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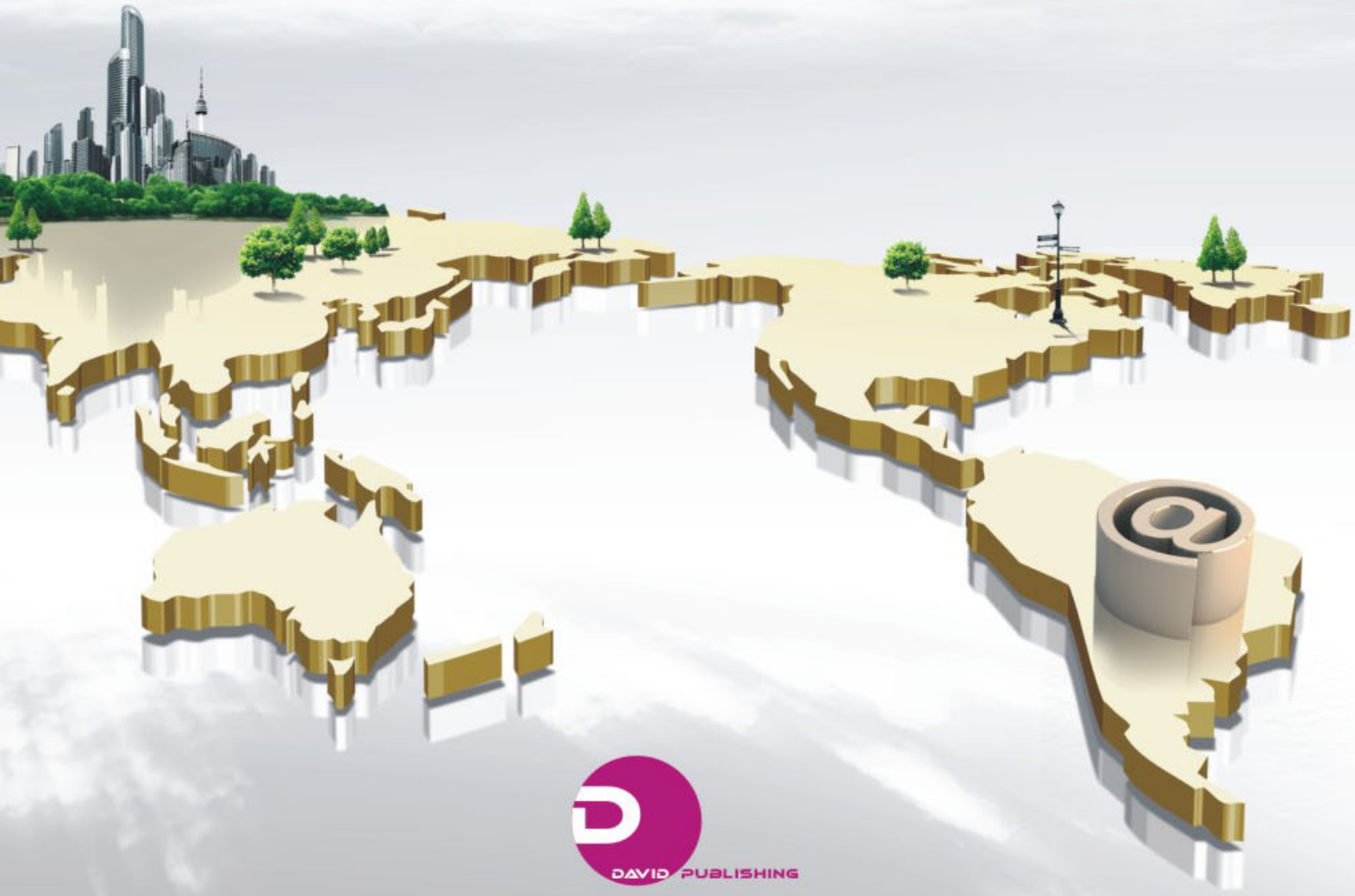

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Analysing Mechanism of an Economic Phase

Eizo Kinoshita, Takafumi Mizuno
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In this paper, we define the thetical and antithetical phases of macroeconomy on a formal basis. And we formulate a bubble economy and its collapse by using these definitions. The concept of thetical and antithetical phases is introduced into economics by Kinoshita. In the course of discussion, we also make clear the difference between economic growth and bubble economy, while describing a mechanism of collapse of a bubble economy by using a simple macro-economic model instead of a specific model. As a result, we can analyse not only the state of thetical economy phase, and antithetical economy phase, but also bubble economy phase and bubble bursting economy phase. And we can describe mechanism of transitions among four economic phases.

Keywords: macroeconomics, thetical economy, antithetical economy, bubble economy, bubble bursting economy, economic phase

Introduction

According to Kinoshita, there are two phases in macroeconomy, and he named these phases thetical economy and antithetical economy (Kinoshita, 2009b, 2011a, 2012; Kinoshita, Suzuki, & Sugiura, 2012). Kinoshita also identified corporate behavioral principles and governmental principles by applying the mechanism of primal and dual problem in linear programming (Kinoshita, 2009a, 2011a, 2012; Kinoshita, Suzuki, & Sugiura, 2012), which led to bringing about the concept of thetical phase and antithetical phase in macroeconomy. While summarizing the relations between thetical phase and antithetical phase in "The Theorem of Duality in Macroeconomics", Kinoshita clarified duality in the role of market and that of government (Kinoshita, 2004, 2009a, 2011a, 2012; Kinoshita, Suzuki, & Sugiura, 2012). Furthermore, Kinoshita described the processes of occurrence and collapse of a bubble economy from the angle of the above-mentioned phases (Kinoshita, 2010, 2011c).

In this paper, we define thetical and antithetical phases, using formulas which are not based on a specific model. We also define a bubble economy and its collapse by using the formulas. Furthermore, we show what these phases, or economic bubble and its crashing, signify by applying a simple model of macroeconomy.

Notes

In this paper, variable Y denotes gross domestic product, variable D represents total demand, variable C indicates total consumer spending, variable a expresses consumption coefficient, and variable I signifies capital expenditure of economic entities (corporations, etc.) in macroeconomics.

The state of an economy is shown in Y-D space, and Y-axis expresses values of gross domestic product (Y),

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while values of total demand (*D*) are also shown by *D*-axis. A state of an economy is expressed as a pair of values *Y* and *D* such as (*y*, *d*) where y signifies any value of *Y* and d denotes any value of *D*.

Simple Model of Macroeconomy

In this paper, we adopt a simple model of macroeconomy as a concrete model for the purpose of explaining abstract definitions, which is shown as:

$$D = C + I$$
$$C = aY$$

In this model, variable a and variable *I* are exogenous variables. We are interested in demonstrating how these exogenous variables affect the endogenous variable *Y*.

Thetical Phase and Antithetical Phase

Kinoshita proposed two economic phases in macroeconomy, or thetical phase and antithetical phase (Kinoshita, 2009b, 2011a, 2012; Kinoshita, Suzuki, & Sugiura, 2012). These phases are described as subsets of *Y*-*D* space. Thetical phase is a set of points in *Y*-*D* space:

$$\text{Thetical}(y_0) = \{(y, d) | \, y > y_0 \text{ and } d \geq y\}$$

Antithetical phase is a set of points in *Y*-*D* space:

$$\text{Antithetical}(y_0) = \{(y, d) | \, y < y_0 \text{ and } d \leq y\}$$

Elements of these subsets are affected by y_0 whose supply is equal to an economic equilibrium point, or a full employment income. In the simple model of macroeconomy, thetical phase and antithetical phase are represented by two triangle areas shown in *Y*-*D* plane (see Figure 1).

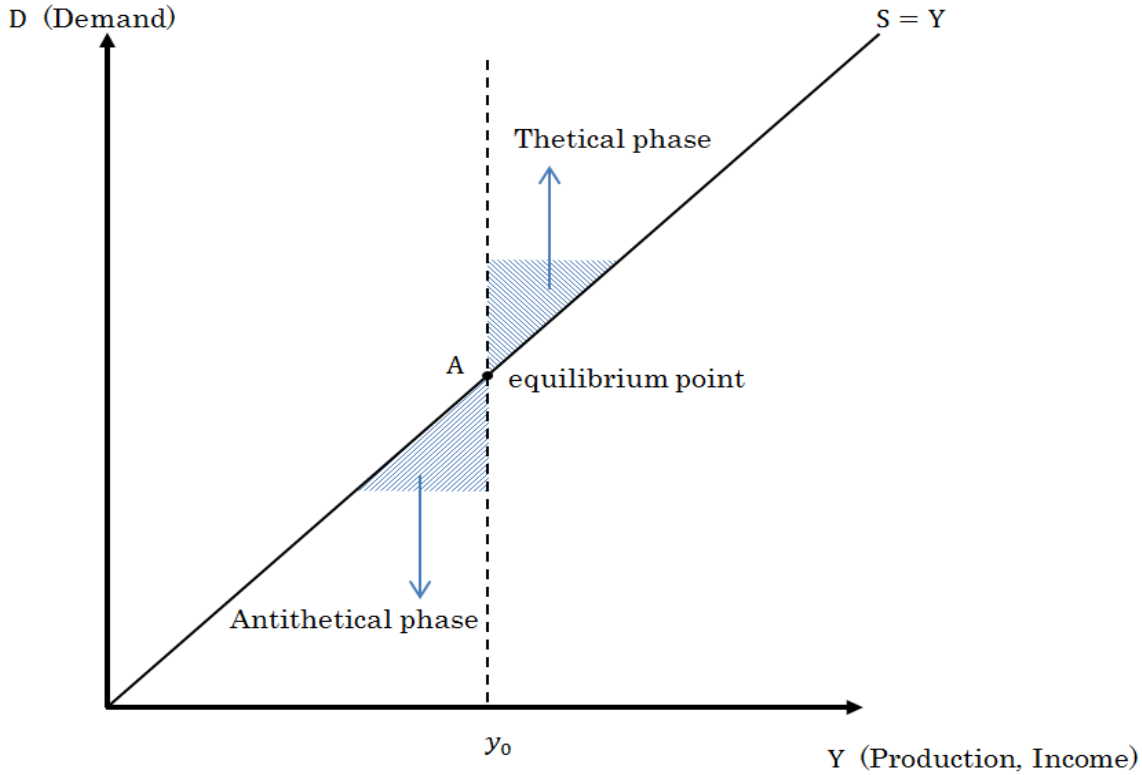

Figure 1. Thetical phase and antithetical phase in economic space in the simple model of macroeconomy. *Y* denotes gross domestic product, *D* signifies demand, and *S* represents supply. These phases have a relationship of duality.

If a state (y, d) is in a thetical phase, supply is defined as follows:

$$Y = C + I$$

The Say's law is applicable in this case.

While, if a state (y, d) is in an antithetical phase, supply holds a relationship as follows:

$$Y \geq C + I$$

The principle of effective demand comes into play in this case.

Bubble Economy

We define a bubble economy as follows: If a state (y, d) is in a thetical phase and the value $\frac{\partial Y}{\partial I}\Big|_{(y,d)}$ is sufficiently large, the state (y, d) is in a bubble economy. And we define the bubble bursting as follows: When there can be seen a partial change, or $\frac{\partial Y}{\partial I}$ from value $\frac{\partial Y}{\partial I} > 0$ to value $\frac{\partial Y}{\partial I} < 0$, in any state in a bubble economy.

We explain a mechanism of the bubble bursting shown by the simple model of macroeconomy through variations of consumption coefficient a. If a state is in a thetical phase, in the simple model of macroeconomy, we obtain the following relationships:

$$\frac{\partial Y}{\partial I} = \frac{\partial C}{\partial I} + 1$$

$$\frac{\partial C}{\partial I} = a\frac{\partial Y}{\partial I}$$

Now, we deduce as follows:

$$\frac{\partial Y}{\partial I} = \frac{1}{(1-a)}$$

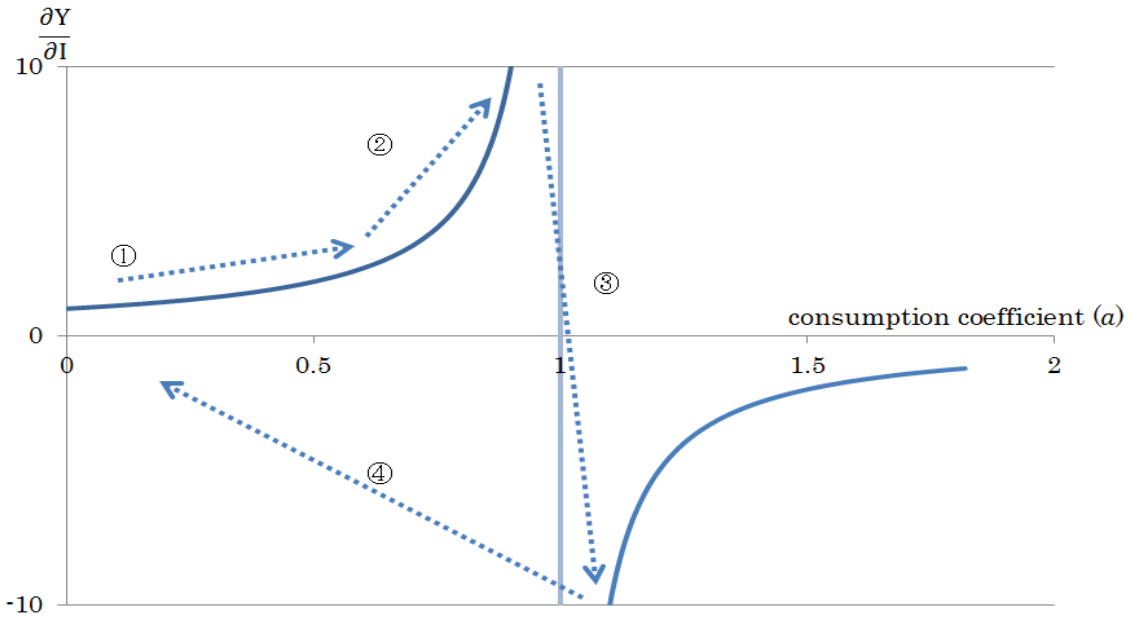

Figure 2. Mechanism of bubble bursting: ① a state of economy is in a thetical phase; ② a state is in a bubble economy; ③ bubble bursting; and ④ a state of economy is in an antithetical phase.

Thus, we can describe a mechanism of the bubble bursting through the behavior of exogenous variable a: ① first, an economy of real world is demonstrated in a thetical phase economy; ② the consumption coefficient a increases and comes close to 1, and the state is in a bubble economy; ③ the consumption coefficient a surpasses 1, resulting in bubble bursting ($\frac{\partial Y}{\partial I}>0 \rightarrow \frac{\partial Y}{\partial I} < 0$); and ④ the value $\frac{\partial Y}{\partial I}$ is sharply down, and an economy of real world is found to be in an antithetical phase.

Discussions

In our definition, a bubble economy is different from economic growth. A concept of economic growth based on the simple model of macroeconomy is demonstrated in Figure 3. When corporate investment increases (ΔI), the equilibrium point moves from A to A', heading toward the expanded equilibrium. When corporate investment increases to I_1, then the economic equilibrium point moves to A_1. As a result, the economy expands more, which is accompanied by an increase in consumption. When corporate capital expenditure grows to I_2, the economic equilibrium point moves to A_2, spurring the economy to grow further. During the process of the transition of economic equilibrium points $A \rightarrow A' \rightarrow A_1 \rightarrow A_2$, the consumption coefficient a is constant in the demand function.

$$D = aY + I$$

When the consumption coefficient a is 0.9 in the simple model, for instance, the multiplier effect is expressed as follows:

$$\frac{1}{(1-a)} = \frac{1}{(1-0.9)} = 10$$

This means that economic growth with the multiplier effect is 10 times (see Figure 3). We define this type of economic expansion as “economic growth”. We hope readers will remember this definition whenever it is mentioned in this paper.

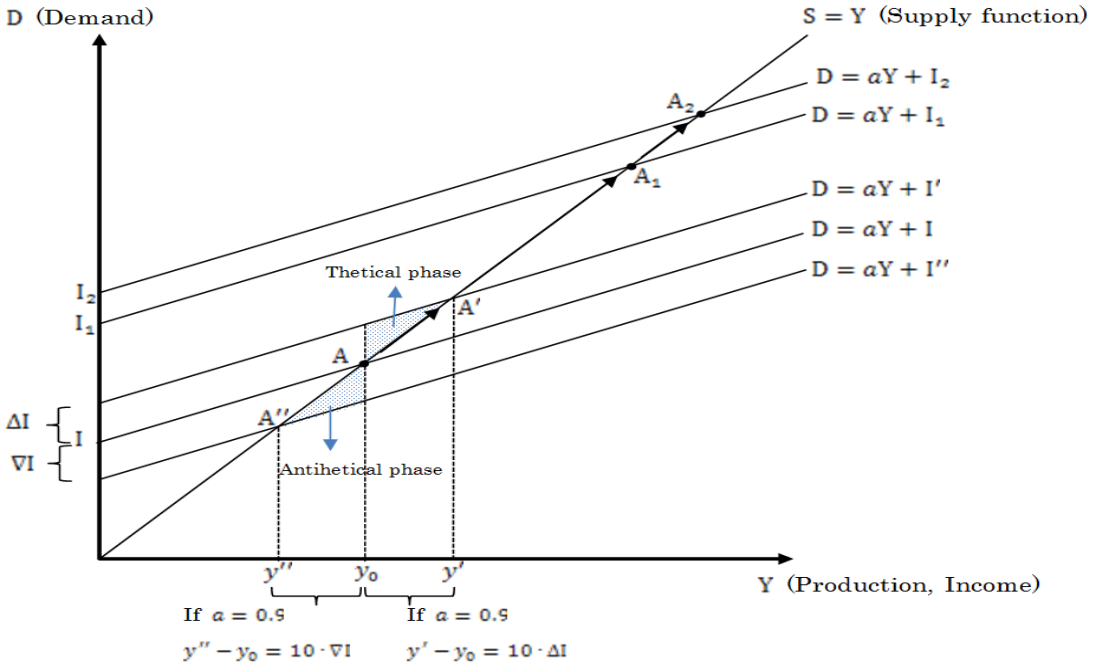

Figure 3. Concept of economic growth. *I* represents investment and a signifies consumption coefficient.

An increase in private sector demand, during the process of economic growth, may prompt not only companies to expand capital expenditure, but also individual consumers to engage in speculation. In the United States, for example, even a shoeshine boy purchased stocks for speculation during the 1920s. In Japan, housewives, elderly people, and even students engaged in speculation during the so-called Heisei Bubble of the early 1990s. The housing bubble of the United States occurred as an increasingly large number of low-income earners started taking out sub-prime loans after 2005, before U.S. house prices began their steep decline, which triggered the sub-prime crisis in 2008. It was another example of speculative behavior by common folks in the U.S.. In such a state, the consumption coefficient a in the demand function $D = aY + I$ is infinitely close to 1. As a result, its economic effect, or multiplier effect, represented by $\frac{1}{(1-a)}$ in the simple model of macroeconomy, grows without limit. Under such circumstances, the economy expands infinitely, even without an increase in corporate capital expenditure. Our definition of a bubble economy in section three expresses such a state without abnormally high investment effect. We demonstrated a bubble economy in Figure 4. The economy expands when the consumption coefficient of individual consumers is closer to 1, even without an increase in corporate investment in facilities. And the economic equilibrium point moves from A' to A_1, and to A_2. This is the state of a bubble economy.

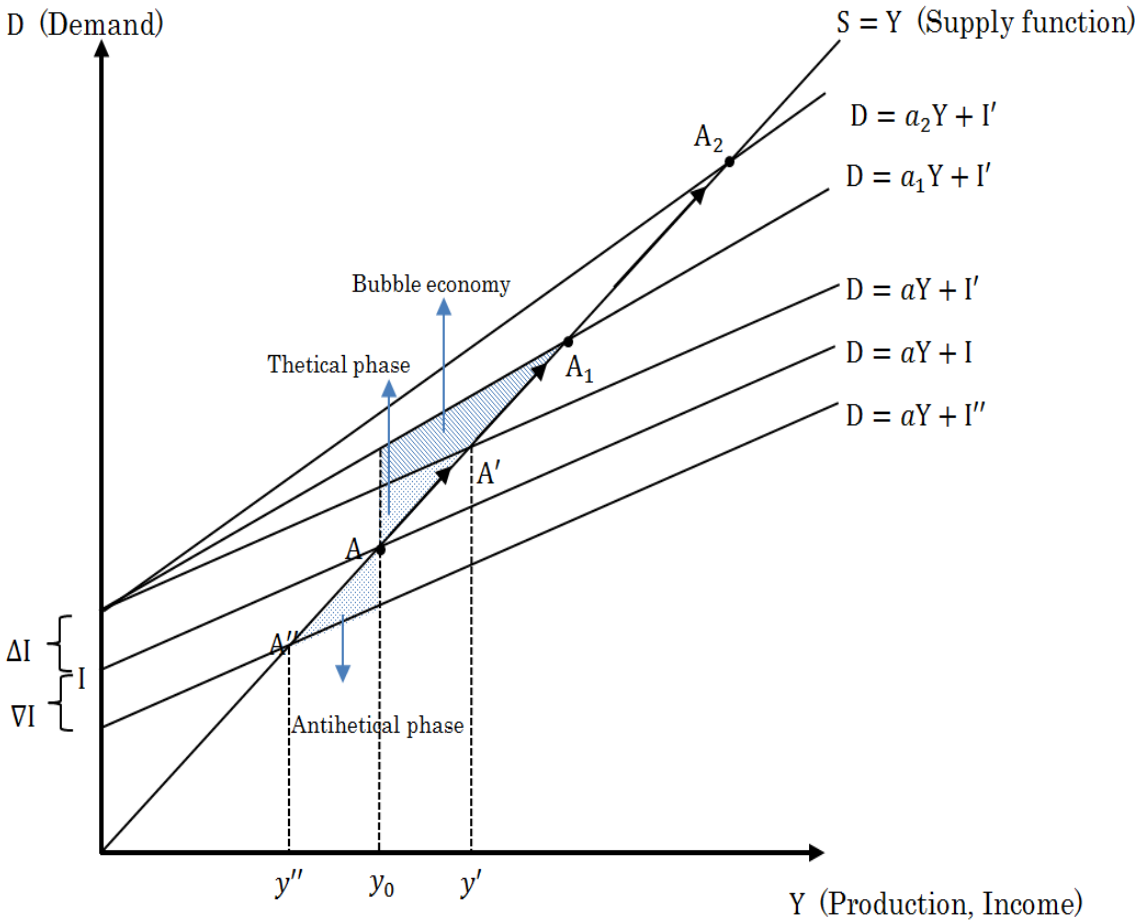

Figure 4. Bubble economy.

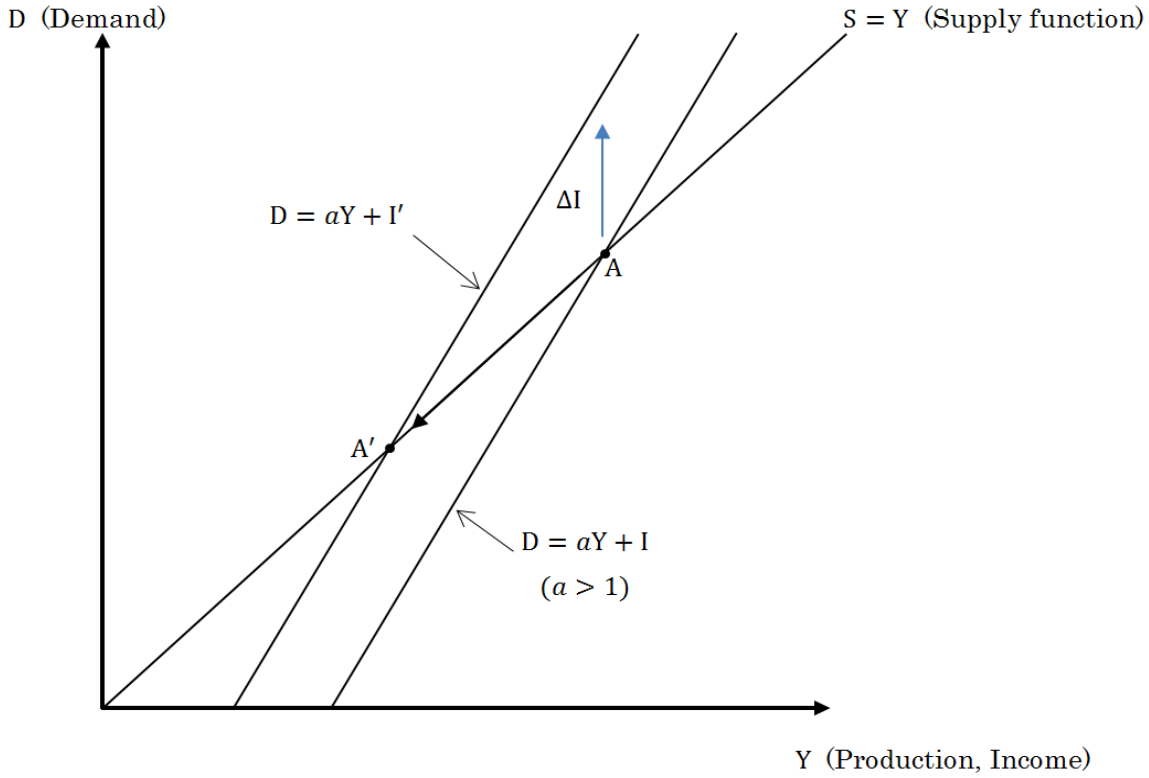

Figure 5. Mechanism of occurrence and collapse of a bubble economy.

A bubble economy is often mistaken to be “an outstanding state of economy”. History shows that once an individual gets a forbidden state of “a bubble economy”, his or her enthusiasm for speculation tends to be accelerated. During “the Tulip mania” in the first half of the 17th century in the Netherlands, the fad became so excessive that the price of a single tulip bulb rose as high as the price of a house. However, once the consumption coefficient of this “forbidden state of bubble” becomes marginally above 1, the bubble bursts. The process is shown in Figure 5.

If the consumption coefficient a is 1.1, for instance, in the simple model, it turns out to be as follows:

$$Y = C + I$$
$$C = 1.1Y$$

The solution for the simultaneous equations is as follows:

$$Y = -10I$$

It means that when consumption coefficient grows larger than 1, and corporate capital expenditure increases by a unit ΔI, the economic equilibrium point falls sharply, and the bubble bursts as shown in Figure 5. The economic equilibrium point moves from A to A' in this case. Once people come to recognize this downturn, they tend to refrain from economic activities, which include not only speculation but also consumption. As a result, the overall consumption of the economy shrinks back, and the consumption coefficient marks less than 1.

After the collapse of a bubble economy, consumption activities return to normal. As a result, however, the economy suffers a great lack of demand as shown in Figure 6. We define this state “collapse of a bubble economy” as is shown in section three, in which we described the bubble bursting.

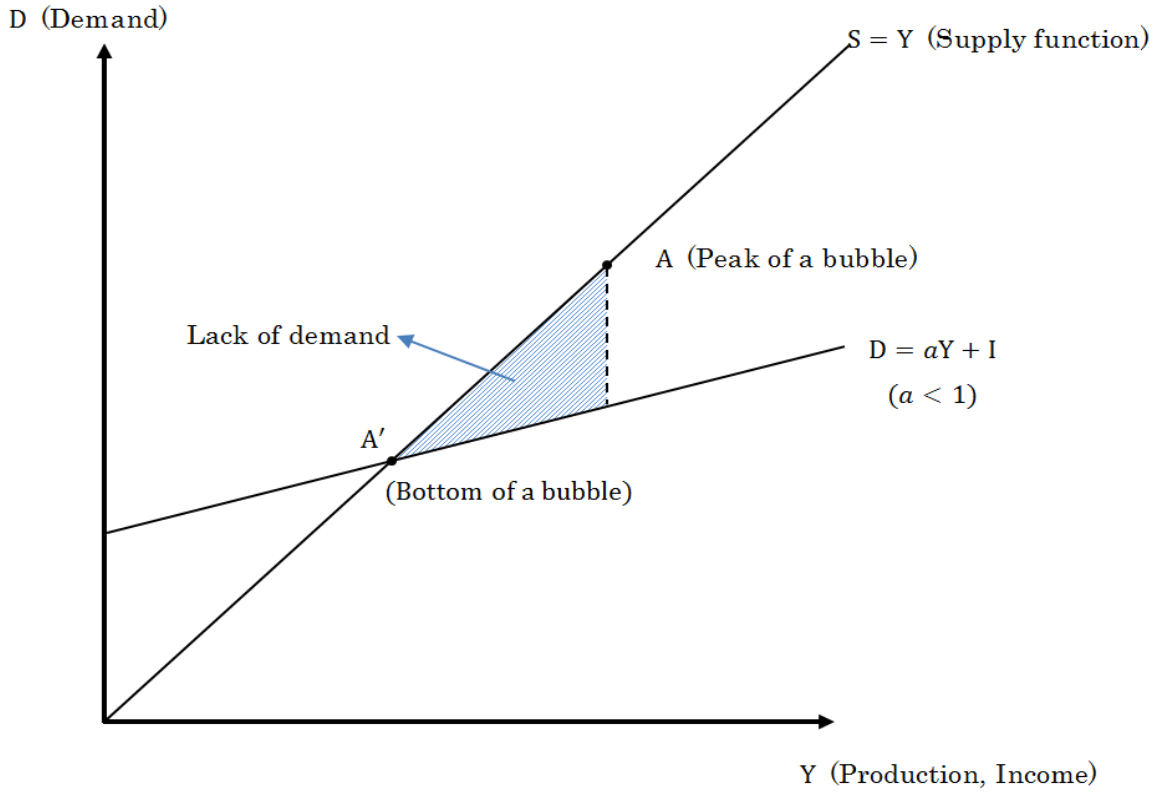

Figure 6. Lack of demand.

As shown in Figure 6, private-sector demand for capital falls sharply. Companies stay away from capital expenditure because investment efficiency goes down to dire levels. In other words, because the value of assets purchased on credit during the bubble period collapses, the efficiency of investment drops below the market interest rate for corporations with debt. As a result, companies discontinue investing in facilities, and shift their business priorities from profit maximization to debt minimization. In this state, macroeconomy moves from thetical phase to antithetical phase, with corporate goal shifting from profit maximization to debt minimization. Meanwhile, due to low investment efficiency, companies stop borrowing money from banks to make investments. Instead, they become intent on paying down debt. As a result, money is tucked away in the banking system.

Conclusions

We define thetical phase and antithetical phase in macroeconomy as subsets of economic space. These are models based on independent definitions. Under these definitions, we describe a bubble economy and the bubble bursting through investment efficiency $\frac{\partial Y}{\partial I}$. In the simple model of macroeconomy, since the investment efficiency is expressed as an inverse proportionality of consumption coefficient, we can describe a bubble economy and the bubble bursting through the variations of consumption coefficient. Also, in the simple model, bubble bursting only occurs when the consumption coefficient a surpasses 1.

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Possibility of the Implementation of the Principle of Sustainable Development in the Sphere of Coal Processing

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High-sulphur coals processing generates a great number of pollutant substances in atmosphere. This study was undertaken to obtain more definite information about the composition of sulphur coal extracts, i.e., on the quality and quantity of dormant Volatile Organic Emissions (VOCs). Analysis of the liquid products was carried out by different protocols of extraction, adsorption chromatography, and GC/MS identification. It should be pointed out that the basic components of coal extracts are polyaromatic hydrocarbons, sulfur-containing compounds and phenols act as a basic factor of environment pollution with carcinogenic products. The complex treatment of these components will permit not only to obtain some valuable chemical products, but also to improve the ecology in the industrial regions.

Keywords: coal, extracts, organic emissions, polyaromatic hydrocarbons, GC/MS

Introduction

The sustainable development concept which from the beginning of 90th year dominated in the world community has been officially declared in the document "Global program of actions—the summons for 21st century". This ideology assumes change of priorities at the decision of ecologic-economic commitments.

High consumption of the energy and fuels in industry is remarkable in high production of polluting substances which have a great influence not only for human health but also for the vegetation and ecosystem balance (Mastral, Callen, Murillio, Garcia, & Vinas, 1999; Lavrieux et al., 2011).

The major part of wastes generated by the industry comes from coal mining, coking plants, power generation, and metallurgy. The considerable part of these waste materials is ejected to atmosphere and groundwater or stored in the conditions of limited area creating the contamination of the environment. During

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coal processing basic harmful pollutants are emitted: SO_x, NO_x, CO_x (in oxidant medium) or H_2S, NH_3 (in reducing-agent medium), effluvial and toxic organic compounds, dibenzodioxins, dibenzofurans and oth (Mastral, Callen, & Garcia, 2000a; Mastral, Callen, Garcia, & Lopez, 2000b).

A pollutant emission depends on the heteroatoms content in the raw material and conditions of coal processing.

Within volatile organic emissions, polycyclic aromatic hydrocarbons (PAHs) and their derived compounds are the most carcinogenic. PAHs can get into water and soil being assimilated by the plants, animals, fish, and human body (Mastral, Callen, & Garcia, 2000b).

At present, European Union legislation establishes limit values for concentrations of sulphur, nitrogen, and carbon oxides, but there is a lack of similar legislation concerning organic compounds emission.

Every year Ukrainian coking plants produce a significant quantity of following waste materials: phenol-containing sewage (30%-40% df), emission into atmosphere (0.7%-0.8% df), and wastes of chemical department (0.10%-0.15% df).

The pollutant emission has increased considerably in recent years to the increased use of low-quality coals with high content of sulfur and oxygen.

A particular characteristic of seams from Donets coal basin is the occurrence of high- and low-sulfur coals, of the same rank differing by some physicochemical properties (The Donetsk Coal Chemistry Research Institute, 1972). These differences are due to specified genetic types formed in alluvial or marine depositional environments during diagenesis processes. High-sulfur coals creation on biochemical stage occurred in high reduced environment with sea water and the presence of anaerobic bacteria (Stach et al., 1975; Taylor et al., 1998).

Previously it was investigated the composition and properties of the Donets coals with different content of sulphur and oxygen (Bechtel, Butuzova, & Turchanina, 2002; Butuzova, Isaeva, Turchanina, & Krzton, 2002; Butuzova, 2004; Butuzova, Minkova, Safin, Marinov, & Stamenova, 2005; Butuzova, Marinov, Minkova, Safin, Stefanova, & Stamenova, 2005; Butuzova, Bechtel, Turchanina, Safin, Butuzov, & Isaeva, 2005; Butuzova et al., 2007; Minkova, Butuzova, Marinov, & Safin, 2004; Marinov, Minkova, Stefanova, & Butuzova, 2000). It was demonstrated that they distinguished in their behavior in the pyrolysis processes. A high reactivity for sulphur coals in coking and lacing processes was indicated (Butuzova, Minkova, Safin, Marinov, & Stamenova, 2005). Pyrolysis of low rank sulphur coals results in a 1.8-2.0 fold acceleration in the maximal gas evolution rate.

The reactions of -S- and -O- containing groups affect the thermodestruction processes resulting in variations in the yield and composition of liquid, solid, and gaseous products and the degree of coal organic matter (COM) conversion. The semi-coking of low rank sulphur samples produce a substantially higher yield of tar and higher content of aliphatic hydrocarbons in semi-coking gas and tar than low-reduced coals (LRC) (Butuzova, Safin, Marinov, Yaneva, Turchanina, & Butuzov, 2009; Butuzova, Marinov, Minkova, Safin, Stefanova, & Stamenova, 2005). So, low rank reduced coals (RC) may be suitable raw material for oil generation (Petersen & Nytoft, 2006).

Sulphur- and oxygen-containing groups take part in the processes of radical formation and recombination during thermal and thermochemical destruction of caking and noncaking coals. They promote the breakdown of lateral chains and increase the amount of the paramagnetic centers (Butuzova, Rozhkov, Makovskyi, Rozhkova, & Butuzov, 2009), which plays one of the most important role for pyrolysis way and composition of products

(Butuzova, Krzton, Saranchuk, & Isaeva, 1994; Butuzova & Krzton, 2001).

According to aforementioned data, it could be concluded that environmental protection requires increased recycling of the nonbiodegradability and toxic organic wastes and further waste reduction. Methods for the elimination of wastes such as burial, incineration, and biodecomposition burial are commonly used, but in the case of coal tars they are ineffective.

The aim of the present study is to investigate the composition of extracts from high- and low-sulphur coals of the different rank and to study organic emissions as a function of the coal sulfur content.

Materials and Methods

Pairs of the isometamorphic Donets coals homogeneous by their petrographic composition, but formed under reductive (RC) or less reductive conditions (LRC) and different by their sulphur content accordingly were used as objects of research. It was coals of D-Grade and J-Grade according to Ukrainian classification (see Table 1).

Table 1

Proximate and Ultimate Analyses of Parent Coals

No.	Coal grade	Type	Coal mine, coal seam	R_o (%)	W^a (wt%)	A^d (wt%)	V^{daf} (wt%)	C^{daf} (wt%)	H^{daf} (wt%)	N^{daf} (wt%)	S_t^d (wt%)	S_s^d (wt%)	S_p^d (wt%)	S_o^{daf} (wt%)
1	D	LRC	Cheluskintsev, l_4	0.71	0.8	2.4	35.6	79.3	4.94	2.32	2.17	0.04	0.11	2.07
2	D	LRC	Trudovskaya, l_4	0.55	1.0	1.6	37.3	78.4	4.95	1.90	1.05	0.04	0.17	0.85
3	J	LRC	Gagarina, m^3	1.01	1.2	3.7	28.7	87.4	5.06	1.56	0.70	0.06	0.03	0.61
4	J	LRC	Zasyad'ko, l_4	1.18	1.4	2.6	31.6	87.8	5.16	1.95	1.09	0.01	0.24	0.84
1^1	D	RC	Ukraine, k_8	0.57	1.5	9.9	41.8	77.9	5.30	2.10	2.87	0.11	0.80	2.18
2^1	D	RC	Trudovskaya, k_8	0.49	0.9	4.6	46.2	76.1	5.43	1.97	5.85	0.05	0.71	5.34
3^1	J	RC	Gagarina, m^0_4	0.96	0.8	12.2	35.6	83.6	4.88	1.64	3.75	0.05	2.41	1.29
4^1	J	RC	Zasyad'ko, l_4	0.96	0.8	2.7	31.7	87.3	5.23	1.48	2.81	0.02	1.14	1.65

The samples studied include four pairs ("RC-LRC") of non-coking coals of D-Grade and coking coals of J-Grade, according to Ukrainian classification. Their geological age is Middle Carboniferous. They have uniform petrographic composition: 80%-89% of vitrinite, 3%-8% of liptinite, and 5%-14% of intertinite. Each pair of samples of the low-reduced and reduced coals was collected from neighbouring coal seams (separated by less than 100 m). Limestone layers at the top of the coal seams and finely crystalline pyrite presence were reliable signs of a reduced type of Donets coals. In addition, the content of microlithotypes with finely dispersed pyrite (carbopyrite) was identified. It is also an indicator of reduced and low-reduced type of coals.

The proximate, ultimate, and petrographic analysis of samples, including total sulfur (St), organic (So), pyrite (Sp), and sulphate (Ss) were determined by using standard methods (GOST 9414.3-93, 12113-94, 27314-91, 11022-95, 8606-93, 6382-91, 2408.1-95, 2408.3-95). The total organic carbon content was measured on a Leco carbon analyzer on the samples pre-treated with concentrated hydrochloric acid and calculated on a dry and ash-free basis (C^{daf}, wt% of the sample).

To determine the most expedient way of sulfur coals technological employment it is important to establish the relationship between the sulfur compounds in Coal Organic Matter (COM) and the basic properties of solid fuels. Statistical methods are applied to the data set derived from the analysis permitting a quantitative description of the effect of the contribution of sulfur into the formation of coal properties. The statistical analysis was performed using the Microsoft Excel and Origin 6.1 software package.

Qualitative characteristics of the Donetsk Basin mined coal seams given in the reference book on the quality of various rank coals and anthracites of the Donetsk and Lviv-Volyn Basins (Catalogue 1972) were used as the data base. All the samples of investigated coals mentioned in the reference book have been selected. From this selection 100 samples characterized by the proximate and ultimate analysis, mainly, the following indices: the total sulphur content (of the seam sample), the volatile matter yield (wt%), the plastometric indicator, i.e., *y*, the elemental composition (i.e., the carbon, hydrogen, sulphur, the total nitrogen and oxygen contents) and the atomic ratios of the individual elements to carbon were used for the statistical analysis. Moreover, the reference data were supplemented by the results of the analysis of two couples of freshly-sampled long-flame coals and two couples of freshly-sampled J-Grade coals of different genetic types (see Table 1).

Statistical methods help us to see that closeness of the statistical connection between the yield of volatile matters and the content of organic sulphur decreases with metamorphism in the transition from D-grade coals to J-grade coals.

The thermal behaviour of coals was studied by classical Fisher method (520 ºC).

Extraction, liquid chromatography and gas chromatography-mass spectrometry (GC-MS) of the saturated and aromatic hydrocarbon fractions were used to the separation and identification of coal extracts.

The pulverised samples (about 7 g) were extracted using dichloromethane in a Dionex ASE 200 accelerated solvent extractor at 75 °C and 50 bar. The solvent was evaporated in a Zymark TurboVap 500 closed sell concentrator. Then the asphaltenes were precipitated from *n*-hexane-dichloromethane solution (80 : 1 v/v) and separated by centrifugation.

The medium-pressure liquid chromatography (Köhnen-Willsch) was used for the separation of the *n*-hexane-soluble fraction of coal organic matter into saturated, aromatic hydrocarbons and polar heterocompounds.

Gas chromatograph was equipped with a 25-m DB-1 fused silica capillary column (diameter 0.25 mm) and coupled to a Finnigan MAT GCQ ion trap mass spectrometer. The oven temperature was programmed from 70 ^{o}C to 300 ^{o}C at a rate of 4 ^{o}C min^{-1} followed by an isothermal period of 15 min.

Helium was the carrier gas. The samples ionisation in mass spectrometer was achieved by the electron impact (70 eV) and a scan range of 50-650 daltons (0.7 s total scan time). Data were processed with a Finnigan data system. Identification of the individual compounds was accomplished by their retention times in the total ion current chromatogram and by comparison of the mass spectra with those of published data (Bechtel, Butuzova, & Turchanina, 2002).

Relative percentages and absolute concentrations of the compounds in the saturated and aromatic fractions were calculated using peak areas from the gas chromatograms in relation to that of internal standards. The concentrations were normalised to the C^{daf} content in the sample.

Results and Discussions

The statistical dependence between the organic sulfur content and the main classification parameter—volatile matter yield has been found for the Donetsk low-rank coals, with the correlation coefficients being R^2 = 0.89-0.95 (Butuzova, Marinov, Minkova, Safin, Stefanova, & Stamenova, 2005) (see Figure 1). But the correlation coefficient (R^2) values between the volatile matter yield and the atomic ratio S_o^{daf}/C^{daf} fall down up to 0.35 for the middle rank coal. At the same time the correlation between S_o^{daf}/C^{daf} and thickness of plastic layer (*y*) appears at this coal rank.

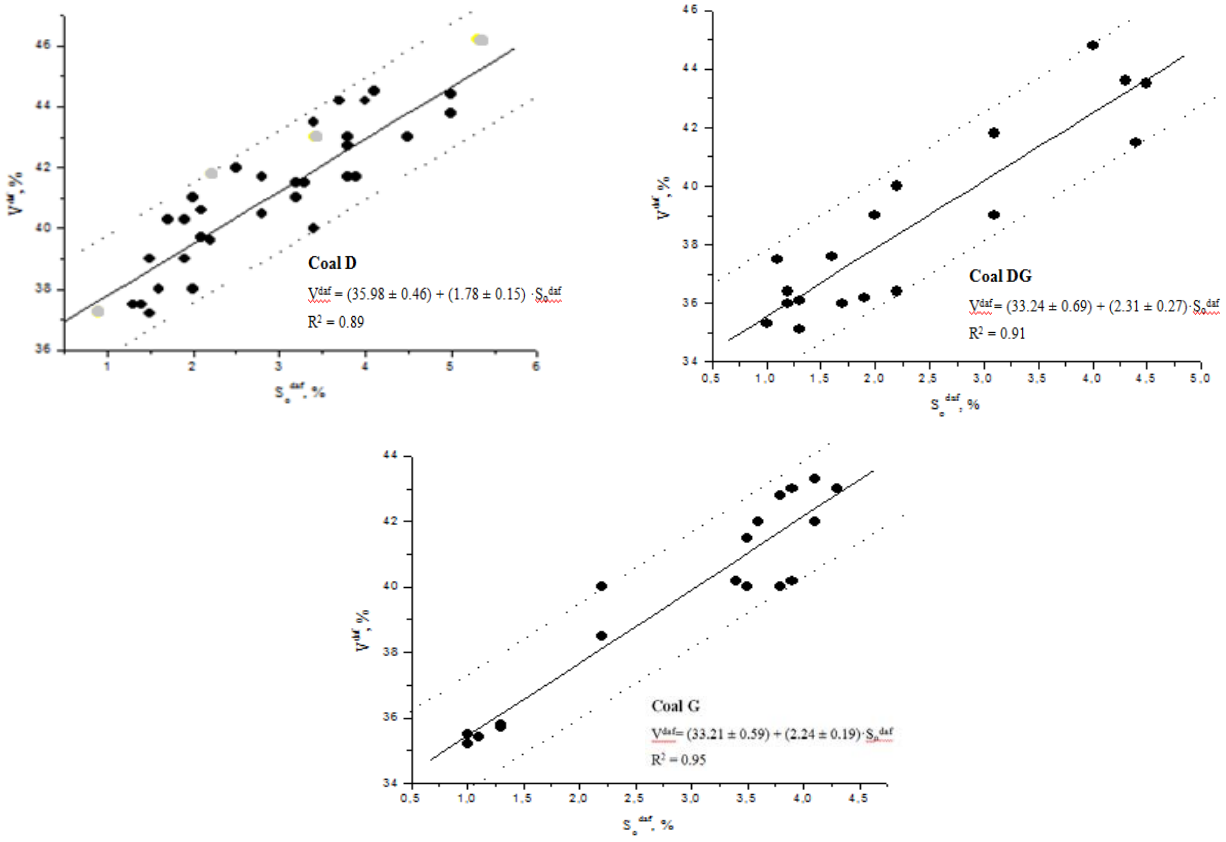

Figure 1. Dependence of the volatile matter yield on the organic sulphur content for low-rank coals.

Then some groups of samples with different ranges of O^{daf}/C^{daf} values were selected (see Table 2). The correlation coefficients within these groups increase when the interval of O^{daf}/C^{daf} is narrowing down, i.e., at a more distinct registration of the coal rank.

Table 2

The Variation of Correlation Coefficients Value in Different Intervals of O^{daf}/C^{daf} for Middle-Rank (J-Grade) Coals: Atomic S_o^{daf}/C^{daf} Ratio Versus Volatile Matter Yield (RV-S) and Versus Thickness of Plastic Layer (RY-S)

Number of coal	Intervals of O^{daf}/C^{daf}	$R_{V\text{-}S}$	$R_{Y\text{-}S}$
100	0.026-0.120	0.35	0.64
91	0.042-0.093	0.43	0.62
62	0.050-0.080	0.59	0.60
43	0.055-0.075	0.58	0.61
27	0.060-0.070	0.55	0.58
22	0.050-0.060	0.72	0.56
24	0.070-0.080	0.61	0.68

The influence of coalification degree on the above correlations can be seen also from Table 3, where the range of O^{daf}/C^{daf} ratio changes in the interval 0.01 for each groups of selected samples. The results show that the correlation coefficient for $R_{Y\text{-}S}$ worsen significantly for coals having O^{daf}/C^{daf} ratio less than 0.1 and for $R_{V\text{-}S}$ value the same worsen appears for coals having O^{daf}/C^{daf} ratio less than 0.05.

Table 3

The Variation of Correlation Coefficients Value Versus Coalification Degree

Number of coal	Intervals O^{daf}/C^{daf}	$R_{Y\text{-}S}$	$R_{Y\text{-}S}$
8	0.10-0.09	0.66	0.83
19	0.09-0.08	0.55	0.67
19	0.08-0.07	0.61	0.64
22	0.07-0.06	0.52	0.59
21	0.06-0.05	0.72	0.56
9	0.05-0.04	0.36	-0.15

An apparent correlation between the S_o^{daf}/C^{daf} ratio and thickness of plastic layer reflects the effect of sulfur on coal caking ability.

So the theoretical aspects of coalchemistry have not been sufficiently investigated to allow the prediction of the results of coal processing on the base of standard coal characteristics.

As it can be seen from Table 4, the yield of dichloromethane extract is higher for high-sulphur coals in comparison with low-sulphur coals of the same rank, which is indicating an increased solubility of their organic matter.

Table 4

Composition of Extracts Obtained From Coals Under Investigation

No.	Coal grade	Type	Coal mine, coal seam	Extract yield (CH_2Cl_2), (μg/g C_o)	C_o, weight (%)	Content of asphaltenes (%)	Content of the aromatic hydrocarbons (%)	Content of the aliphatic hydrocarbons (%)	N+S+O (%)	S_o^{daf}/C^{daf} (atm)
1	D	LRC	Cheluskintsev, l_4	10.80	76.7	59	19	5	21	0.0098
2	D	LRC	Trudovskaya, l_4	10.54	76.3	53	12	4	26	0.0041
3	J	LRC	Gagarina, m^3	1.88	87.8	59	15	13	9	0.0036
4	J	LRC	Zasyad'ko, l_4	2.08	87.4	68	17	6	14	0.0026
1^1	D	RC	Ukraine, k_8	13.54	71.9	36	24	5	30	0.0105
2^1	D	RC	Trudovskaya, k_8	15.77	69.0	37	15	6	31	0.0260
3^1	J	RC	Gagarina, m^0_4	2.43	87.3	53	30	11	12	0.0071
4^1	J	RC	Zasyad'ko, l_4	2.94	83.6	64	25	6	14	0.0058

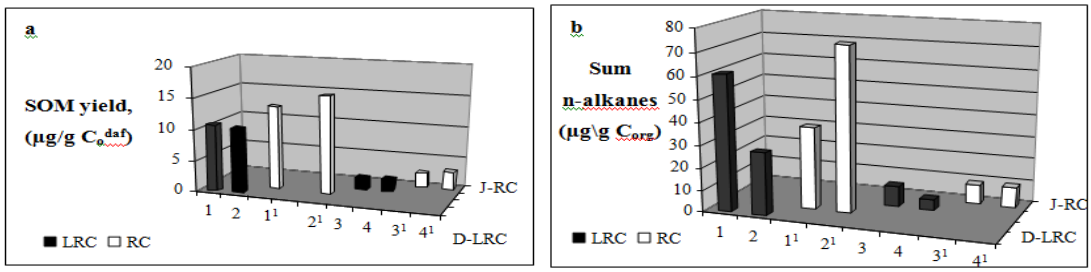

Figure 2. Content of extractable organic matter (a), n-alkanes (b) in extracts of LRC and RC of different coalification degree (D, J).

The extracts obtained from RC coals are characterized by a higher content of polar heterocompounds, as well as aromatic hydrocarbons, which corresponds to their high caking ability. The main part of the extracts of the investigated coals is composed of asphaltenes (36%-68%)—highly reactive components. Quantity of asphaltenes is much higher for coals of low-reduced type. Obviously, their segregation at the early stages of thermal decomposition is very important for the formation of plastic layer and subsequent formation of the coke structure.

Gas chromatography—mass spectrometry analysis of aliphatic and aromatic fractions of the extracts revealed significant quantitative differences in the composition of components extracted from different coals.

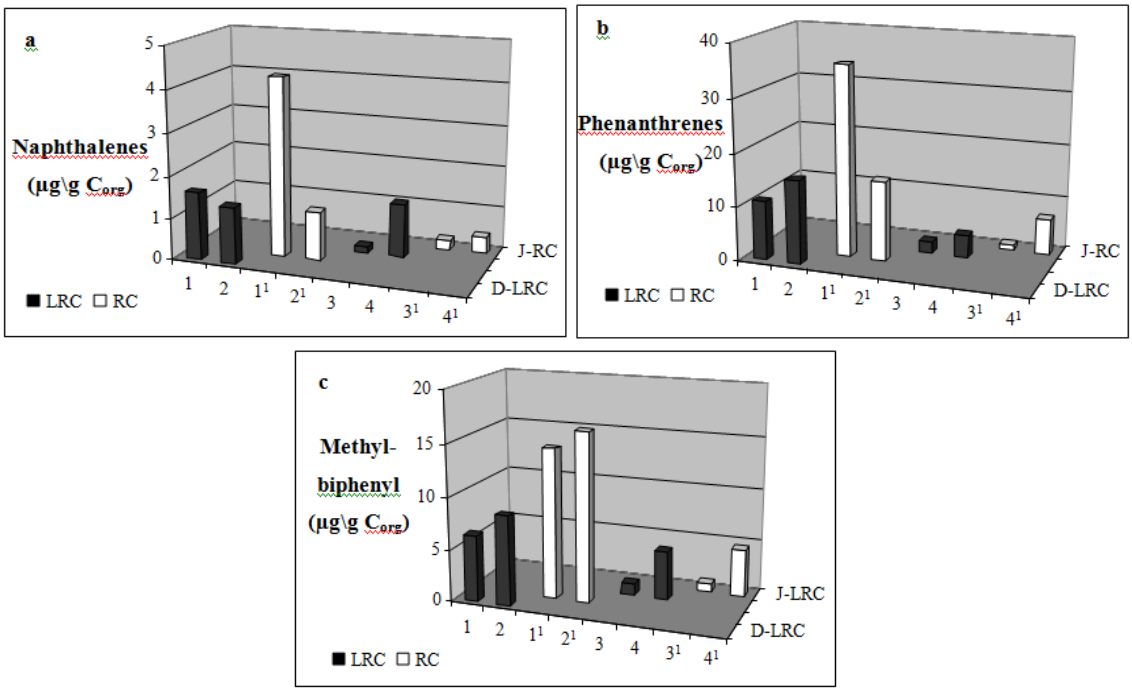

Figure 3. Content of Naphthalenes (a), Phenanthrenes (b), and Methyl-biphenyl (c) in extracts of LRC and RC of different coalification degree (D, J).

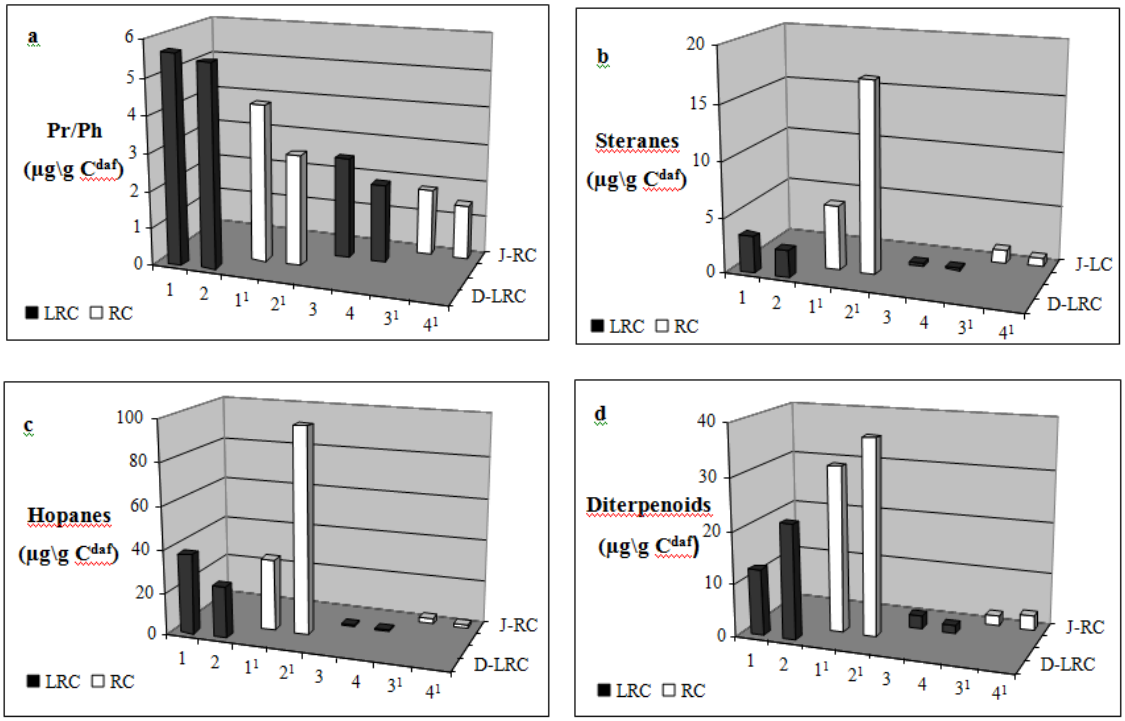

Figure 4. Content of Pr/Ph (a), Steranes (b), Hopanes (c), and Diterpenoids (d) in extracts of LRC and RC of different coalification degree (D, J).

A sharp decrease in the yield of the dichloromethane extract (Figure 2a) and in the concentration of the following components of hydrocarbons is observed during the transition from the low-rank to middle-rank coals:

- *n*-alkanes (in 6-9 times) (see Figure 2b);
- aromatic compounds, such as naphthalenes, phenanthrenes, biphenyls, and their alkyl-substituted derivatives, especially methyl-substituted (see Figure 3);
- biomarkers—the pristanes, phitanes, steranes, hopanes, and deterpenoides (see Figure 4).

n-alkanes with shorter chain (C_{15}-C_{19}) dominate in J-Grade coals, whereas the long-chain alkanes (C_{27}-C_{31}) dominate in extracts of D-Grade coals. The results are in agreement with existing concepts about the reduction of the proportion of long-chain alkanes during coalification.

Reducing the quantity of 2-3-ringed aromatic compounds in the extract is accompanied by the appearance of polycyclic aromatic compounds (see Figure 5a). This fact is evidence that highly-condensed aromatic structures are formed during the processes of aromatization at the metamorphism. Some of them go into an insoluble state.

The study of the hydrocarbon fractions of RC and LRC extracts showed a significant difference in the quantity of oxygen and sulfur-containing compounds. An absolute content of dibenzothiophenes (0.94-20.34 g/g C^{daf}) is significantly higher in high-sulphur samples in comparison with low-sulphur (0.83-9.09 g/g C^{daf}) as well as the content of oxygen-containing dibenzofuran (see Figures 5b and 5c).

Steranes identified in the studied extracts have 27-29 carbon atoms. Steranes C_{29} are dominate. Their presence indicates the influence of higher terrestrial vegetation (Jauro, Obaje, Agho, Abubaker, & Tukur, 2007). The concentration of steranes is higher for reduced samples. Especially, a sharp increase of the C_{27} steranes content is observed for reduced coals (in 5-7 times).

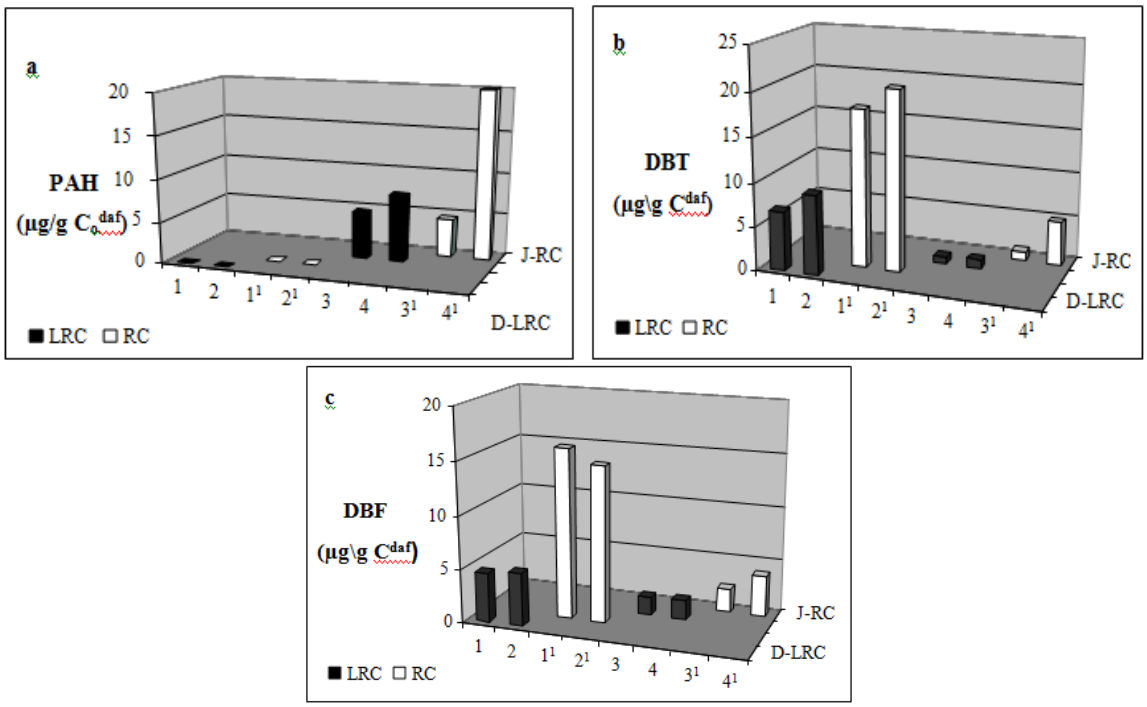

Figure 5. Content of PAH (a), dibenzothiophene (b), and dibenzofuran (c) in extracts of LRC and RC of different coalification degree (D, J).

Extracts of J-grade reduced coals differ from LRC extracts by significantly higher content of hopanes, including stereochemically converted, so-called oil-hopanes, with a higher thermodynamic stability ($\alpha\beta$ configuration). The change in the configuration of the aliphatic chain (22R → 22S) is greater for the samples of reduced type, which is consistent with a high bacterial activity during marine transgressions. The higher steranes/hopanes ratios in this case indicate high primary productivity during sea level rises.

Phytane (Ph) and Pristane (Pr) are often regarded as products of reduction or decarboxylation of phytol, a component of chlorophyll, cyanobacteria diphytilovyh esters, some algae and landed shellfish. Typically, the ratio of Pr/Ph < 1 is used as a marker of reductive conditions of diagenesis, and Pr/Ph > 1 for oxidation conditions (Waples & Machihara, 1990).

The calculated Pr/Ph ratio characterizes a more reducing environment during the organic matter transformation of RC coals.

Influence of sulphur content in coal on the yield and composition of the extracts was evaluated by changes of various characteristics of the extracts, depending on the atomic ratio S_o^{daf}/C^{daf}. A clear correlation between the declared value and the proportion of S-containing rings in the total quantity of aromatic rings was detected (see Figure 6a). This correlation is better for the coals of the middle rank (R^2 = 0.99). The ratio S_o^{daf}/C^{daf} perfectly correlated with the relative content of hopanes (see Figure 6b), so, with high microbial activity during sea transgression.

Based on the distribution of various classes of compounds in the extracts of high- and low-sulphur coals, it can be seen that the ratio S_o^{daf}/C^{daf} in coal (see Figure 6), the extraction yield and the contents of hopanes, biphenyls, dibenzofurans, and dibenzothiophenes can be used as chemical indicators of coal ability to environment pollution with carcinogenic products.

The yield of biphenyls from coal extracts was found to correlate with coal pyrolysis tar yield. So, this structural parameter is very important index for evaluation of coal environment pollution.

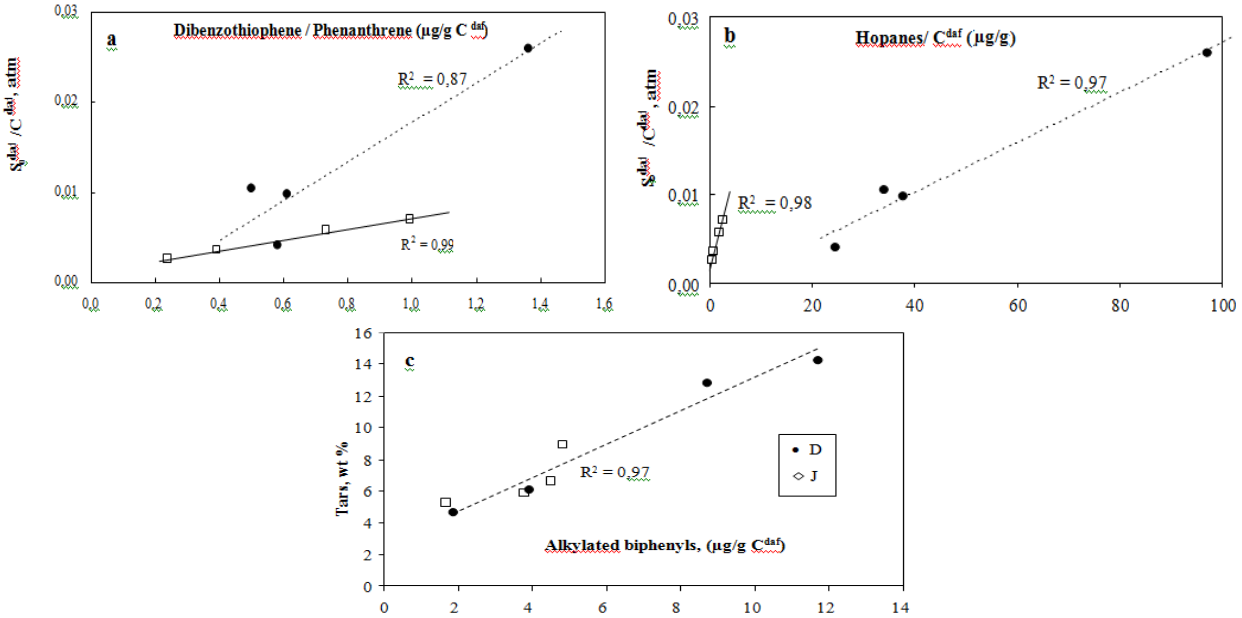

Figure 6. Different correlations for the studied coals: (a) atomic S_o^{daf}/C^{daf} ratio versus dibenzothiophene/phenanthrene contents, (b) atomic S_o^{daf}/C^{daf} ratio versus hopanes content, and (c) yield of tars versus alkylated biphenyls. S_o = organic sulphur.

Conclusions

From the perspectives of the paper, we can conclude that:

(1) Obtained results indicate the connection between vapour organic products emission, i.e., yield, composition of extractable organic matter and sulfur content in coals;

(2) Appearance of polycyclic aromatic hydrocarbons in the coking coals extracts, increase of the biphenyl, DBT and DBF content for RC may apply for assessment of the technological properties of coals for their rational use;

(3) The least polyaromatic compounds emission is produced from low quality sulphur coals.

Therefore, we believe that due to its abundance coal is truly an important energy source and a very versatile organic material, but it is a heritage that has special necessities, its usage and byproducts are a problem that ought to be seen from a sustainable perspective.

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Competitive Neutrality of the OECD Consensus Myth or Reality

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This research paper gives into context ongoing changes in the balance of forces in the international markets caused not only by the crisis and the need to restore market-neutral internationally agreed system for state participation in the support for exports based on real economic criteria. The aim of this research is to demonstrate the changes of the balance of forces in the international markets. This paper presented the statistical data relating to development of GDP, indebtedness or value of exports or imports that the present changes in international markets and open discussion about the topic problem. This article recalled the basic principles of insurance and export financing with state support and also are presented current problems of implementation rules of the CONSENSUS. Due to the fact that state support for exports is an important internationally respected system it is necessary to overcome some doubts and bring to the system real market neutrality. Therefore, we ask whether are respected in practice the agreed principles of international state aid exports and what problems currently international markets and fundamentally different countries are struggling. It can be said that the rules CONSENSUS OECD has contributed to the creation of fair market conditions in international markets, but it can be also monitored over time to some extent being away from the demands of market neutrality. In view of these facts it can be considered as the basis of the current situation primarily to ensure a truly market and competitive neutrality of state support for exports.

Keywords: CONSENSUS OECD, state support, export credit insurance, territorial risk, commercial risk, risk category of country

Introduction

It is increasingly clear that the current economic and financial crisis is the crisis of the advanced/Euro-Atlantic region of the world, which in his behavior crossed the imaginary, but real valid and thousands of years of practice, rules of thumb relating to the necessity of compliance consumption and creation of real sources. The crisis was trying to live on credit, not just individual members of a corporation, but the whole state authorities. Such access and such enforcement of policy interests of the ruling elite, based on life standard, which does not correspond to our economy, could not long continue.

The advent of the crisis of 2008 led to a massive reduction of public and private consumption, an increase in the frequency of corporate bankruptcies and unemployment and internationally to activate so far some latent

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economic problems.

Given the subject of this essay we will address in particular the increase in riskiness of international trade in terms of maturity claims arising from commercial contracts, approach to the classification of these risks, the possibility of their coverage of insurance products, on the basis of the current change of circumstances in the international markets in general and particularly in the Union.

Our aim is to highlight the need for transition the system of state export support to this concept, which will (again, as before) be based on a real assessment of export credit risks in the context of the natural interests of the member states of the European Union (EU) and this community as a whole.

Changes in International Markets in the Context of (not Only) the Current Crisis

The current situation in international markets has long been characterized by changes in the balance of forces that the financial and economic crisis has only accelerated. This change is better than any verbal reasoning document figures of the International Monetary Fund (IMF) about the development of GDP over the last 30 years (accompanied by a forecast to 2015).

Already from this review (see Table 1), it is clear which regions are carriers of the pace of economic development and which ones achieve a relatively lower growth rate. Winners of this contest become clearly emerging countries in Asia but also Central and Eastern Europe, while the U.S. and the EU in achieved economic growth rates significantly lag, and in this case in terms of global comparison is the growth hardly on average.

Table 1

Growth Rates of GDP by Regions in the Period 2010/1980 and the IMF Assumptions About the Development Into 2015 (in %)

	85/80	90/85	95/90	00/95	05/00	10/05	15/10	15/80
World	111.6	185.5	134.0	108.3	141.3	138.2	137.5	806.6
EU	83.5	231.1	130.3	92.6	161.9	118.1	125.4	558.2
U.S.	137.5	151.2	127.8	134.1	126.8	115.1	119.8	623.8
Central and Eastern Europe	105.1	138.2	139.6	119.3	194.9	149.9	142.3	1,006.7
RZ Asia	125.7	134.7	162.4	127.6	174.0	234.1	174.4	2,492.5
Latin America	92.7	151.6	153.5	116.8	125.0	181.7	144.5	826.9
Middle East and North Africa	90.3	120.3	108.0	132.8	167.4	180.2	144.3	678.2
Sub-Saharan Africa	67.6	155.0	110.0	101.2	194.2	167.4	151.6	574.8

Note. Source: Own elaboration (data from IMF, 2012).

This new situation is confirmed by data (see Table 2) about the development of international markets for the last 10 years, which confirm retreat of developed countries from “limelight” to less prestigious positions.

Table 2

Shares of Selected Countries and Their Groups in Total Exports

Rank	Country	Value of exports (in billion USD)			Share of total (in %)	Share of total (in %)	Growth rate (2003 = 100)
		2002	2005	2010	2002	2010	
2010/05/03	World total	6,093.3	10,243.2	14,841.1	-	-	243.6
1./3./4.	China	327.6	752.2	1,506.0	5.4	10.1	459.7
2./1./2.	Germany	608.0	1,016.0	1,337.0	9.9	9.0	220.0
3./2./1.	U.S.	687.0	927.5	1,270.0	11.2	8.6	184.9

(Table 2 continued)

Rank	Country	Value of exports (in billion USD)			Share of total (in %)	Share of total (in %)	Growth rate (2003 = 100)
		2002	2005	2010	2002	2010	
4./4./3.	Japan	383.8	550.5	765.2	6.3	5.2	199.4
5./5./5.	France	307.8	443.4	508.7	5.1	3.4	165.3
6./10./11.	J. Korea	162.6	288.2	466.3	2.7	3.1	286.8
7./7./8.	Italy	259.2	371.9	458.4	4.3	3.1	176.8
8./8./9.	Netherlands	243.3	365.1	451.3	4.0	3.0	185.5
9./9./7.	Canada	260.5	364.8	406.8	4.3	2.7	156.2
10./6./6.	Great Britain	286.3	327.7	405.6	4.7	2.7	141.7
	Top 10/world	3,528.0	5,407.3	7,554.1	57.9	50.9	217.63
23./23./25.	Brazil	59.4	115.7	199.7	1.0	1.3	336.1
1./3./4.	China	327.6	752.2	1,506.0	5.4	10.1	459.7
22./33./31.	India	46.32	76.2	201.0	0.7	1.4	-
37./40./34.	JAR	31.8	50.9	76.9	0.5	0.5	241.8
12./13./17.	Russia	104.6	245.0	376.7	1.7	2.5	359.7
	BRICS/world	537.92	1,189.1	2,283.4	8.8	15.4	-
	EU 27	-	1,330.0	1,791.0	-	12.1	-

Note. "-" not available. Source: Own elaboration (data from IMF, 2012; WTO, 2012).

The Concept of State Support for Exports

The intensity and the development of new forms of state support for exports generally relate with groundbreaking economic and political moments and each new situation in the world economy have led to modifications of the existing system utilization of financial and insurance principles, methods, and tools for the benefit of export support of individual countries and increasingly in broader concept and in the promotion of international trade.

These tendencies can be characterized by the growing involvement of states and their institutions as well as increasing effort about international coordination of procedures used. This coordination embodied particularly in the arrangements for officially supported export credits called CONSENSUS OECD[1] was designed to ensure competitive neutrality of this support in such way that critical for business success in international markets is the quality of goods and accompanying services provided by the exporter. It is, after all, also declared doctrine to which is founded about 80 years Berne Union[2], i.e., the International Association of Credit and Investment Insurers.

In the new situation, in which economies, particularly of developed countries and international markets are now, a question arises whether this principle is in practice into detail really respected and whether is the accepted and the practical implementation of the concept an objective contribution to further development. Are truly this principle and its practical application the best guarantee of prosperity and initiate further development of the world and international trade? In other words, does so far correspond defined framework of this support level, frequency and origin of risks, which now fundamentally international markets and countries are struggling with?

[1] The Arrangement on Guidelines for Officially Supported Export Credits (2011).

[2] Berne Union is the leading international organization of public and private sector providers of export credit and investment insurance. Founded in 1934, it is an international, non-profit organization dedicated to facilitating world-wide cross-border trade and investments by fostering international acceptance of sound principles in export credits and investments insurance, and by providing a forum for professional exchanges among its members.

To better highlight indicated problems of international rules, we must first short mention at least about agreed fundamental principles on which it is now based an internationally acceptable state support for exports.

The Basic Principles of Insurance and Financing Exports With State Support

Mentioned the Arrangement—CONSENSUS OECD[3] in the introduction sets the objective of the Arrangement as follows: "The main purpose of the Arrangement on Guidelines for Officially Supported Export Credits, Referred to Throughout this document as the Arrangement, is to Provide a framework for the orderly use of Officially Supported Export credits".

The Arrangement thus relates to rules:

- State-supported direct or refinancing of export credits include subsidizing interest rate differences;
- State aid insurance of these credits or providing guarantees.

The purpose of this document is to define the framework in which can be state aid of export credits and their insurance accepted, and in which segments exporters will benefit from the financial and insurance services provided on a commercial basis, i.e., without any involvement of the state.

In the field of state aid of insurance and financing of export credits is important (for the purposes of this paper) the application of:

- A uniform system of classification of countries into risk categories;
- A minimum interest rate;
- Minimum premium rates for each risk category of countries and borrowers, depending on the length of the loan.

In this context, in terms of insurance it is considered as a decisive criterion, whether the risks are "marketable", it means hedge able by commercial reinsurance or "non-marketable", it means whose insurance can be provided or ensured only with participation of the state, i.e., with the state support.

The OECD CONSENSUS therefore provides a list of events respectively a list of causes which insurance event insurable with state support occurs from.

These are such risks having in terms of the participants of credit and business relationship so to speak nature of "force majeure".

In addition, they are generally defined de facto by "negative definition" also so-called commercial risks from insolvency or protracted default of the importer or other debtor while insurance of such risks cannot be implemented (due to the negative definition) with the support of the state, i.e., with hedging through the state budget, but only ensuring by market participants—reinsurance.

Compared to so-called territorial risks, i.e., those that are insurable with state support, or when it is possible to use state support, commercial risks arise from the economic and financial situation of the foreign buyer or borrower.

Already here we can be about the accuracy of that definition so-called commercial risk in doubt! It is automatically assumed that these are situations that are influenced by the buyer (failure to pay due to insolvency or late payment). Does the insurer or the state know if that insolvency, but also partly unwillingness is a consequence of mismanagement of the non-governmental debtor or, conversely, the result of government economy and conditions that are formed by financial policy?

In any case, the CONSENSUS can be considered as an important step to layout rules of state support for exports.

[3] The Arrangement on Guidelines for Officially Supported Export Credits (2011).

The Current Problems of Implementation Rules of CONSENSUS

From the beginning the CONSENSUS was conceived such a way (through its rules and criteria) to not interfere but to contribute to maintaining competitive neutrality state support for exports, which are fully complied with the principles of fundamental contractual documents of GATT resp. WTO.

However, inauspicious changes that occurred in recent years in world markets, especially in the financial, have reflected on the ways of implementation of this Arrangement.

In several previous essays (Böhm & Fujerová, 2012; Böhm & Tůmová, 2009) on this topic we pointed out some problems with the implementation of the principles CONSENSUS related. In particular:

- Failing and misleading territorial riskiness assessment of individual countries, and especially those that are classified as so-called most developed countries, where the system does not presuppose the existence of territorial risk;
- Emerging need for re-evaluation, reclassification, territorial, and commercial risks that associated with the intensifying impact of state policies on the export ability of individual firms;
- The need for increased integration of specific approaches and measures for state support of export with overall economic policy of individual countries.

Strengthening the effectiveness of state support for exports and general use of financial and insurance mechanisms thus requires particular:

- Objectification of procedures applied in evaluating of territorial riskiness of countries;
- Reassessment of the current definition of so-called territorial and commercial risks.

Objectification Country Riskiness Rating

Already in the introduction we mentioned the strong and yet unfinished regrouping of forces in international markets, which brings significant changes in the economic strength of regions as well as countries.

There is no doubt that the current and on the basis of global data in the table above presented changes in the ratio of strengths and growth potential of individual parts of world economy are extremely significant, but in our opinion, these changes are not sufficiently reflected in economic policy or the policy itself and in addition the policy does not respond to them as we have indicated, neither the system of state support for export.

That these changes cannot respect now applied the system CONSENSUS disputes the proclaimed competitive neutrality. This is particularly about following issues:

(1) The award, which the countries assigned to the group 0 within (no) evaluating[4] their riskiness are getting, is not objective. It does not represent their real and especially economic situation and as traders so investors mislead.

This statement demonstrates following data about the status of selected countries, both of those so-called developed countries (members of the EU and others), as well as selected dynamically developing countries. Let's look at their results through the indicators that are now mainly in the EU considered decisive quantity for

[4] By creating so-called zero-risk category, into which are assigned countries with gross national income (GNI) exceeding a certain value expressed in USD per capita, countries were de facto excluded from regular evaluations that take place in other countries at regular intervals. In reality, this applies even after November meeting (2012), on which the participants in the Arrangement on Officially Supported Export Credits agreed that there should be terminated automatic classification between high-income OECD countries and the euro area in zero-risk groups. The fact that most of Eurozone member states or members of the EU does not meet this criterion is another question and herewith we will not deal in this paper.

assessing the eligibility of individual countries to adopt the single European currency, thus by development tendencies related to the development GDP, the level of openness of the economy as well now often presented indicator of debt/GDP. We also attach the rating of individual countries and in contrast to how they are evaluated in the OECD CONSENSUS.

Table 3

Basic Indicators of Economic Development of Selected EU and BRICS Countries

	Development of GDP 2010/2000	Indebtedness		Export/GDP 2011	Rating	GNI[5] 2011/2002	Import 2011/2007
		2000	2010				
Czech Republic	166.3	17.8	37.5	75.4	AA-	2.95	114.1
France	134.0	57.3	82.4	21.5	AAA	1.90	112.2
Ireland	147.4	37.5	92.5	58.3	A	1.65	90.3
Italy	129.6	108.5	118.7	23.8	BBB	1.77	91.6
Germany	121.0	60.2	83.2	41.2	AAA	1.94	111.9
Portugal	135.5	48.4	93.4	24.7	BB	1.83	75.1
Greece	168.9	103.4	142.8	10.2	CCC	1.97	64.8
Slovakia	210.9	50.3	41.1	82.6	A	2.73	108.7
Spain	166.8	59.3	61.2	19.9	BBB+	2.05	78.2
Sweden	147.0	53.9	39.4	34.8	AAA	1.95	92.6
Great Britain	149.9	40.9	75.1	19.6	AAA	1.45	93.5
Brazil	319.6	66.5	65.1	10.3	BBB	3.51	145.9
China	404.7	16.4	33.5	26.0	AA-	3.02	142.2
India	343.6	72.7	69.4	17.7	BBB-	3.02	145.6
Russia	618.2	59.9	11.7	28.2	BBB	5.07	120.5
JAR	149.57	43.3	31.5	..	BBB	2.66	104.3

Note. Source: Own elaboration (data from IMF, 2012; WTO, 2012).

As is evident when looking at specific statistical data neither the group of countries the EU or euro area or counties of any formal or informal grouping do not constitute in terms of economic development a monolithic shape. Each country is different (despite some common characteristics), at least in terms of a professional, social and ideological or religious structure of the population, sectorial structure of the economy and its performance.

These real existing differences, however, particularly in case of the developed countries are not reflected in the evaluation of their overall territorial risk, which is in principle contradiction with the principles on which it is based methodology of the risk rating referred in the OECD CONSENSUS.

(2) Doctrine, according to which in all of so-called developed countries does not exist territorial risks also distorts possibilities and conditions under which it may be offered insurance of territorial risks associated with the export to these countries.

The fact that classification of countries into risk categories does not correspond to the current situation and

[5] GNI is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad. GNI, calculated in national currency, is usually converted to U.S. dollars at official exchange rates for comparisons across economies, although an alternative rate is used when the official exchange rate is judged to diverge by an exceptionally large margin from the rate actually applied in international transactions.

the balance of power between participants in international markets is not the only problem of the system or its application.

Conversely, it is even the beginning of deformations by which this system suffers today. To the classification of countries into risk categories is bound primarily price of insurance, it means insurance rates, but among other things, the permissible length of the maturity of loans provided to customers from such evaluated countries. In a situation where in the system CONSENSUS applies the principle of minimum premium rates, differentiated according to risk level of target country of insured export and according to the length of maturity of the loan, represents unobjective rating of countries a significant deformation of currently used mechanism of state support for exports.

Exports to these territories can insure in principle only on a commercial basis de facto against the risk of the company, but not against the risk generated by activity (or inactivity) of the state—the territorial risk. It can be by the CONSENSUS rigorously defined conditions insured against risk of territorial risk only claims arising from exports, where the importer or purchaser or debtor is a state or by its established institution. However, the classification of so-called developed countries into risk category 0 brings to exporters in those territories the lowest minimum premium rates, which in many cases does not correspond to the economic and financial capacity of target country to repay or secure repayment of obligations arising from such contracts. In contrast, insurance of exports to countries categorized in 1-7, that subject to regular rating by group of experts OECD, is burdened with higher insurance rates, corresponding to the appropriate risk category, they are also for exporters from so-called developed countries de facto increased costs related with their exports. Range respectively rate of these differences illustrates the following Figure 1.

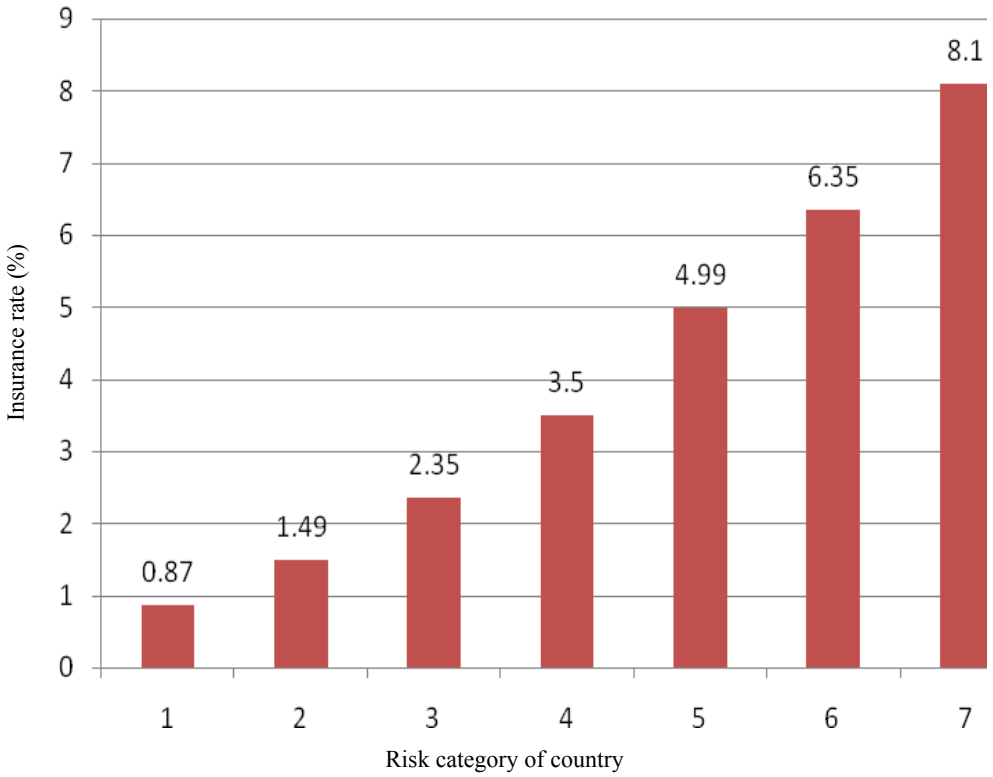

Figure 1. Differences between insurance rates for exports to countries from different risk categories—Sovereign borrowers.

CONSENSUS announced principles of the timeliness and transparency of procedures applied in the evaluation of territorial risk thus taking for their with the fact that the system of state support for exports, which was originally conceived as a competitively neutral and was deformed and did not provide in the meaning of the participants in this international trade fair condition.

Commercial or Territorial Risks

For states are now (due to implemented system consensus, that does not consider the existence of territorial risks) de facto removed the possibility of support through insurance or financing of export in the territorial structure, which it considers from a macroeconomic perspective as necessary. Impossibility of state support of internal EU business may be unpleasant. In this context it should be noted that, especially Eurozone countries then have practically no opportunity to stimulate their export. Due to variance economic potential, different degree of openness of the economy and due to other differentiated characteristics cannot these countries (but they probably would use in other circumstances) use fully the exchange rate of common currency euro as one of the most important tools of macroeconomic and also of export policy?

Related to this is perhaps more important question! Are perhaps importers and borrower's risks actually associated exclusively with their insolvency or protracted default, which are insurable only in mode so-called commercial insurance, or are their carries also acts of states?

Are the commercial risks actually authentically those, that are by current system considered or are they (especially in some countries) rather risks that have from the perspective of participants of a business relationship—it means concrete manufacturing or trading companies—the nature of "force majeure", i.e., territorial risks? Let us recall how so-called territorial risks define the CONSENSUS:

- General repayment moratorium announced by the government of the buyer, borrower, guarantor, or export company of the country, that affects payments;
- Political events and/or economic difficulties or legislative/administrative measures in a third country, that make impossible or delay transfer of funds paid in the credit contract;
- Other additional measures or decisions of government foreign countries, that make impossible loan repayment;
- Intervention by higher power, i.e., war (including civil war), expropriation, revolution, riots, civil disturbances, cyclones, floods, earthquakes, eruptions, tidal waves, and nuclear accidents.

Are not measures that in an effort to overcome the current financial and economic crisis implemented EU, European Central Bank (ECB), and governments of most affected countries by the crisis, just those that increase their riskiness and through an effect restrict the credibility of local businesses? If yes, then it is logical question of the adequacy the current definition of export credit insurance with state support, implicitly defining the space for commercial insurers in this insurance industry.

Let's look at a concrete example of the crisis shaken Greece and at the most efficient macroeconomic and policy measures that with "assistance" of the EU and some member states this country adopted.

These measures for the purposes of our paper we roughly divided into three categories, namely, measures for household consumption, the management of companies, and macroeconomic measures. Already it is clear that these necessary measures reduce the scope for exports to that country, as well as their riskiness. Due to employees and consumers it is about for example wage measures in the public sector, increasing value added tax (VAT), increases in excise duties and taxes on luxury goods, and also the introduction of so-called "crisis"

tax. In relation to companies there was introduced income tax and that differentiated for different levels of profit.

The most important in terms of our discussion, however, is so to speak macroeconomic measures, which include especially relatively drastic reduction in domestic investment and effort to maximum use of external resources especially from the EU.

A special chapter is the massive privatization program, which envisages the privatization of practically all major state-owned enterprises, but also state-owned shares in the business of other companies. From experience with the transformation process that took place in post-socialist countries in the 90th of the 20th century, we know that re-starting the newly privatized companies is neither simple nor immediate and can bring positive results after a certain time, while now there is no talk about certainly needed state revenues from the sale of such companies.

Another state that was most affected by the crisis is Ireland, where the government's "plan for national recovery" brought in particular the gradual increase in rates of value added tax, reduces the number of civil servants, cuts in social benefits, and reduces the minimum wage. In contrast to Greece, Ireland however maintains a low tax on corporate profits. Even here was reduced the absorption capacity of the market.

Also in Spain there is the basis of austerity measures increase of value added tax or cut a variety of benefits for state employees. The specificity of Spain is significant attention by the State to rescue the banking sector, which is given by the fact that banks are majority holders of Spanish government bonds and the status of Spanish banks is so tightly linked to the health of public finances.

However, either really developed countries, such as Germany, France, Netherlands, etc. did not avoid the effects of the crisis and therefore also here we can see decline or, at best case minimal growth in imports. In these cases, it is the consequence of not only restrictive economic measures, but also of large transfers of funds to the crisis-torn countries. Only contributions to the European Stability Mechanism in the case of Germany it is more than 190 billion, France more than 143 billion euros, Netherlands 40 billion etc.[6]

It can therefore continue to have considered that all the CONSENSUS declared so-called developed countries are free from so-called territorial risk in situations where there are macro-economic and administrative measures that limit or restrict the possibility of imports and therefore reduce assurance of successful completion of contracts for exporters to given territories. Is not that exactly the situation that is defined as one that authorizes the use state support for insurance of contracts with companies in these countries? And not to mention the fact that their rating by all recognized agencies indicates about their belonging to a completely different risk category.

Summary and Conclusion

What edification follows from above said for the further development of rules of the application of state support rules exports as they are formulated by the OECD CONSENSUS.

First of all, we can say that this system undoubtedly contributed to the rational organization of rules for state support for export and thereby to create fair market conditions in international markets. This system allowed to individual countries through appropriate institutions support export efforts of their companies in a

[6] In many cases and in large-scope are resources provided to "crisis countries" the source for debt repayment their bodies just financial entities in creditor countries. Their use in the real economy is with regard to their "caution" minimal and does not strengthen the import potential of companies.

way that gaining a competitive advantage in the market flowed only from the quality of goods and services by which the manufacturer/exporter presents in the market.

It can be noted that the application of system, especially in specific conditions of the world economy is to a certain extent moving away from unique requirements of market neutrality. On one side it is given by the artificial creation of a group of countries that are (in conflict with the original idea of the CONSENSUS) considered as risk-free, on the other side it is given by non-respect of both processes and phenomena that are taking place in the economies of individual countries and their groupings, namely, those related to the current redistribution their position in international economic relations, which is in so-called developed (mainly European) countries accompanied by the crisis and the other on the other hand by rapid development.

The system, which is now based on the fact that a sign of advancement and evidence for classification between so-called developed "risk-free" countries is exceeding a certain value of Gross National Income (GNI) or other summary macroeconomic indicator moreover irrespective of status of other macroeconomic parameters is not good and has practically no predicative ability as shown in particular the current economic practice: It is just another manifestation of unhealthy "homogenization" of certain groups of countries, that is especially reflected in the EU (but also in access to other areas); and these lands pay for it.

Face to face deep crisis phenomena that have an impact on these developed countries occur significant national macroeconomic processes that significantly change their economic and ownership structure and these are accompanied by major austerity measures that restrict purchasing power and credibility of their citizens, companies, and countries themselves. As a result, this leads to a reduction in effective demand, investment opportunities and also to interstate differentiated growth of riskiness of trades with such partners.

Risks that were until now considered (in the jargon of the CONSENSUS) as "commercial" suddenly in a number of cases have rather characteristics of those risks that are defined as "territorial", whose insurance with state support, however, the CONSENSUS does not expect. Is not the time to retreat from that principle and to recognize its existence even in developed countries, and in this sense enable their insurance with state support? Weak dynamics of the volume of international as well as of internal EU business requires support!

The solution of the current situation can be seen especially in ensuring effective market and competitive neutrality system of state support for exports, based on:

- Rigorous implementation of existing principles determining riskiness of countries and their classification into risk categories namely for all, including so-called developed countries;
- Strict respect for current economic and political realities of international markets and state of economy of individual evaluated countries;
- Abandonment of the dogma of the absence of territorial risks in selected countries;
- Maintaining applied parameters of insuring export credit risks as they are defined in the OECD CONSENSUS, particularly as regards principles of the system minimum.

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Economic Cooperation Organization Member Countries' Economic Development: The Importance of Assessing Technoparks

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Advanced technologies in the world, especially in the last quarter century of rapid change, radical innovation were required to compete in important decisions, triggered by the national network of cooperation structures which is a very significant changes in participates in the regional country or new technology generation and transfer systems to be released; starting from the most basic research on the effect of knowledge production, commercialization, distribution of the total well-being of society is an important dating "shining knowledge value chain". This important change has become the main formative element of the economies. Recent advances in the knowledge economy and the resulting new strategic theories, knowledge, technology transfer, and increased mobility at the long distances, the concept of regional development is a brand new technological cooperation aims and information focusing on the transformation processes of growth of the economies of developed nations, which is the most important technological innovation in the vision of the economic development advanced plays an important role, evolving processes trigger in all aspects of the right to read most threats and opportunities that might be the best analysis, by passing the appropriate policies for countries in their visions, and entrusted a vital importance. In this context, Azerbaijan, Turkey, Afghanistan, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan in addition to research, technology development and production partner countries' and these countries sharing innovation structures with R&D Center in technoparks and to serve together in the development of the total synergies "of the economic cooperation organization".

Keywords: industry, Technopark, university, ECO, innovation, member states

Introduction

Economic Cooperation Organization (ECO) member countries' economic growth, international competitiveness, and employment opportunities, to come together quickly, surely, are obliged to convert to the technical and commercial success. Member states need to take a moment before the next technological companies to design the structure of the network among the member states and the international networks between information and combining R&D resources, along with their technological alliances come together, providing the knowledge and technology commercialization technology transfer centres, incubators, Industrial-University Business Association from this very shining star of technoparks, technoparks, within

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member countries and a strategic geography and a common regional culture (Özdemir, 2013a).

All countries to tap into the global market environment, advancing at a pace that will return the head of advanced technologies and the products and services on the market life cycle gets shorter, focused on the socio-economic environments, advanced technology, innovation is vital for the ECO member states to be able to do. In general, the member states are based on advanced technology, which is a very low proportion of the value added, and labour-intensive foreign trade and more low-skill industry shows that we can see Parallels product processes. In this case, the international competitiveness must not be overlooked that much capacity meaning big troubles (Özdemir, 2013b).

Economic development: factor-driven economy, efficiency-driven economy, and innovation-driven economy are collected in three main stages. The lowest stage of development economics is factor-driven economy with some natural resources which mediums are basically unskilled labor. Factor-driven economy to develop their countries, host the advanced technology which they provide some other countries instead of the gallery (Özdemir, 2013b). Investment and efficiency-driven economies; providing education and training institutions the skilled workers and providing a certain level of productivity growth factor—internal structures investment (Kılınç, 2011). Most leading countries in economic development, innovation-driven economies, namely, the innovation index, R&D expenditures, health, infrastructure and industry-university cooperation in the host countries, as well as stages of venture capital, they are always successful. The best example, the U.S. has raised with the proven track record of successful design of policies of national innovation system in Silicon Valley. A large part of the money into the U.S. economy is about innovation system and technological inventions were exhibited at Silicon Valley (Özdemir, 2013b).

Silicon Valley produced very successful innovation-driven advanced technologies and inventions on display, and a major cause of the shooting, as well as from abroad as well. There are a lot of important U.S. patent reform efforts. Study of reducing the duration of the studies and patent to the U.S. is important for technology-focused start-ups and entrepreneurs provides an environment, which enables the U.S. patent system with this advantageous environment significantly, so that shots from abroad, almost half of their patents acquired need to know that both with brain power.

In addition, the new U.S. President Obama having been expressed by business strategy plan R&D and innovation in the work of the patent related to the future of the inventions on display will shape innovation-driven economy to the reforms, President Obama would be making further important steps in historical, strategic innovation for the economy.

Basic research, innovation, renewable energy, advanced vehicle technologies, Nano-technology, innovative medicine, advanced technology equipped express trains, such as offshore wind farms is very important in patent reform and strategic planning efforts in this expenditure is approximately 100 billion U.S. dollar budget reserves to underline (Kiper, 2010).

In this sense, the ECO member countries, on the one hand need to produce the international advanced technologies and very urgently, on the other hand pay attention to the regional development, in this sense, also founded by the member states and regional and international relationship with the national innovation systems as they establish strategic alliance to technoparks and public R&D, joint product development, support, and long-term common invention patent agreements and marketing as collaborations even more importance, and most importantly, very important brain capacities the geography of the brain, which was vital for the strategic planning of exposure to regional importance. Members of the ECO, namely, on the basis of advanced

technologies by the capabilities of the strategic alliances will make growth rates in the economies of member countries with leverage effect. Thus, the reduction in technological capabilities in advanced switching costs, high technological capability, facilitate the transition, member states' R&D to reduce costs and minimize the risks of member countries will be very accurate for economic growth. R&D costs and technological changes to be fast, one of the countries' ability to produce advanced technology alone is very difficult (Özdemir, 2013b). For example, a new drug to market costs an estimated $200 million. They create technological alliances with pharmaceutical companies, biotechnology pharmaceutical companies by providing financial resources and high market entry, which facilitates the passage of the latest technology. Thus marketing and innovation alliance at a cost of more than high quality products with companies capable of manufacturing production technology can create the alliance (Mukerji, 2008).

Results and Discussions

ECO member countries will provide important benefits to innovation-driven advanced technology strategic alliance:

To facilitate the flow of information, the establishment of large multinational companies and universities in countries where required thanks to the innovative activities and inventions of member countries' common technoparks will strengthen (Özdemir, 2013b).

Establishment of development centers;

- inventions of importance to the creation of the common patent agencies;
- emphasis on the technological brain power to the activities, reverse brain drain can gain prominence in the strategy;
- quick switch to a market economy;
- reduce the cost of developing new technology;
- the ability to edit the different markets.

The advanced technology entrepreneurs venture capital support of the member countries (for example, in METU Technopolis techno-techno-entrepreneurs with investors, Angel capital network to bring together structured "Technology Investors Network"), Turkey is one of the most important business angels network in instances. By providing this type of structures in other countries, "ECO Advanced Technology Investors Network" is established, creating the brain Center international finance and venture capital:

- the expansion and growth of the international arena;
- increase market share;
- advanced technologies complement to swap;
- lay on the table, the economy of scale;
- you can quickly receive investment in recycling;
- share of R&D costs;
- oil revenues will come from a substantial portion of the money, using active science and technology;
- investments to convert;
- high risk of projects.

To ensure compliance with the policies of other member states.

Selecting the appropriate technology for the member states to common strategic industrial investment reports, and make the necessary technological entrepreneurs help regions, development of advanced

technologies and high value added for all of them is the central base area for economic development, an important strategic diffusion of Technoparks bounce will be known.

ECO member countries in determining the innovation and advanced technology-oriented models require a long process of research and design, including appropriate models at politicians about the realization that must support all parties and it will require courage and determination to put into practice strategies.

Much of the ECO on a world scale and only a few of the country's contribution to be effective, cannot happen with, all countries in the innovation-driven ecosystem that exceeds a threshold of critical transnational raised forward have to be an undisputed competitive advantage which is important in the world.

In a more diverse ecosystem, techoparks, which is the same in the case of information on innovation and Technology Center is located within the companies as a result of the interaction of failover clustering and a country's innovation-driven economy, resulting from different sources together fragments of the resulting advanced technology-oriented innovation-driven economy likely to succeed will be much lower. In this sense, the Economic Development Organization member countries: Azerbaijan, Turkey, Afghanistan, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan to produce technological alliances with very much importance will be successful (Özdemir, 2013b).

For example, in Japan, mainly on the basis of the country's development process, the Far East, much developed from scratch is not allocated to investments in research. Rather, it worked on advanced technologies to be brought from outside the countries' national innovation policies can be resolved within their terms and more in the form of new innovation-driven technologies built upon knowledge obtained from witnessing. In this sense, the ECO member countries focused on technological innovation alliances are very important.

For example, in the last 10 years between 1980-1990 global circles more than 500 technological alliances with American companies that make up the Japanese to enter the North American market have been caused by rich (Mukerji, 2008).

Jiang and Lee on their examination of the 127 German company, strategic alliances help to develop new product and understand the manufacturing processes with the techniques. The format of the strategic alliance is the Technology Alliance. Thanks to advanced technology companies better collaborations internalizing the market needs will enable them to move very fast. Thus, the reduction in costs of switching to the technology, the main driving force will be seen as a momentum. R&D costs and risks that will be minimize (Jiang & Li, 2008).

ECO member countries, R&D centers to build a strong base of technoparks; national innovation systems and institutions and organizations related to entrusted, in an effective manner of coordination with governments that irregularities in the system measures the creation of activities related to the policy, legal, and regulatory framework develops, implements, and that these policies, such as strategic planning, can be made into a colander, Techoparks unwelcome developments advanced in terms of the emergence of technological R&D and inventions, particularly in terms of strengthening the economies was very important (Özdemir, 2013b).

According to the World Economic Forum in this parallel, macroeconomic criterion determines the level of a country's competitiveness, productivity, institutions, policies, and the creation of software. Competition organization of economic growth between the macro and micro levels, and management and community welfare in recent years due to the growing importance of regional development to assure competitiveness attracts both policymakers and academic environment (Boulay, Charles, & Barnes, 1997).

Innovation in less developed countries, technological alliances with many developed countries.

Technology diffusion and innovation performance are economic growth. In addition, in recent years more than half of the U.S. economy growth rates have been achieved thanks to the progress of science and technology that has been mentioned. It is the most beautiful example again, the Silicon of monasticism. There is greater than the share of technoparks (Boulay, Charles, & Barnes, 1997).

Conclusions

There are two major options in terms of economic co-operation member countries. The first option is traditional, labour-intensive industries, such as low wages, low taxes, and energy based on competitive advantage of superiority with the support cost of inputs. This option was also tried but did not succeed. The second option, international firms are specialized in high value-added products and activities.

Technology Center of technoparks, technology from developed countries to developing countries by accelerating the spread of economic development in a positive direction. With their knowledge and technology produced by the techno-country to improve the efficiency and competitiveness of the global market, putting out and spreading of technological innovation, technological innovations, globalization makes it easy, too. Economic growth, technological innovations to more in the future, the Center will have a strategic importance technoparks, the ECO member countries, in collaboration with the international technology diffusion and production factors in the host economies, provided as a part of their efficiency in terms of cost advantage with other international economies will achieve very high according to the competitive advantage.

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The Relevance of Place-Brand Management in Place-Marketing Strategy*

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Observers perceive each place through a particular image, not necessarily positive, definable in a distinctive positioning through place-marketing strategies; the relations between the actors of the territory system play an important role, and the place-brand becomes "the connector" of the relational network in place-marketing management. The aims of this article are to analyze the relations between place identity, place-brand, and place-marketing strategy; to look at case studies of bottom-up strategy as a medium for the long-term empowerment of the place-brand strategy; and to examine the relevance of place-brand positioning and interaction between governance and stakeholders in place-marketing strategy development.

Keywords: place-marketing, place management, place-brand, network, value generation, strategy

Methodology

The work is theoretical and based on the place-brand literature: It refers to the role of this construct in the place-marketing strategy, to the positioning concept, and its construction over time.

We decided to carry out a survey of the relevant literature, underlining the importance of the connection between studies of place-marketing and place-brand, and to perform a qualitative simulation to reduce the complexity emerging among the elements that insist on the nature and definition of place-brand positioning and on their relevance to the construction of the place-brand value. Specifically, beginning from some definitions of place image and place identity, we assign effect multipliers—positive or negative with respect to the positioning of the place-brand—to marketing strategies and a scalar multiple to the size of the territory which is developed through the marketing and place-brand. These concepts are summarized in the graph of the simulation (see Figure 3) and in the formula $PBP = (PI / VT) \bullet MS$.

Marketing and Strategy in Place Development: References to the Literature

Studies of place-marketing continue to interest many researchers on the international level on account of the multidisciplinary aspect of its scope. As a matter of fact, because of the growing relevance of the value of territories, the topic lays out an interesting path toward alternative models of territory development which are

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both competitive and sustainable.

The identification of the correct approach to territory is not immediately describable because of its definition, its integration with economic activity, and the complex networks that directly and indirectly arise between places and stakeholders. It is not a simple matter to standardize a strategy of territory development, or to generate an ideal model of "relationship-wise connections" that encourage an active style between the territorial government body and the stakeholders that interact with the development policy.

In the 1980s, with the crisis in the manufacturing sector, researchers' consideration of topics ascribable to place-marketing was occasioned by the arrival of new economic scenarios and the growing globalization of the contexts: These phenomenon have inspired a need to know the on-going changes and have induced much thought about new approaches to place development and social development, including through multidisciplinary logics.

The object of place-marketing is represented by the place—a public good—and so its aims are a "public asset", namely, the creation of value for socialization (Moore, 1995) and to improve the quality of life of the citizens and the main stakeholder.[1]

The studies of authors who have, over time, dealt with place-marketing can be divided into different currents: Some show an approach referred to as the "pure" promotion of so-called urban facilities (Ave, 1993; Borchert, 1994); others attempt an approach that is mostly linked to strategic planning (Ashworth & Voogd, 1990; Kotler, Haider, & Rein, 1993). The main difficulties have appeared in the study of the similarities and the significant differences between place-marketing and business marketing. Authors like Flipo and Texier (1992) and Caroli (1999, 2006) have presented their contributions from this perspective. Among them, Corsico (1994) correlated marketing, strategies, and cities by considering several approaches; Ancarani and Valdani (2000), together with Camagni (1996) and Latusi (2002), have considered the possibility of thinking of the territory as a firm, studying its limits in terms of identification. The development of this notion has led to the interpretation of the place as a changeable reality, complex to decode, identifiable as a subject, and possibly manageable "as a firm."[2]

Among the main research currents we find the relationship between stakeholder territorial government bodies, funds for the strategic planning of territories according to the sustainability principle, and the place-brand issue.

Relationship Between Place-Brand, Network Planning, and Marketing Strategies: Focus on the Reference Literature

Practical experience and critical reflection on the literature show a tendency to conceive and define the territories through certain identifying patterns. In some cases, we can identify a "local label"—a place

[1] The issue of quality of life is considered fundamental in economic, social, and political studies. It is very important for the development of the community and, in general, of populations, and it arises especially in cities, which are the centre of life and of people's interests. Many economic and social indicators contribute to the measurement of the quality of life and many of them are also hard to identify. They include social inequality, access to different educational levels, pollution, safety and the perception of safety, political freedom, democracy, average salaries, the urban environment, the typology of city services, beauty of the landscape, and so on.

[2] The concept was promoted by Van den Berg in 1990. In 1994, Van den Berg and Van der Meer asserted that strategic place-marketing cannot be compared to the marketing of large firms, because the management of a city considerably differs from the management of a firm.

image[3]—as a result of a common language and experience of the stakeholders, without defining a specific location. In these cases, the territorial governance must choose whether to allow the spontaneous evolution—or devolution—of the positioning elements to an entity rationalized in a brand, or to drive strategically a place-brand project through a structured marketing-oriented plan.

The concept of place-brand has, in recent years, received increasing attention among scholars, who have focused on the concepts of management, looking for cooperation, development of knowledge, and sharing of strategic planning models inspired by the core concepts of marketing. Among the most significant work of systematization of the reference literature on place-brand, we mention the research of Ashworth and Kavaratzis, (2010), Hankinson (2004), and Kavaratzis and Ashworth (2005), and we consider the contributions of Anholt (2007) to the competitiveness of nations, cities, and regions in relation to the image perceived by stakeholders and studies of specific performance indicators. Medway and Warnaby (2008) have addressed the issue from another perspective; specifically, they have examined the relevance to marketing of images perceived in negative territory (cities, provinces, different places), which over time have gained notoriety due to adverse events. These authors have also suggested the use of levers of communication due to demarketing. Medway and Warnaby, in the case study cited, also speak of "perverse place-marketing" which supports the possibility of identifying benefits of the appropriate dissemination of the negativity of a place—or rather, of the less attractive characteristics (unpleasant events, massacres, catastrophes, features which are not positive stakeholders or people), identifying the so-called negative place image. This hypothesis helps to support the argument that the management of a place image (whether negative or positive) can be defined as a place-brand that, over time, will generate value for stakeholders.

Hankinson (2004), Kavaratzis and Ashworth (2005) systematized the contributions of many authors arguing that the sites can be conceptualized as recognizable brands and that, above all, they can be powered by a defined target group, classified in the work of Kotler et al. (1993). In this case, we speak of visitors, workers, residents, and businesses.[4]

Depending on the territory under analysis, we can see the different desires and needs of specific groups that can help to strengthen the relevance of the distinguishing features of the territory; the larger the target group, the greater the number of relevant factors that multiply the difficulty of identifying a distinct and recognizable image. Also, the larger the territory, the more distinctive elements, characteristics, variability, and the number of target groups, and this causes difficulties in building brand awareness according to the principles emerging from naturally generated positioning, or built in some way through actions initiated on the specific territory or otherwise especially valued.[5]

A major strand in studies of place management, receiving special interest from scholars, is destination branding: in particular, relational elements, marketing policies, and the evolutionary dynamics between tourism destinations and recipient-tourists, players that over time can build the destination brand. Among the authors

[3] Work in terms of place brand, country image, and brand positioning, though similar, are addressed with different approaches on the international level. The literature indicated below identifies the place image as a spontaneous image, which is overall created in the mind of the person concerned to the territory—that is, the set of identity and experience in the area.

[4] Regarding the variation proposed by Kotler et al. (1993), it is possible to specify the classification as in Hankinson (2004), who divided the category of visitors into leisure tourists and business travelers, or as in Zenker and Petersen (2009), who talked about interior and potential residents. In the latter are to be placed students and members of the creative class.

[5] In the case of large areas, the development of a place-brand implies a communication campaign aimed at both inside and outside to share the mission and vision and to support the joint work of the actors of marketing planning.

who have examined this subject are Morgan and Pritchard (2004), Pencarelli and Gregori (2009), and Pencarelli and Splendiani (2010).

The territorial model of reference for the place-brand can be identified in the city,[6] which, with due caution, can partially attenuate the complex problem of the definition of territorial boundaries;[7] talking about place-brand for a large area is complex, especially if you try to go beyond the concept of administrative boundaries, as a territory, like a network, should not be subject to border schematics, but should define itself in a geographical space and be confined to a specific course of work relations that arise between the subjects of the local community, stakeholders and, especially, businesses. A place-brand would be identified as the synthesis of place-marketing strategies and would represent the objectives of the community and of the strategic place-marketing plan. The studies mentioned above help to support the hypothesis that a territory is more likely to affirm a defined positioning of its place-brand, if it can optimize and improve its place image, avoiding leaving the construction of a specific image to spontaneous events.

Hankinson (2004) focused on the importance of research-behavior relationships between stakeholders and the consistency between worlds and attributes evoked by the brand and specific territorial reality. By identifying three elements with the term "core brand" (namely, personality, positioning, and reality), he defined place identity (see Figure 1), which is the "core" of the place-brand. The latter is built and strengthened over time only if the identity has those items in it.

The primary elements that Hankinson described in the "core brand" that define place identity are: the "personality", which identifies the potential attributes of the territory (functional, symbolic, and experiential attributes); the "positioning", which would identify specifically the "place positioning" or attributes that, naturally and not systematically, make the area unique, along with the basic elements common to other areas; and the "reality", which identifies the level of consistency between what the image of the territory promises and what the observing subject can find in the area.

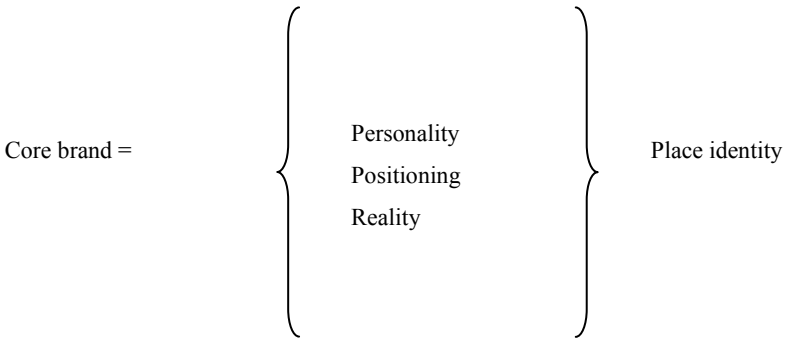

Figure 1. Core brand and place identity. Source: Hankinson (2004).

We can see the importance of making coherent what is communicated with what actually exists in the territory; this concept and its importance are also mentioned by Allen (2007), who emphasized the need for consistency between theory, marketing planning, communication, and the result in the territory.

Figure 2 summarizes the ideas of Hankinson (2004) on the importance of relationships between

[6] Consider the cases of Manchester, Liverpool, Madrid, Barcelona, etc..

[7] Caldwell and Freire (2004) say that "The factors that influence the image of a country are different from the factors that affect a region and city. In this sense, the work of branding a country is different from that of branding a region or city".

stakeholders and the consistency in behavior between worlds and attributes evoked by the brand and the specific territorial reality. The quality of the relationship in the network (see Figure 2) and the classification of each element in the primary "core brand" (personality, positioning, and reality) are strictly connected to the nature and quality of relationships and the attitude to stakeholder collaboration with the local administrators. In this paper, we add two important elements:

• The governing body's ability to plan, coordinate, and implement a marketing strategy, possibly in bottom-up mode, involving many stakeholders and building strong and durable relationships;

• The willingness of stakeholders to observe the marketing strategy for long periods of time, extending the assertion of a shared strategic positioning, rather than framing the place offer in an image resulting from a set of uncoordinated inputs.

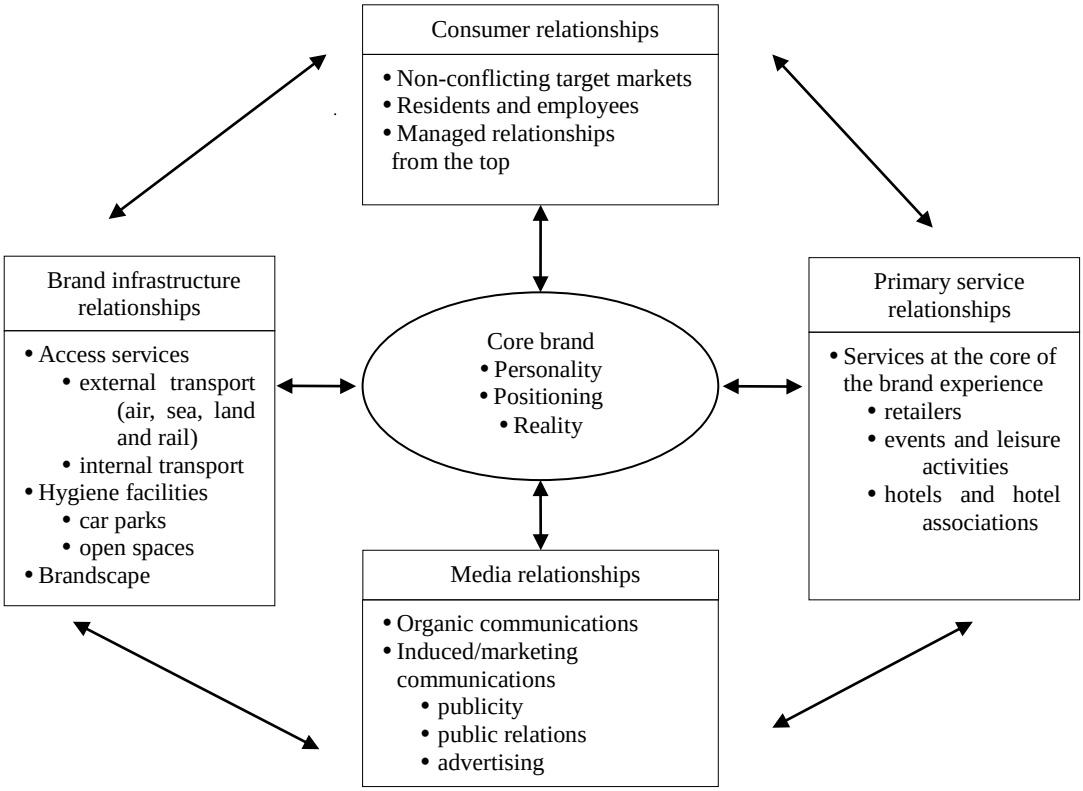

Figure 2. Relational network brands: Towards a conceptual model of place-brands. Source: Hankinson (2004).

A brand stands out from its competitors by its specific positioning and its personality, which corresponds to a unique combination of functional attributes and symbolic values (Hankinson & Cowking, 1993). A brand incorporates a set of beliefs and physical and sociopsychological attributes associated with the product (Simoes & Dibb, 2001): The branding implies a conscious and deliberate process in which such attributes are selected and combined to add value to the products and services (Knox & Bickerton, 2003). Thinking from the perspective of place-branding means identifying a country, region, or province as a multidimensional construct characterized by the strategic functional, relational, and emotional elements that society creates in the public mind as a single set of associations with the place—in the "consumer's mind". In this sense, branding means to identify the positioning of the territorial area, to define attributes, and to assign values in the present and the

mission and vision in the future.

Although the debate is still rich in ideas, it is argued in this paper that the place-brand is not a static or defined construct; it is rather the synthesis of a place image consistent with the strategic positioning identified in the relational network among stakeholders, services, infrastructures, and projects, valued and systematized in a place-marketing strategy.

The place-brand assumes a key role in both communications directed to the outside of the territory and that aimed inside the area, in line with the constitutive components of the brand (Howard, 1977; Busacca, 1994, 2000). In the case of external communication, the place-brand plays a role in identifying, comparing, and generating confidence: In the process of identifying, the place-brand aims to convey the image of the area and its distinctive features. In the case of comparing, the role of the place-brand is to signal, directly or indirectly, the particular differences between the represented territory and other territories. Finally, the place-brand's role of generating confidence allows it to appear as the guarantor of the activities and results of marketing planning in the area, as well as the correspondence between the "promise" of marketing and the territorial reality. In the second case, communication with the interior of the area has a function addressed to stakeholders—as communicating a common identity will tend to enhance the aggregation operators—and one of coordination and support to define and develop the criteria for the use of the brand by involved people.

Interactions Between Relevant Factors in the Definition and Affirmation of Place-Brand Positioning

In the early 1980s, Ries and Trout (1981) declared that "The positioning is the conception of a product and its image in order to give him, in front of the consumer, a location appreciated and different from that occupied by the competition". The reference literature in the field of marketing and branding is unanimous in considering that there are several issues to be addressed in the field of product positioning,[8] businesses, and brands. Here we consider the distinctive characteristics; the perception that consumer clusters have of the product's, company's, or brand's competitors; the optimum position for a good chance of survival in the market; and the marketing tools available to the budget.

Borrowing concepts from the theory of marketing businesses, we can frame similarities between the processes of identifying place-brand positioning and firm-brand positioning: There are elements in the process of analysis of the strategic positioning of the territorial brand that cannot be underestimated.

The territory as "subject" or "viable system" will have an ultimate survival aim over time under conditions guaranteed by sustainable development. In this sense, the territory will survive, albeit changing according to specific strategic directions towards different local communities that take turns characterizing and placing the image and its material and immaterial reality.

Since the territory, regardless of administrative boundaries, is a complex system with components in continuous interaction, it generates (quite independently of any marketing strategy) communication signals and impulses inward and outward (place identity) that rapidly and continuously stimulate the perception of observers. Although the outward impulses may be continuous, multiple observers are characterized by different cognitive facilities and varied interests and are stimulated by the territory in different ways. Thus different "place images" will be generated. The indirect signals coming from place, regardless of the governing body,

[8] Wind (1982) identified six types of brand positioning based on the distinctive quality of the product, the benefits found in the product, brand, or company, the occasion of use, the user category, the product category, and its distinctiveness in the market.

will express their meaning in the scheme of the core brand of Hankinson, and can be identified with the place identity that is characterized by the subjective impressions of the observer who sees generate a specific mental place image[9].

In summary, the place identity is the "core brand" identified by Hankinson and, in the place identity, the "place positioning" can be identified through the affirmation (the automatic and non-systemic strategy of development) of some of the places' features that in some way objectively make it unique and recognizable. When this system of automatic definition of the impressions includes the work of a government able to successfully implement a place-marketing strategy, a place image can be transformed in a strategic positioning identified with the place-brand positioning. The place-brand positioning is related to several factors that can enhance or degrade its essence depending on the degree of intensity of the effects they have on the observing subject—but also depending on the combinations that develop both independently and through plans. The basis of the place-brand positioning is made up of levels of recognition and affirmation of the distinguishing characteristics of the place and the efficiency of the marketing strategy. The roles of time, of the quality of relationships between stakeholders, and of the size of the geographical and administrative area are then mutually dependent generators of influence, whether positive or negative.

The recognition and affirmation of the distinctive features of the area—and therefore the affirmation of its place-brand positioning—depend on the consistency between the marketing strategy and the reality actually found in the territory—which implies a situation of excellence among the relations in the network of local stakeholders.[10] In Figure 3, we show a simulation of the effects in the case of verified coherence (the dashed line) and in the opposite case (the solid line).[11] Putting the play time on the *x*-axis and the levels of minimum, average, and maximum levels of affirmation of the distinguishing characteristics of the area on the *y*-axis, we represent functions that allow the simulation of the situations described above.

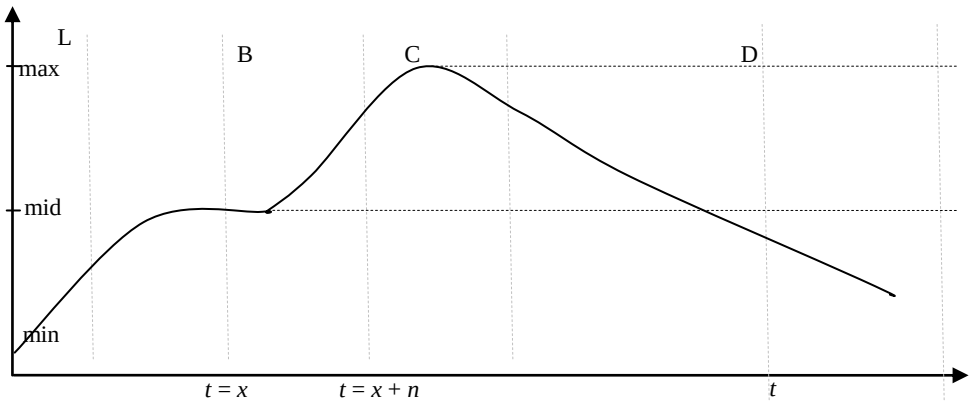

Figure 3. Relationship between level of success of the distinctive features of the area (principal assets), the time factor (*t*), and contribution of the marketing strategy. *t* = identifies the time on the *x*-axis.

[9] The subjective expression that the area gives to observers who come into contact with the place identity is called the "place image".

[10] If the operational policies underlying a good place-marketing strategy are consistent with the reality that is found in the territory (that is, if what the marketing promises to the consumer is to be found in the area), it will receive the highest level of recognition and affirmation of the distinctive features of the territory.

[11] A good positioning must be secured to a corresponding physical reality in the territory which equals the expectations of the target audience and helps to define the same position (Morgan, Pritchard, & Piggott, 2002).

In Figure 3, L represents the level of success of the distinctive features of the territory. From a minimum level of success, the maximum level (point C Max Level) may be reached through a place-marketing strategy. In the event that marketing strategies are not developed, the level of affirmation of the distinctive features stands, in a natural way variable from territory to territory, around an average value given by the natural perception of the distinguishing emerging features. Under the reported conditions, for periods of time greater than $t = x$, the statement and the "reputation" of the distinctive features, if not reduced, stand at a medium level.

Between B and C: The solid line expresses the results of increased awareness of the distinctive characteristics following the implementation of a marketing strategy for success. This is the case in which there is consistency between the marketing promise and the real organization and setting of the place. Without a marketing strategy, in the same period, the result shown by the dotted line would be obtained.

Between C and D: The solid line indicates the range in which the influence of time—and therefore the noncompliance in the long term of the marketing strategy—or of the difficulties arising from the large size of the territory act to lower the statement of distinctive features and weaken relations between stakeholders. Although we can achieve a maximum level of recognition of the distinctive characteristics, we may incur a progressive weakening of the same due to the factors previously mentioned. In some cases, however, it is possible to encounter maintenance over time (and sometimes also an increase) in the level of affirmation of the distinctive features: This is indicated by the dotted line that starts from C and proceeds horizontally. In the final situation, the stakeholders are aligned in a single marketing strategy and excellence exists in the relations between them.

Analyzing the graph of Figure 3, it can be seen that:

• All the elements of the place-brand management are in relation to time, which contributes to weaken the marketing strategy, the exclusivity of distinctive features, and the relations between stakeholders;

• The quality of relations among stakeholders in the process of place-brand positioning is relevant, and it contributes to define the place-brand's distinctive features.

It could be possible to analyze the relations among place-brand positioning (PBP), the size of the territory (VT), and marketing strategy. In particular, because the PBP depends on place image (PI) and marketing strategy (SM), the size of the place (VT) could be analyzed as a divisor of the relevance of the PI. Only marketing strategy could then serve as a multiplier. We can represent the concept as follows:

$$PBP = (PI / VT) \bullet SM$$

From this expression, we outline the major differences that explain meanings that are apparently similar but, especially for the area, are in close collaboration with the marketing strategy and the size of the affected area.

The place-brand positioning (PBP) is therefore the result of a perceived place image: It is sensitive to the size of the territory (the larger the size, the more possible interactions between stakeholders decrease) and is enhanced (or weakened) through a marketing strategy capable of facilitating the transition from the place image to the place-brand positioning by the launch process of generating value.

In this sense, Table 1 represents the path of construction of place-brand positioning, beginning from the recognition of a generic place image of the area—that is, the spontaneous overall image that is created in the mind of a person thinking of the territory, regardless of the strategic marketing intervention. The positioning is generated through the emergence of distinctive features and the place-marketing strategy.

Table 1

From Place to Place-Image Brand Positioning

Construct		Elements of generation of the construct
Place image	Generated by	Asset and drivers: tangible and intangible
Place-brand positioning		Asset and drivers (tangible and intangible) and the affirmation of distinctive features
Place-brand positioning		Asset and drivers (tangible and intangible), affirmation of distinctive features, and territorial marketing strategy

Note. Source: Authors' work.

Importance of the Relational Network and the Bottom-up Approach in Place-Brand Strategy

The importance of networking between local actors and government bodies concerned with the development of the territory with a view to marketing has been studied by Simoni (2009), among other authors. Specifically, this author, taking a page from Golinelli and Dezi (1997), summarizes the need to identify the degree of centrality and the clustering coefficient of the territorial network in order to measure the number and the strength of relationships between the actors involved in the network and the bodies in the central location. For radical interventions in place positioning, the role of a single body with a central position is more efficient; for less radical interventions, a greater number of central bodies may be efficient in a network with an average relational intensity. It remains clear that the spontaneous involvement of more actors—for example, through a bottom-up model—may lead to an increased quality of relationships in the network, and an affirmation and strengthening of the effects of interventions over the longer period, but also implies greater attention and preparation of local actors. The connection between local actors and the relevant assets and drivers systematized in a place-marketing strategy can be generated in different ways,[12] and the governing body as the "director" of the development is important, though not essential at the beginning of the project. In some cases, place-marketing projects are proposed by local government bodies, which in most cases are identified with public bodies (municipalities, provinces, regions, etc.); in other situations, it is one or more investors who initiate a project to develop the area with the intention of promoting the economic development of their sector of activity. In several cases, however, the approach is bottom-up, and is created by a group of subjects in the territory, giving rise to individual initiatives, ensuring that central government is stimulated to support the definition of an overall marketing strategy.[13]

In several reported cases, it has not always been possible to identify specific expertise—whether these

[12] Stokes (2008) presented three models: the top down, in which a few stakeholders, through one or two public entities, take the lead and guide the development process with the aim of optimizing the return on investment; the mixed model, in which many stakeholders together with a public entity drive the strategic process, seeking a balance between the private need for economic return and the will to develop the local economy in the public interest; the third model is independent of the proponent, but is characterized by the will to obtain the maximum involvement of local actors and a return linked to sustainable development with high social benefits.

[13] Among the problems studied in the framework of place-marketing, there are several emerging complexities, such as:
(1) The classification of the fields of definition of the territory to be investigated, such as city, region, nation, spatial area without administrative boundaries, and so on;
(2) Identification of those responsible for the initiation and implementation of a marketing strategy, in which case there are several techniques applicable to each aspect, whether spatial, cultural, business features, and the available financial resources.

private individuals, different investors, businesses combinations, or the governments of local authorities—resulting consequently in a critical level that threatens the projects in progress and undermines the relational levels between actors. In such cases, bottom-up initiatives would seem to give better results in the long run, both in terms of implementing the marketing strategy, and, in general, the effectiveness of the network of local actors—think, for example, of the tools of negotiated planning.[14]

The greatest opportunities for a bottom-up approach[15] are found by internalizing the metaphor of the territory as a "subject" (Camagni, 1996; Caroli, 2006) with vitality, interactivity, and development capability; the territorial "subject" is able to self-determine the importance of the network elements, the nature and characteristics of its governing body[16] which has been democratically elected by residents and internal stakeholders, and its governing body is the expression of a public authority or multiple mutually associated administrations;[17] in contrast, an area identified as a "complex" product, or as an entity to organize and "sell", would have less autonomy arising "from below" and reduced participatory planning. In the case of top-down interventions, however, even in a territory "subject", organizational shocks and difficulties would be experience in the network among those stakeholders who might in some way suffer from higher levels of rigidity. In some cases, however, over shorter times, good results might be obtained from the transformation of territories. In any case, it is necessary to evaluate the result and the conditions for sustainable development.[18] Generally, the bottom-up approach can reach a good solution of centrality of the primary stakeholders (companies and people), and through this approach, civil society can become involved in development projects with direct impact on the local environment. However, there are difficulties and strengths to this. The following elements show the complexity of bottom-up projects:

- The need to commit long periods of time to generate interest in the subjects that are to be involved;
- The need to find a large number of supporters of the project and to carry out widespread initiatives;
- The need to manage the early stages of negotiations and meetings for the sharing of guidelines and directives;
- The need to develop different projects regarding the expectations of the individual because of compatibility with certain types of financing.

Among the strengths are:

- The shared ownership of a variety of businesses and individuals;
- More opportunities to produce more efficient interactions within different kinds of networks due to

[14] Agreement program, project framework, territorial pact, program contract, framework contract, and PIT, are all projects for the development of the area that are relevant to the negotiated programming.

[15] Among the authors who have reported opportunities and problems as part of the territory in the bottom-up and top-down views are Zanderighi (2004) and Stokes (2008).

[16] In this case, consider any area of land ruled by a government democratically elected by the population of a territory. The governing body will be the expression of the strategic territory and will interpret the needs, including the developmental needs, of the stakeholders in a sustainable development perspective.

[17] Some territories may, however, delegate the responsibility of marketing planning to public-private entities, and in some cases, the integrated efforts of several public entities may materialize in the planning and marketing of large, integrated areas. Consider here the initiative of Trentino SpA: http://www.trentinospa.info/interne/societ%C3%A0_interna.ashx?id=19843&l=1.

[18] Through a series of elements and top-down actions, a local identity is constructed; large events, road shows, and panel discussions are organized. Remote areas are promoted at trade fairs, inviting tourists and stakeholders to visit. But sometimes, as with the Province of Frosinone in 2010 (http://www.provincia.fr.it/showcontent.aspx?l1=14&l2=149&l3=174), the design and launch of regional labels or aggregation initiatives are done without proposals of content or services to be conveyed to the operators, who, in turn, are often insufficiently aware of the initiatives pertaining to them. In these cases, the initiatives remain a mere exercise in style and an instrument of political propaganda.

the sharing of the "bottom-up" project and, therefore, more opportunities to develop a shared project in larger territories;

- The development of small systems of interacting and cohesive stakeholders, capable of providing a significant contribution to the development of the area;
- The possibility of having thorough knowledge of the territory and internal relations;
- The sharing of marketing communications and the subsequent spread of the place-brand image among stakeholders;
- The sharing and amplification at the capillary level of the guiding principles of the marketing strategy;
- Consistency between "top" planning and the reflected actual operations on the "bottom".

The top-down approach is certainly more immediate and linear, as it chiefly involves one or a few decision makers involved in the area. It represents advantages in creating projects: Initiatives planned and funded as part of the project are immediately, implemented thanks to the certainty of the funding sources; participatory planning processes are also resolved quickly, because of the low number of financiers. Of course, similar projects sometimes face resistance from some local stakeholders and this may contribute to the slowing of the process of generating a positive impact on the development project[19] in the case of the absence of a relevant involvement.

Managerial Implications

The ideas of this study lead us to consider the issue of the place-brand according to an approach that goes beyond the mere identification of a graphic symbol. In recent years, the experience of the practitioner has reduced the place-brand to a mere exercise to use for communication purposes, for limited periods, or even only in some promotional events. Several times in the initiatives proposed by policy makers at all levels, especially in Italy, we have seen a reduced ability to fill the place-brand with contents, to communicate the features to the primary stakeholders, and to see the potential of the land for various reasons—for example, a lack of ability to identify the real intangible value of the brand has become apparent. Place management plays a key role in leading the country from a generic image to a suitable place-brand positioning that will govern and control through a marketing plan and a shared strategy that are implemented daily by local actors; the role of territorial management is also relevant in the involvement of local actors themselves and in reinforcing the relations between them, in order to create and strengthen the value and nature of the place-brand (including through applying stimulus to bottom-up approaches). In this sense, in each region, the quality of management, culture, traditions, and respect for a marketing strategy, as well as the knowledge spread among the local actors and the principle of sharing of problems and opportunities, all determine the time resistance of the projects of place-brand.

In an evolutionary perspective, new areas of research are emerging: the analysis of the correspondence in time between declarations of intent to collaborate and effective collaboration; the open issues between the different levels of regional governance; the role of new technologies and the growing importance of the latter as a key asset in the economic development of the territories; the study of control systems of strategies, and the formulation of performance indicators for measuring the relationships between stakeholders.

[19] Examples and literatures on a top-down approach can be identified in works that link place development to investment by private or public-private partnerships. Examples include case studies of the relationship between land development and events (Wood, 2004; Allen, 2000; Hall, 1989, 1992; Hiller, 2000).

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Executive Compensation: Pay-for-Performance in High-Technology Firms

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This study examines the relationship between corporate performance and the Chief Executive Officer (CEO) compensation in high-technology firms in the S&P 500. The total short- and long-term CEO compensation in high-technology was compared with other industrial sectors from standard classification codes and tested in terms of corporate performance. The ExecuComp database was used to find the variables and to create a sample of firms between 2004 and 2010. Important corporate performance variables are used in this work, such as assets, employees, sales, net income, and earnings per share (EPS), as reported by the firms for each year. A panel data GLS with a fixed effect model for time is estimated that describes total compensation for the period between 2004 and 2010. The result was aligned with the theory of executive compensations to address agency problems and to examine CEO pay-for-performance. The main objective of this paper is to consistently demonstrate that the performance is determined for the total CEO compensation for short- and long-term periods and to examine whether the total remuneration paid to CEOs in high-technology firms in the S&P 500 is related to corporate finance. This work provides a better understanding of the relationship between compensation and performance in high-technology firms. Results suggest that high-tech firms tend to use more sophisticated performance measurements to determine CEO compensation.

Keywords: corporate finance, CEO compensation, accounting, performance

While most management scholars would agree that technological innovation is a key source for competitive advantage in high-technology firms and that top executives in those firms should be rewarded accordingly, little is known about which executive pay policies are more appropriate for those organizations to promote such goals. The high-technology sector plays a pivotal role in the new economy and has become the major source of employment and productivity growth over the last years. Innovativeness is also one of the fundamental instruments for growth strategies to enter new markets and to provide the company with a competitive edge.

The purpose of this study is to investigate the relation between the Chief Executive Officer (CEO) pay and the value, performance, and behavior of the firms in terms of innovation in high-technologies. This work will contribute to this subject as it introduces a new measurement pertaining to the relationship between the CEO and the other members of the top executive team. Furthermore, this paper studies the relation between this

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measurement and the performance and behavior of firms in terms of innovation. For that, this paper will use a new data sample of high-tech companies in the S&P 500 for the period between 2004 and 2010.

In their paper, entitled “The CEO Pay Slice”, Bebchuk, Cremers, and Peyer (2011) studied the relation between the CEO pay slice and the value, performance, and behavior of public firms, demonstrating a rich set of relations between these aspects. Furthermore, Makri, Lane, and Gomez-Mejia (2006) reported empirical evidence that high-technology firms that use outcome-based and behavior-based performance criteria to reward executives exhibit better market performance than those that do not. Their research on innovation CEO pay linkages in high-technology firms has focused on aligning pay with the quantity of innovation inputs (R&D spending) and outputs (number of patents). In fact, authors show the importance of the quality of innovation outputs. They argue that for CEO pay-performance relations in high-technology firms these views are not incompatible, but represent two sides of the same coin (Makri, Lane, & Gomez-Mejia, 2006).

The theory summarizes that executive pay should be designed by the board to maximize shareholder value. The level and structure of executive pay have already been discussed in the literature, resulting in three dominant views. One strand of literature studies the pay-to-performance sensitivity. Jensen and Murphy (1990a) showed that CEO wealth is only weakly related to firm performance. Subsequently, another view provides abundant evidence of a significant increase in CEO pay in both absolute and relative terms since 1990, which is consistent with a better alignment of interests between managers and shareholders (Murphy, 1999; Bebchuk & Fried, 2004; Frydman, 2009). Another important strand of literature explains the level and the functional form of pay as skimming issues rather than optimal contracting outcomes.

The inner workings of a top executive team and their importance for firm performance and innovation are hard to observe or quantify. As previously described, in order to promote firm growth, sustainable advantage, innovation and performance behavior, the role of the CEO is fundamental. Furthermore, over the last years, due to the effects of the global financial crisis, the role of the CEO has been called into question, as well as their behavior and their pay-compensation as a result of their performance and objectives. Moreover, it is essential to maintain confidence in the executive for there to be a balance between the institutions that foster the best conditions for their employees and maximize the profits of their shareholders. For these reasons, and because this subject is pertinent, it is interesting to examine these issues and contribute to the enrichment of research in this area.

This study explores the performance determinants of the high-tech and all other CEO pays for long- and short-term periods. This work also attempts to examine the systematic difference in CEO pays and the performance expectations of high-tech firms and others firms. Furthermore, this paper attempts to examine how high-tech and other CEO pays are related to various performance measurements, such as assets and employment in their specificity in high-tech firms, sales growth, operating income before depreciation, net income before extraordinary items and discontinued operations, and earnings per share (EPS).

This work is organized as follows: Section two contains a revision of the main theories in the literature, as well as an analysis of executive compensation in order to address agency problems. Furthermore, this section provides an analysis in order to examine CEO pays for performance. Section three explains the research hypotheses and section four presents the methodology, sample, and data collection for the regression estimation, as well as the results of the econometric model in order to assess the influence that firm performance has on executive compensation. Lastly, the main conclusions are discussed, as well as some limitations and new perspectives for future research.

Corporate Performance and CEO Compensation

In the period between 1970 and 2005, it was observed that executive compensations increased tremendously. The underlying reasons for these executive compensations need to be discussed and analyzed so as to provide a better understanding on this matter as we move into the future. Much literature on executive compensation has emerged since Jensen and Meckling (1976) published their work. According to Jensen and Murphy (1990b):

> There are serious problems with CEO compensation, but "excessive" pay is not the biggest issue. The relentless focus on how much CEOs are paid diverts public attention from the real problem—how CEOs are paid. In most publicly held companies, the compensation of top executives is virtually independent of performance. (p. 138)

Executive Compensations to Address Agency Problems

The emergence and general acceptance of the agency theory and the parallel research on executive compensation began in the early 1980s. It was the evolution of the modern corporation with ownership separation and control that undermined the agency theory. Early studies in this area focused on documenting the relation between CEO pay and company performance.

The problem of managerial power is analyzed in modern finance as an agency problem. The discussion of executive compensation must proceed with the fundamental agency problem afflicting management decision-making as background. According to Jensen and Murphy (1990a), there are two approaches to agency problems. The authors state that there is an optimal contracting approach, which is when boards use design compensation schemes to maximize shareholder value with efficient incentives. To connect the agency problem and the executive compensation, the authors use the managerial power approach, when this connection is seen as an integral part of the agency problems. It is important to remember that the principal-agent problems treat the difficulties that arise under conditions where information is incomplete and asymmetric whenever a principal hires an agent (Jensen & Murphy, 1990a). The agency theory is directed as an agency relationship between principal and agent in which one part—the principal—delegates work to another—the agent, who performs that work. It is created at any company that is not owned by its manager. This theory may be summarized as having two problems: Firstly, the agency problems arise when the desires or goals of the principal and agent are conflicting and when it is difficult or expensive for the principle to verify what the agent is doing; the second is the problem of risk sharing that arises when the principal and agent have different attitudes towards risk. Maybe the agent and the principal prefer different actions and different risk choices. Jensen and Meckling (1976) suggested that the agents of a company have the tendency to expropriate from the company because the benefits are higher than the cost as such costs are shared or undertaken by various shareholders. Therefore, there should be a balance, and both parties' participation constraints should be satisfied. According to them, the agency problem existed in all organizations and cooperatives, including universities (Jensen & Meckling, 1976). The agency problem is a classic problem in corporate governance as a result to motivate executives to do what is best for their company when they themselves do not own the company. It is necessary to anticipate the agency problem as because of it company investors may try to specify how the manager should act. Furthermore, it is necessary to analyze this problem because the owner may not be able to predict the business and may not know the best action for their manager (Maxim, Shleifer, & Vishny, 1996). The contracts signed between shareholders and managers are usually general, specifying broad goals and

the division of profits. These contracts do not specify how managers should behave in specific business situations.

Some authors see the weakness of shareholder rights more generally and warn shareholders and their advisers to focus on the corporate governance provisions that really matter for the firm's value (Bebchuk, Cohen, & Ferrell, 2009; Cremers & Nair, 2005). To help solve the apparent theoretical paradox in agency predictions on the normative consequences of performance-based pay, it is possible to create a common fate for the principal and the agent, or to make the agent overly conservative. The agency theory has been the foundation for both positive and negative answers to the key question: Does incentive compensation help high-technology firms attain higher subsequent performance levels (Makri, Lane, & Gomez-Mejia, 2006)?

Some authors assume CEOs to be more powerful when they serve as chair of the board, when they are the only member of the board, and when they have the status of a founder (Adams, Almeida, & Ferreira, 2005).

Examining CEO Pay-for-Performance

For Murphy (1999), the components of CEO pay are substantially heterogeneous in pay practices across firms and industries. Most executive pay packages contain four basic components: a base salary, an annual bonus linked to accounting performance, stock options, and long-term incentive plans. Moreover, executives participate in employee benefit plans and also receive special benefits, such as life insurance and supplemental executive retirement plans. Today the packages of most CEO compensations have many components, which include payouts for long-run incentive plans, restrict option grants and restrict stock grants, pension plans, various perquisites and, in some cases, severance payments. Perquisites, pensions, and severance pay are important, and yet less understood components (Frydman & Jenter, 2010; Jensen & Murphy, 1990a). It is difficult to obtain information on these components because of insufficient disclosure. Some authors suggest that the perks may be a signal of weak corporate governance, particularly when firms find ways to conceal the re-porting of perks (Grinstein, Weinbaum, & Yehuda, 2011). For pensions, the evidence is similar to that of the perquisites (Sundaram & Yermack, 2007). Executives pay substantial attention to the salary-determination process because salaries comprise a declining percentage of total compensation. Base salaries are key components of executive employment contracts and represent the fixed component in executive contracts. Executives will naturally prefer a dollar increase in base salary to a dollar increase in target bonus or variable compensation, and so the target bonuses, for example, are typically expressed as a percentage of base salary. Each dollar increase in the base salary has positive implications on many other compensation components. Most compensation components are measured relatively to base salary levels, for example, the option grants are expressed as a multiple of base salary.

In the 1980s and 1990s, there was a steady increase in stock option grants within executive compensation, which on a Black-Scholes basis now constitutes the single largest component of CEO pay. Stock options are contracts which give the recipient the right to buy a share of stock at a pre-specified exercise price for a pre-specified term. In other words, the recipient has the option to buy a certain number of company shares for a specified price. Therefore, there is a direct link between managerial rewards and share-price appreciation. The incentives from stock options do not, however, mimic the incentives from stock ownership because only stock-price appreciation is rewarded, as opposed to total shareholder returns. Therefore, the value of options increases with stock-price volatility. Other reason for this is that the options lose incentive value once the stock price falls sufficiently below the exercise price.

The literature focuses on equity-based compensation paid in the form of restricted stocks, stock options, and other instruments whose value is tied to future equity returns. Equity-based compensation is widely documented in the research examining pay versus performance (Jensen & Meckling, 1976). Hall and Murphy (2003) and Jensen (2004) stated that the increase in stock options pay is the result of the boards' inability to evaluate the true cost of this form of compensation. The controversy over CEO compensation reflects a perception that CEOs effectively set their own pay levels. In most companies, the last decisions over executive pay are made by members outside the board of directors who are keenly aware of the conflicts of interest between managers and shareholders over the level of pay. However, the CEOs and other top managers exert at least some influence on the level and on the structure of their pay (Jensen & Murphy, 1990a; Murphy, 1999).

In the substantial heterogeneity across companies and industries, executive bonus plans can be categorized in terms of three basic components: performance measurements, performance standards, and the structure of the pay-performance relation. Hall and Liebman (1998) showed that CEOs are, in fact, not paid like bureaucrats, but that there is a strong relationship between firm performance and CEO compensation. The annual bonus contracts are characterized by discretion. In some firms, boards can use discretion while allocating a fixed bonus, but discretion in this case only affects individual allocations and not the overall amount of the executive payouts. A percentage of their bonus depends on individual performance. Nevertheless, this is a subjective issue because individual performance sometimes includes performance pertaining to some pre-determined objectives or strategic mile-stones. Often the non-financial performance measurement used in annual incentive plans is individual performance with performance measured relatively to pre-established objectives, as well as subjective assessments of individual performance. Other non-financial measurements include customer satisfaction, operational and strategic objectives.

Some research highlights the importance of debt-based compensation as an element of top management contracts, and also the underlying incentive and governance implications of these schemes. Debt-base compensation provides managers with research that includes interesting incentives to reduce the agency cost or debt. Inside debt in the form of pensions also exerts strong influence on the patterns of CEO turnover and other types of compensation (Sundaram & Yermack, 2007). All this research is based on the assumption that managerial compensations consist of only two components, cash and equity-linked instruments. These authors argue that top managers receive significant compensations from "inside debt" that are pensions and deferred compensations.

In recent years, the use of restricted stock has been increasing due to a combination of reasons. Firstly, a compelling advantage held by stock options was eliminated as companies were required to recognize a charge to earnings on fixed option grants at fair market value. Secondly, publicly traded companies became concerned about the excessive dilution that resulted when the majority of long-term incentives were granted in options. Restricted stock plans offer companies much more design flexibility. Restricted stocks can be criticized mainly because of the dividend equivalents which have to be paid on these stocks prior to the vesting of the stocks. Some authors draw attention to the complete elimination of dividend equivalents, while others insist on its continued use as a way to align the interests of management and shareholders in order to solve agency problems.

EPS (Epstein & Roy, 2005) is a popular performance metric used in executive compensation contracts (Murphy, 1999; Conyon & Murphy, 2000). Compensation contracts that tie managerial rewards to EPS create

explicit incentives for executives to manage the EPS denominator using stock repurchases (over and above any implicit market-based incentives associated with increasing stock-based wealth and improving job security). However, these direct incentives are still absent in compensation contracts that employ non-per-share-based earning metrics, such as return on assets, and non-accounting measurements, such as stock price or qualitative targets linked to personal objectives. Accordingly, the stock repurchases activity will be positively associated with the incidence of EPS-based performance conditions in executive compensation contracts (Core, Guay, & Verrecchia, 2003; Young & Jing, 2011). The author argues that the level of dividend payments and the choice between dividends and stock are sensitive to the executives' compensation arrangements. Furthermore, a statistically and economically strong link between stock repurchase activity and the presence of EPS performance conditions in executive compensation contracts is documented.

For Murphy (1999), the levels of pay are higher and pay-performance sensitivities are lower in larger firms. However, the levels of pay and pay-performance sensitivities are lower in regulated utilities than in industrial firms. With that analysis, it was also possible to understand that pay-performance sensitivities are driven primarily by stock options and stock ownership, and not by other forms of compensation.

Bebchuk and Fried (2004) advocated that managerial power has played a key role in shaping managers' pay arrangements. The pervasive role of managerial power can largely explain the contemporary landscape of executive compensation. The managers' influence over their own pay has been the focal point of the criticism on executive compensation in the media and by some shareholders. They argue, with supporting evidence, that when executives have more power, their pay is higher and less sensitive to performance. In their opinion, executive pay is much less sensitive to performance than has been commonly acknowledged (Bebchuk & Fried, 2004). Other authors study the opportunistic timing of option grants and their relation to firm governance and structure (Berger, Ofek, & Yermack, 1997; Bebchuk, Cremers, & Peyer, 2011; Bebchuk, Grinstein, & Peyer, 2010). Malmendier and Tate (2009), Bertrand and Schoar (2003) study how the type and style of a CEO affect the firm's outcomes. For that, the authors analyzed the CEOs' roles in achieving superstar status to the performance of their firms, and whether and how individual managers are affected by corporate behavior and by performance (Malmendier & Tate, 2009; Bertrand & Schoar, 2003). When other sectors were compared, it was possible to confirm that the success of high-tech firms depends more on managing intangible assets. Some of these assets were technology innovation, continuous improvement, software development, and knowledge-based management. High-tech firms must continuously innovate to survive and to sustain their firms' growth (Shim, Lee, & Joo, 2009).

In summary, it was found that firms are subjected to the agency problem in which the CEO (agent) may not work in favor of the shareholders (principal) to maximize their wealth by improving firm performance. The decisions related to CEO compensation are based on the firms' accounting and finance performance. Therefore, it is theorized that CEO compensation in the function of firm performance in the high-technology with this variables; total assets (ASSETS), employees (EMPL), changes in sales (SALECHG), operating income before depreciation (OIBD), net income before extraordinary items and discontinued operation (NIBEX), earning per share (EPSEX), presented above.

Research Hypotheses

As previously discussed, existing theories provide predictions on the outlined considerations related to firm value, allowing for two different selection hypotheses.

The first research question will be:

Hypothesis 1: The CEO compensation is positively correlated with firm performance for high-technology companies in the short term.

Rejection of the null hypothesis would mean that the relative weight in terms of total compensation of each compensation component (such as salary, bonus, stock options and other compensations) are different goals for executives, as opposed to performance in the short term. It might be argued that powerful incentive models are especially valuable for high value firms with high opportunities for growth that need to be decisively and vigorously pursued. It might also be that high value firms are especially likely to attract star CEOs.

Hypothesis 2: The CEO compensation is positively correlated with firm performance in high-technology companies in the long term.

It is possible that high value firms have CEOs with an interest in long-term performance and with obtaining personal benefits in terms of total compensation.

Methodology, Sample, and Data Collection

The chosen sample is the ExecuComp database, which was used to find the variables and to create a sample of firms between 2004 and 2010. The ExecuComp database provides yearly data on salary, bonus, stock option, and restricted stock grants, as well as managerial stock and option holdings for top executives in firms within the Standard & Poor's Index (S&P 500). To test this hypothesis, the following specification is run of the balanced panel of high-technology firms, between 2004 and 2010. High-technology firms are the firms that operate in an industry with a four-digit SIC code of 3570, 3571, 3572, 3576, 3577, 3661, 3674, 4812, 4813, 5045, 5961, 7370, 7371, 7372, or 7373, using the Fama and French classification of 48 industry groups, instead of four-digit SIC (Standard Industrial Classification) codes (Fama & French, 1997).

According to Bebchuk et al. (2011), in order to test the variables and to assess the above-mentioned research hypotheses there are independent variables that will possibly be used by the regression model to perform the estimation. At an empirical level, this analysis focuses on a sample of 500 high-tech companies in the S&P index (S&P500), for the period between 2004 and 2010, which constitutes a sample of 3,356 observations. The ExecuComp database collects information about seven independent variables—total assets (ASSETS), employees (EMPL), changes in sales (SALECHG), operating income before depreciation (OIBD), net income before extraordinary items and discontinued operation (NIBEX), earning per share (EPSEX)—and the independent total compensation (SUMTDC1) variables are listed by year and company.

Several measurements were used as control variables in this study. These include number of employees, assets, increase in sales, the net income, and the EPS, as a proxy of firm size, firm performance and wealth of shareholder, the common predictors of executives' pay.

The High-Tech Dummy (DHTECH) is equal to one if the firm operates in an industry with a four-digit SIC code of 3570, 3571, 3572, 3576, 3577, 3661, 3674, 4812, 4813, 5045, 5961, 7370, 7371, 7372, or 7373, instead of four-digit SIC codes. The main variable of the analysis is SUMTDC1 and it is defined by the sum of the total compensations of the top executives in each company and it includes: salary, bonus, non-equity incentive plan compensation, grant-date fair value of option awards, grant-date fair value of stock awards, deferred compensation earnings reported as compensation, and other compensations.

Table 1

Executive Compensation Dependent and Independent Variables

Name	Expected variation	Definition	Units
Ln (SUMTDC1)	(+)	Ln (the sum of the compensations of top executives includes: salary, bonus, non-equity incentive plan compensation, grant-date fair value of option awards, grant-date fair value of stock awards, deferred compensation earnings reported as compensation, and other compensations).	Thousands
Ln (ASSETS)	(+)	Ln (the total assets as reported by the company).	Millions
Ln (EMPL)	(+)	Ln (employees, the total employees as reported by the company (#)).	Thousands
EPSEX	(-)	EPS (Primary) excluding extraordinary items and discontinued operations.	
SALECHG	(+)	The year to year percentage change in Sales.	Percentage
Ln (OIBD)	(+)	Ln (the operating income before depreciation as reported by the company).	Millions
Ln (NIBEX)	(+)	Ln (the net income before extraordinary items and discontinued operations).	Millions

Table 2

Descriptive Statistics

	SUMTDC1	ASSETS	EPSEX	OIBD	NIBEX	EMPL	SALECHG	DHTECH
Mean	25,599.88	46,886.07	12.65983	3,249.064	1,215.441	46.30875	10.80346	0.121275
Median	19,561.74	10,698.19	2.090000	1,296.557	507.4820	17.59400	7.909000	0.000000
Maximum	264,964.7	2,264,909.	8,548.000	78,669.00	45,220.00	2,100.000	1,106.400	1.000000
Minimum	454.4000	182.7430	-37.84000	-76735.00	-99289.00	0.053000	-92.68800	0.000000
Std. Dev.	21,706.99	168,685.8	252.8151	6,878.305	3,586.554	110.5579	30.22776	0.326496
Skewness	3.365542	8.450905	26.43878	4.478257	-3.906328	11.92814	15.95401	2.320283
Observations	3,346	3,356	3,353	3,242	3,356	3,333	3,350	3,356

The descriptive statistics of the variables for total CEO compensation for high-tech firms are presented in Table 2. In the S&P500, in the period between 2004 and 2010, there are about 12% high-technology firms, and it is possible to observe that the group of top executives in each company has a total average compensation around USD 25,600 million. Other interesting finding is that in this period there was not always an increase in sales, but there was a 10.8% average growth in high-tech companies.

The models presented below were used to test whether firm performance is relevant to ex-plain executive compensation. Firstly, the model for the short term:

$$\text{Ln (SUMTDC1)}_{it} = a + b_1\ln(\text{ASSETS})_{it} + b_2\ln(\text{OIBD})_{it} + b_3\ln(\text{NIBEX})_{it} + b_4\ln(\text{EMPL})_{it} + b_5*\text{ERPSEX}_{it} + b_6*\text{SALECHG}_{it} + u_{it}$$

and the secondly, the model for the long term:

$$\ln (\text{SUMTDC1})_{it} = a + b_1\ln(\text{ASSETS})_{it} + b_2\ln(\text{OIBD})_{it} + b_3\ln(\text{NIBEX})_{it} + b_4\ln(\text{EMPL})_{it} + b_5*\text{ERPSEX}_{it} + b_6*\text{SALECHG}_{it} + c*\ln(\text{SUMTDC1})_{it\text{-}1} + u_{it}$$

where, *i* and *t* represent the year and the company, respectively.

The coefficient *a* is a constant denoting the base level from which the sum of the compensations of top executive vary according the changes in performance variables.

The panel data model is used as it is the most suitable way of studying a large set of repeated observations and as it assesses evolution over time. With panel data it is possible to simultaneously explore several variations over time and between different individuals. The use of such models has increased immensely and, in fact, combining time and cross-sectional data brings many advantages: It is possible to use a larger number of observations and the degree of freedom in estimates increases, thus making statistical inferences more credible.

At the same time, the risk of multicollinearity is reduced since the data in companies present different structures. Moreover, this model provides access to further information and the efficiency and stability of the estimators increase, while enabling the introduction of dynamic adjustments (Greene, 2003; Gujarati, 2004).

The regression presented was estimated using the Generalized Least Squares (GLS) with a fixed effect model for time. This means that the regression coefficients which were used with the fixed effect model for explanatory variables do not vary over time. The estimation was conducted assuming that the company's heterogeneity is captured in the constant part and that it differs between companies. The fixed effect model is the most suitable when there is a correlation between errors and variables (Greene, 2003).

In order to assess the above-mentioned research hypotheses, the regression model was used and estimated with fixed effects. The first hypothesis for the positive influence of the CEO compensation in firm performance is presented in Table 3. As it is possible to observe, the regressions are globally significant, with a 5% significance level. The following table presents the results of the estimation conducted by the generalized method using the fixed effect model for the studied data. The statistics are computed based on a panel data set of 484 firm-year observations, a total of about 2,969 companies that represent 14.08% of high-technology firms between 2004 and 2010. The total assets, the operating income before depreciation and the net income before extraordinary items and discontinued operations, the growth sales and employment, as reported by companies, are positive (see Table 1—expected variation) and significantly related to total executive compensations.

Table 3

Results of the Total Executive Compensation Estimation (Regression With SIC Code Dummy (DHTECH) for High-Technology Companies—Econometric Models)

Dependent variable: LOG (SUMTDC1)			Dependent variable: LOG (SUMTDC1)		
Method: Panel EGLS (Period weights)			Method: Panel EGLS (Period weights)		
Sample: 2004 2010 IF OIBD > 0 AND NIBEX > 0			Sample: 2004 2010 IF OIBD > 0 AND NIBEX > 0		
Periods included: 7			Periods included: 7		
Cross-sections included: 484			Cross-sections included: 484		
Total panel (unbalanced) observations: 2969			Total panel (unbalanced) observations: 2969		
Linear estimation after one-step weighting matrix			Linear estimation after one-step weighting matrix		
Variable	Coefficient	Prob.	Variable	Coefficient	Prob.
C	7.279001	0.0000	C	7.302197	0.0000
LOG (ASSETS)	0.054566	0.0002	LOG (ASSETS)	0.054500	0.0002
EPSEX	-0.000620	0.0000	LOG (ASSETS)*DHTECH	0.014395	0.0000
LOG (OIBD)	0.204273	0.0000	EPSEX	-0.000619	0.0000
LOG (NIBEX)	0.069080	0.0003	LOG (OIBD)	0.200525	0.0000
LOG (EMPL)	0.044388	0.0000	LOG (NIBEX)	0.070401	0.0002
SALECHG	0.002650	0.0000	LOG (EMPL)	0.043644	0.0000
DHTECH	0.140800	0.0000	SALECHG	0.002667	0.0000
	Weighted Statistics			Weighted Statistics	
R-squared	0.403318		*R*-squared	0.402732	
Adjusted *R*-squared	0.400693		Adjusted *R*-squared	0.400104	
S.E. of regression	0.553285		S.E. of regression	0.553552	
F-statistic	1,536,448		*F*-statistic	1,532,713	
Prob (*F*-statistic)	0.000000		Prob (*F*-statistic)	0.000000	

As expected, EPS is negative and significantly related by total compensation in high-tech companies. This

indicates that there are no explicit contractual arrangements linking compensations and EPS. The performance ratio of firms measured by return has a negative influence. Note that around 40.4% (R^2 = 0.404) of the variance in degree of CEO compensation can be explained by the group of variables for short term (see Table 3). Yet, it is important to highlight that around 60.6% (R^2 = 0.606) of the variance in degree of CEO compensation for long term, can be explained by the group of variables (see Table 4). These indicate that variables addressed here play a significant role in explaining executive compensation for short- and long-term periods as stated by Chi-Square test (*P*-value = 0).

Table 4

Results of the Total Executive Compensation Estimation (Regression With SIC Code Dummy (DHTECH) for High-Technology Companies—Econometric Models)

Dependent variable: LOG (SUMTDC1)			Dependent variable: LOG (SUMTDC1)		
Method: Panel EGLS (Period weights)			Method: Panel EGLS (Period weights)		
Sample: 2004 2010 IF OIBD > 0 AND NIBEX > 0			Sample: 2004 2010 IF OIBD > 0 AND NIBEX > 0		
Periods included: 6			Periods included: 6		
Cross-sections included: 483			Cross-sections included: 483		
Total panel (unbalanced) observations: 2,517			Total panel (unbalanced) observations: 2,517		
Linear estimation after one-step weighting matrix			Linear estimation after one-step weighting matrix		
Variable	Coefficient	Prob.	Variable	Coefficient	Prob.
C	3.372131	0.0000	C	3.379249	0.0000
LOG (SUMTDC1(-1))	0.545348	0.0000	LOG (SUMTDC1(-1))	0.545797	0.0000
LOG (ASSETS)	0.026126	0.0388	LOG (ASSETS)	0.026164	0.0387
EPSEX	-0.000275	0.0000	LOG (ASSETS)*DHTECH	0.006955	0.0177
LOG (OIBD)	0.085650	0.0006	EPSEX	-0.000274	0.0000
LOG (NIBEX)	0.029623	0.0787	LOG (OIBD)	0.083758	0.0007
LOG (EMPL)	0.021974	0.0086	LOG (NIBEX)	0.030160	0.0733
SALECHG	0.003060	0.0000	LOG (EMPL)	0.021637	0.0096
DHTECH	0.066078	0.0138	SALECHG	0.003064	0.0000
	Weighted statistics			Weighted statistics	
R-squared	0.606381		*R*-squared	0.606318	
Adjusted *R*-squared	0.604336		Adjusted *R*-squared	0.604273	
S.E. of regression	0.440828		S.E. of regression	0.440872	
F-statistic	2,966,106		*F*-statistic	2,965,326	
Prob (*F*-statistic)	0.000000		Prob (*F*-statistic)	0.000000	

Conclusion and Future Researches

The main purpose of this study was to examine whether the total remuneration paid to CEOs in high-technology firms in the S&P 500 is related to corporate finance. This work aims at contributing to explaining the influence that performance has on CEO compensation in these companies.

In conclusion, according to the results that were obtained there is empirical evidence to state that in high-technology firms in the S&P 500, during the period between 2004 and 2010, performance determined total CEO compensation in short- and long-term periods. Results suggest that high-tech firms tend to use more sophisticated performance measurements to determine CEO compensation.

This study only focuses on high-technology firms in the S&P 500 in the period between 2004 and 2010. The definition of high-technology used in this study can be extended by including other important items, such

as value of R&D expenditures, number of patents by firm and citation of patents. Additionally, the findings of this study could only be generalized to other sectors at an international level similarly to those in this research. Furthermore, it will be necessary to focus on the comparison between high-technology firms from other sectors at an international level.

In the future, it will be important to analyze other developments, such as the short- and long-run effect of executive compensation. Furthermore, it will also be important to increase the data sample for the period between 2000 and 2010 in order to broaden the period of analysis and to investigate the effect of the financial crisis in 2008.

Innovation constitutes an indispensable component of corporate strategies. For that, further considerations on innovation measurements may be incorporated in order to analyze the real motivation of the CEO. Further developments on this work will include new variables for the other research hypotheses, including returns to measure firm performance, firm expenditures on research and development, number of patents granted, and degree of openness. These variables and others may be the best proxies to measure the behavior of innovation and the link between executive compensation and firm performance. This paper will provide better understanding on the relationship between compensation and performance in high-technology firms, something which is often discussed in the literature.

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Organizational Culture, Leadership Behaviors, and Employee Attitude in Chinese SMEs: Empirical Evidence

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This study examines the impact of organizational culture on leadership behaviors, as well as the influence of leadership behaviors on employee attitude in Chinese small and medium-sized enterprises (SMEs). Based on previous researches, this study establishes a conceptual model that indicates the two types of influential relationship. Data are collected from 515 subordinates of 23 SMEs in Chengdu of Sichuan province. By using statistical methods, findings of this study are concluded. Directions for future research are also discussed.

Keywords: organizational culture, leadership behavior, employee attitude, SMEs

Introduction

During the last three decades, Chinese economy has experienced a prolonged transition from centrally planned economy to socialist market economy. In the transition period, the nation's politics, economy, and culture have been greatly changed, while the most attractive one is that Chinese small and medium-sized enterprises (SMEs) have drastically flourished. Till now, it has already become the vital factor for the rapid development of the Chinese economy. In 2008, the number of Chinese SMEs rose up to 42.8 million which accounts for 99.25 percent of all enterprises. Till 2009, SMEs in China had employed around 78 percent of workforce. SMEs exports amounted to 68.65 percent of total exports in China in 2006.

As to the reasons underlying the flourish of Chinese SMEs, two main factors can be concluded. One is the upgrading of human resources in both quantity and quality in China. Another one is the most important role that entrepreneurs play in the development of Chinese SMEs. In detail, China has over 1.37 billion people, of which around 800 million are economically active populations (NBS, 2010). The largest population foundation in the world provides adequate labor force for the growth of Chinese SMEs. In addition, the fast development of Chinese higher education and vocational education, furthermore, overseas-educated Chinese dramatically swarming into Chinese labor market have remarkably enhanced the quality of human resources in China. The great changes in both quantity and quality of Chinese human resources bring challenges to human resource management. Especially, this change has attracted much emphasis on the effectiveness of entrepreneurs in Chinese SMEs, because it has been practically and academically proven that entrepreneurs connect crucially with the destiny of SMEs.

Since human resources and entrepreneurs have been considered to be the most significant factors for the flourish of Chinese SMEs, it is important to make clear that how entrepreneurs lead the employees to improve

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their organizations. Hence, the purpose of this research is to probe the impact of organizational culture on leadership behaviors and the influence of leadership behaviors on employee attitude. The expected achievement of this research is to help entrepreneurs taking feasible and effective leadership behaviors to stimulate active employee attitude under different organizational culture.

Relevant Literatures and Research Models

Although there is still no general consensus on the definition of organizational culture, one frequently cited definition is from Schein (1992), who defined organizational culture as:

> The pattern of basic assumptions that a given group has invented, discovered, or developed in learning to cope with its problems of external adaptation and internal integration, and that have 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 other problems. (p. 12)

Definition of organizational culture from Lau and Ngo (1996) is also generally acknowledged. They defined an organization's culture as a common understanding and things including philosophies, ideologies, values, assumptions, expectations, perceptions, norms, sayings, behaviors, heroes, and traditions that are shared among members of the organization (Lau & Ngo, 1996).

As to the way of classifying organizational culture, Competing Values Framework (CVF) is deemed as one of the most influential and widely used models in organizational culture research. CVF categorizes four types of organizational culture (group, developmental, hierarchical, and rational culture) from two dimensions (flexibility vs. control orientation and within vs. outside the organization orientation) (Denison & Spreitzer, 1991). In detail, group culture emphasizes flexibility and maintains a primary focus on the internal organization. This kind of organizational culture is full of atmosphere of openness and emphasizes the morale of employees. As to developmental culture, innovation and adaptation are strongly emphasized to glue the organization together. Growth is the eternal goal for organizations with developmental culture. Hierarchical culture has clear structures, strict rules, and well defined responsibilities which are regarded as the glues that hold the organization together. Rational culture stresses on goal achieving, so the accomplishment of tasks and goals is the prime criteria of success. The chasing of profit and productivity is the significant orientation for the organization with rational culture.

Based on this framework, many empirical studies (Lau & Ngo, 1996; Quinn & Spreitzer, 1991) have testified the impact of organizational culture on individuals' perceptions and behaviors. But most studies concentrated on individuals' reflection to organizational culture at the level of employees, while the leaders' behaviors were hardly emphasized when considering the impact of organizational culture on individual behaviors.

In leadership theories, transformational and transactional leadership are classic and representative. Burns (1978) is the first scholar who introduced the concepts of transactional and transformational leadership in his descriptive research. According to Burns (1978), transformational leaders inspire the followers to do more than what the contract requires by paying attention to their personal development, while transactional leaders motivate employees through offering rewards and punishments according to their accomplishment of goals.

Another scholar, Bass (1985) developed transactional and transformational leadership theories. According to Bass (1985), entrepreneurs of transactional type are prone to clarify the criteria of rewards and punishments on the basis of organizational goals to form the relationship of benefit exchange between leaders and employees. Transformational leaders encourage followers to resolve problems in new and creative ways and focus on employees' difference and personal needs to improve the morale.

Paternalistic leadership as a management concept with oriental characteristics can be traced back to the early works of Max Weber. According to Weber (1947), paternalism is defined as one form of legitimated authority and one of the most elementary types of traditional domination. More recent researches from Middle East, Pacific Asia, and Latin America (Farh, Cheng, Chou, & Chu, 2006; Martinez, 2003; Pellegrini & Scandura, 2006; Uhl-Bien, Tierney, Graen, & Wakabayashi, 1990) have proven that paternalism is still a prevalent and effective leadership style in many business cultures. Westwood (1997) suggested that paternalistic leadership is effective in the Chinese business context because it matches properly with the core value of Chinese traditional culture—compliance and harmony. Farh and Cheng (2000) argued that paternalistic leadership has positive implications in oriental society, because almost all Asian countries and districts are intensively affected by oriental cultures like Confucianism and Taoism that are the indigenous cultural context for the origination of paternalistic leadership.

As to employee attitude, many variables have been applied to measure it directly or indirectly. The most representative variables are job satisfaction, turnover intention, and work effort. Job satisfaction is an intuitive concept that reflects employees' perception of the value or interest of work itself, rewards, relationship among peers, and appraisals from leaders and organization (Broome, Knight, Edwards, & Flynn, 2009). At the level of organizations and managers, job satisfaction can directly reflect employees' performance, for it usually links to job-related behaviors. Employees with turnover intention will directly affect their performance, even that of organizations (Schwepker, 2001). Bluedorn (1982) reported that turnover intention has a positive impact on actual leaving behavior which is significantly related to the individual's performance. Effort is one of the most significant constructs in motivation theory. It can be conceptualized as the energy that people put into their behaviors (Mohr & Bitner, 1995).

As to the relationship between organizational culture and leadership behaviors, Song and Zhu (2003) argued that organizations have different requirement on leadership under different organizational culture on the basis of leadership theory. As to leader effectiveness, transformational leadership has been proven to be effective in increasing followers' job satisfaction (Mirkamali, Thani, & Alami, 2011), organizational citizenship behaviors (Nahum-Shani & Somech, 2011), organizational identification (Epitropaki & Martin, 2005), and service performance (Liao & Chuang, 2007). But transactional leadership is less positively related with followers' effectiveness compared to transformational leadership (Wofford & Goodwin, 1994). Paternalistic leadership has been proven to be effective in organizations with high power distance, according to Saufi, Wafa, and Hamzah (2002). On the basis of literature review, the conceptual model can be established in Figure 1.

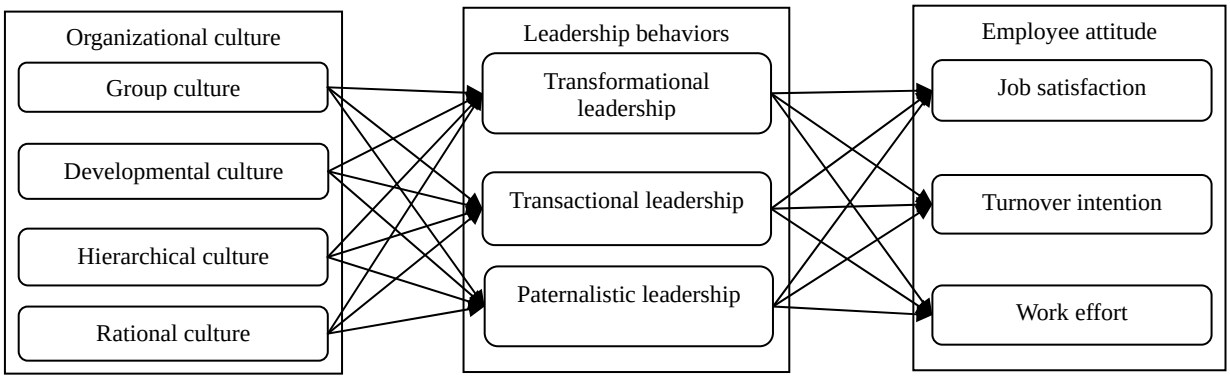

Figure 1. Conceptual model.

Model Testify

Data Resource

The survey was carried out in Wuhou high-tech industrial development zone of Sichuan province in China. It was established in 2000, with a planned area of 3.5 square kilometers. Till the year of 2006, the zone had achieved accumulated 8.3 billion RMB of industrial output. There are over 300 high-tech enterprises in the zone and they account for more than 90% of the total industrial output. The leading industries in Wuhou high-tech industrial development zone are electronic information, mechanical and electrical industry, biological medicine, and new materials.

This research defines Chinese SMEs as enterprises with less than 500 employees, taking no account of their capital scale, industry, pattern of ownership etc.. The reasons are: First, the definition of Chinese SMEs is complex and it has experienced great changes in the last few decades. Second, the various standards for categorizing Chinese SMEs have further increased the difficulty of understanding this concept and even the research concerning about Chinese SMEs.

Two main selecting methods were used for sampling. They are random selection and random walking. The list of SMEs was offered by the administration committee of Wuhou high-tech industrial development zone at first. Then the sample firms were selected out by using the method of random selection. In addition, the subordinates who will be asked to accomplish the questionnaires were selected out from the employee list of sample firms also by random selection. However, all the employees of the firms with less than 10 headcounts were required to finish questionnaires. For those SMEs which are not on the firm list, the method of random walking was used.

By using the methods introduced above, 23 SMEs were selected out to be sample firms. These firms belong to the industries of manufacturing, telecommunication, environment protection, transportation, and logistics. All the sample firms are of state-owned enterprises, private companies, and joint venture. The leadership style of 23 top leaders of these SMEs will be judged by their subordinates. Seven hundred employees were also selected out as participants to complete all parts of the questionnaire. The researcher initially distributed 700 questionnaires to the 23 SMEs, and 515 completed and useable questionnaires were received, indicating an overall response rate of 73.6%.

Survey Design

In statistical survey, common method bias is a kind of systematic error variance shared among variables. The spurious variance can be attributed to reasons from questionnaire, samples, and survey design. Based on the remedies proposed by Podsakoff, MacKenzie, and Podsakoff (2012), common method bias has been minimized in this research.

First, in order to extremely alleviate the factors from a questionnaire that will cause the common method bias, this research took some effective measures on questionnaire designing. In detail, these obvious ways are: simplify complex or compound questions; translate questionnaire between Chinese and English twice in order to use vocabulary and syntax that match with the reading custom of the participants; define ambiguous terms in the questionnaire; split double-barreled questions up into two questions; group related items together and divide the questionnaire into three parts.

Second, for resolving the bias problem caused from respondents, all the sample firms were selected out from Wuhou high-tech industrial development zone. Over 96% of respondents in these sample firms have

educational background above high school and over 90% of them have already work for the firm for over one year. Hence, they have the quality of reading skills, education, or cognitive sophistication to understand issues in the questionnaire and the working experience to easier their understanding about the topics of the survey. Meanwhile, information for survey and cover letter of the questionnaire particularly stressed the purpose of survey, voluntary, confidentiality, feedback, expected benefits, and appreciation for participation, so as to increase the willingness of respondents to answer questions according to their own perceptions.

Third, survey design is the key procedure to diminish the common method bias problem. This research divided the questionnaire into three parts. Part one refers to organizational culture, while part two and three concern about leadership and employee attitude. So part one was separated from part two and three when taking field survey. The time and space of taking questionnaire of different parts are different and artificially separated in order to alleviate the bias caused by environment factors.

Measures

Organizational culture. Items for organizational culture were adapted from Lau and Ngo (1996), consisting of 16 items on four dimensions at the values and assumptions level as suggested by the competing values framework: group culture (four items), developmental culture (four items), hierarchical culture (four items), and rational culture (four items). The Cronbach's alpha coefficients of group culture, developmental culture, hierarchical culture, and rational culture were 0.762, 0.842, 0.832, and 0.796, respectively.

Leadership behaviors. Transactional and transformational leadership behavior will be operationalized using Multifactor Leadership Questionnaire (MLQ) from Bass and Avolio (1996). In this research, the rater forms are chosen as the measure instrument. The rater form consists of 32 questions. Paternalistic leadership behavior is going to be measured by using a questionnaire developed by Cheng, Chou, and Farh (2000). Paternalistic leadership has three distinct elements: authoritarian leadership, benevolent leadership, and moral leadership. They were measured with 26 items using a five-point Likert scale. The Cronbach's alpha coefficients of transactional, transformational, and paternalistic leadership were 0.869, 0.953, and 0.868, respectively.

Employee attitude. Job satisfaction was measured by using a global indicator developed by Cammann, Fichman, Jenkins, and Klesh (1979) (in MacIntosh & Doherty, 2010). This paper will use Kelloway, Gottlieb, and Barham's (1999) four-item measure to assess respondents' turnover intention. In addition, this research will measure work effort by using the three-item scale developed by Brockner, Grover, Reed, and Dewwitt (1992). The Cronbach's alpha coefficients of job satisfaction, turnover intention, and work effort were 0.788, 0.908, and 0.900, respectively.

Control variables. As to the impact of organizational culture on leadership behaviors, gender, age, and educational experience of entrepreneurs were found to directly influence entrepreneur's behavior in prior research. When considering the impact of leadership behaviors on employee attitude, employees' gender, age, educational experience, tenure, and position will be introduced. But the impact of these individual factors on leadership behaviors and employee attitude is not the main problem that will be discussed in this research. They will only be introduced as control variables. Gender was dummy coded (1 = male, 2 = female). Five-item variables were used to measure age from 1 = 20-30 years to 5 = 60 years above. Six-item variables were used to measure educational experience with 1 = junior middle school, 4 = bachelor's degree, and 6 = others. Tenure and position will be measured by five and seven blocks respectively.

Methods

The measures will be subjected to reliability analysis by using SPSS to examine the reliability of questionnaires. The validity of measures has already been tested by prior researches, because all the questionnaires are classic and oft-applied. Hence, the validity test of questionnaires will not be taken in this research. The measures will also be subjected to correlation analysis in order to reveal the correlative relationship between variables in order to modify the conceptual model. Regression analysis is conducted to test the causal relationships between variables.

Results

Since the personal characteristics of individuals, like gender, age, educational experience, tenure, and position influence on individual behaviors, the impact of gender, age, and educational experience on the choice of leadership behaviors will be first examined. As can be seen from Table 1, entrepreneurs' gender significantly is related to transformational and transactional leadership, but does not significantly influence on the choice of paternalistic leadership at the level of 0.05. The factor of age insignificantly impacts on the three types of leadership. Educational experience is significantly related to transformational leadership at the level of 0.05, while it is insignificantly related to transactional and paternalistic leadership. Therefore, the variables of entrepreneurs' gender and educational experience will be introduced in correlation analysis.

Table 1

ANOVA

Dependent variables	Gender		Age		Educational experience	
	F	Sig.	*F*	Sig.	*F*	Sig.
Transformational leadership	17.272	0.000	0.579	0.447	3.063	0.028
Transactional leadership	7.821	0.005	2.616	0.106	0.712	0.545
Paternalistic leadership	2.671	0.103	0.003	0.960	0.345	0.793

Note. The impact of entrepreneurs' gender, age, and educational experiences on the three types of leadership.

From Table 2, the employees' gender, educational experience, and position impact on job satisfaction, turnover intention, and work effort insignificantly at the level of 0.05. As to the factor of age, it is significantly related to job satisfaction and turnover intention, but not significantly related to work effort at the level of 0.05. Tenure has a significant influence on turnover intention and work effort, but is not significantly related to job satisfaction. Hence, the variables of employees' age and tenure will be introduced in the next correlation analysis.

Table 2

ANOVA

Dependent variables	Gender		Age		Educational experience		Tenure		Position	
	F	Sig.	*F*	Sig.	*F*	Sig.	*F*	Sig.	*F*	Sig.
Job satisfaction	0.020	0.887	2.709	0.030	1.616	0.154	1.951	0.101	0.497	0.811
Turnover intention	0.084	0.772	3.325	0.011	1.060	0.382	2.628	0.034	0.182	0.982
Work effort	2.532	0.112	1.183	0.317	0.213	0.957	3.952	0.004	0.202	0.976

Note. The impact of employees' gender, age, educational experience, tenure, and position on job satisfaction, turnover intention, and work effort.

Table 3

Means, Standard Deviations, and Correlations of the Variables (N = 515)

	Mean	S.D.	1	2	3	4	5	6	7	8	9
1. Group culture	3.762	0.846	-								
2. Developmental culture	3.788	0.646	0.656**	-							
3. Hierarchical culture	3.875	0.597	0.589**	0.768**	-						
4. Rational culture	3.826	0.622	0.488**	0.646**	0.660**	-					
5. Transformational leadership	3.641	0.767	0.531**	0.599**	0.601**	0.544**	-				
6. Transactional leadership	3.011	0.809	0.230**	0.260**	0.255**	0.297**	0.533**	-			
7. Paternalistic leadership	3.260	0.466	0.274**	0.322**	0.357**	0.316**	0.488**	0.416**	-		
8. Gender (entrepreneurs)	1.140	0.349	-0.124**	-0.065	-0.013	-0.070	-0.180**	-0.123**	-0.072	-	
9. Educational experience (entrepreneurs)	4.670	0.613	-0.153**	-0.162**	-0.139**	-0.056	-0.124**	0.051	-0.002	0.171**	-

Notes. ** $p < 0.01$; * $p < 0.05$.

Table 4

Means, Standard Deviations, and Correlations of the Variables (N = 515)

	Mean	S.D.	1	2	3	4	5	6	7	8
1. Transformational leadership	3.641	0.767	-							
2. Transactional leadership	3.011	0.809	0.533**	-						
3. Paternalistic leadership	3.260	0.466	0.488**	0.416**	-					
4. Job satisfaction	3.531	0.743	0.425**	0.112*	0.207**	-				
5. Turnover intention	2.409	0.852	-0.332**	0.058	-0.059	-0.590**	-			
6. Work effort	4.146	0.587	0.355**	0.130**	0.240**	0.258**	-0.286**	-		
7. Age (employee)	1.740	0.843	0.081	0.087*	0.016	0.125**	-0.105*	0.079	-	
8. Tenure (employee)	3.370	1.355	0.029	-0.016	0.049	0.065	-0.074	0.103*	0.589**	-

Notes. ** $p < 0.01$; * $p < 0.05$.

Tables 3 and 4 give the means, standard deviations, and correlations of the variables in this research. According to Table 3, the four types of organizational culture are significantly related to the three styles of leadership at the level of 0.05. The entrepreneurs' gender has significant impact on transformational and transactional leadership, while entrepreneurs' educational experience has been significantly related to transformational leadership. In Table 4, the three types of leadership significantly impact on job satisfaction and work effort. Transformational leadership has negative impact on turnover intention at the level of 0.05, while transactional and paternalistic leadership insignificantly impact on employees' turnover intention. Employees' age impacts significantly on job satisfaction and turnover intention, while tenure has a significant influence on work effort.

Results for the regression analysis are presented in Tables 5 and 6. According to Table 5, the impact of four types of organizational culture on transformational leadership is shown in Model 1 (see Table 5). The results indicate that group, developmental, hierarchical, and rational culture are positively related to transformational leadership with standardized coefficients (β) of 0.166, 0.176, 0.253, and 0.173 at the significant level of 0.01. The control variable—gender also has a significant influence on transformational leadership.

Model 2 (see Table 5) represents the impact of four types of organizational culture on transactional leadership. Based on the results from Table 5, only rational culture has a positive impact on transactional leadership ($\beta = 0.182$, $p < 0.01$). The impact of group, developmental and hierarchical culture on transactional

leadership is not significant. However, entrepreneurs' gender and educational experience are significantly related to transactional leadership.

Model 3 (see Table 5) shows that the influence of group, developmental and rational culture on paternalistic leadership is not significant, while hierarchical culture is significantly related to paternalistic leadership ($\beta = 0.219$, $p < 0.01$). The influence of gender and educational experience on leadership behaviors is not significant.

Table 5

Results of Regression Analysis for the Impact of Organizational Culture on Leadership Behaviors (N = 515)

Independent variable	Model 1 Beta	2 Beta	3 Beta
Group culture	0.166**	0.067	0.063
Developmental culture	0.176**	0.062	0.048
Hierarchical culture	0.253**	0.062	0.219**
Rational culture	0.173**	0.182**	0.109
Gender (entrepreneur)	-0.133**	-0.116**	-0.061
Educational experience (entrepreneur)	-0.003	0.110*	0.063

Notes. Model 1 dependent variable: Transformational leadership; Model 2 dependent variable: Transactional leadership; Model 3 dependent variable: Paternalistic leadership. ** $p < 0.01$; * $p < 0.05$.

Table 6 shows the regression results on the impact of leadership behaviors on employee attitude. In Model 1 (see Table 6), transformational leadership has a positive impact on job satisfaction ($\beta = 0.490$, $p < 0.01$), while transactional leadership negatively impacts on job satisfaction ($\beta = -0.176$, $p < 0.01$). The impact of paternalistic leadership on job satisfaction is not significant. However, the employees' age has a significant influence on job satisfaction at the level of 0.05.

Model 2 (see Table 6) represents that transformational leadership has negative impact on turnover intention ($\beta = -0.527$, $p < 0.01$), while transactional leadership positively impacts on turnover intention ($\beta = 0.318$, $p < 0.01$). The impact of paternalistic leadership and employees' age and tenure on turnover intention is not significant.

Model 3 (see Table 6) shows that the influence of transformational and paternalistic culture on work effort is positive with standardized coefficients (β) of 0.354 and 0.105 at the significant level of 0.01 and 0.05, while transactional leadership is negatively related to work effort ($\beta = -0.102$, $p < 0.05$). However, the influence of control variables on work effort is not significant.

Table 6

Results of Regression Analysis for the Impact of Leadership Behaviors on Employee Attitude (N = 515)

Independent variable	Model 1 Beta	2 Beta	3 Beta
Transformational leadership	0.490**	-0.527**	0.354**
Transactional leadership	-0.176**	0.318**	-0.102*
Paternalistic leadership	0.040	0.068	0.105*
Age (employees)	0.112*	-0.089	0.010
Tenure (employees)	-0.020	-0.004	0.080

Notes. Model 1 dependent variable: Job satisfaction; Model 2 dependent variable: Turnover intention; Model 3 dependent variable: Work effort. ** $p < 0.01$; * $p < 0.05$.

Discussion

In this section, theoretical and practical implications will be discussed. In addition, suggestions for future research will be pointed out on the basis of limitations of this study.

Theoretical Implications

This study responds to the question of how organizational culture relates to leadership behaviors in Chinese SMEs. In other words, this contributes to a theoretical extension of the research on leadership by taking organizational culture as an antecedent of leadership behavior, which has not been sufficiently explored in the past.

The findings of the study show that the four types of organizational culture relate to different styles of leadership behaviors. According to the results, group, developmental, hierarchical, and rational culture has a positive influence on transformational leadership. This totally proves the evidence that transformational leadership matches properly with all kinds of organizational culture. Rational culture links positively to transactional leadership. Moreover, in SMEs of hierarchical culture, entrepreneurs are prone to take paternalistic leadership to establish leader-member relationship of the characteristics of parents and sons.

In addition, findings in this research also represent that transformational leadership has quite significant and positive effect on job satisfaction and work effort, while it has a negative influence on employees' turnover intention. This study provides evidence that transformational leadership has been viewed as a universally effective leadership behavior in Chinese SMEs. Meanwhile, transactional leadership shows a negative impact on job satisfaction and work effort, but it is significantly related to turnover intention. We can conclude that in Chinese SMEs, transactional leadership is not suitable for improving employee attitude. As far as paternalistic leadership is considered, it is positively related to work effort, but its impact on job satisfaction and turnover intention is not significant. The underlying cause might be that employees in Chinese SMEs have to devote lots of effort to their daily jobs in the context of authority and obedience.

Practical Implications

The results of the influence of organizational culture on the choice of leadership behaviors imply that establishing a multicultural environment in an organization is quite necessary to obtain desired outcomes. Many previous researches have proven that cultural styles coexist in one organization simultaneously. Overemphasizing any culture type may become dysfunctional and the strength of the quadrant may even become a weakness (Denison & Spreitzer, 1991).

Moreover, the findings of the impact of leadership behavior on employee attitude imply that entrepreneurs should be mindful of two notions: The first is the importance of leadership behaviors for improving employee attitude; the second is how the three types of leadership behaviors impact on employee attitude. In this study, transformational leadership has been proven to be the most effective leadership behavior. Transactional leadership is often rebelled by most employees. Entrepreneurs should alter their leadership behaviors to be transformational style. In detail, entrepreneurs could improve employees' attitude by paying attention to their personal development, enlarging their individual needs, and stimulating their work intention for organizational goals, but not through constructing relationship of "give and take" between entrepreneurs and employees.

Directions for Future Research

Though many findings have been concluded in this research, there are still several limitations that need to

be considered when undertaking research in the future.

First, the applicability and generalizability of organizational culture, leadership, and employee attitude theory in oriental society need to be further explored in the future. The investigation area should be extended, so that even comparative analysis on leader effectiveness can be conducted among countries or districts under oriental culture background.

Second, data collection was conducted only in Wuhou high-tech industrial development zone in Chengdu of Sichuan province. Although this zone is one of the most representative industrial development zones in China, data collected from more zones of some other provinces in China will firmly increase the reliability and persuasion of the research. Future research will intend to take investigation in SMEs of other provinces in China to enlarge the extent of cases.

Third, more variables of outcomes should also be introduced to testify the effectiveness of leadership. Furthermore, the outcomes of leadership do not need to be restricted at the level of only individuals, such as performance of employees and entrepreneurs. Performance at the level of organization is worthy of exploration as the outcomes of leader effectiveness.

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SHRM: Progress and Return

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The objective of this study is to argue transition from human resource management (HRM) to strategic human resource management (SHRM). In addition, this study also discusses the theory of SHRM. The research methodology of this study is based on arguments from SHRM literature. The significant of paper is a discussion of SHRM theory. Key terms are personnel, employee, and capital in management of human resources by firms. Practitioners call human resources as personnel in personnel management (PM); and call human resources as an employee in HRM. Practitioners do not clarify the term yet for human resources in SHRM. This paper suggests "capital" term for human resources in SHRM. Secondly, return on investment (ROI) of HRM might be positive organizational attitude and behaviours. HRM makes investment to employees, and ROI of HRM is important to SHRM because positive attitude and behaviours increase individual performance of employees. Thirdly, there is a triangular relation in SHRM theory. This is named as trigonometry of SHRM. There are dependent variables, independent variables, and moderators in this triangular. Finally, SHRM can be described with employee performance and firm performance relationship. In this relation, HRM practices lead to increased individual performance, and individual performance increases performance of business departments such as logistics, supply, finance, marketing, production etc. and performance of business departments has an impact on firm performance. In this SHRM model, HRM has an impact on firm performance through individual performance and business departments. All are described is SHRM theory in this study. For HRM case, HRM has two purposes in firm management. Those purposes are performance and recruitment. HRM aims to increase individual performance of employees. If HRM aims to increase firm performance through individual performance, it is description of SHRM. HRM has an impact on individual performance via HRM practices. HRM practices are keys to increase individual performance. Because employees implement business processes in firm management. Those processes are such as production, marketing, stock, supply, logistics, finance and others. Individual performance of employees increases performance of those business processes in firm management. Therefore, it is important to increase individual performance through HRM practices. This is a HRM theory in this study. Moreover, HRM does recruitment of employees for functioning these business processes. Because all needs human resources to effectively implement processes in firms.

Keywords: strategic human resource management (SHRM), human resource management (HRM), progress, return on investment (ROI), individual performance, firm performance

Introduction

What is the definition of human resource management (HRM)? HRM is, maybe, defined as an employee is

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not cost, but employees are resource. The resource can be identified with production factors. There are four production factors. They are: raw materials, human resources, capital, and knowledge. Firm aims to increase the efficiency of four, but HRM aims to increase efficiency of one: human resources.

Therefore, HRM departments apply to several HRM practices to increase the efficiency of employees. Most prominent sign of efficiency is individual performance. Therefore, HRM departments in firms apply several HRM practices to increase individual performance. Those human resource (HR) practices are HR planning, staffing, training, performance appraisal, reward, career planning, compensation, job health and security, industrial relations, and personnel management. Therefore, first definition of HRM is "to increase efficiency of human resources through HRM practices". Because employees perform business processes in organizations. If their performance increases, performance of business departments increases. Because business processes establish business departments in organizations such as stock department, logistics department, supply department, finance, accounting, marketing departments etc., performance of business departments' increases firm performance.

Secondly, HRM can be identified with term "performance". HRM aims to increase the individual performance of employees, because employees implement the task and duties in business departments. Firms convert inputs to outputs. There are business processes in this convert from inputs to outputs. We call these processes as business functions. Business functions are: production, marketing, stock, logistics, finance, supply, accounting etc.. First of all, HRM aims to increase employee performance who works for those business functions. If an employee's individual performance increases, performance of firm increases with people who perform those functions. Therefore, total performance of firm increases. This is the theory of strategic human resource management (SHRM) in this study. We call this as strategic HRM in this paper. Strategic HRM can be defined as a relationship between employee performance and business performance.

Thirdly, HRM does recruitment of employees for business functions, because all are needed human resources (e.g., manager, specialist, chief, for men, worker, labor, and employee).

Therefore, this paper aims to argue the transition from HRM to SHRM.

HRM Practices to Business Performance: Targets of HRM

HRM has four targets: (1) individual performance; (2) positive organizational attitude and behaviours; (3) HR governance; and (4) employee satisfaction. HRM aims to increase individual performance via HRM practices. HRM aims to achieve positive organizational attitudes and behaviours. HRM is to manage a relationship between firm and employees, and the fourth target is that, HRM aims to increase employee satisfaction.

So, HRM practices are important to achieve those targets above. They are: HR planning, staffing, training, performance evaluation, compensation, career planning, job health and security, industrial relations, and personnel management. HRM departments of firms apply of those HRM practices to increase employee performance because individual employee performance is expected to increase firm performance through business departments. Due to the performance of employees it is expected to increase performance of business departments; and it is expected to have an impact on firm performance. This relationship figures SHRM in this study, because the major definition of SHRM in literature is HRM-firm performance link.

The second target of HRM departments is to achieve positive organizational attitudes and behaviours. HRM departments in firms implement HRM practices to obtain positive attitudes and behaviours. These

attitudes and behaviours are commitment, motivation, satisfaction, individual performance, organizational citizenship, and organizational support. It is expected that those attitude and behaviours increase individual performance. For example, commitment behaviour is important to SHRM to have long-term employees. Due to HRM doing investment on employees, HRM can obtain return on investment (ROI) with long-time employees. Therefore, for example, employee commitment is important to ROI in training practices.

HRM is of investment to human resources of firms and HRM does this investment by HRM practices. Therefore, ROI of HRM might be positive-organizational attitudes and behaviours. The return of HRM investment to employees is positive attitudes and behaviours such as employee commitment's, satisfaction, motivation etc.. Therefore, if firm obtains positive attitude and behaviours; therefore, this firm can obtain ROI from HRM.

Meanwhile, ROI is a measure of efficiency of firm's investment. Firm divides benefits of investment to cost of investment to calculate ROI. So, benefits of HRM investment might be positive organizational attitudes and behaviours. The cost of HRM investments to employees might be such as cost of training programs, cost of staffing process, cost of reward and career planning etc..

The third target of HRM is employment relationship. That can be named as HR governance. Therefore, HR governance is to manage relationship between employees and firm. For example, training or career planning is a relation between employee and firm. Training is firm investment to employees to increase their individual performance, because employee learning occupational knowledge in training and career planning is succession planning made by firm for employee's future. Therefore, for example, training and career planning establish a relation between firm and employees.

The fourth target of HRM is to obtain employee satisfaction. Employee satisfaction is important to SHRM because it may lead to positive organizational attitude and behaviours.

What is the future for HRM? The future of HRM might be to develop positive organizational attitudes and behaviours, because it has an impact on individual performance. The most important gain of positive organizational attitude and behaviour is individual performance. It is expected that, positive attitudes and behaviours increase employee performance.

SHRM: Employee Performance/Business Performance Relationship?

HRM is related with employee performance, and strategic HRM (SHRM) is related with firm performance. Strategic HRM aims to increase firm performance through individual performances and business departments.

HRM aims to increase employee performance so that employees efficiently do their task duties in business functions. If task performance of employees increases in business functions, therefore, performance of firm increases. This is called business performance in this study; and refers to employee performance and business performance relationship in this study to understand strategic HRM. This relationship between employee/business performances might set up HRM-SHRM relationship as employee/business performance relationship.

Therefore, HRM is oriented to employees for individual performance; and, SHRM is oriented to firm performance. Therefore, personnel management (PM) focuses on "job", HRM focuses on "employee", and SHRM focuses on "business".

Therefore, in PM practitioners say "personnel" for human resources, and, in HRM practitioners say "employee". For strategic HRM, practitioners did not clarify the "term" yet. HR practitioners maybe say

"capital". Human capital enables firms to achieve their objectives. The major objective of firms is firm performance and SHRM is described with HRM-firm performance link; therefore, practitioners may call human resources as "capital" in SHRM.

Theory of SHRM

The theory of this study is that, HRM has two main objectives: performance and recruitment. Firstly, HRM aims to increase individual performance of employees. HRM departments apply of several HRM practices to increase individual performance. Those practices are: staffing, HR planning, training, performance evaluations, career planning, compensation, reward, health and security, industrial relations, and personnel management.

Secondly, HRM has recruitment of employees for firms. Firms have business process to convert inputs to outputs. Literature called this as a value chain. Processes in this value chain are marketing, manufacturing, supply, stock, logistics and others. Firms need human resources to implement these processes. Thirdly, HRM aims to increase individual performance of employees performing these processes in firms. Strategic HRM starts here with this point: employee performance and business performance relationship. SHRM anticipates that, individual performance of employees increases performance of these processes; therefore, total performance of business increases. Therefore, SHRM can be defined with employee/business performance relationship.

This study proclaims that there is a trigonometric relationship in this SHRM definition above in employee performance and business performance relationship. There are three variables in this definition: individual performance, business processes, and business performance. Therefore, trigonometric function of SHRM can be established below:

$$\text{SHRM: } f(x, y, z)$$

where x = Individual performance;

y = Business processes;

z = Business performance.

According to this trigonometric relation, individual performance increases firm performance through business processes. Individual performance increases performance of business processes and performance of business departments increases firm performance. Trigonometric relation assumes moderator between dependent variable and independent variable. Moderator in this function is business processes. The dependent variable is firm performance, and the independent variable is individual performance.

Trigonometry of SHRM

This study recommends that there is a trigonometric relation to SHRM function. Trigonometry assumes moderator between independent and dependent variable. However, this relation is triangular. The dependent variable is business performance in trigonometry and independent variable is individual performance. Moderator is business processes. Trigonometry anticipates triangular relationship among variables in SHRM function. The figure of SHRM trigonometric function can be seen in Figure 1.

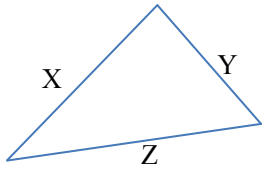

Figure 1. Trigonometric function of SHRM.

Figure 1 assumes that *X* (individual performance) has an impact on *Z* (business performance) by *Y* (business process). In addition, according to this triangular relation, *X* has a direct impact on *Z*, i.e., individual performance can directly impact on business performance.

Conclusions

In HRM employees are considered as "resources". In SHRM employees might be considered as "capital", human capital, or intellectual capital. HRM considers employees as a resource. But SHRM perceives employees as a capital, human capital. SHRM acknowledges that human capital has an impact on individual performance. Therefore, employees are perceived as "capital" in SHRM.

Human capital is important in SHRM because this is expectation that, human capital (or intellectual capital) increases individual performance, because the individual performance of each employee has an impact on firm performance through performance of business departments. Therefore, this study aims to progress HRM into SHRM by employee/business performance relationship.

In SHRM, practices are: interrelated HRM practices, human capital practices, and HR system. Those three variables may progress HRM into strategic HRM. HRM practices are separate and individual in HRM. There are individual HRM practices in HRM. However, HRM practices are interrelated in SHRM. These interrelationships build HR system, interrelationship of HRM practices, and human capital are the practices that can be established in strategic HRM. For example, HRM departments correlate training, career planning, and performance appraisal in "performance management". Therefore, performance management is maybe another SHRM practice. Further, HRM departments participate new employees to training and development program. So, HRM correlates training to staffing. These relations represent interrelationships among HRM practices.

To conclude, in order to progress HRM to SHRM, firms may associate individual performance with business performance and interrelated HRM practices, human capital, and HR system expected to increase employee performance. Therefore, those practices are considered as SHRM practices. In addition, performance management and HR governance can become another SHRM practice to increase individual performance and business performance consequently.

Finally, this study has three contributions for academics:

- Positive organizational attitudes and behaviours are important to increase individual performance. Because individual performance achieves firm performance in SHRM theory. Therefore, those positive organizational attitudes and behaviours are critical to SHRM objectives to achieve firm performance;
- An employee is considered as "capital" in strategic HRM. Therefore, HR practitioners may call human resources as capital in SHRM;
- Human capital, interrelated HRM practices, HR system, HR governance, performance management, and individual HRM practices are considered as SHRM practices.

Discussion of PM

PM is practiced inside organizations. We should not forget and ignore PM. Because PM holds career records of employees such as compensation benefits or performance notes. This information (records) can save in a personnel file or in an HR information system. Therefore, the PM should be kept as one of HRM practices by firms.

So, PM should be applied inside HRM and HRM should be applied inside SHRM (see Figure 2).

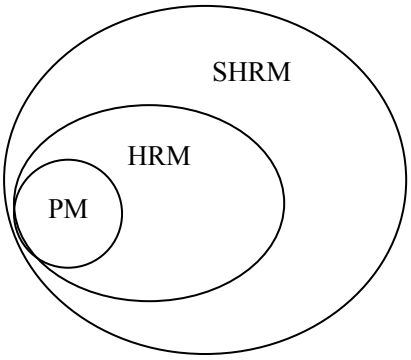

Figure 2. Relation between PM, HRM, and SHRM.

HRM departments in firms implement PM together with HRM practices and PM has supervisory position inside HRM departments in line management. Therefore, HRM should practice PM as one HRM practice.

The major reason for transition from PM to HRM might be intense competition by Japan and other Asian competitors. Asian competition increased after the 1960s and 1970s. Intense competition changed the view against employees by firms. Firms perceive their employees as resource.

There is viewpoint difference between PM and HRM. PM protects rights of firms. PM tends to firm and firm's objectives. Contrastly, HRM is in the side of employees, tends to employees, and aims to increase individual performance of employees.

Relation among PM, HRM, and SHRM is presented in Figure 2. Therefore, firms should not forget and ignore none of them because firm needs each. Therefore, PM is hidden inside HRM and HRM is hidden inside SHRM. SHRM can be between an employee and firm because it aims to increase both employee performance and business performance. Therefore:

PM ⟶ firm
HRM ⟶ employee
SHRM ⟶ firm and employee

Figure 3. Interests of human resource methods.

Figure 3 demonstrates that PM saves the interests and rights of the organization. HRM tends to employees to increase individual performance. SHRM is between firm and an employee and each is hidden inside others. Therefore, firms should practice PM, HRM, and SHRM. PM's organizational position may be supervisory in organizational chart in HRM division.

Therefore, PM should have supervisor. HRM department has HR manager in hierarchical level. SHRM may be different department and therefore, there should be SHRM managers in organizations.

Finally, this study suggests six SHRM practices for SHRM managers. They are:

- performance management;
- HR governance;
- interrelated HRM practices;
- individual HRM practices;
- HR systems;
- human capital.

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Appendix A: Program and Curriculum Development of HRM Programs in Business Schools

The aim of this Appendix is to discuss HRM and executive HRM programs for business schools to educate future's HR professionals and managers.

Structure: HR Program

This program is based on three majors: foundation, major, and specialization. Foundation courses are core business courses such as marketing, management, and accounting. Major courses are built on HRM interests such as personnel management, international HRM, HR planning, staffing, training etc.. Elective courses enable HRM students to specialize on a business field such as accounting, marketing, and management. Therefore, HRM student obtains a dual career opportunity: One is in HRM and the other is in business. HRM students should experience management courses and law courses because HRM professionals manage a relation between employees and firm.

Courses

There are three courses: foundation, major, and specialization in this curriculum. The number of courses is 42, and credits to complete this program are 168 credits. Each course is given to four credits.

Foundation courses are: management and organization, organizational behaviour, organizational psychology, strategic management, business policy, introduction to business, international business, marketing management, principles of marketing, principles of accounting, financial accounting, production management, business law I, business law II, quantitative methods in business, principles of statistics, business statistics, research method I, research method II, principles of economy, micro economy, macro economy.

Major HRM courses are: personnel management, human resource management, strategic human resource management, international HRM, research method in HR, HR planning, staffing, training, performance evaluation, reward management, career management, compensation, industrial relation, labor law.

First two-year courses are business courses in the program, and third- and fourth-year courses are HRM courses. There are four elective courses in the program. Content will be developed later.

Curriculum

First Year

Fall	Spring
Principles of Management	Business Statistics
Principles of Economy	Quantitative Methods
Principles of Marketing	Financial Accounting
Principles of Accounting	Business Law I
Principles of Statistics	Macro Economy

Second Year

Fall	Spring
Management and Organization	Marketing Management
Production Management	Strategic Management
Research Methods I	Research Method II
Organizational Psychology	International Business
Organizational Behaviour	Labor Law

Third Year

Fall	Spring
Personnel Management	Career Management

Human Resource Management	HR Planning
Strategic Human Resource Management	Staffing
International HRM	Training
Research Method in HRM	Performance Evaluation
Specialization I	Specialization II
Fourth Year	
Fall	Spring
Reward Management	HR Case Study Course
Compensation	Industrial Relation
Job Health and Security	Specialization IV
Specialization III	Internship II
Internship I	Internship III

Executive HRM Program: One Year

Executive human resource management courses (executive HRM) are built on core courses and career courses. This program is benchmarked with current executive MBA programs in business schools.

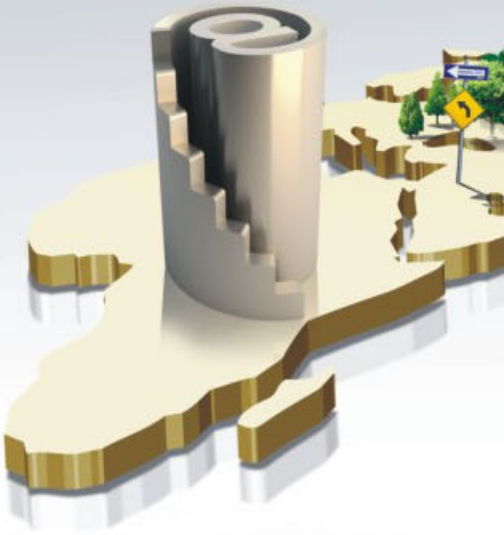
There are five core courses and nine career courses. Each course's credit has six credits to complete. Total credit of executive's HRM program is 84 credits.

Table A1

Executive HRM Courses

Courses	Credits
Core Courses	
Management and Organization	6
Personnel Management	6
Human Resource Management	6
International HRM	6
Strategic HRM	6
Career Courses	
HR Planning	6
Staffing	6
Training for Development	6
Performance Evaluation	6
Compensation	6
Career Planning	6
Industrial Relations	6
Health and Safety	6
Labor Law	6
Total	84

This program and curriculum of undergraduate and executive HRM programs aim to educate future HR professionals.



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