of the territory in terms of substance;
- The high complexity and value of the supplier—client exchange;
- The mutual effort, on the part of the players, to make the business relationship successful.

Thus, it becomes evident how, in such a context, the importance of a territory is concentrated on the notion of created value for its clients, i.e., its users or those who benefit from its resources. From here, it is a short step to seeing the importance of possessing a thorough knowledge of both the needs and the expectations of the clients who make up the demand, both current and potential.

It is evident that numerous relationship flows develop between the industrial enterprise and the various players in the network, identified as the market made up of industrial clients, the suppliers of goods and services and other organizations operating in the territory. Through the relationships that are created between the enterprise and the players, but also among the individual groups of actors themselves, there takes place an exchange of both tangible and intangible resources such as knowledge and experience. A true circuit is thus created, affecting both the territory and the external environment and, in a parallel manner, the environment in turn affects the relationships that are being formed and those already established (Ford et al., 1998). In order for the interaction mechanism between subjects and territory to fully achieve its highest potential, some additional conditions are also necessary:

- Information must be disseminated in a continuous and systematic way;
- The actors must have access to the information in an efficient way.

The principles enunciated by relational marketing can supply both the tools and the methods suitable for managing such complexity.

A Virtuous Example of Territorial Enhancement: The “Land of Value” (LOV) Case⁷

The case under study presents an interesting company project aimed at enhancing the territory, and it is called “Land of Value”, or LOV.

The project was conceived and promoted by the Loccioni Group⁸, a family-run enterprise⁹ which operates in the high technology sector and is located in the township of Rosora, in the inland area of the province of Ancona, in the Marche region. With an annual turnover of 50 million Euros on average and approximately 300 employees, the group represents a fairly significant business entity for the territory in question¹⁰. The enterprise has strong ties to this territory, as evidenced by the fact that the only two production facilities are located just a short distance one from the other, in the original area where the company was founded.

The group was founded in 1968 by Enrico Loccioni, who also founded I.C.I.E. (which, in 1974, became General Impianti), as an artisanal business for electrical installations. Over the years, it adopted major

⁷ The present case study was the fruitful outcome of the close collaboration, over many years, between the “Loccioni Group” and the Department of Industrial Management and Organization at the Polytechnic University of the Marche.

⁸ Source: The authors’ data.

⁹ The controlling share of capital is owned by the founder and his family, of which some members are also directly involved in company management, in different capacities and in different roles under various aspects—strategic, administrative and marketing—in close contact with the heads of those functions.

¹⁰ To put it in perspective, the township of Rosora has a resident population of just over 1,900; the surrounding area includes a number of peripheral townships and villages (Arcevia, Castelplanio, Cupramontana, Maiolati Spontini, Mergo, and Poggio San Marcello) with an overall population of about 23,500.

diversification strategies which helped the group to grow considerably, as subsequent additions were made: A.E.A. (Applicazioni Elettroniche Avanzate) in 1980, SUMMA in 1991 and BLU SOLUTIONS in 2004.

Currently, the group is actively involved in different types of business activities, in particular, manufacturing measurement systems and instruments, quality testing and monitoring of products and processes, as well as providing integrated solutions for industrial monitoring of quality, for industrial automation and for Information and Communication Technology; the group also provides solutions for energy savings in terms of rationalized use and management¹¹.

In addition, the Loccioni Group promotes and integrates a number of networks for companies, territorial entities, research bodies because it firmly believes that the network system represents a tool for growth, improvement and innovation. Examples of such networks are:

- Netpeople (to bring together companies' competencies and know-how);
- Nexus (a multi-sector network created for local territories to communicate and interact, so as to maximize both the territory's features and the individual and company-owned knowledge contained therein);
- Crossworlds (to promote innovation through a technological transfer from the automotive towards other worlds);
- U-net (a network that includes universities and research institutions).

Finally, the group is also actively and intensely involved in collaborating with the Marche Polytechnic University to create study and research projects, as well as to finance scholarship grants for doctoral studies.

In recent years, the enterprise has seen an important evolution take place in terms of marketing. Prior to 2005, there was essentially no marketing function within the group as there were only two people who took care of communication activities (website, communication material), organized internal events or decided which trade fairs to attend. Any strategic marketing activity was practically non-existent.

In 2005, a specific marketing department was established, whose function was to undertake research activities in order to gain an understanding of market dynamics so as to provide useful support, primarily:

- To upper-level management: in terms of analyzing possible "market frontiers" or choosing a "niche technology" in which to position themselves;
- To the R&D department: by carrying out analysis of new ideas or new projects in the research portfolio, in terms of potential market position;
- To the sales division: by studying potential markets.

Over the last two years, growth of the marketing area has been intense.

The support tools for marketing activities have been fully implemented (CRM software, planning tools such as budgets) and a person has been appointed to be specifically responsible for this function¹²; previously, in fact, one person covered both the marketing and the communication areas.

It should be emphasized that the marketing function's principal task is to develop and maintain long-term relationships with loyal clients (Gummesson, 2006), when considering the company to be "technologically

¹¹ In keeping with this approach, we mention the creation of the "Leaf House", the first "carbon neutral" residential building of its kind built in Italy, consisting of six apartments laid out on two floors; the building is located in the vicinity of the Loccioni Group headquarters. This eco-sustainable project was the fruit of collaboration among several partners who are members of the network of business relationships, each of which contributed its own competencies; for further discussion on this topic, see Temperini (2009).

¹² The current marketing director coordinates about 10 people who report to him, interacts directly with the entrepreneur, with whom decisions are made jointly.

irreplaceable". The relationships created with current and potential partners are, in fact, seen as a central element in the Loccioni Group's development strategies and so it is in this sense that marketing is increasingly being recognized as having a fundamental role.

Furthermore, the particular attention paid to relational aspects has heightened the awareness of how important it is, for the success of a company, to share certain values held in one's own territory. Values like family, quality and respect for the environment have, for some time now, pervade the group's company culture and represent pivotal points for the entire organization and contribute to its growth¹³. It follows, then, that there is a greater desire to communicate and give value to the culture which connotes the enterprise and its territory, along with the all of the experiences and sensations that the latter can offer, with the knowledge that they can represent an important resource for the development of relationships.

It is this attitude that gave rise to the project entitled "Land of Values" (LOV), aimed at creating a particularly positive experience for visitors coming to meet their business counterparts at the Loccioni Group¹⁴.

The project consists of creating a network of collaborators with hospitality facilities (mainly agri-tourism, B&B and country house accommodation) and restaurants that best represent the local territory, so people will come to appreciate the typical aspects and strengths of the area¹⁵. Specifically, a number of different farms and agri-tourism facilities are involved in order to also offer visitors a sampling of local food products in addition to hospitality characterized by a direct contact with nature (an increasingly sought-after and appreciated feature, especially by those who live in a large metropolis)¹⁶.

Further collaborative efforts are planned with tourist associations and several local agencies and operators interested in spreading awareness of territorial assets and heritage (natural, historical, cultural, and artistic). So, for example, visitors are taken to the huge underground Karstic cave complex known as the "Frassassi Caves" (located in nearby Genga), to museums in the surrounding towns, to cultural and artistic events held locally and on shopping expeditions to area outlets.

The intent, then, is to create for visitors—be they clients, partners or suppliers—a familiar and friendly environment, while at the same time communicating and sharing the values and the culture that characterize the business enterprise and its territory¹⁷. The basic idea is that by offering a welcoming environment and creating a positive experience¹⁸, it is possible to combine business interests with the pleasures of the particular features of the geographic area¹⁹. It cannot escape notice, then, that this constitutes an interesting example of

¹³ Due to the need to protect the environment, Loccioni has spread on the business context the values around eco-sustainability by organizing strong communication initiatives (Bullis, 1997).

¹⁴ The acronym LOV intentionally makes the phonetic association with the word "love", to evoke the care and attention showered on the company's visitors and partners.

¹⁵ Particularly the role of small family enterprises operating in the tourism sector has been relevant in order to spread culture; also, their attractiveness can be considered (Getz, Carlsen, & Morrison, 2004).

¹⁶ The growing desire to go back to nature, to seek and re-discover the beauties of nature and to somehow re-establish contact can be seen in the rise of so-called "ecotourism". It is a particularly interesting form of tourism for many Italian communities, also in light of the fact that there exists a segment of tourist demand that is made up of people who are willing to spend more money in an effort to preserve the local environment (Sambri & Pegan, 2008).

¹⁷ Companies need to strongly communicate intangible factors such as own cultural values of the territory; it can be strategic to develop also business opportunities (Nes, Solberg, & Silkoset, 2007).

¹⁸ The experiential aspect (Pine & Gilmore, 2000) takes on greater and greater significance as an effective competitive factor and has been the object of several consumer studies and market research (Schmitt, 1999); nevertheless, an interesting area for analysis is prospected by B2B contexts.

¹⁹ Due to the sharing of territorial values with customers and suppliers a company can enhance the trust of the business relationships (Huang, Gattiker, & Schwartz, 2008).

convergence between relational marketing and territorial marketing²⁰.

As a matter of fact, with its LOV project the company not only achieves the objective of increasing its relational capital (Costabile, 2001), but at the same time, it takes on an important role in a network that facilitates communication and synergetic promotion of the area of reference. Important advantages are observable for the Loccioni Group and for the operators involved, as well as for the territorial system itself.

With reference to the first, widely positive feedback was had from guests, many of whom take advantage of the free “incoming” service to organize their personal vacations. The project has received a favorable evaluation from internal collaborators who consider it a valid support for organizing client/supplier visits (in particular because it allows them to optimize the time needed to manage the relationships) and a useful tool for improving interactions with them. Moreover, the project has also boosted the group’s image, as it has earned recognition as a finalist in the competition for the 2008 “Sodalitas Social Award” (national award for business projects in the field of social responsibility).

Although it is extremely difficult to determine the direct impact that LOV has, or has had, on company performance, it nevertheless appears evident that it has contributed positively to the achievement of important company goals and objectives, in spite of the global economic crisis.

As regards the players and the territory, first of all, there have been advantages reaped in terms of increased visibility. By way of example, between 2007 and 2010 several thousand visitors, including foreigners, were affected by the project, in that they have had the opportunity to become familiar with the area and its features. Thus, increased value is assigned to the territory, its activities and assets contained therein²¹.

With specific reference to tourism operators in the hospitality sector, they have had the opportunity to serve new market segments; the chance to interact with business travelers has meant that these figures can now better understand the needs of the businessman (shuttle service, internet access, late check-in, etc.), and can respond by offering improved service, thus becoming more competitive²². This means then, that the overall attitude towards hospitality in the area is improved²³; business tourism can, in effect, be catered to year round²⁴.

For local farm and winegrowing businesses, LOV offers an interesting solution to the issue of promoting their products and represents an alternative source of income.

It bears pointing out how the Loccioni Group has invested in hospitality services for its partners, and it must be added the indirect economic returns, taken in consideration of the fact that many visitors, once they have come on business, return to the area on holiday, attracted by the excellencies of the territory and the services offered.

From an organizational viewpoint, in the selection phase for who should be involved, the group reference persons carried out on-site visits to farms and wineries, to hospitality and catering establishments, to evaluate

²⁰ In the conviction, though, that territorial marketing cannot be viewed as mere promotion, but rather, as a strategic re-formulation of what the territory has to offer (Bellini, 2000).

²¹ We have to consider that local investments on the territory could be stimulated by the integration between companies by managing business relationships; in fact we can observe a positive relation between level of foreign investments and tourism development (Sanford, Jr., & Dong, 2000).

²² SME operating in the tourism are creating new business relationships in order to develop other services complementary to the core business: the aim is to offer more value by integrating several activities into the company (Kandampully, 2006).

²³ It is important to highlight that exchanging knowledge between the network’s actors can have positive effects on the territory (Tzortzaki, Mihiotis, & Agiomirgianakis, 2011), also the business network can positively affect the learning process among actors (Lemmettyinen & Go, 2009).

²⁴ Ferrari and Adamo (2005, p. 86) made the observation that the highly seasonal nature of tourism demand reduces the interest to invest in the sector and weakens the supply of services in the low season, further aggravating the phenomenon itself; this is reflected in the extremely low user indices, both gross and net, for hospitality facilities, reduced rates of return on investment, difficulty in finding qualified personnel and many other problems.

the level of quality of the facilities, the service and the products offered; they definitely excluded standardized offers that lacked personality, whilst they gave preference to those who were able to combine simple hospitality with typical and quality products, because the latter were judged to be more suitable, offering the type of hospitality that is in keeping with the values that the territory intends to communicate.

Some difficulties were encountered in obtaining the collaboration of local accommodation facilities. There was a certain attitude of distrust vis-à-vis the project which had generated some erroneous opinions. The common fear was that the various hotels and such would have to contribute to the cost of communication (paper and digital brochures, web pages, dedicated newsletters) and to managing reservations and transfers. This was perceived as a service that was very similar to what is offered by any tour operator. The company put in considerable effort to overcome these obstacles so to make people understand the objectives of the LOV project and see it as something for the complete benefit of the territory, from which everyone taking part in the project stood to gain.

The results outlined above and the fact that the project is now in its fourth year are proof that it has been, and is, successful; they show just how important the capacity for integration among the players is for the enhancement of a territory.

Concluding Remarks

Making use of territorial marketing territoriale is becoming more and more common, in light of the growing competition among geographical areas to attract and retain the resources necessary for their development.

From a theoretical point of view, the concept has seen a significant evolution which has resulted in attention being focused not so much on the available resources *per se* in a given area, but on the interactions among the players in that area. This would lead to the question of what role can be played by them in the overall enhancement of the territory.

This study, specifically, looked at the issue from the perspective of local enterprises. For them, on the one hand, there is the prospect of relocation to territories that are capable of offering specific advantages; on the other hand, there is the option to continue to co-evolve right along with the territory of origin, by investing heavily and by actively helping to develop relational systems and share the territorial values.

The “Land of Value” (LOV) case study has brought to light a number of interesting aspects.

First of all, it must be emphasized that reciprocal promotion not only provides the opportunity to integrate the various dimensions of the territory (production, nature, culture, etc.), but this interaction also constitutes a significant resource in terms of relational capital growth for enterprises.

Another aspect to highlight is the organizational function that a local SME can carry out with an effort to promote its territory; the Loccioni Group is a specific example of this in that it has assumed an important position in a network made up of a variety of different territorial players and, in doing so, has facilitated a fairly significant degree of synergetic promotion.

In this sense, the project represents an interesting example of convergence between relational marketing and territorial marketing.

Not to be overlooked is the important experiential aspect which becomes a particularly effective competitive factor. In this case, the reason lies in the fact that the experiences had by the various subjects involved in the project, as visitors and consumers, are considered germane to a B2B context.

The case study thus serves to illustrate a correct approach to territorial enhancement which, in turn, has a positive impact on a specific business project; hence, there is growing interest on the part of public operators to support such initiatives.

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International Chinese Contractors in Small Geographic Markets: 2005/2009 Evolution

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The importance of understanding international business management has become imperative for companies and other organizations. This broad range of relationships is the paradigm of world living for contemporary societies, where the various legal persons, regardless of their size, have more and more information about the world as a whole, and even not being aware of this, they are affected by decisions and events that are, or seem to be, geographically distant from them. The public works are one of the components of the building industry. The analysis of enterprises internationalization, of this activity sector, implies to understand how and why companies are addressing more other markets than the domestic ones, to bid in public tenders, and when they get success, to work in these different regions or countries. Public works are an economic activity linked with sovereignty, because the main customer is the state. This paper studies Chinese international contractors' presence in geographic small markets, namely Caribbean Islands and Oceania. Considering the data from 2005 to 2008, gathered from McGraw Hill Construction Reports—Engineering News Record. We analyse the evolution of the presence of referred companies in the targeted market, consider the main internationalization models, and we try to identify the main variables explaining the international contractors' options. Then, we conclude that Chinese companies are increasing their international activity, and geographic proximity has no significant importance and it is not as relevant as to other foreign companies.

Keywords: international contractors, market segments, internationalization models

Introduction

We begin with the presentation of our paper and the goals we intend to achieve. Then, considering the revising literature work, we present the most known internationalization models and the main emergent motivational factors for internationalization. After these two chapters we develop our study, referring the largest international Chinese contractors and their presence in small geographic markets. Finally we present our conclusions and comments.

Nowadays the organizations are obliged to understand that international relations are a reality that no one can avoid, independently of their dimension or activity.

They must take a clear consciousness of this fact in order to avoid facing serious setbacks in short term. Their competitiveness and growth prospects, or even mere survival, must be considered taking into account a

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number of competitors and other influential forces of the environment, where economic agents are moving themselves in a complex network of inter-influences. The consequences of this process can go, and we certainly know they will, beyond what is perceived in the short term.

Punnett and Ricks (1997) also claimed that the global environment creates competitive challenges with diverse backgrounds that may arise from public or private sector and large and small organizations. The same authors reported that the main feature of international competition is precisely the variety of factors present in the game, which must be duly considered and analyzed.

Thus, we are in a globalized world, where the internationalization of organizations in general, and of all kind of business in particular, became a daily topic, although with different degrees of involvement. This new reality of international business requires that we understand the increasingly importance of the information as a very relevant resource today. Companies struggle with a dichotomy of great demand management. On one hand it is important to seek and gather information, but, on the other hand, it is equally important that organizations could not drown in the information and they must be able to create levels of relevance to bring them to focus on the most significant data in relation to each goal.

In this paper, we analyze the involvement of Chinese contractors in the Caribbean Islands and in Oceania, seeking to conclude about the variables supporting their options. We work with a data base from McGraw Hill Construction Reports—Engineering News Record, which considers the largest 225 international companies using the criteria of the turnover generated outside the home country.

Internationalisation Models

General Framing

The internationalization model option for each company must be consistent with the conditions it has for, eventually, developing its business in foreign markets. Regarding this, the diagnosis procedure is a very important stage preparing the decision about the internationalization process. This statement aims to highlight that companies must be fully aware about their financial conditions, technical resources, human resources, technological resources, and above all, available intellectual capital, with which they will address the new markets. Actually, international context must be properly studied, analyzed and understood, given the growing complexity acting abroad comparing the performance in the domestic market.

Already Aharoni (1966) stated that a decision related to investment across borders can not be seen isolated from future decisions, which means that looking back to a past decision and considering that it is not understandable for itself, placed in a sequence of options assumed by the company, we understand the logic that was behind its actual choice on a past time.

In the same line, Tayeb (2000) considers two major groups of internationalization models, namely, sequential models and simultaneous models.

The sequential models, as it can be inferred from the name, means the internationalization by stages, being identifiable the moments when companies have developed several measures to promote their involvement in international business, since the simplest way of exporting until they reach levels of internationalization more sophisticated, and they will be our concern in this study.

The Uppsala Model

One of the most used models to study the process of internationalization, particularly considering small

and medium enterprises, is the Uppsala model, which emerges from research projects developed in the mid-1960s at the University of Uppsala by a group of researchers led by professor Sune Carlson. According to Björkman and Forsgren (1997), the Nordic countries compared with most regions of the world, form an area of great homogeneity. These countries have a similar geographical size, their history has common links and language proximity is significant. All of them are open economies and the companies seek business opportunities abroad, because the limited sizes of the region where their work doesn't allow important growth. The importance and relevance of international trade also influenced the Nordic academics and researchers.

Also the studies of Johanson and Wiedersheim-Paul (1975) and studies of Johanson and Vahlne (1977) took, as their starting point, the model above, emphasizing that it is characterized, precisely, for considering that the process of internationalization is an incremental progression. This leads to successive stages of greater involvement in foreign markets through different operation modes with growing international level of needs in terms of resources. In addition, geographical distances between the country of origin and the company's target markets are becoming larger when international experience becomes greater. These studies began to focus on international expansion of companies in the Nordic countries, namely Swedish ones, and later they were confirmed by studies on other industries in other countries. One of the studied cases was the Finnish, by Luostarinen (1979) who confirmed the theory of internationalization by stages, with preference for geographical proximity in the early stages of the process.

However, Langhoff (1997) emphasizes that the concept of psychic distance has a cultural nature, and should be considered on the basis of individuals' decisions rather than as an independent variable that explains the internationalization process of companies. Indeed, the author claims that psychic distance is not an objective factor and cannot be considered as an independent variable that affects all enterprises in an equally way. Therefore, Langhoff (1997) questioned whether psychic distance should not be a concept which covers the cultural differences or the cultural similarities.

This last reference raised some criticism to the model, adding that Bridgewater et al. (2004) said that remains unclear how knowledge affects the increase of resource allocation in the process of internationalization.

Björkman and Forsgren (1997) state that constraints of the model were not properly specified, and this one is less valid when studying large multinationals. These companies have a significant international experience, trying to use the latest generation technology, international operations are not only motivated by the quest for new markets, and there is a great bet in services and industries with innovative technology.

Theory of Networks

Johanson and Vahlne (1990) and Forsgren and Johanson (1992) develop their work considering the establishment of networks as a process of companies internationalization. The prospect of networks leads us to have in mind the long-term relations between companies in the same sector of activity or economically interrelated, even in complementary sectors. The authors state that the development of operations in international markets is influenced by the increasing existence of relationships of proximity in these markets. From this perspective, the internationalization of the organization depends on a set of relationships in the network, being the developed standards and behaviours expressed, the corollary of relations established between the various actors, introducing an international multilateral element in the process, as Johanson and Vahlne's (1992) opinion.

Considering Nieminen and Törnross (1997), the industrial development of businesses in new markets

faces a multiplicity of factors belonging to environment and affecting business relationships. In this sense, it is important to understand the basic construction of networks as a way to approach the market, which, according to the same authors, concerns with understanding the heterogeneous mix of resources with different actors and various activities. Nieminen and Törnross (1997) argue that networks can be used as a way to look at the process of developing the business from a more holistic perspective. They emphasize that one can identify the existence of networks taking into account the different aspects of the business-to-business as well as the context in which it develops, whether geographic, economic, social, cultural or political. The same authors consider that dynamics of networks can not be understood without reference to the basic concept of learning. The authors define learning as a cognitive exchange between actors and based on the ability to perceive the world from a new perspective. Learning allows to a new behaviour development for dealing with situations and problems of the contemporary world.

Anderson and Narus (1990), argue that the success of a company depends, in part, on third ones, including one or more other companies. Based on a study of partnerships between producers and distributors contend that both are involved in fewer but ever larger networks of cooperation, in which the coordination of marketing and technological resources is increasingly challenging to achieve success near the markets.

Holm and Johanson (1997), refer that, in the social exchange theory, networks are defined as combinations of two or more partners linked by relations of mutual exchange, in which the change in a dual relationship is constrained by the change, or on the other hand, the absence of change. In this sense, the use of the exchange networks theory in the perception of the transactions, in the business world, means that the implementation of a business is sustained by the realization of another one.

Emergent Motivational Factors for Internationalization

Innovative technologies or intellectual capital are important factors, usually hard to get from other countries, mainly when they artificially hinder their mobility. However, their economic and financial exploration can be very interesting. We have here a good reason for an internationalization option. Organisations may have to choose those markets where they can benefit from referred factors. That is a reason why they should invest taking local partnership into account. Those alliances can have an economic, financial, cultural or technical basis.

We detach that Bartlett and Ghoshal (2000) also consider the research and development investments on new products or services as relevant factors for internationalisation option. Companies need to achieve high levels of turnover, because this is the only way to make those investments profitable. That is why enterprises created from a national perspective have evolved for an international or even global structure. It was a survival condition. After one or more experiences in foreign markets new impulses may naturally appear, giving breath to internationalisation process. For example, when searching for new knowledge's sources, organizations can find new chances for introducing productivity gains, or for getting innovative services or products.

Additionally, we must refer that geopolitical issues and institutional relations are important supports for internationalization movements. The existence of strong multi-domestic, global or transnational companies coming from the same country is an important and powerful way to extended political influence beyond boards. This intention risks to bring up negative reactions and eventual feelings or fears of sovereignty's loss, but we know that developed and economic stronger countries find up with this strategy an open way for foreign affirmation.

Negotiations for foreign direct investment accomplishment that creates jobs in poor regions and contributes for their economic and social development may have as counterpart the support to strategic international trade decisions, or to have privileged access to relevant raw materials' supplying, or to get geopolitical strategic decisions or even for building lobbies against regions, cultures or countries.

Motivations also base on domestic market success, as Tayeb (2000) suggests, considering that referred success leads to more self-confidence for new markets approaching. Top management finds these challenges as natural and considers them as the natural way of firm growth.

Empiric Study

General Framing

According with McGraw Hill Construction Reports, namely in its publication named Engineering News Record, the international market for public works was going on blooming in the years of 2005-2007, being a strong business in developed countries and a growing business in developing countries. In these ones, inner investment, namely public investment, as well as foreign investment and international organisations support, mainly from financial sector, has been strongly led to major infrastructures construction, considered indispensable for economic development, as roads, basic sanitation structures and energy production. In 2006 public works projects, allocated to major international contractors, raised to 224.43 billion dollars, representing an increase of 18.5% comparing 2005, when the homologous value was 189.41 billion dollars.

However, in 2008, the revenue generated by international contractors from projects outside their home countries was already 390.01 billion dollars, more 25.7% than the 310.25 billion dollars in 2007. From 2005 to 2008 the turnovers from these abroad projects are more than doubled.

With the crisis, we had some adjustments in terms of products segments, and the international contractors recognized recession in petroleum facilities, but we considered that the companies were buoyed by infrastructure orders. We can notice that the general turnover is still growing, and this is good news.

International Chinese Contractors

We begin with data from Table 1 and Table 2, where we can observe the distribution for home countries of larger international contractors and global contractors, particularizing only the most relevant. The international contractors ranking is built considering the turnover generated abroad for each company, and the global contractors ranking is built considering the total turnover of each company.

The first highlight we want to do is about the strong presence of Chinese companies in the international market of public works. In the biennium of 2005/2006, reflected in the 2007's ranking, China was the second home country with more international contractors among the largest ones (49 in 225, representing 21.8% of total). In the biennium 2007/2008, reflected in 2009's ranking, China had 50 international contractors among the largest ones and was the home country with the largest contribution to the international ranking.

We can also add, given the relevance of the data, that the largest growth in terms of contribution to this ranking was from Italy, passing from 11 to 26 international contractors, and from Turkey, passing from 22 to 31. In the opposite direction we have the case of USA, which passed from 51 international contractors to 26, always considering the largest 225 ranking.

Table 1

International Contractors 2005/2006

Countries 2005/2006	International contractors	Global contractors
USA	51	103
China	49	25
Turkey	22	8
Japan	15	15
Italy	11	10
South Korea	10	10
Spain	8	8
France	8	6
Others	51	40
Total	225	225

Note. Source: McGraw-Hill Construction (author's conception).

Table 2

International Contractors 2006/2007

Countries 2007/2008	International contractors	Global contractors
China	50	32
Turkey	31	9
Italy	26	14
USA	25	86
Japan	15	15
South Korea	13	14
Spain	11	11
France	6	4
Others	48	40
Total	225	225

Note. Source: McGraw-Hill Construction (author's conception).

Focusing on the case of China we get relevance comparing its international contractors' number with the one of global contractors. In both biennia the Chinese international contractors are enough more than the global ones. Perhaps we can infer from here that internationalization is a very relevant concern for the companies of this country and at the same time, being China a central planning economy, inward competition is not promoted.

Chinese International Contractors in Small Markets

According with the database we are using we consider as small geographic markets Oceania and Caribbean Islands. In the former we have data of Australia, Pacific Islands, New Zealand and Papua New Guinea, and in the latter we have data of Greater Antilles, Puerto Rico, Cuba and Lesser Antilles.

The international contractors' presence in these markets is as follows in Tables 3-6. We have data to the biennia 2005/2006 and 2007/2008.

Regarding Oceania we find Chinese contractors in all the market segments here considered, but this presence is stronger in the most recent biennium. We can also notice that the stronger position, considering the weight on total of the largest contractors in each market segment, is higher in developing countries than in developed countries.

Table 3

Largest International Contractors Presence in Oceania Markets in 2005/2006

Oceania								
Markets Countries	Australia		Pacific Islands		New Zealand		Papua New Guinea	
	No. of companies	Percent (%)	No. of companies	Percent (%)	No. of companies	Percent (%)	No. of companies	Percent (%)
Germany	3	9.09	0	0.00	0	0.00	0	0.00
Australia	0	0.00	2	13.33	2	22.22	1	12.50
Austria	1	3.03	0	0.00	0	0.00	0	0.00
Belgium	1	3.03	0	0.00	0	0.00	0	0.00
China	3	9.09	2	13.33	1	11.11	3	37.50
Spain	1	3.03	0	0.00	0	0.00	0	0.00
France	4	12.12	3	20.00	3	33.33	1	12.50
Holland	1	3.03	0	0.00	0	0.00	0	0.00
Italy	1	3.03	1	6.67	0	0.00	0	0.00
Japan	1	3.03	2	13.33	0	0.00	0	0.00
U.K.	3	9.09	0	0.00	1	11.11	1	12.50
USA	14	42.42	5	33.33	2	22.22	2	25.00
Total	33	100.00	15	100.00	9	100.00	8	100.00

Note. Source: McGraw-Hill Construction (author's conception).

Table 4

Largest International Contractors Presence in Oceania Markets in 2007/2008

Oceania								
Markets Countries	Australia		Pacific Islands		New Zealand		Papua New Guinea	
	No. of companies	Percent (%)	No. of companies	Percent (%)	No. of companies	Percent (%)	No. of companies	Percent (%)
Germany	4	11.43	0	0.00	1	7.14	0	0.00
Australia	1	2.86	1	7.14	3	21.43	0	0.00
Luxembo.	1	2.86	0	0.00	0	0.00	0	0.00
Holland	1	2.86	0	0.00	0	0.00	0	0.00
China	4	11.43	3	21.43	2	14.29	7	58.33
S. Korea	2	5.71	0	0.00	0	0.00	0	0.00
Spain	3	8.57	0	0.00	0	0.00	0	0.00
France	3	8.57	1	7.14	3	21.43	1	8.33
Italy	3	8.57	0	0.00	1	7.14	0	0.00
Japan	0	0.00	3	21.43	0	0.00	0	0.00
U.K.	3	8.57	0	0.00	1	7.14	1	8.33
USA	10	28.57	6	42.86	3	21.43	3	25.00
Total	35	100.00	14	100.00	14	100.00	12	100.00

Note. Source: McGraw-Hill Construction (author's conception).

Now, if we read Table 5 and Table 6 about the presence of largest international contractors in Caribbean Islands, we can also say that between 2005/2006 and 2007/2008 the number of Chinese contractors in this market has grown. Once again, the weight of Chinese companies is higher in developing territories.

Table 5

Largest International Contractors Presence in Caribbean Markets in 2005/2006

Markets Countries	Caribbean Islands							
	Greater Antilles		Puerto Rico		Cuba		Lesser Antilles	
	No. of companies	Percent (%)	No. of companies	Percent (%)	No. of companies	Percent (%)	No. of companies	Percent (%)
Germany	0	0.00	0	0.00	0	0.00	2	7.14
Belgium	1	5.26	0	0.00	0	0.00	0	0.00
Brazil	1	5.26	0	0.00	0	0.00	0	0.00
China	3	15.79	0	0.00	0	0.00	2	7.14
S. Korea	0	0.00	0	0.00	0	0.00	1	3.57
Denmark	1	5.26	0	0.00	0	0.00	1	3.57
Ecuador	0	0.00	0	0.00	0	0.00	1	3.57
Spain	3	15.79	1	5.26	0	0.00	0	0.00
France	2	10.53	1	5.26	2	40.00	4	14.29
Greece	0	0.00	0	0.00	0	0.00	1	3.57
India	1	5.26	0	0.00	0	0.00	0	0.00
Israel	0	0.00	1	5.26	0	0.00	0	0.00
Italy	2	10.53	0	0.00	0	0.00	0	0.00
U.K.	0	0.00	1	5.26	0	0.00	1	3.57
Sweden	1	5.26	0	0.00	1	20.00	0	0.00
USA	4	21.05	15	78.95	2	40.00	15	53.57
Total	19	100.00	19	100.00	5	100.00	28	100.00

Note. Source: McGraw-Hill Construction (author's conception)

Table 6

Largest International Contractors Presence in Caribbean Markets in 2007/2008

Markets Countries	Caribbean Islands							
	Greater Antilles		Puerto Rico		Cuba		Lesser Antilles	
	No. of companies	Percent (%)	No. of companies	Percent (%)	No. of companies	Percent (%)	No. of companies	Percent (%)
Germany	1	4.17	1	10.00	0	0.00	1	3.85
Australia	1	4.17	0	0.00	0	0.00	0	0.00
Belgium	1	4.17	0	0.00	0	0.00	1	3.85
Brazil	2	8.33	0	0.00	0	0.00	0	0.00
Canada	0	0.00	0	0.00	0	0.00	1	3.85
China	3	12.50	1	10.00	1	20.00	7	26.92
S. Korea	0	0.00	0	0.00	0	0.00	1	3.85
Denmark	1	4.17	0	0.00	0	0.00	2	7.69
Spain	2	8.33	1	10.00	0	0.00	0	0.00
France	3	12.50	0	0.00	1	20.00	2	7.69
Italy	3	12.50	0	0.00	0	0.00	0	0.00
Japan	1	4.17	0	0.00	0	0.00	1	3.85
U.K.	0	0.00	1	10.00	0	0.00	1	3.85
USA	6	25.00	6	60.00	3	60.00	9	34.62
Total	24	100.00	10	100.00	5	100.00	26	100.00

Note. Source: McGraw-Hill Construction (author's conception).

Another important issue is the distribution of these contractors for product markets. The answer is in Table 7. We just consider the relevant markets for the below list of companies. That is why we don't include the following products segments: hazardous waste, sewerage/solid waste and manufacturing.

Table 7

Product Markets 2007/2008

Chinese contractors/Ranking position	General building (%)	Power (%)	Water supply (%)	Industrial process/petroleum (%)	Transportation (%)	Telecom-munications (%)
Oceania						
China Communicat. Construction Group Ltd. 17	1	0	2	1	95	0
China National Machinery Indus. Corp. 28	3	68	5	6	16	2
Sinohydro Corp. 56	32	42	7	0	14	0
China Metallurgical Group Corp. 61	14	5	0	42	0	0
China Railway Group Ltd. 62	31	0	0	0	47	0
China Civil Engineering Constr. Corp. 72	32	0	1	0	66	0
China Overseas Engineering Group Co. Ltd. 141	27	0	10	4	53	0
Qingjian Group Co. Ltd. 143	96	0	1	0	3	0
China Jiangsu Int'l Econ-Tech. Coop. Corp. 147	92	0	4	0	1	0
Weihai Inter. Eco. & Tech. Coop. Co. Ltd. 199	19	0	12	0	66	2
Zhejiang Constr. Investment Group Co. Ltd. 225	100	0	0	0	0	0
Caribbean Islands						
China Communicat. Construction Group Ltd. 17	1	0	2	1	95	0
China National Machinery Indus. Corp. 28	3	68	5	6	16	2
China Railway Construction Corp. Ltd. 51	2	2	0	0	96	0
China Metallurgical Group Corp. 61	14	5	0	42	0	0
China Civil Engineering Constr. Corp. 72	32	0	1	0	66	0
Shanghai Constr. (Group) General Co. 103	66	12	0	7	15	0
Beijing Construction Eng'g. Group Co. Ltd. 140	98	0	2	0	0	0
Anhui Fore. Econ. Constr. (Group) Co. Ltd. 212	93	0	0	0	7	0
China Nat'l Compl. Plant Imp. & Exp. Corp. 224	59	0	41	0	0	0

Note. Source: McGraw-Hill Construction (author's conception).

We notice that the most part of Chinese international contractors operating in these two regions of the world, which are the smaller geographic markets we consider, are specialized in general building or in transportation infrastructures. However we can point three major exceptions:

(1) China Metallurgical Group Corp. has 42% of its turnover generated with industrial process/petroleum infrastructures and is working in Australia, Papua New Guinea and Lesser Antilles;

(2) China National Machinery Indus. Corp. has 68% of its turnover generated with power infrastructures and is working in Papua New Guinea, Greater Antilles, Cuba and Lesser Antilles;

(3) Sinohydro Corp. has 42% of its turnover generated with power infrastructures and is working in Pacific Islands.

Conclusions

The international markets are becoming more and more important to Chinese contractors, and this means to China as a whole. The number of Chinese companies in the international ranking is considerably higher than the one in the global ranking. We can admit that the central planning economy avoids too much inner competition and promotes strong presence in foreigner markets. This is really important and suggests a national strategy, which overlaps corporate strategy, because companies are almost all state-owned. We also conclude that China is already the country with more companies in the international ranking, well ahead of the second one, that in the last biennium was Turkey.

International contractors from China are operating in both markets here considered, but their presence is stronger in Oceania than in Caribbean Islands. We think that this difference, which is not very significant, can be explained by geographic distances, as considered by the Uppsala Model. However, in both cases, we can not speak about cultural proximity, which seems to be not a problem for the Chinese companies' internationalization process. So, the Uppsala Model doesn't match very well with these companies' strategy.

The main Chinese international contractors are working in both regions. Usually the largest companies appear in all markets, maybe to show a strong presence and to mark a position that can defend the smallest Chinese companies also working in international markets.

These companies are mainly specialized in two kinds of infrastructures: general building and transportation. We know that search for raw materials is important to China but the markets here studied don't offer an important source in this field. That is why we don't have the petroleum segment with a strong presence. On the other hand, general building and transports are always relevant in developing countries, which are beginning the process of infrastructures creation.

Chinese contractors are stronger in developing markets than in developed, which is confirmed by other studies we have already done about other geographic regions.

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Arbitrage and Pricing in Financial Markets with Interval Data*

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Financial data are often affected by uncertainty: imprecision, incompleteness etc.. Uncertain data may be represented by intervals. Intervals may be useful for representing uncertainty in financial data or, by converse it may be useful to construct intervals from scalar financial data, for analyzing the uncertainty in the solution of real financial problems. Considering this different form of input data, a review of some financial models and definitions has been necessary. The notion of arbitrage is crucial in the modern theory of finance. It is the cornerstone of the option pricing theory. Roughly speaking a market is arbitrage-free if there is no way of making risk less profits. How to extend this definition when the returns are intervals? In the present work the definition of a system of returns which does not allow arbitrage opportunities is given for the case of interval returns. It is proved that, given a two-period economy $T = (t_0, t_1)$ and n securities, the system of returns at time t_0 which does not allow interval arbitrage opportunities, is an interval vector. Furthermore using the IntervalCAPM (Interval Capital Asset Pricing Model) methodology, in the present work the region of the plane, risk vs. expected return, where surely there are arbitrage opportunities is described. Some numerical results are presented: the interval beta and the interval alpha of the asset ABBOT (Abbot Laboratories), which belongs to the SP500 (Standard and Poor's 500 Composite) index, is estimated using the IntervalCAPM approach. The used algorithm has been implemented in MATLAB. The solutions obtained are always well interpretable.

Keywords: interval algebra, interval-valued variables, interval financial returns, interval arbitrage

Introduction

Financial data are often affected by uncertainty: imprecision, incompleteness etc.. Therefore, in a decision-making problem, we should be able to process uncertain information. The uncertainty in the data may be treated by considering, rather than a single value, the interval of values in which the data may fall. For example, many times we do not know the exact value of the return of an asset in the i th state of the world but we bet, at best, on the interval of its possible values. Intervals may be useful for representing uncertainty in financial data or, by converse it may be useful to construct intervals from scalar financial data, for analyzing the uncertainty in the solution of real financial problems. In section 3, as an advancement with

* The author is very grateful to professor V. Aversa for his precious help and intelligent suggestions during the development of this research work.

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respect to (Gioia, 2009): (1) The definition of a system of returns which does not allow arbitrage opportunities is given for the case of interval returns; and (2) It is proved that, given a two-period economy $T = (t_0, t_1)$ and n securities, the system of returns at time t_0 which does not allow interval arbitrage opportunities, is an interval vector. The CAPM is a pricing methodology, and as such it is supposed to provide a pricing functional for several assets that at least in the limit satisfy the no-arbitrage condition. In section 4, as an improvement of the IntervalCAPM methodology already known in the literature (Gioia, 2009) the region of the plane, risk vs. expected return, where surely there are arbitrage opportunities is described. In section 5 a real case is presented: the interval beta and the interval alpha of the asset ABBOT (Abbot Laboratories), which belongs to the SP500 (Standard and Poor's 500 Composite) index, is estimated using the IntervalCAPM approach. The downloaded data refer to single-valued variables; to manage uncertainty we have transformed these variables into interval-valued ones by applying a perturbation using a uniform distribution $U(0, 0.01)$.

Definitions Notations and Basic Facts

Let I be the set of closed and bounded intervals. If \bullet is one of the symbols $+$, $-$, $/$, \cdot , we define an arithmetic on I by:

$$[a, b] \bullet [c, d] = \{x \bullet y \mid a \leq x \leq b, c \leq y \leq d\} \tag{1}$$

Except that we do not define $[a, b]/[c, d]$ if 0 is in $[c, d]$.

Definition 1. An interval-valued variable X_j^I is a variable which assumes an interval of values on each of k considered individuals: $X_j^I = (X_{ij} = [\underline{x}_{ij}, \bar{x}_{ij}])$, $i = 1, \dots, k$.

Proposition 1. If $f(x_1, \dots, x_n)$ is a real rational function in which each variable x_i occurs only once and only at the first power, then the corresponding interval expression $f(X_1, X_2, \dots, X_n)$ will compute the actual range of values of f :

$$f(X_1, X_2, \dots, X_n) = \{y \mid y = f(x_1, x_2, \dots, x_n), x_i \in X_i = [\underline{x}_i, \bar{x}_i], i = 1, \dots, n\}$$

The proof of this proposition may be found in Moore (1966).

Definition 2. A $k \times n$ interval matrix A^I is the following set of matrices:

$$A^I = \{A \mid \underline{A} \leq A \leq \bar{A}\}$$

where \underline{A} and \bar{A} are $k \times n$ scalar matrices which verify $\underline{A} \leq \bar{A}$. The inequalities are understood to be componentwise.

These results and other properties of the interval algebra may be found in Moore (1966), Alefeld and Herzberger (1983), and Alefeld and Mayer (2000).

Interval Arbitrage

Suppose we have a two period economy $T = (t_0, t_1)$ and n securities denoted as $S_j (j = 1, \dots, n)$. Let us indicate with $R^0 = (R_1^0, R_2^0, \dots, R_n^0)$ the vector of the returns of the n securities at time t_0 and with x_j the portion of total investment funds devoted to this security. Thus $\sum_{j=1}^n x_j = 1$, where $x = (x_1, x_2, \dots, x_n)^t$ is the portfolio of the considered consumer and X is the set of possible portfolios. At time t_1 the returns of the n securities are assumed to be $k \times 1$ random variables denoted by: $R_j (j = 1, \dots, n)$ (k different states of the world are contemplated), represented as columns of the following $k \times n$ matrix:

$$R = \begin{pmatrix} R_{11} & R_{12} & \cdots & R_{1n} \\ R_{21} & R_{22} & \cdots & R_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ R_{k1} & R_{k2} & \cdots & R_{kn} \end{pmatrix}$$

The vector $p = (p_1, p_2, \dots, p_k)$ is a discrete probability distribution on the outcomes of the random variable R_j ($j = 1, \dots, k$). A market is *arbitrage-free* if there is no way of making riskless profits (Schachermayer, 2008), more formally:

Definition 3. A system of returns R^0 at time t_0 does not allow arbitrage opportunities if and only if for all portfolios x :

$$R^0 x \leq 0, \quad R x \leq 0 \tag{2}$$

For example an arbitrage opportunity would be a trading strategy which started at time t_0 with zero value, and terminated at time t_1 with a positive value. Financial data are often affected by uncertainty: imprecision, incompleteness etc. Therefore in setting the arbitrage-free returns of a set of securities, we should be able to process uncertainty. For example, let us suppose now that the returns of the security S_j ($j = 1, \dots, n$) at time t_1 are represented by intervals of values when each state occurs. Thus R_j ($j = 1, \dots, n$) are assumed to be interval-valued variables denoted by: R_j^I ($j = 1, \dots, n$) and represented as columns of the following interval matrix:

$$R^I = \begin{bmatrix} [\underline{R}_{11}, \bar{R}_{11}] & \cdots & [\underline{R}_{1j}, \bar{R}_{1j}] & \cdots & [\underline{R}_{1n}, \bar{R}_{1n}] \\ \vdots & & \vdots & & \vdots \\ [\underline{R}_{i1}, \bar{R}_{i1}] & \cdots & [\underline{R}_{ij}, \bar{R}_{ij}] & \cdots & [\underline{R}_{in}, \bar{R}_{in}] \\ \vdots & & \vdots & & \vdots \\ [\underline{R}_{k1}, \bar{R}_{k1}] & \cdots & [\underline{R}_{kj}, \bar{R}_{kj}] & \cdots & [\underline{R}_{kp}, \bar{R}_{kp}] \end{bmatrix}$$

where $[\underline{R}_{ij}, \bar{R}_{ij}]$ is the interval in which the return rate of security S_j “falls” when the i^{th} state occurs.

Definition 4. A system of returns R^0 at time t_0 does not allow interval arbitrage opportunities if and only if for all portfolios x in X :

$$R^0 x \leq 0, \quad R^I x \leq 0 \tag{3}$$

where the operations are interval algebra operations, “ \leq ” is an order relationship (Gioia, 2011) on the set of closed and bounded intervals I and the inequalities are understood to be component wise.

Proposition 2. The system of returns R^0 , which does not allow interval arbitrage opportunities, is an interval vector.

Proof. Let us suppose that the system of returns R^0 does not allow arbitrage opportunities, thus equation (3) holds true; in it, *the interval system of inequalities* $R^I x \leq 0$ (explicitly):

$$\begin{aligned} & [\underline{R}_{11}, \bar{R}_{11}] x_1 + [\underline{R}_{12}, \bar{R}_{12}] x_2 + \cdots + [\underline{R}_{1n}, \bar{R}_{1n}] x_n \leq 0 \\ & [\underline{R}_{21}, \bar{R}_{21}] x_1 + [\underline{R}_{22}, \bar{R}_{22}] x_2 + \cdots + [\underline{R}_{2n}, \bar{R}_{2n}] x_n \leq 0 \\ & \vdots \qquad \qquad \qquad \vdots \qquad \qquad \qquad \ddots \qquad \qquad \qquad \vdots \\ & [\underline{R}_{k1}, \bar{R}_{k1}] x_1 + [\underline{R}_{k2}, \bar{R}_{k2}] x_2 + \cdots + [\underline{R}_{kn}, \bar{R}_{kn}] x_n \leq 0 \end{aligned} \tag{4}$$

where $E(\mathbf{R}_j) = \sum_{i=1}^k p_i R_{ij}$, $E(\mathbf{A}) = \sum_{i=1}^k E(\mathbf{R}_j) A_j$, are the expected return of the j^{th} security and of the market portfolio respectively; r_f is the risk-free rate and the factor of proportionality β_j has the following expression: $\beta_j = \sigma(\mathbf{A}, j) / \sigma^2(\mathbf{A})$ having indicated with $\sigma(\mathbf{A}, j)$ the covariance between the return of the market portfolio and the return of the j^{th} asset, and with $\sigma^2(\mathbf{A})$ the variance of the market portfolio. Let \mathbf{Z}_{jt} and \mathbf{Z}_{mt} (Campbell, Lo, & MacKinlay, 1997) be the vectors of the excess returns of the asset S_j and the market portfolio respectively in different periods of time, those excess returns can be described using the excess-return single-index marked model:

$$\mathbf{Z}_{jt} = \alpha + \beta \mathbf{Z}_{mt} + \mathbf{e}_{jt} \tag{9}$$

where \mathbf{e}_{jt} is the vector of disturbances and the hypotheses concerning time-independence are supposed to hold true. It is known from classical theory that estimators for β and α are the OLS (Ordinary Least Square) estimators. The IntervalCAPM introduced in (Gioia, 2009) applies when the returns are described by interval-valued variables and all the necessary assumptions for equations (8) and (9) are required to hold true. It uses the interval algebra operations directly in equation (8) to compute: (1) the interval expected return of asset S_j , when the interval expected return of the market portfolio and the interval beta are known; (2) the interval beta, when the interval expected return of asset S_j and of the market portfolio are known. Furthermore, when interval time-series of the returns in equation (9) are available, the IntervalCAPM algorithm computes the interval slope of the Security Market Line by means of an interval regression technique (Gioia, 2005) based on an optimization method; in particular IntervalCAPM computes: the interval $\hat{\beta}'_j$ and the interval $\hat{\alpha}'_j$ which are the sets of all β and α of relation (9) respectively, when each return R_{ij} , $i = 1, \dots, k$ ranges in its own interval of values; the interval expected return of asset S_j is then computed using equation (8) and combining the obtained intervals with the interval algebra operations. It is important to notice that IntervalCAPM makes extensively use of the interval algebra tools combined with some optimization techniques to consider the interval as a whole structure and to compute the interval of solutions, which is the interval containing all possible values assumed by a considered function when the observed values vary in their own interval of values. The CAPM states that the equilibrium price of a risky asset given its beta, is the point on the Security Market Line corresponding to that beta; each point not belonging to the Security Market Line creates arbitrage opportunities. In the case of interval returns, the beta is an interval thus we may consider, rather than the equilibrium price of the risky asset, its interval equilibrium price. Let us give a graphical interpretation: when the returns vary in their intervals of variation, the value of the market portfolio, depending on that returns, also varies and in particular its expected excess return ranges in the interval $E^I(\mathbf{A}) = [\underline{E}(\mathbf{A}) - r_f, \overline{E}(\mathbf{A}) - r_f]$; the equation (8) becomes:

$$E(\mathbf{R}_j) = [\underline{E}(\mathbf{A}) - r_f, \overline{E}(\mathbf{A}) - r_f] \beta_j + r_f \tag{10}$$

By means of the interval algebra operations, equation (10) describes in the plane $(\beta, E(\mathbf{R}))$ a sheaf of straight lines of intercept r_f and slope in $E^I(\mathbf{A}) - r_f$ as described in Figure 1. Let us consider the risky asset S_j , its interval beta $\hat{\beta}'_j = [\underline{\beta}_j, \overline{\beta}_j]$ is represented on the horizontal axis; a β_j in $\hat{\beta}'_j$ identifies a segment which

contains the set of equilibrium returns of S_j , with respect to β_j , for each value of the slope $E(A)$ in its interval of values $E^I(A)$. When β describes the whole interval $\hat{\beta}_j^I$, region **B** in Figure 1 is represented:

$$\mathbf{B} = \{(\beta, E(\mathbf{R}_j)) : \beta_j \in \hat{\beta}_j^I, E(A) \in E^I(A), E(\mathbf{R}_j) = (E(A) - r_f)\beta_j + r_f\}$$

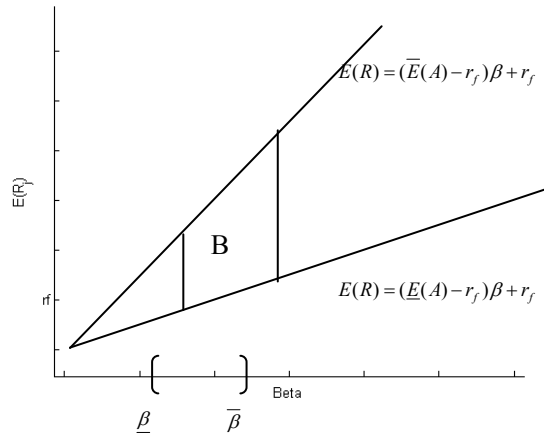


Figure 1. Region **B**.

Furthermore, when the returns of asset S_j are not known precisely, even the corresponding β_j and $E(\mathbf{R}_j)$ are unknown punctually, A describes the set of possible combination of β_j and $E(\mathbf{R}_j)$ for each value of the returns each of which in its range of variations. The interval expected return of the asset S_j at time t_0 is computed as:

$$[E(\mathbf{R}_j), \bar{E}(\mathbf{R}_j)] = [E(A)\underline{\beta}_j + r_f, \bar{E}(A)\bar{\beta}_j + r_f]. \tag{11}$$

which contains the set of all equilibrium returns of S_j as each R_{ij} at time t_1 varies in its interval of variation. It is known that the CAPM is a pricing methodology, and as such it is supposed to provide a pricing functional for S_j , which is in practice never exactly correct because for example, as in this special case, the returns of the asset at time t_1 are known approximately, i.e., are intervals; a point not on the Security Market Line is considered an “arbitrage point” but maybe it is not. In the interval case, the uncertainty in the returns is taken into account considering the interval returns, and a set containing all possible equilibrium returns (region **B**) is computed: each point not region **B** surely allows arbitrage opportunity. The IntervalCAPM should be regarded as a method which may give some additional information to that provided by the classical method, in fact the classical CAPM computes the equilibrium return of S_j , the IntervalCAPM computes the “uncertainty” around this value. Let us point out that one of the advantages in using the described methodology for interval data is to estimate how a perturbation on the input data (returns) reflects on the final solution. In fact each interval solution must be regarded as a set of solutions of infinitely different problems generated by the values of the quantity involved (returns) each of which in its own interval of variation. For example the interval expectations involved in equations (10) and (11) are the sets containing the set of all expectations of the excess return of the market portfolio and of the returns of security S_j respectively, for each value of the return R_{ij} in $[\underline{R}_{ij}, \bar{R}_{ij}]$. In conclusion, interval methods aim at enforcing the power of decision of classical methods analyzing the interval of solutions when each quantity varies in its own interval of values.

Real Case

In the following example the interval risk and the interval expected return of the asset ABBOT, which belongs to the SP500 (Standard and Poor's 500 Composite) index, are estimated using the IntervalCAPM approach. The forecast of some interval returns of asset ABBOT, referring to different periods of time, is also computed (see Table 1). The downloaded data refer to single-valued variables; to manage uncertainty we have transformed these variables into interval-valued ones by applying a perturbation using a uniform distribution $U(0, 0.01)$. The interval β^I (4th column in Table 1) is well interpretable considering that it does not contain the zero; an investor knows that, even if the returns fluctuate around their fixed values, the β is always positive and it ranges from 0.060 to 1.007. Furthermore, remarking that for a single-valued security the CAPM states that the intercept α in equation (9) is zero, the interval α^I is interpretable as the set of all "errors" that we may do using the CAPM for predicting the expected return of the considered risky security. It is remarkable that $\alpha^I = [-0,044, 0,0005]$ is an interval around the zero which does not contain elements with absolute value significantly different from zero, thus IntervalCAPM may be a good way to make forecast. Finally constructing on a Cartesian plane the region \mathbf{B} described in Section 4, with respect to the computed β^I and $E(\mathbf{R})^I$ (5th column in Table 1), an investor knows which are the points in the plain that surely allow arbitrage opportunities.

Table 1

Interval CAPM on Asset ABBOTT

Asset: ABBOTT	Forecast	α^I	β^I	$E(\mathbf{R})^I$
[0.005, 0.014]	[-0.043, 0.021]	[-0.044, 0.005]	[0.060, 1.007]	[-0.023, 0.027]
[-0.023, -0.017]	[-0.081, 0.003]			
[0.000, 0.009]	[-0.106, 0.002]			
[-0.043, -0.039]	[-0.068, 0.004]			
[-0.053, -0.041]	[-0.157, 0.000]			
[-0.058, -0.046]	[-0.064, 0.004]			

Conclusions and Future Perspectives

In this paper a special kind of data is considered: the interval data. Intervals may be useful for representing the uncertainty in the data or by converse, it may be useful to construct intervals, from scalar financial data, for aggregating huge number of data; furthermore intervals may be used to analyze how a perturbation on the input data reflect on the final solution. Considering this different form of input data a review of some financial models and definitions has been necessary. In this paper: (1) the definition of a system of returns which does not allow arbitrage opportunities is given for the case of interval returns; (2) it is proved that, given a two-period economy $T = (t_0, t_1)$ and n securities, the system of returns at time t_0 which does not allow interval arbitrage opportunities, is an interval vector. The CAPM is a pricing methodology, and as such it is supposed to provide a pricing functional for several assets that at least in the limit satisfy the no-arbitrage condition. One of the drawbacks of the CAPM is that it provides a pricing functional for an asset S_j which is in practice never exactly correct because for example, the returns of S_j at time t_1 are known approximately; a point not on the Security Market Line may be considered an "arbitrage point" but maybe it is not. In the case of uncertain returns, the interval CAPM (IntervalCAPM) has been treated in (Gioia, 2009). In this paper as an improvement with respect to (Gioia, 2009), the region of the plane, risk vs. expected return, where surely there are arbitrage opportunities is described; a region containing all possible equilibrium returns is computed: each point not in

that region “surely” allows arbitrage opportunity. Some numerical results are presented: the interval beta and the interval alpha of the asset ABBOT (Abbot Laboratories), which belongs to the SP500 (Standard and Poor’s 500 Composite) index, is estimated using the IntervalCAPM approach. The forecast of some interval returns of the considered assets, referring to different periods of time, is also computed. The used algorithm has been implemented in MATLAB. The solutions obtained are always well interpretable. As a future prospective of research it could be interesting to give a demonstration of the Fundamental Theorem of Asset Pricing in the special case of interval data.

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Investor Relations as a Determinant of the Company's Accounting Policy

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Relations between companies and their investors are the issues of major importance in establishing and operating modern financial markets. Not only do they influence the communication process between these organizations and the investors, but they also constitute the basic tool for building trust amongst the participants in the market. Appropriate relations with investors contribute to increasing the company's chances of success on financial markets. Investor relations derive from financial reporting based on the data obtained from the company's accounting system. The content of the financial reports is directly influenced by the company's accounting policies. Therefore a question can be asked whether investor relations may improve by carefully exploiting accounting policy instruments. This paper attempts to answer the above question and concludes that improvement in investor relations requires shaping the accounting policy according to certain rules. First of all the accounting policy should aim at a better quality of reporting data, to ensure speedy and accurate information for the investors. The methods used for the assessment of the financial information disclosed ultimately lead to the approximation of those values to their market values. This paper based on literature regards the subject in question, the binding legal acts and research reports either published in the literature.

Keywords: investors, communications, financial statements, accounting policies, asymmetry of information

The Aim of the Paper

A very important method of building relationships between companies and investors is to transmit information through various media, both company owned as well as the mass media. Such a method uses first of all financial reports provided by the company accounting system. The content of these reports is influenced by the company financial reporting policy. Therefore a connection exists between financial reporting policies adopted by companies and the shape and effectiveness of their investor relations. The question is whether it is possible to shape an accounting policy in such a way, that the investor policy will improve. The aim of this paper is to answer the above question. In order to do so the paper describes the essence of investor relations and the circumstances needed to improve these relations, the concepts and aims of the accounting systems, along with particular instruments of the accounting policy and its role in building adequate investor relations.

The Essence of Investor Relations

Literature concerning investor relations most often stresses the functions and results of company's

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communication with investors and opinion makers. For example, the National Association of Securities Dealers Automated Quotations (2000) defines investor relations as a process of constant dissemination of vital and valuable information into the investor's environment in order to secure a proper evaluation of the company on the market. Of a similar opinion is the National Investor Relations Institute (2010)—one of the biggest United States organizations in the field of investor relations—which describes investor relations as part of strategic management that combines finance, communication, marketing and observance of the trading and securities law, thus enabling effective communication between the company, the investors and other interested parties, promoting, as a result a fair valuation of the securities by the market.

Apparently, there is a belief that an action taken on the investor relations serves not only investors who are consequently better informed about the economic results and performance of companies, but also companies whose shares are priced higher and for whom the cost of capital decreases. Therefore building proper investor relations should be seen as an action falling within general management of a company directed to creating value for shareholders.

The targeted recipients of investor relations are institutional and individual investors, stock market analysts and financial press. Each of these groups, due to its specific character, requires a different approach and adaptation of the information provided to it according to their needs. Thus actions taken in that regard boil down, in most cases, to maintain constant communication with the most involved stakeholders, by organizing "road shows", establishing special "www" sites on the corporation's portals with information about the current share prices and the shareholder structure, share graph, pricing history, financial results, forecasts and other information important to current and potential investors. Vital are also activities aimed at the financial analysts who are a very important element of the company's environment because they evaluate the companies, and consequently affect the value of their assets. Also essential are activities aimed at influencing the opinion of journalists who formulate an opinion about the company, which is an important ground for decision-making, especially when it comes to individual investors.

The most common classification of investor relation instruments is the one based on communication methods. According to these criteria, they may be divided into direct communication, indirect communication, and modern techniques of communication. Direct communication depends on a personal contact between the sender and the recipient in the form of a conversation, discussion, meeting or interview. It enables an effective information flow, builds mutual relations, and even helps to obtain feedback when managed properly. Because direct communication is a complex undertaking and requires organizational commitment of many people from company management, it is recommended to be used only in relation to a limited group of selected addressees. It is mostly used in dealing with analysts, institutional investors and media representatives.

Indirect communication, which is considered very valuable in terms of effectiveness, is achieved primarily by providing written documents of various kinds, such as annual reports, interim reports (quarterly, semiannual), current reports, prospectuses, news to the media, letters to new and prospective shareholders. These documents, and in particular the annual, periodic and current reports, are largely based on the data from the accounting system. The major advantages of indirect communication include the ability to reach large groups of geographically dispersed recipients and fulfill their varied information needs (Wojcik, 2005).

Internet is considered to be number one among the modern communication techniques. This technique allows inexpensive, quick and easy multimedia communication adapted to the challenges raised by globalization of the economy and the rapid development of capital markets. The internet enables investors to

obtain information related to the company, practically immediately after it has become released, which considerably facilitates communication between the company and its stakeholders. Investors can also use electronic means for forwarding motions, questions or other documents to the company.

The Requirements of Effective Investor Relations

Literature points to various characteristics of investor relations, which condition the improvement of these relations. These are transparency, credibility, compliance with the legal regulations, cohesion (comparability), timeliness, interactivity, and integrity (Gajewska, 2005).

Transparency is considered as a feature greatly improving the image of a company. It is contrasted by concealment of information, which in the long run is believed to be clearly a destructive behavior because concealment or dishonest presentation of information undermines the credibility of a company and its management and restoration of this credibility is a lengthy and costly process. It is believed that transparency helps to reduce the volatility of share prices and the cost of capital. This happens because the market is more likely to come to terms with information about unfavorable tendencies in the company if such information is disclosed alongside information that the Management Board is not making them light, but is taking appropriate measures to reduce them.

Credibility is understood to be a feature attached to logically consistent behavior and messages presented in a fair manner (based on easily verifiable facts), free from mistakes, and disclosing both good and bad news and events concerning the company. An obvious condition for the credibility of information coming from companies is the company's compliance with the applicable national regulations and in case of the company's participation in foreign markets-foreign regulations. A lack of credibility arises when messages are presented in a tendentious and biased way, which is the result of manipulating of accounting data, or is generated using loopholes and biased methods of measurement and presentation of report information, thereby creating a false image of the company.

The credibility of the company's investor relations is related to cohesion (comparability) of the information published by the company. Cohesive information is based on stable principles and rules concerning the collection, classification and processing of the data as well as the presentation of the financial statements. Respecting the principle of cohesion allows investors to make comparisons over time and space. Comparing over time allows balancing information from different reporting periods, whilst comparing over space makes it possible to compare data from different companies and different industries. The informational value of these comparisons depends on whether the reporting information has been prepared using the same and unchangeable principles.

Timeliness of information manifests itself by delivering information in compliance with the dates set out by relevant provisions. This contributes primarily to the improvement of the work of financial analysts who prepare evaluations and recommendations of economic plans of companies. Timeliness also means simultaneous dissemination of information, which makes it available at the same time to all parties concerned. This results in the reduction of the risk of improper (i.e., damaging to the interests of other stakeholders of the company) use of information by insiders (i.e., persons with access to the company's confidential information). The practice confirms that companies which have accelerated the publication of their reporting information are better perceived by the recipients of these messages (Gmytrasiewicz & Karmańska, 2004).

An important feature of investor relations is interactivity. This means taking into account the feedback flowing from investors. Registering and use of such feedback obtained in the form of comments or questions

from analysts should be formally incorporated into the process of the investor relations.

Finally, investor relations should be characterized by integrity. This means that the development of these relations should not be solely the responsibility of a specialized IR division, but it should involve all key organizational units of the company. Messages to investors agreed to in such an "integrated" way are typically characterized by a higher quality, and their content is consistent with the intention of the persons responsible for the specific functions they perform in the company. This way of creating messages by the company ensures at the same times that the feedback from investors will be transferred to the appropriate organizational units of the company.

Listing the characteristics of effective investor relations one cannot overlook the importance of the relevance of information addressed to investors. Information is relevant if its inclusion contributes to the improvement of the assessment of certain phenomena and processes taking place in a business entity or to the improvement of the quality of forecasts made by the user of the information. Relevant information is characterized by the ability to influence the economic decisions of people using such information. Its omission, inclusion in other information or its distortion could also influence those decisions. In this context, the precise definition of what information may or may not influence the investors' decisions, will affect whether it is disclosed or whether it may be omitted. Information deemed relevant should be disclosed to investors as soon as possible. It is considered that the catalogue of relevant information which should be reported should include, inter alia:

- the periodic financial results;
- changes in the accounting system;
- transformations in the structure of the company;
- changes in the management of the company;
- mergers and acquisitions;
- offers to purchase or exchange shares;
- changes in capitalization;
- an issue of securities;
- changes in the listing conditions of the company's securities;
- the emergence of a new product on the market;
- signing or a loss of a significant commercial contract;
- opening or closing of a large plant;
- purchase or sale of significant assets;
- relevant matters concerning the community and natural environment protection;
- proceedings arising from instigating a legal action, or matters pending a judicial decision;
- change of the legal status of the company;
- provisions relating to the company issued by regulatory authorities (Niedziółka, 2008).

Non-disclosure of relevant information results in the emergence of confidential insider information, known only to selected owners of a company, who may use it for their own benefit and to the disadvantage of other investors. One way to avoid such a situation is a quick and public communication of relevant information to all investors.

The process of shaping investor relations cannot ignore the important principles that improve effective functioning of a capital market which are: equal, universal and free access to information disclosed by

companies. Universality of information is understood as the ease of obtaining data on the situation in the capital market. This information must therefore be published in the mass media. A universal access to information is closely connected with an equal access to it. This equality is assured mainly by the legal regulations that apply to the trading in securities, which indicate information must be disclosed, in what form and when. The equality in access to information assures that a selected group of investors will not come into a possession of more information or information at an earlier date than others. Free access to information is closely related to the equal and universal access. Respecting the indicated principles limits the risk that investors bear when making decisions.

The shape of investor relations is not only determined by the requirements of efficiency in this sphere but also by specific regulations. The basic rules on disclosure of financial information of business entities in Poland are included in the provisions of the Accounting Act of 29 September 1994 (*Dziennik Ustaw (Journal of Laws)*, 1994). Pursuant to this Act, the financial statements of Polish companies must be filed with an appropriate court for subsequent inclusion in a court register (Article 69). In this way they become a public document because the court register is a public document. Attached to the financial statements are: the auditor's opinion (if the financial statements have been subject to examination by auditors) copies of resolutions or decisions of the company's approving organs endorsing the financial statements and the proposals of the distribution of profits or covering losses, as well as reports on the activities of the company (this applies to entities preparing such report). Companies that are required to have their financial statements examined every year are obliged to publish the audited statements in the following journals: *Monitor Polski B* or *Monitor Spółdzielczy*.

In the case of Polish companies that are issuers of shares and securities the disclosure of reporting information is further regulated in the Ordinance of the Minister of Finance dated February 19 2009 on current and periodic information disclosed by issuers of securities and the conditions of recognizing this information as equivalent to the information required by the laws of non-EU member states (*Dziennik Ustaw (Journal of Laws)*, 2009). The said ordinance sets out the type, scope, form, time table and frequency of reporting of the current and periodic information by issuers of securities.

As provided for in §82 of the ordinance, issuers of securities are required to prepare periodic reports, including quarterly reports, semi-annual reports and annual reports.

The periodic reports prepared for control purposes are made available to the public, and to stock market investors, in particular. They are published on the websites of the issuers.

Since it is possible that the information provided in accordance with the requirements laid down in the legal acts referred to above may not show the full picture of the company's business, additional information (or notes to financial statements), referred to as voluntary disclosures, may be disseminated. Using that option, companies more and more frequently provide additional information about themselves in order to enhance communication with stakeholders and to enable the existing and potential investors to make more accurate assessment of their activities. The scope of the voluntarily disclosed information depends largely on the decisions of the companies' management, and is expanding with increasing competition in attracting investors' capital. It is believed that increasing the amount of voluntary disclosures enhances the company's corporate image and goodwill, which results in increased investor confidence, ultimately resulting in higher valuation of the companies themselves.

However, there are a number of opinions to the contrary, arguing that greater disclosure brings negative effects, such as inter alia:

- increased costs of preparation and publication of information;
- lack of tangible benefits of a voluntary disclosure;
- possibility of the disclosures in the additional information be used by the competition (Niedziółka, 2008).

And indeed, it is harder to estimate the scale of the benefits of additional disclosure than to measure the cost of its preparation. Nevertheless, an increased credibility of a company being the effect of an expanded scope of the content of messages it sends, is undoubtedly conducive to the improvement of investor relations, which in the long term translates into higher company's valuation.

The Concept and Objectives of Accounting Policy

As already mentioned, among the indirect methods of shaping investor relations, the reports prepared on the basis of the data from the accounting system are of fundamental importance. The information contained in those reports largely derives from the accounting policy adopted by a given company, while the shape of this policy is determined by the company's objectives which can only be achieved when an appropriate relationship with the environment (market, owners, internal revenue service, society, etc.) has been established. This is because among the most important relationships between a company and the environment, investor relations play a vital role. That is why it is so important to ask the question which has already been posed at the beginning: how should the accounting policy be conducted to achieve better investor relations. This issue has been analyzed in the context of the views on the accounting policy that have been till date presented in literature.

Most definitions of the accounting policy presented in the context of microeconomics emphasize that the main function of the financial statements, in addition to the task of reflecting the real economic situation of a company, is maximization of the accomplishments of the company's objectives. In reality, that task boils down to the making of decisions that shape the information contained in the financial statements. This is possible owing to the specific, alternative solutions of certain accounting issues. The existence of alternative ways is justified not only by an objective impossibility of fully regulating all the cases that occur in business, but also by the need to ensure companies the right to choose from among suggested solutions, which in principle should serve a more faithful reflection of their condition presented in financial reports. The type of regulations called "choice rights" (or rights to choose) occurs when a certain fact (an actual state) may be solved in at least two different ways, being precisely described solutions that are mutually exclusive, and the choice can be made by the company's management board. The choice rights are therefore clearly and univocally granted an alternative ways to proceed. The nature and scope of those rights define the area of freedom a company has in shaping its financial statements.

In this context a fundamental question comes up whether the practice of influencing the information contained in the financial statements is not inconsistent with the general accounting principle of presenting a "true and fair view". The preparation of financial statements in accordance with this principle requires impartiality. This view has been reflected in the wording of point 36 of the conceptual framework of the International Accounting Standards, which states that preparation of the financial statements that would comply with the above principle requires impartiality, which means that the choice of the manner in which the information will be presented should not influence the decision-making process or the formulation of opinions in order to achieve the previously planned results or effects (International Accounting Standards Board, 2007).

This understanding of impartiality seems to be based on the unrealistic assumption that the author of

financial statements has a neutral attitude towards the company and is not interested in what image of the company will be presented in the report he has prepared. The reality, as everyone knows, is different. It therefore appears that the principle of impartiality has in fact a declarative character and it can be assumed that, in practice its role is to raise the awareness of the existence of a boundary between arbitrary decisions and a reasonable business assessment.

In this context, the existence of the phenomenon of accounting policy should be regarded not only as a justifiable practice, but also rational from the company's point of view. Always, when it is allowable to choose between different solutions, the company will use this opportunity guided by a particular objective. Since a financial report is used primarily by external entities it can be concluded that the main purpose of the accounting policy is to influence the behavior of the recipients of this report. The accounting policy, however, must take into account the objective of a financial report and must maintain the quality of reporting, and in particular the relevance of information and its credibility. It should be obvious that accounting policies should be conducted following the principles of legality and comply with the existing rules and principles of proper accounting.

The diversity of recipients of the financial statements and their varied information needs means that the range of the accounting policy goals is defined very broadly. The goals that are typical financial goals include:

- lowering the tax burden;
- maintaining financial liquidity;
- achieving adequate financial results;
- achieving the required level of financial ratios used in the assessment of the company by a parent company, the company's creditors, lenders or contractors.
- There are also objectives related to specific groups of employees in the company, such as:
 - maximizing the remuneration of the members of the management or keeping their posts;
 - influencing the value of those items of the financial statement which condition the financial benefits of the employees (bonuses, awards, allowances for earmarked funds, such as the social fund).
- Among the objectives of the balance sheet policy are such which are conducive to the improvement of investor relations. They are:
 - impact on the payment of profit after tax for the benefit of shareholders;
 - impact on the financial ratios taken into account when assessing the company by potential buyers, or the value of shares to be subscribed for before the proposed new issue;
 - satisfying the ambitions of the owners/shareholders;
 - increasing confidence in the company;
 - positive public perception of the company (Sawicki, 2009).

Thus, for companies that seek to improve investor relations, the hierarchy of objectives of the accounting policy they adopt is clear. Priority should be given to the objectives set out in the last group; other accounting policy objectives can only be pursued if they are not in conflict with the primarily identified priorities. In this way, the scale of the balance sheet dilemmas faced by businesses with an active accounting policy (i.e., problems associated with achieving a balance between the established objectives of this policy) is limited.

The effect of the accounting policy adopted by a company is that the image of its economic situation presented in the financial statements, deviates, in some way, from its original state (that is, from the state it was in before certain priorities pertaining to the accounting policy were pursued). It is generally assumed that the

deviation is mostly aimed at improving or worsening the image of the company. Sometimes, however, the only goal is to obscure the picture of the company. If the accounting policy is used to increase the effects of investor relations, the expected effect of this policy should surely be the improved image of the company, which is directly related to the improved transparency of the condition of its business. Presenting the company in a more favorable way undoubtedly influences the price of shares that go up, and thus helps to attract additional capital for the company.

The effects of the deterioration of the company's image include the reduction of the share price, which may consequently discourage small shareholders from investing and encourage them to dispose of their shares at a low price to shareholders seeking majority shareholding. Such practices, based on the effect of "asymmetric information" (in this case between the small and leading investors) should be regarded as contrary to the principle of company transparency and equal access to the information to all stakeholders. Therefore, they cannot be classified as measures improving investor relations understood in the manner described above.

The Use of Accounting Policy Instruments in IR

The right to choose between various accounting solutions is the basis for defining the instruments of the eventually chosen accounting policy. These instruments are means and moves geared for achieving the objectives of the adopted accounting policy. Most frequently, these instruments are divided into:

- material instruments;
- time instruments;
- formal instruments (Weber, & Kufel, 1993).

The material instruments of the balance sheet policy are the solutions that influence the value of assets and liabilities, revenues and expenses, gains and losses. Among these solutions, the most important ones are those means that exploit the possibility of deciding how the financial statements are to be published and how the individual items are to be assessed and calculated, how the costs are to be settled over time, the provisions made, the interim settlements accounted for, the amortization or depreciation amounts calculated, and the value of the depreciation write-offs made in respect of those re-valuations made. The material instruments also include solutions that shift business operations in time (such as purchases of materials, goods, capital goods, services, or sale of services). Most of these solutions can be economically justified (as they may, for instance, help to shifting in time the tax liabilities). Nevertheless, in a big part they only serve the so-called "window dressing" function.

One the time instruments of accounting policy is choosing the date as at the balance sheet is made. This is especially important for companies whose activity is highly seasonal. Another time instrument is the opportunity to choose (within the law limits) the date for submission, approval and publication of the annual financial statements. Many companies in the process of creation of their own image deliberately bring forward or delay the publication date of the reports. If the publication of the financial statements confirming the successful development of the company coincides with important development events, such as share issue, sale of bonds, restructuring, etc., then a speedy provision of updated and audited information to the recipients may be the key factor determining the success or failure of the undertaken projects. An intentional delay of publishing of the financial statements is particularly characteristic of those companies whose business performance deteriorated or even closed at a loss. In this case, the time gained by the maximum delay in informing the recipients of the financial report about the adverse trends is most frequently used for

implementing actions to improve the situation or image of the company, or is motivated by the desire to postpone the decision about changing its management.

Formal instruments are based primarily on the right to choose a variant (comparative or multi-step) and version of the profit and loss account, the structure of the balance sheet and level of disclosure of its items, and the manner in which the financial statements will be published.

The company making the choice between a comparative and a multi-step variant may disclose the items in the annual financial statements either in a greater detail than the statutory requirements, or a simplified version (in Poland only small companies are allowed to do so).

An important right of companies is the right to decide about the structure of the balance sheet items. The statutory requirements in this respect are to be understood as the necessary minimum. If a company wishes to allow a more accurate insight into its business, it can subdivide the items of the balance sheet, while respecting the prescribed layout. Among the formal instruments of accounting policy very important is the possibility of "free" classification of financial assets either as fixed assets or as current assets. This law applies to long- and short-term securities.

Companies also choose the manner in which the financial reports are published (announced). The obligation to publish financial reports is regulated by the Accounting Act. It gives companies some freedom in choosing the details of the content of this report. The right to choose the form of publishing also applies to an important part of the financial statements which is "additional information and explanations". A detailed list of "additional information and explanations", is set out in the Annex to the Accounting Act. The Annex orders to disclose information not included in the balance sheet and in the profit and loss account, or to include explanations confirming that the company's financial condition, its assets and obtained results are presented in the financial statements in a fair manner and may be relied on. A company is given some room for maneuver with regards certain terms that appear in the checklist "additional information and explanations".

It follows that the accounting policy instruments provide a real opportunity to influence the company's image. Before answering the question which of these instruments to use and how to enhance the effects of investor relations, it is worthwhile quoting the published results of the research conducted by the Polish Institute of Investor Relations which concerned investor relations shaped by Polish companies. The study was conducted on 214 listed in the Warsaw Stock Exchange and companies representing various industries.

One of the specific issues investigated in the research was the quality of financial reports prepared by companies. The investigations concluded that there were large discrepancies between the actual quality of these reports and the expectations expressed by their recipients. A significant percentage of analysts (70% of the questioned) graded the quality of financial information received from the companies as below the average or average. The investors pointed to many shortcomings of financial reports, such as failure to offer notes or comments on the figures, information too concise to understand, frequent use of too specialized language making the information incomprehensible, chaos in the structure of the reports and late release of information, close to the deadline. Other reasons for the low rates given to the quality of the provided financial information were irregularities and inconsistencies in the financial reports and numerous corrections of fundamental errors from previous years. It was emphasized that the low quality of financial information makes it difficult to compare companies from the same industry and cannot serve as the basis for accurate assessment of the company or for preparing financial forecasts (Dziawgo & Gajewska-Jedwabny, 2006).

Regarding the ease of access to information and information meeting the expectations, most investors (82%) assessed the ease of access to information as only satisfactory, while only 9% of the respondents considered it to be very good. Analysts criticized the lack of cooperation and communication with some of the companies and unsatisfactory amount of the additional information, while that provided was considered vague, incomplete and not facilitating investment decisions.

This not too good opinion on the quality of financial information may be surprising in view of the importance that investors assign to the quality of the messages. As demonstrated in the study the quality of investor relations (determined by financial information) affected the assessment of companies by 83% of investors. At the same time for 74% of investors the quality of information had a significant impact on the lengthening or shortening of the time horizon of their investment.

Eliminating or even reducing the shortcomings of financial reporting released by companies to their stakeholders may be achieved by the appropriate use of the instruments of accounting policy. In view of the shortcomings in the structure, details, time and ease of access to such information the most important seem to be formal and temporary instruments.

Among the formal instruments the most important ones include the right to choose the structure or layout and the level of detail of the items disclosed in the balance sheet and the right to choose the manner in which the financial statements should be published. The possibility of disclosing more detail than statutorily required and shown in report templates annexed to the Accounting Act and the possibility of including additional explanations (particularly in the part called "additional information") should be used as widely as possible as it ascertains greater insight into the company's business and facilitates its assessment by investors, which consequently improves investor relations. Actions to the contrary (i.e., reducing the level of detail in the prepared reports) can produce quite the opposite effect.

The time instruments of accounting policy can play a great role in shaping investor relations. These relations may be improved by early submission, approval and publication of audited annual financial statements, which will result in the reduction of the "information asymmetry" effect, thus allowing investors without a day to day, direct access to the company's accounting records to make more accurate decisions. Postponing publication of the financial statements in order to make or gain time for improving the unsatisfactory condition of the company, considering the principles of IR, i.e., timely presentation of information and equality in access to the information, reduces the credibility of the company and is a factor which, in the long run, degrades investor relations.

Material instruments of accounting policy may also play an important role in shaping investor relations, among them, in particular, the right to choose the methods of assessing individual items of the financial statements, the right to choose the date of cost settlement over time, the right to choose the manner in which to account for the provisions, reserves, interim settlements, amortization and depreciation write-offs and revaluation amounts. Solutions adopted by companies using those statutory rights law allow adjusting the value of assets and liabilities and the company's financial results, and bringing those values to a level close to market values. It is no doubt that the use of material instruments of the accounting policy for this purpose is fully justified and indeed desirable from the perspective of improving investor relations. As a result of these actions the investors receive information of a better quality and therefore their investment decisions are based on more reliable grounds.

Conclusions

Developing effective investor relations is a very important task for companies, including, in particular, companies with diversified and dispersed shareholders. An important way in which these relations may be shaped is through indirect communication. Such communication is based, among others, on financial reporting governed by the Accounting Act. Due to the fact that the companies have a “right to choose” alternative solution in accounting, companies adopt an accounting policy that serves their objectives and goals. These objectives may be varied, hence the shape of the accounting policy adopted (its goals, instruments and effects) may differ. However, the use of accounting policy to improve investor relations requires that actions of this policy are subject to certain principles of effective investor relations. As indicated, this means that these actions should be geared primarily to improve the quality of the provided reporting information which amounts to presenting it as quickly as possible, with the amount of detail required by investors. In addition, solutions implemented in connection of the assessment of financial amounts disclosed in reports should result in an approximation of their value to the market level.

In conclusion, the issue of adopting and then using a given accounting policy by a company cannot be considered in separation from its functioning. The shape of this policy should be determined by the kind of necessary conditions for the company's continued, successful growth and expansion. In case of companies whose major stakeholders are investors, the accounting policy of the companies should be geared to the development of effective investor relations.

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Research, Development and Innovation Impact in Services and Industry: The Canary Islands Case

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The services sector represents about 70% of developed economies (in terms of employment and value added) and its evolution has contributed significantly to economic growth during the last decade. However, the services have traditionally considered residual sectors and they have not been (not even now) a target for the main R&D and innovation policy support. Contrary to the traditional thoughts, according to the results achieved comparing Canary Islands and Spanish services sector and manufacturing sector, the first contributes significantly to economic growth and productivity. The results point out that due to the significant contribution of innovation and R&D's efforts to GDP and productivity, it becomes a necessity and an opportunity to promote and further enhance services sector competitiveness through a more focused R&D and innovation support. The analysis carried out indicates the need of encouraging innovative efforts in the services sector as a means to improve its productivity levels not only with the sector itself but also the whole economy.

Keywords: R&D+I (research, development and innovation), impact, services sector, Canary Islands

Introduction: Knowledge, Services and Industry

Nobody questions the importance of knowledge and innovation as key elements of competitiveness in the economic context of the 21st century. Knowledge generation and innovation efforts have been traditionally identified with the work of universities, research centers and even the administration itself, and mostly business. Companies are ultimately responsible for transforming the knowledge generated in useful, marketable value for the markets.

However, while “knowledge is the most profitable investment” as Benjamin Franklin pointed out, development is subject to various market imperfections: uncertainty and imperfect information, externalities and public good nature, very long-term returns etc.. As consequence, it is common that its provision is usually below the optimal threshold (De la Fuente, 1999). As with any market imperfection, the administration should try to reduce any possible negative effects by supporting policies that favor the generation of knowledge and innovation to near the optimum.

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It is not difficult to see how, in the broad spectrum of current public support, there is discrimination at sectoral level. Although it has been declining recently, it remains strong both in terms of amount and intensity. This discrimination is more evident among the services than industry. This fact is not new and it was very common throughout the 20th century as seen in the arguments of authors such as Clark (1940) or Chanon (1978).

Services historically have been considered as activities where knowledge, innovation and especially technology had a residual nature. But the truth is that the heterogeneity of the activities included in the services and the inherent difficulty in finding a common innovation model, together with the complexity to quantify it, have been major barriers to the definition and implementation of appropriate policies for promoting R&D+I (research, development and innovation) in the private sector. And this legacy is what has resulted in a clear R&D and innovation emphasis in industry against services¹, technology against innovation, what is measurable against what is difficult to quantify.

But we cannot ignore the importance of the service sector. These activities represent about 70% of developed economies (in terms of employment and value added) and its evolution has contributed significantly to economic growth (Cuadrado Roura, 2009) during the last decade. It seems that only with a competitive service sector economy may be competitive as well. At the dawn of the new economy, being competitive will necessarily require to be knowledge intensive, innovative and technologically advanced. In addition, it is questionable whether, given those processes already known as “outsourcing industry and industrialization of services” (Barras, 1990), it is not a prerequisite for considering service activities as focus of efforts in R&D+I.

These arguments are still more obvious in small economies with sound tertiary patterns. The case of the Canary Islands is probably one of the clearest, with an economy dominated by service sector (81.19% of GDP according to INE data for 2009) and a strong tourism profile. But local businesses are facing with new destinations and the maturity of the market they belong to. It seems necessary, to enhance the resources of knowledge and innovation in the sector as the only way to compete in global markets and ensuring a sustained growth path in the region.

In this context, the aim of this paper is twofold. On the one hand, challenging the widespread belief of services as a residual sector, both in terms of contribution to growth and productivity, and the impact that knowledge and innovation has in their competitiveness. On the other hand, the opportunity to show the importance of R&D+I support policies for services sector as drivers of competitiveness of the entire economy. To verify these arguments, we have chosen the example of Canary Islands, an ultraperipheral region of Europe and an economy dominated by services, especially those related to tourism.

Conceptual Framework: A Review of the Literature

The services have been traditionally considered residual sectors. Classic literature has noted the negative impact on numerous occasions, and Adam Smith (1776), the father of economics, came to regard them as unproductive in comparison to agricultural and industrial sectors.

Until Marshall's (1879, 1890) literature had not begun to consider services as truly productive business activities to the economy. Later, Baumol, Blackman, and Wolff (1985) nuanced that high work intensity was the main element that explains lower values in terms of productivity per employee, not being “unproductive” per se.

¹ To a certain extent, the possibility of quantifying the R&D and innovation industry support programmes and policies along with the ease to design and implement specific measures in that sector are the main reasons of a broader extension of industry innovation support against the services sector.

Nowadays other authors such as Triplett and Bosworth (2000), Wölfl (2003), and Cuadrado Roura (2009) have shown the limited basis of these arguments. According to them, services sector industries include many different activities, some of them with high productivity levels and competitive performance are similar to those in industry.

For authors such as Triplett and Bosworth (2005, 2007), services have been largely responsible for the economic growth of the United States, both in terms of labor productivity and multifactor productivity. Further, Stiroth (2002) highlights the importance of services sector as user of technology, and Triplett and Bosworth (2003) as highly innovative activities. It seems that, given the growing importance of service activities and the current theories against the traditional approaches of the literature, it is necessary to consider the contribution of these activities in terms of economic growth and knowledge and innovation contribution.

Next chapter will present a brief review of the studies that analyzed the contribution of service activities in terms of productivity and competitiveness, as well as the level of impact that factors related to the knowledge economy had on businesses.

A Methodological Proposal

The new competitive context places knowledge and innovation in the hub of all competitive process (in business) and economic growth (considering the economy as a whole). Undeniably, the investment in R&D+I has positive effects on productivity and therefore on economic growth. Schumpeter (1934), Solow (1957), and Krugman (1990) stress the importance of technical change and productivity growth, while other authors such as Griliches (1979, 1986) or Romer (1990) emphasize the effects of R&D+I effort on them.

Table 1

Regression Weights of Perceived Value

Author	Work	Description
CDTI	2009—"El impacto de la I+D+I en el sector productivo español" Departamento de estudios del CDTI	Analysis of the effects of several input variables (technological innovation) on several output variables (economic) in Spanish enterprises.
Griffith, R., Huergo, E., Mairessey, J. Y., and Peters, B.	2006—"Innovation and Productivity across four European Countries". NBER Working Paper	Comparative analysis of the innovation effort impact on productivity levels in the case of Germany, Spain, UK and France.
Harrison, R., Jaumandreu, J., Mairesse, J., and Peters, B.	2005—"Does innovation stimulate employment? A firm level analysis using comparable micro data on four European countries". MPRA Paper	Analysis of the impact of R&D employment in Spain, Germany, France and the UK.
Beneito, P.	2001—"R&D productivity and spillovers at the firm level: Evidence from Spanish panel data". Investigaciones Económicas. Vol. XXV	Analysis of the effect of R&D and its spill-overs on productivity levels in Spanish enterprises.
De la Fuente, A.	1999—"Una nota sobre la rentabilidad social del I+D+i y el nivel óptimo de gasto". Papeles de Economía Española. Vol. 81	A proposal of a model with human, physical and technological capital measuring technological efficiency on productivity. Optimal R&D expenditure proposal for some OECD countries.
Crepon, B., Duguet, E. and Mairesse, J.	1998—"Innovación tecnológica y crecimiento económico" Fundación COTEC. N° 11	Analysis of R&D effort impact on productivity levels as an intermediate input in economic performance in France.

Note. Source: Authors.

Therefore, as noted initially, to know how the R&D+I impacts on productivity and economic performance is crucial for the design and implementation of public policies in this field. Authors such as Dosi (1982), Nelson

and Winter (1982) share the view that there is an important link between the evolution of the economy and the development of its innovation system, the latter being the key to determine a favorable framework to knowledge, technology and innovation flourishing. But how do we calculate the impact of investment in R&D and technological innovation? And, how do they influence the performance of enterprises and the overall economy?

The literature has studied in detail these issues, and therefore it can be considered as a phenomenon that, at least, raises the academic interest and probably political. Table 1 shows a brief summary of the most prominent examples.

The work presented here, for the specific case of the Canary Islands, has been developed considering the methodology proposed by the Center for Industrial Technology Development (CDTI, 2009). In this paper, the authors use two sets of variables: inputs to measure their outcomes in terms of technology, and outputs that quantify the impact of those outcomes in major economic variables at micro-level. Two databases were used: the panel on technological innovation (PITEC)² and the survey on business strategies (ESEE)³.

Although their study examines the impact of innovation efforts on economic performance through a number of both input variables (in our case, keeping the input-output distinction), which has been limited the use of indicators to “innovation expenditures” (considering them as inputs), “turnover”, “labor productivity”, and “exports” (all of them considered as output variables). We also considered GDP as a final variable (linked to turnover) and R&D expenditure (as proxy for linking funding commitment by public administration in the business innovation effort). Table 2 shows a summary of the variables and techniques used to estimate the coefficients.

Table 2

Components of the Model

Component	Area	Variable	Models and methods
Inputs	Technological results: innovation effort in the technological behavior of the company	Expenditure on Innovation	Continuous variables—Analysis OLS
Outputs	Economic performance: the technologic impacts on economic behavior	Turnover Labour productivity Exports	
Auxiliaries	Support variables for the estimation of other parameters	Expenditure on R&D GDP	General Algebra

Note. Source: Compiled from “Impacto de la I+D+i en el sector productivo español” CDTI 2009.

Using the method of ordinary least squares (OLS) regression coefficients between input variables and output variables have been obtained: turnover δ , productivity α and exports λ . Subsequently, due to their “elastic” nature, these coefficients were applied to annual “innovation expenditures” variations between 2000 and 2008 obtaining the amount of impact for each output variable.

$$f_{it} = F_{it} \delta_{it} = F_{it} \left(\frac{GI_{it} - GI_{t-1}}{GI_{t-1}} \right) \delta$$

² PITEC (Retrieved from <http://sise.fecyt.es/sise-public-web/>) is a statistical tool that comes in 2004 to monitor the activities of technological innovation of Spanish companies, a collaborative effort between the National Statistical Institute (INE), Spanish Foundation for Science and Technology (FECYT) and Cotec Foundation.

³ ESEE (Retrieved from <http://www.funep.es/esee>) contains comprehensive statistical data on a representative sample of companies in the Spanish manufacturing industry. Surge in 1990 between the Ministry of Industry, Tourism and Trade and the SEPI Foundation and annually collects information from approximately 1,800 companies.

$$pr_{it} = Pr_{it}\alpha_{it} = Pr_{it} \left(\frac{GI_{it} - GI_{t-1}}{GI_{t-1}} \right) \hat{\alpha}$$

$$exp_{it} = Exp_{it}\lambda_{it} = Exp_{it} \left(\frac{GI_{it} - GI_{t-1}}{GI_{t-1}} \right) \hat{\lambda}$$

where f_{ij} , pr_{it} and exp_{it} are the turnover, productivity and exports generated as a result of the impact of innovation expenditure for the sector i and the moment t (increases). F_{it} , Pr_{it} and Exp_{it} are the total of turnover, productivity and exports for the sector i and the moment t . GI_{it} and $GI_{it} - 1$ are expenditures on innovation in two consecutive moments and δ , α , and λ the estimated coefficients of the impact of innovation expenditure for turnover, productivity and exports (elasticity measures).

Table 3 presents the values δ_{it} , α_{it} , and λ_{it} to be applied to turnover, productivity and exports (F_{it} , Pr_{it} and Exp_{it}) for each year t and for each sector i (total economy, industry and services). The final result (f_{ij} , pr_{it} , and exp_{it}) is the impact (in terms of each variable), related to innovation expenditure:

Table 3

Contribution of Innovation Expenditure in Terms of Turnover, Productivity and Exports of Enterprises in Spain and the Canary Islands 2000-2008

Variable	Coefficients of δ_{it} , α_{it} , λ_{it}										
	2001	2002	2003	2004	2005	2006	2007	2008			
Spain	Turnover	Total	0.00225	0.00099	0.00003	0.00171	0.00286	0.00475	0.00196	0.00208	
		Industry	-0.00054	0.00099	-0.00022	0.00262	0.00251	0.0013	0.00139	-0.00156	
		Services	0.00730	0.00099	0.00036	0.00052	0.00335	0.00951	0.00254	0.00566	
	Labour productivity	Total	0.00196	0.00086	0.00002	0.00148	0.00249	0.00413	0.0017	0.00196	
		Industry	-0.00047	0.00086	-0.00019	0.00228	0.00218	0.00113	0.00121	-0.00047	
		Services	0.00635	0.00086	0.00032	0.00045	0.00292	0.00828	0.00221	0.00635	
	Exports	Total	0.017634	0.00774	0.00022	0.01336	0.02237	0.03718	0.01531	0.01628	
	Canary Islands	Turnover	Total	0.0098	0.00977	0.00869	0.00916	0.01066	0.00379	0.00228	-0.00594
			Industry	0.01072	0.01098	0.00865	0.00986	0.01193	0.00338	0.00201	-0.00653
Services			0.00961	0.00951	0.00869	0.00901	0.01038	0.00389	0.00234	-0.0058	
Labour productivity		Total	0.00852	0.00849	0.00755	0.00797	0.00927	0.0033	0.00198	0.00852	
		Industry	0.00932	0.00955	0.00753	0.00857	0.01038	0.00294	0.00175	0.00932	
		Services	0.00836	0.00827	0.00756	0.00784	0.00902	0.00338	0.00204	0.00836	
Exports		Total	0.07669	0.07642	0.06798	0.07172	0.08343	0.02969	0.01785	-0.04646	

Note. Source: Authors.

Results: The Case of Canary Islands

From the last data available in the regional accounts of the National Statistics Institute (INE) it can appreciate the importance of the services sector in terms of the Spanish and Canary economies. In 2008 Spanish service sector services represent about 70% of regional GDP (which is similar to what it represents in terms of employment) compared to just 30% of the broad industrial sector⁴. Besides, if we observe the evolution from the beginning of 2000, we can see that this gap has been increasing between services and industry. Therefore Spanish services sector represents not only the dominant sector, but also the most dynamic in terms of wealth and employment generation.

⁴ In terms of broad industrial sector are included in this group building activities and energy.

In the case of the Canary Islands, the pattern of specialization is even more pronounced than the Spanish. In this region, service activities reach 81.19% of regional GDP (76% in terms of total employment). These activities are dominated by tourism and related businesses.

If we consider the assumptions that literature has traditionally maintained on services, we may venture an endemic problem in terms of economic growth for the region. This analysis is even more dramatic when taking into account its tourism industry specialized in a mature segment where several less developed countries have begun to compete primarily via costs. However, the analysis of productivity levels calculated for the Spanish and Canary Islands between 2000 and 2008 can provide some interesting nuances.

In Spain, while the industrial sector appears to have a slightly higher productivity levels than services, the differences are not significant. Only since 2004, the productivity gap between industry and services begin to increase, recording a difference of 9.3% for 2008. In any case, Spanish the services sector productivity ranks at the national economy average for almost the entire period even if we consider the smooth but negative trend (-1.79 % between 2000 and 2008).

In the case of the Canary Islands, and against traditional literature, levels of productivity in services have been significantly higher than those in the industry. However, the sector seems to be suffering a crisis of "competitiveness" as reflected in the gradual reduction at productivity levels since 2000. Thus, while in 2000 the value stood at €39,939.53 per employee, in 2008 it has fallen to €37,419.74. In other terms, comparing to industry productivity values, in 2000 the value of the services productivity index was 33.76% higher, but in 2008 this had fallen 26 percentage points.

According to this data, it is easy to say that service activities are not less productive per se (in fact the sector presents higher values than the regional and national average). However, the decline in productivity, what the sector is experiencing in Canary Islands, could severely affect the overall economic competitiveness in the territory. So it seems that the challenge now is how to find formulas to recover and enhance the competitiveness of the sector. In the context of a new knowledge economy innovation effort and support play a central role.

If we analyze the evolution of innovation expenditure in the Canary Islands, we observe that between 2000 and 2008, the innovative effort has quadrupled in the services sector, well above the industry average in Spain and half of the entire national economy. However, even with these high rates the total innovation expenditure is still very small. Thus the total expenditure shares comparing to the Spanish sector is only 1.43%, well below the economic weight (4.7%). Therefore, poor innovative services are a possible explanation for the gradual loss of competitiveness and low productivity levels. On the other hand, it is also an argument to strengthen the focus on designing and implementing proactive policy to promote R&D+I in the Islands.

Our argument for a proactive policy that favors the development of innovative activities (through and increasing innovation expenditure) is supported by the results of applying the methodology presented earlier for the case of Canary Islands.

If we analyze the impact of innovation expenditure in GDP, productivity and exports, we obtain results that support our hypothesis. For the Canary Islands case, spending innovation expenditure in services has contributed on average to 20.57% of the GDP growth between 2000 and 2008. This value is much higher than the one reported by industry (12.28%) and the whole economy (13.43%). In Spain, the ratio between industry and services remains.

A similar effect is observed when analyzing the impact of innovation expenditures at productivity levels. In the Canary Islands, again, the services appear to have higher annual average contributions (25% growth—€1,621.78 per employee) compared to the industry (22.47%—€1,351.13 per employee). In Spain, the differences between manufacturing and services are more pronounced in the latter⁵.

Finally, regarding exports, there is a high impact on global growth, with more than 30% for both the Canary Islands and Spain. It corroborates the importance of the innovative component in the international trade.

Comparing the information contained in Tables 4 to 7, some interesting preliminary findings can be highlighted:

(1) The contribution of innovation expenditure to GDP and productivity seems to be much more meaningful for service activities than for industry. This finding is a shared feature at both the Canary Islands and Spain;

(2) In the case of Spain, the productivity levels of the services appear to stagnate in contrast to the industry. One of the reasons may attribute to the fact that despite the major impact of the innovative efforts in services, innovation expenditures in this sector seem to be much lower than it should be given its weight in GDP (54.65% versus 69.02%). It is also much lower in terms of innovations expenditure/GDP (1.96% in industry versus 3.5% in services). This would explain the different evolution in industry-services productivity levels or in other words, a sub-optimal allocation of innovative effort in services activities;

(3) In the Canary Islands, the contribution of innovation expenditures to productivity, even being higher in services than in industry, it is not as disparate as the Spanish case. On average, there is no difference between the structure of expenditure in industry and services. In this sense, the difference between positive changes in the industry productivity and negative changes in services is explained by other competitive factors. It is likely that competition from new tourist locations in the same market segment (but with lower costs) is affecting the tourism sector (and the whole Canary Islands service activities).

Table 4

GDP at Constant Prices (Thousand €) in Spain and Canary Islands 2000-2008

	Spain			Canary Islands		
	Total	Industry	Services	Total	Industry	Services
2000	630,263,000.00	184,254,940.17	418,409,751.52	25,312,755.00	4,174,191.03	20,620,777.56
2001	653,255,000.00	190,658,973.95	434,796,457.18	26,553,784.00	4,506,524.00	21,533,503.21
2002	670,920,422.98	194,213,032.65	449,743,472.00	27,310,325.34	4,816,709.44	22,017,059.55
2003	691,694,679.13	200,099,024.72	464,191,343.14	28,340,908.44	4,997,465.76	22,871,393.14
2004	714,291,204.24	208,023,298.46	480,435,502.44	29,027,310.55	5,234,871.27	23,342,648.73
2005	740,108,017.23	219,739,803.41	496,711,888.69	29,934,971.05	5,605,595.69	23,881,996.90
2006	769,850,229.86	229,749,755.25	518,615,020.28	30,859,546.90	5,704,458.44	24,770,722.10
2007	797,283,091.67	232,681,196.99	542,774,120.84	31,927,350.03	5,837,527.86	25,688,419.31
2008	804,121,945.24	228,401,520.17	555,011,835.46	32,208,168.94	5,690,957.32	26,152,657.48

Note. Source: Regional Economic Accounts. INE, 2009.

Going back to Table 4, it appears that the lower GDP growth in services (27.44%) compared to the

⁵ Note that by far the largest increases in the Canary Islands can be attributed to lower starting levels that contribute to multiply the effect of a higher percentage change.

industry (36%), and employment growth of the first (35.36%)⁶ compared to the latter (17.16%) may explain the decrease of Canary Islands productivity levels.

Table 5

Productivity (GDP/Employment) in Spain and Canary Islands 2000-2008

	Spain			Canary Islands		
	Total	Industry	Services	Total	Industry	Services
2000	36,685.43	36,879.75	37,818.59	37,306.93	29,858.30	39,939.53
2001	36,850.85	36,786.16	38,072.91	37,336.59	29,746.03	40,039.98
2002	37,033.05	36,924.74	38,267.25	37,304.09	30,466.22	39,828.26
2003	37,016.34	37,340.27	37,946.45	37,325.05	30,640.50	39,714.17
2004	36,944.63	37,898.21	37,576.88	36,567.54	30,506.24	38,762.29
2005	36,793.84	38,653.92	37,077.74	36,262.84	32,346.20	37,692.55
2006	36,771.07	39,385.22	36,717.15	36,059.30	32,803.10	37,316.54
2007	36,938.10	39,137.00	36,971.45	35,933.99	32,074.33	37,343.25
2008	37,428.53	40,600.38	37,138.20	36,633.50	34,743.33	37,419.74

Note. Source: Own elaboration from INE regional economic accounts.

Table 6

Innovation Expenditure (Thousand €) of Enterprises in Spain and Canary Islands 2000-2008

	Spain			Canary Islands		
	Total	Industry	Services	Total	Industry	Services
2000	10,174,259.00	6,158,124.00	3,401,673.00	35,713.69	5,889.35	29,093.79
2001	10,631,884.50	6,014,326.86	4,482,051.21	50,873.38	8,633.88	41,255.21
2002	11,089,510.00	6,273,200.00	4,674,971.00	72,333.77	12,757.47	58,314.10
2003	11,198,505.00	6,212,536.00	4,749,282.00	99,572.00	17,557.93	80,355.59
2004	12,351,728.00	6,919,695.00	4,855,994.00	139,085.00	25,083.00	111,846.82
2005	13,635,950.00	7,675,666.00	5,564,103.00	203,441.00	38,096.18	162,304.39
2006	16,533,416.00	8,108,272.00	7,866,533.00	236,402.00	43,699.46	189,758.08
2007	18,094,616.00	8,598,275.00	8,735,358.00	259,877.00	47,515.35	209,094.38
2008	19,918,946.00	8,014,113.00	10,887,574.00	192,542.00	34,020.82	156,341.86

Note. Source: Compiled from statistics on R&D. INE, 2009.

Table 7

Annual Contribution Average of R&D and Innovation Expenditure to GDP_{Prp}, Productivity and Exports Growth in Spain and the Canary Islands Between 2000-2008

	Spain			Canary Islands		
	Total	Industry	Services	Total	Industry	Services
GDP _{Prp} (%)	7.39	2.54	11.16	13.43	12.28	20.57
Productivity (%)	14.07	6.96	30.52	25.00	22.47	25.00
Productivity (€)	533.84	214.65	980.41	1,545.58	1,351.13	1,621.78
Exports (%)	33.76	-	-	32.78	-	-

Note. Source: Authors, based on the methodology proposed and statistics on R&D and regional economic accounts. INE, 2009.

In any case, this apparent loss of competitiveness (identified with the slowdown of services) seems to be another argument for the need of greater innovation promotion oriented to productivity growth. Tables 8 and 9

⁶ INE 2009 Regional Economic Accounts.

show in terms of annual rates the variables presented in Table 7.

Table 8

Contribution of R&D and Innovation (in Terms of Annual Variation) to Spanish and Canary Islands GDP Growth

	Spain			Canary Islands		
	Total (%)	Industry (%)	Services (%)	Total (%)	Industry (%)	Services (%)
2000-2001	6.18	-1.60	19.38	20.5	14.53	22.68
2001-2002	3.45	5.41	2.98	33.01	17.06	43.30
2002-2003	0.09	-0.76	1.17	23.39	23.93	23.27
2003-2004	4.86	6.87	1.53	36.96	21.74	44.65
2004-2005	7.32	4.71	10.24	34.54	18.04	45.94
2005-2006	11.14	2.98	22.54	11.71	19.52	10.84
2006-2007	5.60	11.03	5.71	6.84	8.81	6.56
2007-2008	20.48	-8.34	25.70	-59.52	-25.36	-32.69

Note. Source: Authors, based on the methodology proposed and statistics on R&D and regional economic accounts. INE, 2009.

Table 9

Contribution of R&D+I (in Terms of Total Annual Productivity) to Spanish and Canary Islands Productivity Growth

	Spain			Canary Islands		
	Total (%)	Industry (%)	Services (%)	Total (%)	Industry (%)	Services (%)
2001	0.20	-0.05	0.64	0.85	0.93	0.84
2002	0.09	0.09	0.09	0.85	0.96	0.83
2003	0.00	-0.02	0.03	0.76	0.75	0.76
2004	0.15	0.23	0.04	0.8	0.86	0.78
2005	0.25	0.22	0.29	0.93	1.04	0.9
2006	0.41	0.11	0.83	0.33	0.29	0.34
2007	0.17	0.12	0.22	0.20	0.17	0.20
2008	0.18	-0.14	0.49	-0.52	-0.57	-0.50

Note. Source: Authors, based on the methodology proposed and statistics on R&D and regional economic accounts. INE, 2009.

Main Findings: A Proposal for Action in Services

The analysis carried out indicates the need of encouraging innovative efforts in the services sector as a means to improve its productivity levels not only with the sector itself but also for the whole economy. In the Canary Islands, with services sharing 81% of the economy, the impact of R&D and innovation could help to reverse the trend in the sector and indirectly the trend in the regional economy.

However, along with the need, there is also an opportunity. As pointed out, innovation expenditures have a significant indirect effect on economic growth. In the case of the Canary Islands, the estimates reflect an impact on GDP growth for the services sector above 20% (12% for the industry and 13% for the whole regional economy). It is interesting therefore to consider future scenarios resulting from a substantial increase with an innovative effort across the regional services sector, as well as the commitment of the public administration, either through proactive R&D and innovation policies and other mechanisms.

In this section, regional services sector will not be considered separate from the rest of the economy. It is assumed that with more than 80% share of the economy, the total impacts are in fact a result of the effect produced by the impacts of that sector. Besides it has also been considered more interesting to analyze the figures for the whole regional economy in order to obtain more representative results.

Two future scenarios have been considered for Canary Islands: one reaching the current level of R&D expenditure in Spain⁷, and the other reaching the target level set in the Lisbon Strategy. In both cases, we can see the significant increase required in the private sector, which rose from 23% to 55% (national average), and 66% (Lisbon strategy target).

Although we have included the R&D contribution of higher education and public administration in the analysis, we will focus specifically on business. In any case, we have distinguished within the business R&D expenditures those funded by public administration but executed by enterprises (mainly related to public support frameworks).

According to the data presented in Table 10, in the first scenario, firms should increase its efforts in R&D in a 373% to 286.7 million euro. Of these 216.5 million euro would be financed by the companies and 70 million euro mobilized from the administration in the form of frameworks and other support activities.

Table 10

Improving R&D Effort in the Canary Islands' Economy 2008

	2008	Ratio R&D/GDP CAN	Exp. R&D (€miles) CAN (A)	Ratio R&D/GDP ESP	Exp. R&D (€miles) New (B)	Difference (A-B) %	Finan Business	Finan Gov.
Scenario 1:	Government	0.30	81,374.00	0.18	94,698.59	0.16	-	-
Reaching the	Businesses	0.23	60,624.00	0.55	286,697.38	3.73	216,571.20	70,126.18
Spanish	University	0.47	126,835.00	0.27	138,925.96	0.10	-	-
average	Total	0.62	268,833.00	1.20	520,321.93	0.94	-	-
Scenario 2:	Government	0.30	81,374.00	0.10	130,080.48	0.60	-	-
Reaching the	Businesses	0.23	60,624.00	0.66	858,531.19	13.16	648,534.46	209,996.73
Lisbon	University	0.47	126,835.00	0.24	312,193.16	1.46	-	-
targets	Total	0.62	268,833.00	3.00	1,300,804.84	3.84	-	-

Note. Source: Authors, based on the proposed methodology, statistics on R&D and regional economic accounts 2009.

In the second scenario (much more ambitious and long term), companies should increase its R&D efforts by 1,316% (€858.5 million). Of this amount, €648.5 million would be financed by the private sector and 209.9 million euro by public administration. Obviously, these figures far exceed the current capabilities of the regional economic structure that would require moving from 0.62% to 1.20% of R&D effort in terms of GDP in the first scenario, and 3% in the second. Besides, the effort required to achieve these targets would be greater in the business sector since it is the least committed sector to R&D in the region (23% vs. 30 administration and 62% of higher education).

However, which effects might be expected with such effort? Table 11 presents an estimate of the effects of innovation effort variables on GDP, productivity and exports. If we consider the business R&D expenditure in the first scenario, total innovation expenditures⁸ will amount to €95.3 million. Using the coefficients of the

⁷ The unavailability of data for innovation expenditure required to use R&D expenditure as a proxy. Although R&D business expenditure do not include all private expenditure, it shows a significant positive relationship (positive correlation).

⁸ Keep proportions R&D Expenditure/Expense Innovation business the latest year available 2008.

previous chapter to analyse the contribution to GDP, we would get additional €2,601.9 million and a growth rate of 8.17%. In terms of productivity, this increase in innovation expenditure would account €2,819/employee, an increase by 7.7%. Exports in turn would increase in €2,352.68 million, a 66.72% more comparing to the previous year.

Table 11

Effects of R&D+I Improvement on GDP, Productivity and Exports in the Canary Islands (Estimates 2009)

	Estimates 2009	Inno. Exp. New (€miles)	% Inno. Exp. Var 08-09	Increase 2008-2009	Increase (%) 2008-2009	Estimated value 2009
Scenario 1:	GDP (€miles)			2,601,901.89	8.17	34,445,516.69
Reaching the Spanish average	Productivity (€)	895,292.32	371.00	2,819.32	7.70	39,452.81
	Exports (€miles)			2,352,689.50	66.72	5,879,124.41
Scenario 2:	GDP (€miles)			9,191,709.36	28.87	41,035,324.16
reaching the Lisbon targets	Productivity (€)	2,682,909.98	1,309.00	9,959.78	27.19	46,593.27
	Exports (€miles)			8,311,319.57	235.69	11,837,754.48

Note. Source: Authors, based on the proposed methodology, statistics on R&D and regional economic accounts 2009.

If we consider the business R&D expenditures in the second scenario, the innovation expenditure would amount to €2,682.9 million. Again, using the coefficients we would get additional €9,191.7 million, and an annual growth rate of 28.87%.

In terms of productivity, the additional expenditures on innovation will increase productivity levels in €9,959 per employee (increase by 27.19%).

Exports in turn would increase €8,311.32 million, a 235.69% more comparing to the previous year.

Although as mentioned in the last chapter, both the projections for the first scenario and the second are difficult to reach (especially the latter) they allow presenting the underlying opportunity considering innovation and R&D efforts as engines of economic growth and competitiveness.

Contrary to the traditional thoughts according to the latest research in the field, the services sector contributes significantly to economic growth and productivity. Thus, as we have seen, the contribution of innovation and R&D efforts to GDP and productivity in services is so high, that it becomes a necessity; an opportunity to promote and further enhance services sector competitiveness.

Therefore, in Canary Islands the potential of improvement regarding R&D and innovation support are considerable. Proactive policies by public administration (for example through R&D support funding) can have very positive effects on productivity gains and competitiveness.

Conclusion

In the context of knowledge economy, it cannot ignore the importance of the service sector for overall economic competitiveness. Although the services sector represents about 70% of developed economies (in terms of employment and value added) and its evolution has contributed significantly to economic growth during the last decade, the services have been traditionally considered residual sectors and they have not been (not even now) a target for the main R&D and innovation policy support. In this context, the paper has questioned the widespread belief of services as a residual sector, both in terms of contribution to growth and productivity, and the impact that knowledge and innovation has in their competitiveness. On the other hand, the

results show the opportunity behind the R&D and innovation support policies for services sector as drivers of competitiveness of the entire economy. Thus, contrary to the traditional thoughts, according to the results achieved comparing Canary Islands and Spanish services sector and manufacturing sector, the first contributes significantly to economic growth and productivity. The results point out that due to the significant contribution of innovation and R&D efforts to GDP and productivity, it becomes a necessity and an opportunity to promote and further enhance services sector competitiveness through a more focused R&D and innovation support. The analysis carried out indicates the need of encouraging innovative efforts in the services sector as a means to improve its productivity levels not only with the sector itself but also for the whole economy.

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Employee Empowerment in the Royal Commission at Yanbu

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The purpose of this study is to find out if there are employee empowerment structures and programs in the Royal Commission at Yanbu; and if so whether they are operative. The research questions are: Is there an operative culture of employee empowerment? To what extent is formal power shared? To what extent is operational information shared? Are there any competency development programs in existence? Are employees supported in pursuance of organizational goals? Respondents were a sample of employees at the head office of the organization. The assessment strategy was a questionnaire of 36 items administered to 10% of employees ranging through all organizational levels. The questions aimed at obtaining evidence of existence of five components of employee empowerment, namely, a culture of employee empowerment, power and information sharing, employee competency development, and employee support. Under each component were a number of elements whose existence and activeness were directly tested by the questions. The responses to each item were rated in a 5-point Likert scale anchored at 1 = strongly disagree and 5 = strongly agree. Data was analyzed by presenting a table of frequencies of responses to each question testing the element(s). An element was considered highly operative if 80% or more of respondents chose the positive responses of agree or strongly agree; and the element was considered operative if between 60% and 79% of respondents chose the two options. If between 45% and 59% of the respondents chose the two options on the scale, the element was considered operative but deflated. If less than 45% of respondents chose the two options, the element was considered inactive or inoperative. The scores of all elements subscribing to an empowerment component were then averaged to find the score of the component. The findings showed that employee empowerment was an active phenomenon in the Royal Commission at Yanbu, albeit not so strong.

Keywords: assessment framework, employee empowerment, royal commission Yanbu directorate

Literature Review

Employee empowerment is difficult to positively define because it takes on different forms in different people and contexts (Zimmerman, 1990, p. 169). A dictionary definition of empowerment—"to give official authority to or delegate legal power to or to commission or authorize (Grove, 1971, p. 744) is similar to Gandz's view that empowerment means vesting decision-making or approval power in employees, where such

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authority was a managerial prerogative (Gandz, 1990, p. 75). However, both definitions fail to encapsulate the entirety of the concept of employee empowerment as the term implies a great deal more than delegation. It is thus our view that a better understanding of employee empowerment can only be derived through exploring and analyzing the different forms it takes in different contexts.

Block (1987, p. 65) views empowerment from the point of view of the party being empowered. According to Block to feel empowered means to feel our survival is in our hands... we have an underlying purpose... we commit ourselves to achieving that purpose now. This definition corresponds with that of Caudron (1995, p. 28) who articulates employee empowerment as "when employees own their jobs, when they are able to measure and influence their individual success as well as the success of their departments and their companies". Implied in both definitions are a number of employee empowerment elements, including clarity of organizational purpose or goals, communication of employee performance through a fair performance evaluation and reward system, employee control or ownership of the job situation and employee commitment. Control and ownership of a job situation necessarily implies job enrichment and job satisfaction.

Bowen and Lawler (1992, p. 32) define empowerment as "sharing with front-line employees four organizational ingredients: information about the organizational performance... knowledge that enables employees to understand and contribute to organizational performance, rewards based on organizational performance, and power to make decisions that influence organizational direction and performance". Bowen and Lawler (1995, p. 73) conclude that research suggests that empowerment exists when companies implement practices that distribute power, information, knowledge and rewards throughout the organization. It should be easy to note that in addition to delegation, Bowen and Lawler identify the same elements of employee empowerment as Caudron and Block above. However, the two authors go on to note that if any of the four elements is zero, nothing happens to redistribute that element, and empowerment will be zero (Bowen & Lawler, 1995, p. 74).

The additive construct of Bowen and Lawler is also evident in Spreitzer's writing, who uses a combination of concepts to define empowerment. Spreitzer (1995) defines psychological empowerment as a motivational construct manifested in four cognitions: meaning, competence, self-determination and impact. One should be able to note the coincidence of the various definitions of employee empowerment around the stated elements. In Spreitzer's definition meaning coincides with purpose or goals, competence coincides with control, self-determination coincides with autonomy or delegation of power and impact with feedback of performance. These four elements reflect an active rather than a passive orientation towards a work role; and they combine additively to create an overall construct of psychological empowerment. Spreitzer says lack of any single element will deflate the overall degree of felt empowerment. Note that while Bowen and Lawler say absence of one element will negate the distributive power of that element, Spreitzer maintains that absence of one element will rather deflate the overall degree of empowerment.

Some researchers provide definitions of empowerment that reflect their empirical observations or concepts that are precursors to empowerment. For example, Menon (1995) indicates, the empowered state as a cognitive state of perceived control, perceived competence and goal internalization. While Menon views empowerment as essentially a cognitive state, which means management can make employees perceive empowerment even in the absence of reality and still derive the benefits of employee empowerment, Conger and Kanungo (1998, p. 471) have assumed empowerment is an active process by which a leader or manager shares his or her power with subordinates. Power in this context is interpreted as actual possession of formal authority or control over

organizational resources. This view of employee empowerment is so common that often employee participation is equated with empowerment. Moreover, the definition supposes that delegation of power over organizational resources is a way of providing resources and support to juniors.

Quinn and Spreitzer (1997, p. 38) indicate that empowerment in an organic sense is about understanding the needs of employees, modeling empowered behaviour, building teams, encouraging risk-taking, and trusting people to perform; while Thomas and Velthouse (1990) maintain that the word empowerment has become popular because it provides a label for a non-traditional paradigm of motivation. In this sense to empower means to motivate or energize.

Linda Hanold indicates that to be successful, each organization must create and define empowerment for itself. Empowerment must address the needs and culture of each unique entity (Hanold, 1997, p. 202). It is not surprising therefore that there are many definitions of employee empowerment. In the same spirit, we propose our own definition and model for understanding employee empowerment.

Our Definition and Model

Our definition of employee empowerment builds on a number of perspectives provided by various authors on the subject including those reviewed above. Employee empowerment is hereby defined as “A process by which a culture of empowerment is evolved, power and information is shared, employee competency is developed, and employee support is provided” (see Appendix A).

The above definition provides the basis of an employee empowerment model that has five interactive components, namely, empowerment culture (EC), power sharing (PS), information sharing (IS), employee competency development (CD), and employee support (ES). Under each component are a number of elements or factors with distributive or multiplicative properties.

The employee empowerment model that derives from the definition resembles a hut with a crown on the roof (see Appendix A). The crown or the apex of the “hut” represents the empowerment benefits as the ultimate goal of any empowerment effort or program. The roof represents the space in which the elements and components of empowerment interact and exchange their distributive, additive and multiplicative powers before releasing empowerment benefits to the organization. The third level of the hut (the walls) consists of the elements of employee empowerment grouped under their respective interactive components. The foundation of the hut is the environmental or cultural basis of empowerment; comprising pertinent organizational values and beliefs. The cultural environment feeds, and sets the tone for, all employee empowerment activities within the organization. The model, thus, maintains that effective employee empowerment should begin with evolution of an organizational culture that is conducive to, and supportive of, employee empowerment. Because organizational culture provides the environment within which empowerment activities take place, the model envisages that employee empowerment is not possible in the absence of conducive organizational values and beliefs. It is the underlying organizational cultural values and beliefs that inform and empower the elements that subscribe to the four empowerment components of power sharing, information sharing, competency development, and employee support.

It should be noted that components and elements of empowerment do not exist in watertight compartments, as they, in fact, are interactive. Components and elements have distributive, additive, and multiplicative properties when interacting with each other. In such a setting, an element of empowerment might as well be listed under more than one component. For example, providing access to organizational resources could be

viewed as a way of sharing power as well as a way of providing support to employees. The model also supposes that the process of employee empowerment necessarily begins with addressing the elements before components are addressed. Should one element be absent or not addressed, the empowerment process loses the distributive power of the element, resulting in a deflationary effect on the component and the empowerment benefits as a whole.

Empowerment Culture (EC): Values, Beliefs (and Assumptions)

Edgar Schein defines organizational culture as a pattern of basic assumptions... that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems (Schein, 1985, p. 9). These assumptions are a set of shared values and beliefs that are ingrained in the employees' mindset and subconsciously determine the way they behave, perceive and respond. Gandz (1990, p. 75) indicates that culture as "a set of shared values is needed and that beliefs about the way things should be done, the standards of behavior that are appropriate and the ethics of organizational actions do compel and propel behaviour". Quinn and Spreitzer (1997, p. 40) also indicate that empowerment must be defined in terms of fundamental values, beliefs, and personal orientations.

Therefore, organizations that will have efficacious empowerment programs are those that have conducive values underpinning the empowerment efforts. Among these values are respect and appreciation for individual employees and the value they bring to the organization. Values alone do not make up an organization's culture, and respect for individuals is only one of the outward signs of an empowered culture. Organizational structure and reward systems are also basic assumptions that are part of the organization culture. Schein (1985, p. 244) supported this view by maintaining that culture affects most of the aspects of an organization—its strategy, its structure, its processes, its reward and control systems, and its daily routines. Other cultural values are belief in devolution of power, participation of employees in goal formulation and decision-making, and information sharing. Another basic assumption is whether individuals or groups (teams) should be rewarded for their efforts. Many organizations value individualism, but if teams are being promoted as a tool of empowerment and, on the other hand, individuals are being rewarded for the work of the team, then employees will unconsciously (or consciously) pick-up on the cultural norm and will be reluctant to dedicate themselves to the idea of team approach where their work may not be recognized and rewarded. Mallak and Kurstedt (1996) writes, "Managers who understand how empowerment integrates with organizational culture are motivated to lead employees... and help them internalize the values and traditions of empowerment (1985, p. 244)".

Power Sharing (PS)

In an empowered organization the managers and supervisors take on different roles than they normally would in most organizations. One aspect of the role change is devolution of power and authority through the process of delegation down to lower levels of the organization and finally to empowered teams and individuals. Conger and Kanungo (1988) suggested that, like the concept of power, empowerment can be viewed in two ways. First, it can be viewed as a relational construct which implies the delegation of power. For instance Burke (1986) argued that to empower implies the granting of power and delegation of authority. Similarly, Sewell and Wilkinson (1992) suggested that for the use of the term empowerment of members to be meaningful, there must be a genuine shift in the locus of power away from management and to the shop floor.

Moreover, empowerment delegation implies a great deal more than delegation of authority to juniors, as it implies granting access to organizational resources necessary to pursue organizational goals. If employee

empowerment is to be implemented successfully, controls over the resources must be removed and resources should be placed under the empowered employees' control. Resources include funding, materials, support staff, and expert advice on which the employee can draw (Ward, 1996, p. 22). Caudron (1995, p. 31) notes, once both employees and managers have received proper training, the next step is to give employees control of the resources needed to make improvements. Bowen and Lawler (1995) describe what happens if insufficient resources are provided. Relying on people to provide improvements without resources is called the human resources (HR) trap. The HR trap occurs when managers expect their front-line people to provide better and better service without simultaneously providing the necessary resources (Bowen & Lawler, 1995, p. 82). Release of control to employees demonstrates management trust and confidence in their competence which is very empowering. Power sharing is also achieved through job enrichment. Job enrichment increases job depth, which refers to the ability and power an employee has to influence his or her work environment. It refers to the amount of discretion or decision opportunities an employee has in a job.

Information Sharing (IS)

Information is what organizational culture is made of and is the gatekeeper to power. People without information cannot act responsibly and if information shared is zero, nothing happens to redistribute empowerment; and empowerment will be zero (Bowen & Lawler, 1995, p. 74). Communication and information are the lifeblood of empowerment (Ginnodo, 1997, p. 12). In the absence of information employees do not know the ramifications of their actions and therefore are not responsible. Caudron (1995, p. 28) in reporting about how to get the best from employees in Eastern European countries, he indicated that managers gave employees information about the business, invested in new skills training, set goals for employees and gave them ongoing feedback on how they were meeting those goals.

The importance of sharing information and effective communication about goals and plans, successes, and failures cannot be undervalued (Byham, 1997, p. 27). Randolph (1995, p. 22) shows research revealed that people who have information about current performance levels will set challenging goals—and when they achieve those goals they will reset the goals at a higher level. Spreitzer (1995) provides additional evidence of this value when she notes in her hypotheses that access to information about the mission of an organization, the performance of a work unit, and individual performance-based reward system are positively related to psychological empowerment. Spreitzer (1995, p. 1448) supports the hypothesis further by saying that information about mission is an important antecedent of empowerment because it helps to create a sense of meaning and purpose, and it enhances an individual's ability to make and influence decisions that are appropriately aligned with the organization's goals and mission.

An important element in information sharing is feedback about the employee's effectiveness. To make employee empowerment work, not only do we need to give them information about their own work, we must also give employees information about the business and let them know how their work fits in. Everyone wants to feel they are doing something of value. When you demonstrate the value that individuals bring to the business, people want to grow (Caudron, 1995, p. 29).

Effective information-sharing does not only imply effective organizational communication structures but also an effective management information system and information technology. It is imperative in a modern business environment to capture data and disseminate information for decision-making in a timely and empowering manner.

Competency Development (CD)

In order to implement employee empowerment, the employees must be competent. Competency goes beyond developing job-task specific knowledge. Bowen and Lawler (1995, p. 80) cite the importance of training in which employees are familiarized with how their jobs fit into upstream and downstream activities. It does not make sense to empower employees to do things such as to make decisions or to approve or to initiate action if they are not properly trained (Gandz, 1990, p. 76). Caudron (1995, p. 32) indicates that once employees understand what needs to be done to improve the company they must have all the skills and resources necessary to be able to accomplish those improvements. Ginnodo (1997, p. 13) indicates that empowerment training is more than remedial; it prepares people for collaboration and higher level performance for the future. Ettore (1997, p. 1) defines empowerment as employees having autonomous decision-making capabilities and acting as partners in the business, all with an eye to the bottom-line implications. Training does not come cheaply. Organizations seeking to empower employees through training should see to it that their training and development budgets are not underfunded.

Employee Support (ES)

Empowerment techniques and strategies that provide emotional support for subordinates and that create a supportive and trusting group atmosphere can be more effective in strengthening self-efficacy beliefs (Conger & Kanungo, 1988). Support can also take the form of recognizing and rewarding improvement efforts and success (Ginnodo, 1997, p. 8). Reward and recognition systems... build pride and self-esteem (Byham, 1997, p. 27). Quinn and Spreitzer (1997, pp. 46-51) raise other aspects of support by noting that the fourth lever (of effecting empowering changes) is support and a sense of security. Every employee should have one or more sponsors who provide training, act as coach or mentor, and advocate with the compensation committee for the employee's pay increases. The sponsor tracks the employee's progress, providing help and encouragement... A sponsor is a friend and an associate. All the aspects of friendship are also present. Malone (1997) asserts that managers should act as coaches and help employees to solve problems in organization. Managers empower their subordinates by delegating responsibilities and assisting them when they have problems. This makes subordinates more satisfied with their managers in return they will perform to the manager's expectations. Employees need to be assisted in the process of empowerment. Managers frequently use coaching as one of the strategies in making empowerment successful in organization.

Employee empowerment significantly enhances job involvement, job satisfaction; career satisfaction and organizational commitment (Noorliza et al., 2006). Employee empowerment makes employees feel that they are valued in organizations and will create a high degree of job satisfaction and commitment. Employees are motivated by both intrinsic and extrinsic rewards.

Benefits of Employee Empowerment

Literature is abounding with evidence of employee empowerment benefits for organizations that implement it effectively. Kanter (1979, p. 73) indicates that organizational power can grow, in part, by being shared. By empowering others, a leader does not decrease his power; instead he may increase it. Kanter then uses the logic that the productive capacity of nations, like organizations, grows if the skill base is upgraded. Bowen and Lawler provide research evidence which shows that practices such as gain sharing, communication programs, work teams, job enrichment, skill-based pay, and so on has shown the results of these practices are consistent and positive. They go on to provide research evidence that empowerment may have a positive impact

on a number of performance indicators. Respondents report that empowerment improves workers' satisfaction and quality of work life. Quality, service, and productivity are reportedly improved as a result of employee involvement efforts in about two-thirds of the companies. Approximately one-half of the companies also report that profitability and competitiveness have improved; this is supported by the finding of a relationship between empowerment and the firms' financial performance (Bowen & Lawler, 1995, p. 75)

For those seeking softer evidence, Bowen and Lawler (1992) indicate empowered employees provide quicker on-line responses to customer needs during service delivery; quicker on-line responses to dissatisfied customers during service recovery; employees feel better about their jobs and themselves; employees will interact with customers with more warmth and enthusiasm. Randolph (1995, p. 22) indicates that a more subtle, yet very powerful benefit of employee empowerment was increased trust in the organization. People who have information about current performance levels will set challenging goals and when they achieve those goals they will reset the goals at a higher level (Randolph, 1995, p. 23). A number of authors also indicate that the increasing competitiveness of the global marketplace calls for better service and the benefit of drawing upon the entire pool of employees for creative ideas (Bowen & Lawler, 1992; Gandz, 1990).

Empowering employees has shown to improve efficiency and reduce costs on the assembly line in a transmission plant (Suzik, 1998). Employee empowerment leads to job satisfaction, job involvement, loyalty, higher performance and faster service delivery to customers (Fulford & Enz, 1995). Empowered employees make quick decisions and suggestions that improve quick service delivery in their sphere of operations and this saves a lot of money and time in organization (Sitterly, 1998). In addition, empowered employees provide exceptional customer service in several competitive markets and improve the profits of the organizations through repeated business (Bourke, 1998). Besides, employee empowerment promotes good relationship between the employee and the customers and the end result will be promoting good image of the organization in the environment (Potochny, 1998). Other benefits of employee empowerment in organization include reduced workload of the top management, improving training of employees and boost their morale. Employee empowerment fosters competitive climate and facilitates change in organization. In practice empowered employees have a high sense of self-efficiency, are given significant responsibility and authority over their jobs (Conger & Kanungo, 1988; Ford & Fottler; 1995; Quin & Spreitzer, 1997).

Case Study: Assessment of Employee Empowerment in the Royal Commission (RC)—Yanbu Directorate

Assessment Framework

Literature has many frameworks for assessing employee empowerment in organizations, including frameworks provided by Conger and Kanungo (1988, p. 474), Byham (1997, p. 25), Bowen and Lawler (1992, 1995). Our assessment method borrows from numerous frameworks. For example, from Quinn and Spreitzer (1997) we adopted the approach of establishing organizational characteristics that facilitate employee empowerment. From Randolph (1995), we adopted the approach of conducting a survey to determine if the empowering organizational characteristics or elements were present in an organization.

The strategy for assessing employee empowerment in the RC was a questionnaire of 36 items administered to 10% of employees ranging through all organizational levels during the month of September 2009. The responses from participants were allocated in a 5-point Likert scale of strongly agree, agree, not sure, disagree, and strongly disagree. The aim of the survey was to test the presence of employee empowerment in

the Royal Commission and, thus, whether employee empowerment benefits accrued to the organization. Underpinning the questionnaire were the employee empowerment elements or characteristics sought to be established; grouped under specific empowerment components. The responses to the questions corresponding to each element indicated whether the characteristic or element was highly operative, operative, deflated, and inoperative in the organization. If an element was operative it was concluded the benefits of empowerment accrued to the organization on the basis that so far no research provides evidence that where empowerment was active there could be no empowerment benefits deriving. Rather the evidence is that where an element is absent, the empowerment process only loses that element's distributive power; which may in turn only deflate the overall empowerment.

An element was considered highly operative if 80% or more of respondents chose between the two options of agree or strongly agree in the Likert scale; and an element was considered operative if between 60% and 79% of respondents chose the two options. If between 45% and 59% of the respondents chose the two options in the scale, the element was considered operative but deflated. If less than 45% of respondents chose the two options, the element was considered inactive or inoperative.

After summing and averaging responses to questions relating to individual elements, data analysis resulted in conclusions on empowerment components tabulated in Table 1.

Table 1

Summary of Data Analysis Results and Conclusions (See Appendix B)

Component tested	Mean % age score ("agree" or "strongly agree") of elements	Comment
Power sharing	62	Component is operative, but approaching deflation
Information sharing	68.3	Component is operative
Competency development	62.8	Component is operative
Employee support	65.8	Component is operative
Empowerment culture	60.4	Component is operative, but close to deflation point

At 68.3, information sharing seems the most operative element of employee empowerment in the RC; yet there is room for improvement on this component as well. Power sharing, competency development, and employee support are operative but necessarily low due to a weak culture of employee empowerment in the organization; which approaches deflation. Culture, as represented by organizational values, beliefs and assumptions forms the basis upon which all organizational processes are founded and sets the tone of all other activities. However, the overall employee empowerment efforts in the RC are at a level that guarantees some benefits to the organization. The extent to which empowerment benefits accrue cannot be determined. The data collection and analysis methods used are not capable of determining the extent. What is clear, though, is that the empowerment process is deflated and, therefore, empowerment benefits are not fully realized. For example the competency development component approaches a point of remarkable deflation because the element "training and development" under it was nearly inoperative and thus lost its distributive and multiplicative powers.

Limitations

The limitations of this research mainly relate to use Likert scales as data collection methods. Likert scales may be subject to distortion from several causes, including:

- Central tendency bias—Respondents tending to avoid using extreme response categories;

- Acquiescence bias—Respondents tending to agree with statements as presented;
- Social desirability bias—Respondents trying to portray themselves or their organization in a more favorable light.

Moreover, the data analyzed is cross sectional. It is envisaged more reliable positions would have been obtained had the data been collected over a period of time, since attitudes change with time.

Conclusion

Even though employee empowerment should mean different things to different people, it is clear numerous benefits would accrue to any organization and its employees by having the employees empowered in their work roles. The main strategies of employee empowerment recommended here are information and power sharing, development of employee competencies, support for employees in their work roles and workplace in general, and maintenance of a potent culture of employee empowerment.

This article should contribute to existing literature on employee empowerment and inspire human resource management academicians and practitioners to adopt the perspective shared by its authors in dealing with the question.

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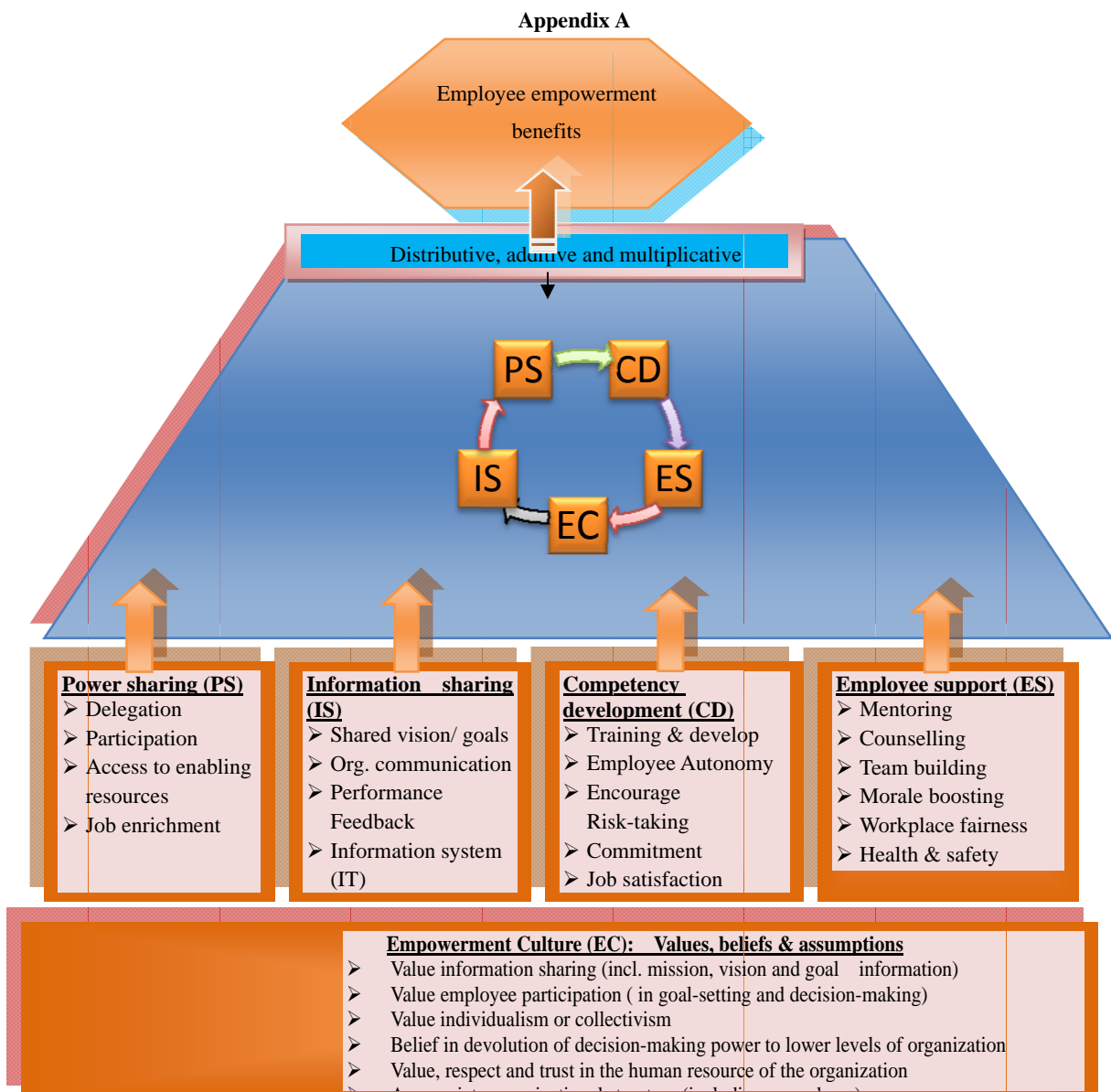


Figure A1. The employee empowerment model.

Appendix B

Table B1

Employee Empowerment Elements Frequencies and Components Averages

Element/Component tested	Corresponding question(s)	Average % age score	Conclusion
Power sharing		62	Operative
Delegation	23 & 26	60.5	Operative
Participation	24, 25 & 27	57.3	Deflated
Access to enabling resources	26	62.5	Operative
Job enrichment	23 & 32	67.5	Operative
Information Sharing		68.3	Operative
Communication	28, 29 & 30	73.3	Operative
Shared vision/goals	1, 2, 3, & 5	75.2	Operative
Feedback	8 & 27	69.5	Operative
Information system	4	55.1	Deflated
Competency development		62.8	Deflated
Training and development	34 & 35	38.2	Inoperative
Autonomy	32	76.3	Operative
Encourage risk-taking	25, 32, & 34	58.4	Deflated
Commitment	5 & 6	63.1	Operative
Job satisfaction	10 & 36	78.1	Operative
Employee support		65.8	Operative
Mentoring	12 & 18	65.7	Operative
Counseling	18 & 33	58.8	Deflated
Team building	20, 21, 22, & 23	57.5	Deflated
Morale building	8, 10, & 11	73.4	Deflated
Fairness	13 & 14	65.3	Operative
Health & safety	31 & 33	74.2	Operative
Empowerment culture		60.4	Operative
Value and trust workers	17 & 19	73.1	Operative
Value information sharing	28, 29, & 30	73.4	Operative
Value employee participation	24, 25, 26, & 27	58.5	Deflated
Belief in devolution of power	23 & 26	60.6	Operative
Individualism and collectivism	16	36.5	Inoperative

Celtic Tiger and Celtic Cat

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This paper analyzes the relationship between the business schools and the economic growth in two areas, Ireland and Galicia. In the last few years, many studies have been carried out on the Celtic Tiger miracle, i.e., on the spectacular economic growth Ireland experienced between 1995 and 2007. All the studies agree on the key factors that explain this progress, including the commitment to specialized training designed to guarantee the competitiveness of its companies at an international level, in particular in the technology, chemical/pharmaceutical and food and agricultural sectors. Given the limitations of its domestic market, all entrepreneurial initiatives linked to these areas have targeted export markets, and these efforts have received government's support and been reinforced by a close collaboration between universities and the business world. Within this context, business schools have played a crucial role given their close ties to business, not only as far as supplying skilled labor, but also by providing business advice as well as a space that serves as a meeting point for entrepreneurs. This situation has fostered the development of a modern, dynamic and, above all, enterprising entrepreneurial culture. The close links between Ireland and Galicia (a Celtic region in the north-west of Spain) are due to geographical, historical and cultural factors; however, this is not the case in terms of their evolution over the last few decades. This paper aims to contribute to a better understanding of the Celtic Tiger miracle through a study of Irish business schools that analyses their efficiency and compares this to that of their counterparts in Galicia during the 1997-2002 period in order to determine if, as in the case of their economies, there are any significant competitive differences.

Keywords: higher education, business schools, efficiency, competitiveness

Introduction

The Irish miracle ended abruptly in 2008 when the global crises erupted leading to a sharp recession and a significant increase in unemployment. More than a decade of spectacular progress and economic growth during which the Celtic Tiger had roared louder than ever was gone. This golden age of the Irish economy was driven by the simultaneous occurrence of several factors. On the one hand, Ireland chose to join the euro which encouraged certain US-based companies with close ties to the island to set up business in Ireland instead of the UK to avoid exchange risks when operating inside the euro zone. The presence of large multinationals was further favored by the low fiscal pressure applied in the case of these corporations and the unconditional support of institutions of higher education which not only served as a source of highly qualified workers, but also became enterprise partners and consultants for these large corporations. This

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synchronization of educational and economic development has been particularly important in the areas linked to the activity of the multinationals that set up business in Ireland, such as the computer and pharmaceutical industries. Irish business schools have played a key role in this development as the fundamental support reinforcing the links between multinationals, the Irish economy and the rest of Europe. In addition to these circumstances, in the last few years this economic boom took place along with an unprecedented growth in the real estate market.

This is directly in line with the role Europe has assigned to higher education in the 21 century. Higher education has evolved from being important to playing a crucial role once Europe adopted the objective of designing a “Europe of Knowledge” (European Commission, 2003) where higher education becomes a strategic element in gaining a competitive edge for economies in the 21st century, at the same time, this would allow social and economic standards obtained in the last century to continue and improve. In its 2004 report on the financing of higher education the European Research Associates recognise increasing efficiency as one of the five objectives that the new measures adopted by the members must try to achieve. These targets are, namely, increasing absolute levels of funding, diversifying the sources of revenue at the university’s disposal, providing additional funds to guarantee excellence in research and education and increase its appeal abroad, increasing the amount of financial assistance provided to students, and increasing efficiency.

Efficiency and Competition in Higher Education

Although it is generally accepted that the market alone does not yield globally desirable social outcomes, it seems that public provision of free higher education does not succeed in accomplishing this goal either. Research by several authors indicates that free higher education is neither efficient, as it leads to a situation characterized by an oversupply, nor equitable. The majority of analysts consider this indisputable (Franck & Schönfelder, 2000). These authors maintain that the greater part of the problems the university system faces would be resolved by increasing competition among universities and allowing less regulation of the higher education market so that it could behave more like a free market: less regulation and greater autonomy would increase competition at the university level which, in turn, would increase efficiency. However, competition increases efficiency only if certain conditions are applied. The author affirms that competition is positive only if the university is able to inform its potential clients regarding its level of quality. But providing information at the level of quality is a difficult issue—all the university can do is provide indirect or symbolic indicators of this quality, in other words, it can offer signals of quality. A well-established ranking of universities is indispensable so that those in the top positions can use symbols that indicate their quality. This ranking does not only depend on the intellectual quality of the universities, but also on their wealth. If the market for higher education is indeed hierarchical (Winston, 1999), then the competition will allow universities in the top positions to use signals of quality, if it was not this type of market, quality could not be an indicator and the market would fail.

As previously mentioned, Irish universities have accepted the challenge and taken on the role Europe has awarded them in the new century. Despite their public character, which makes them dependent on government funding to a large extent, in recent years universities and business schools in particular have opted to compete not only at the national level, but also internationally. The legislation regulating universities grants them a great deal of autonomy which they have taken advantage of in order to expand their horizons and find additional

funds, whether this could through European research funding, collaboration agreements with companies, or efforts to draw students from outside the EU, especially from Asia, as in these cases university fees are significantly higher than those of students from within the EU. In addition to increasing and diversifying funds, promoting excellence in research and efficient management of resources have also proved fundamental. In fact, in the last few years a more professionalized model of management based on results has been instated in which decentralisation and cost—consciousness have been key factors. Business schools in particular have made an important effort to obtain international accreditation used as a mark of quality worldwide. In contrast, Spanish universities have maintained their chronic resistance to change showing not clear signs of opening up or improving management due in part to the lack of incentives for facing new challenges available within the existing excessively bureaucratic model. Given this climate, in 2001 new legislation regulating universities was passed (for the first time since 1983) which was modified in 2004 and designed to change the university model in place to make Spanish universities more competitive in the 21st century.

The Analysis of Irish and Galician Business Schools

This work analyzes technical efficiency in three public business schools during the period of 1997-2002, one in Ireland and two in Spain. In addition to being public institutions, they also share a similar system of financing, but operate within a notably different regulatory framework. In Spain university legislation is much more exhaustive and interventionist than that in Ireland (Fernández, 2011). Moreover, the cost per student in Ireland and Spain is also very similar. The Council for University Coordination (CCU—“Consejo de Coordinación Universitaria”) reports that, in 2003, the cost of higher education in Spain for each student was 10,181 euros and 10,634 in Ireland.

The Irish business school presented in our case study is the largest and best ranked internationally. Located in Dublin, it is the only business school in Ireland to hold the “triple crown” of accreditation by EQUIS (the European Quality Improvement System), AACSB International and AMBA. EQUIS is the most important accreditation awarded by the associations of management and business in Europe. AACSB (the Association to Advance Collegiate Schools of Business) is the American accreditation awarded to business schools such as Harvard, Cornell, Columbia and Stanford. The AMBA (the Association of MBAs) accreditation is the global standard for all MBA programmes. The two Spanish business schools this work examines are two faculties of Economics and Business Sciences in Galicia¹ that have not been awarded the accreditations cited above. This indicates little interest on the part of these intuitions in participating in the international rankings that would allow them to compete in the international market.

The analysis focuses on the loss of efficiency in two equivalent degree programmes² taught at the institutions referred to above: the Irish Bachelor of Commerce degree and the Spanish degree in Business Administration and Management (“Licenciado en Administración y Dirección de Empresas”). In addition to the Bachelor of Commerce programme in Spain, its international version is also included in this case study.

¹ In Galicia (a Celtic region in the north-west of Spain) there are three public universities, each of which includes a Faculty of Economics and Sciences. However in 1997 only two universities offered the five-year degree in Business Administration and Management (“Licenciado en Administración y Dirección de Empresas”).

² The Bachelor of Commerce degree and the “Licenciado en Administración y Dirección de Empresas” degree are considered equivalent on the basis of the recognitions that the Spanish Ministry of Education has awarded to the Bachelor of Commerce graduates in the last 10 years.

In this work we consider that there is one single output: graduates. Rao and Tikkiwal propose an efficiency indicator for courses, programmes and degrees offered by educational institutions based on the estimate of the wastage of efficiency during and after the educational process which is considered to focus on the production of a single output: the student who completes the programme under examination (Rao & Tikkiwal, 1966). The most important difficulty in elaborating this indicator is that it requires access to very specific data about the cohorts, which are understood to be the group of students that begin the programme of study to be analysed at the same time. Needless to say, the analysis must be carried out once students have completed the programme. According to the Rao-Tikkiwal indicator, the efficiency of a programme, course or degree would be inversely proportional to the wastage of efficiency incurred, and wastages may take place during the period of study (wastage of internal or primary efficiency) or afterwards (wastage of external or secondary efficiency):

- Internal efficiency would be the measure of the proportion of students who complete the coursework and the time it takes to do so;
- External efficiency would be derived from the evidence that the skills and knowledge acquired as a result of their education and training serve to enter the labour market and obtain a position in line with their educational background or serve as a springboard to higher levels of education;
- Wastage of internal efficiency is due to desertions during the period of study, which refers to students who leave before completing the programme, and stagnation, which is produced when students take longer to complete their studies than the period of time stipulated;
- Wastage of external efficiency refers to the extent to which graduates are not able to embark on postgraduate study or are unable to join the profession their training has prepared them for.

In various countries, students frequently take significantly longer to complete certain degree programmes than what is theoretically stipulated (Ortiz, 2003). This implies not only an inefficient use of both human and material resources and consequently economic, but in terms of our analysis, it leads to the existence of members of the cohort who are still in the programme at the same time as the analysis is being carried out. The author introduces a new category for those students who are still in the programme at the beginning of the analysis. This group would be included as part of the total number of students whose progress is characterised as stagnant, along with those who take longer to complete the course than the expected number of years. According to this the measures of the different types of wastage would be defined as follows:

$$W_d = \frac{U_1}{U}$$

$$W_s = \frac{U_2 + U_4}{U}$$

$$W_{fs} = W_d + W_s$$

$$W_{ss} = \frac{U_3}{U}$$

$$W_t = W_{fs} + W_{ss}$$

where:

W_d = measure of wastage due to dropouts;

W_s = measure of wastage due to stagnation;

W_{fs} = measure of wastage at the first stage (internal inefficiency);

(Table 1 continued)

	IU1 Cohorts					IU2 Cohorts				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
U_1	53	80	21	61	86	23	31	22	20	32
U_2	53	50	33	61	50	13	7	8	5	18
U_3	0	0	0	0	0	0	0	0	0	0
U_4	0	0	8	0	0	0	0	0	0	6
U	928	868	824	875	910	372	370	366	385	348
W_d	0.057	0.092	0.025	0.070	0.095	0.062	0.084	0.060	0.052	0.092
W_s	0.057	0.058	0.050	0.070	0.055	0.035	0.019	0.022	0.013	0.069
W_t	0.114	0.150	0.075	0.139	0.149	0.097	0.103	0.082	0.065	0.161

Table 2

Indicator Calculations (Galician Programmes)

	GU1 Cohorts					GU2 Cohorts				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
K	10	9	8	7	6	10	9	8	7	6
d	5	5	5	5	5	5	5	5	5	5
N	406	406	390	411	392	337	368	366	297	178
N_1	51	55	41	48	35	32	36	32	44	14
N_2	149	147	141	80	36	107	106	82	36	13
N_3	173	163	128	175	167	171	191	198	158	93
N_4	33	41	80	108	154	27	35	54	59	58
M	0	0	0	0	0	0	0	0	0	0
U_1	554	423	208	401	351	542	572	528	413	243
U_2	337	314	270	128	36	272	240	156	56	13
U_3	0	0	0	0	0	0	0	0	0	0
U_4	330	369	640	756	924	270	315	432	413	348
U	2,221	2,116	2,028	1,925	1,666	1,779	1,837	1,686	1,282	739
W_d	0.249	0.200	0.103	0.208	0.211	0.305	0.311	0.313	0.322	0.329
W_s	0.300	0.323	0.449	0.459	0.576	0.305	0.302	0.349	0.366	0.488
W_t	0.550	0.523	0.551	0.668	0.787	0.609	0.614	0.662	0.688	0.817

The results indicate significant differences in efficiency between Irish programmes (see Table 1) and Galician programmes (see Table 2). In the first case, the loss of efficiency (W_t) only exceeds 0.15 for one of the cohorts in one of the programmes. However, in the second case, the loss of efficiency is systematically higher than 0.5; in some cases even rising above 0.8. These differences are the result of loss of efficiency due to students who drop out (W_d) as well as due to stagnation (W_s). This reflects the lower motivation of students attending the Galician universities in the study. This lack of motivation may be explained by the lower opportunity cost incurred by Galician students (since both job opportunities and salaries are lower in this region than in Ireland). Another reason for this lack of motivation could be that stagnation is culturally more acceptable in the Spanish context. The similar results obtained in the case of the two Irish programmes (IU1 and IU2) and by the two Galician programmes (GU1 and GU2) are certainly worth noting. This parallelism, which to a certain point was to be expected, further reinforces the validity of the results obtained.

The study focuses on internal efficiency since the Galician government only provides aggregated data on external efficiency for the three public universities in Galicia. The Agency for Quality Assurance in the Galician University System report (ACSUG, 2008) estimates that the percentage of graduates in 2004 in the area of business (which encompasses degrees in Business Administration, Economics, and the diploma in Management Science) from the Galician universities who find a job in the first three months after graduation is approximately 57%; 80% do so within the first six months, and 92% in the first year. According to the data provided by The Higher Education Authority (HEA, 2009), only 2% of the graduates from the Irish institution were looking for employment nine months after completing their degrees. Although it is true that the data employed are not homogeneous, and, consequently, this makes it difficult to compare the data, it is equally true that nothing indicates that the loss of external efficiency in the Galician institutions is less than for the Irish, where it is practically non-existent.

Conclusion

The results obtained clearly indicate that the two Irish programmes have similar values in terms of loss of efficiency as do the two Galician institutions when compared with each other. However, the Irish programmes are evidently more efficient than those taught in Galician institutions. The high efficiency of Irish programmes allows these to supply the business sector the highly skilled labor force it demands by adhering to international standards of quality with hardly any loss of efficiency due to stagnation or drop outs. These results in an effective use of the resources invested in the entire educational process. The fast rate at which highly qualified graduates are generated and the fact that these graduates are prepared for either entry into the labor market or post graduate study is a clear sign that the dynamic and competitive nature of the Irish business environment is reflected in Ireland's higher education system. One reason for the lack of competitiveness in business schools in Galicia may be the system of financing where, to this day, negotiation with government authorities (closely linked to inputs) continues to be more important than financing tied to objectives (linked to the outputs generated). This, along with exhaustive regulation, where bureaucratic and administrative aspects remain an important part of the process while the evaluation of results is avoided, is also part of the problem. The fact that the present labor market in Galicia is not as promising for university students as it is in Ireland may also contribute to this situation.

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China-USA Business Review
Volume 11, Number 5, May 2012

David Publishing Company
9460 Telstar Ave Suite 5, EL Monte, CA 91731, USA
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