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## BUSINESS SUSTAINABLE COMPETITIVENESS – A SYNERGISTIC, LONG-RUN APPROACH OF A COMPANY’S RESOURCES AND RESULTS

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**Abstract:**

*Business sustainable competitiveness is a very complex concept. This complexity generates a variety of possibilities to define, to measure and to test it. The purpose of the paper is to develop the concept of businessness (for business sustainable competitiveness) by leveraging productivity, profitability, effectiveness and sustainability, at firm level. The interrelations between them, in terms of revenues per employee, return on assets, total assets turnover and Dow Jones Sustainability Index, were integrated into models/functions in order to develop, test and apply businessness. The article is about proposing functions (by using multiple discriminant analysis) in order to measure business sustainable competitiveness (businessness). The hypotheses and functions were tested using a sample of 500 companies (2000 observations) from Global Fortune 500. The results showed that there are direct and positive interrelations between the following items: number of employees, revenues, net income and total assets, but with different degree of correlations between groups. Therefore, it is very important to consider industry/group when conducting an analysis on business sustainable competitiveness.*

**Key words:** *Business sustainable competitiveness – businessness, productivity, profitability, effectiveness, sustainability*

### 1. Introduction

The complexity of the business environment brings together sustainability and competitiveness. The new paradigm and the dynamic approach of business competitiveness have to consider, beyond revenues and profitability (Garelli, 2006), innovation (Porter and Van der Linde, 1995) and sustainability (Vlachvei and Notta, 2016; Wagner, 2010). But, concepts like competitiveness or sustainability are still blurred, even if they are used on a daily basis in any field/domain. One of the reasons may be the fact that both concepts are dynamic ones, which are upgrading and

improving constantly (Chen and Miller 2012; Chichilnjsky, Heal and Vercelli, 2012; Porter, 1998). That is why, in terms of business, competitiveness and sustainability have multiple approaches, perspectives, meanings and determinants.

However, researches on business competitiveness and corporate sustainability – considered together or separately – are not new. In this context, the main objective/purpose of the paper is to define *business sustainable competitiveness*. We will contribute to the literature by introducing the new conceptual model of businessness (business sustainable competitiveness) and by offering a methodology in order to measure it. Companies develop their business in a very competitive – national, international or global – environment. Up to a point, they focus on revenues and profitability, only to satisfy the shareholders' needs; but, in order to be(come) and remain competitive, they have to satisfy shareholders' needs, and to be able to switch from profitability to sustainability on the long run, by synergistically approaching the companies resources and results.

The paper is organized as follows. In the next part we will review the literature in order to identify the relevant variables that can influence/affect business sustainable competitiveness by leveraging productivity, efficiency, effectiveness and sustainability of firm resources. Based on that, the conceptual model of businessness will be developed. Other distinct parts of the paper are focused on transforming the conceptual model into an empirical one – that measures businessness – and on testing the proposed model – by using data on companies from Global Fortune 500 (2016) and Dow Jones Annual Review (2016). We found that, considering companies by their group (according to our own clusterization of industries), some variables are more important than others into the businessness model, displaying different coefficients for multiplication. If using relative indicators, not absolute ones, and integrating sustainability as a measurable factor into the model, companies from Global Fortune 500 do not keep their rank. The analysis of the results, the limitations of the study, its managerial relevance and practical application of the proposed model are presented in the last part of the paper.

## **2. Literature review and conceptual model**

More than 20 years after, we have to agree with the assertion made by Feurer and Chaharbaghi (1994) arguing that “competitiveness is relative and not absolute”. It is related to: competitive advantage (Chaharbaghi and Lynch, 1999; Porter, 1985; Porter and Kramer, 2002); technology (Denning and Stratopoulos, 2003; Shrivastava, 1995; Tracey, Vonderembse and Lim, 1999); value – in different forms, from shareholders to customers and (other) stakeholders (Kramer, 2011; Marín, Rubio and Maya, 2012; Turnbull, 1994; Yong-Hong and Xiu-Cheng, 2004).

Business competitiveness is, for many authors, a form of productivity – “the ability of firms to create valuable goods and services using efficient methods” (Porter,

2007); an expression of profitability (Garelli, 2006); a fulfilment of stakeholders (Chikan, 2008). Also Krugman (1994) describes business competitiveness – by defining firm un-competitiveness: “if a corporation cannot afford to pay its workers, suppliers, and bondholders, it will go out of business. So when we say that a corporation is uncompetitive, we mean that its market position is unsustainable – that unless it improves its performance, it will cease to exist”. The level of business competitiveness can (only) be identified by comparison with other players (Jiang et al, 2016; Tan et al, 2016). Companies have to develop the ability to act and react in a competitive environment (Feurer and Chaharbaghi, 1994) because they must be aware that their core/specific competencies and resources are no longer enough to be competitive (Wu, 2008); they have to seek new or complementary resources and develop new capabilities in order to achieve competitiveness (Lin and Wu, 2014). Recently Tan et al (2016) concluded that “competitiveness, at the firm level, refers to the ability of a firm to better utilize the resources (efficiency) to meet objectives (effective) compared to other players”.

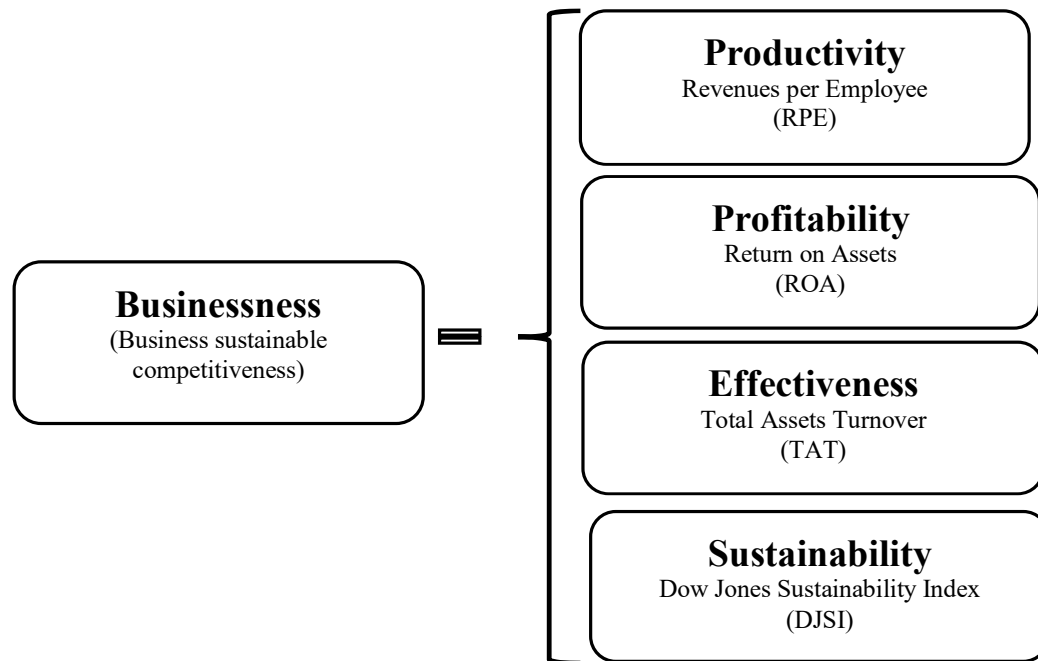
Nevertheless, companies have to better understand the relationship between sustainability performance and business competitiveness, to properly evaluate their current position, to optimize their resources allocation on sustainable development and to integrate sustainability into their strategic planning (Balkyte and Tvaronavičiene, 2010; Tan et al, 2015) – in order to achieve long-term competitiveness. According to the Network for Business Sustainability, business sustainability is about managing the triple bottom line. They noted, also, that business sustainability is able to develop business models that create value for today and for tomorrow, because sustainable competitiveness is an interrelation between competitive performance, competitive potential and management process (Buckley, 1990).

The concepts of business sustainability and/or corporate social responsibility have been developed over the last few decades (Kolk, 2008; Kolk, 2016). Dyllick and Hockerts (2002) have noted that “corporate sustainability can (...) be defined as meeting the need of the firm’s direct and indirect stakeholders without compromising its ability to meet future stakeholders need as well”. McDonough and Braungart (2002) have operationalized new tools for sustainability (triple top line – ecology, equity, economy). Young and Tilley (2006) have moved forward by proposing a new model for corporate sustainability: sustainable entrepreneurship model based on the models proposed by Dyllick and Hockerts (2002) and McDonough and Braungart (2002). Also, Perrini and Tencati (2006) argued that “corporate sustainability is the capacity of a firm to continue operating over a long period of time and depends on the sustainability of its stakeholder relationships”; they even proposed a Sustainability Evaluation and Reporting System. More than that, Searcy (2012) investigated corporate sustainability performance measurement system by reviewing key literature published in this field between 2000 and 2010. All these researches reveal why non-financial information are also very important, especially from the stakeholder-based management perspective (Donaldson and Preston, 1995; Harrison and Wicks, 2013; Rowley, 1997) and the

resources-based view of the firm (Barney, 2001, Mårtensson and Westerberg, 2016; Russo and Fouts, 1997).

Considering all the above mentioned, *business sustainable competitiveness* (businessness) can be defined in terms of a firm's capacity to synergistically combine all its resources in order to achieve better productivity, profitability, effectiveness and sustainability on the long run.

In order to operationalize the definition of business sustainable competitiveness we develop the conceptual model of businessness (Fig. 1), by considering, first of all, some information at firm level, such as: number of employees, revenues, net income, total assets and corporate social responsibility practices. Secondly, in order to be able to compare companies' results we have used some of the most important (correlated) indicators: revenues per employees (RPE), return on assets (ROA), total assets turnovers (TAT) and Dow Jones Sustainability Index (DJSI).



**Figure 1. Conceptual model**

### **1.1. Productivity and Revenues per Employee**

Employees are playing an important role in achieving business sustainable competitiveness. Employers (companies) have to start to consider human resources as intangible assets (Porter, 1992), which are sources of sustainable competitive advantage (Datta, Guthrie and Wright, 2005; Pfeffer and Veiga, 1999; Pfeffer, 2010) – because having very good employees and a performing system of human resources practices, especially in terms of job satisfaction, represents an important driver for business competitiveness (Jiang et al., 2012; Mudor and Tooksoon, 2011).

Satisfied employees will be more productive – which will generate higher levels of growth and profitability for the company (Huselid, 1995; Mathew, Ogbonna and Harris, 2012) – and more positive about implementing corporate social responsibility activities (Garavan and McGuire, 2010; Lee, Park and Lee, 2013) – which will generate sustainable competitiveness for business. To capture the importance of human resources to business sustainable competitiveness in terms of outcome, the model uses labor productivity as an indicator that measure employees' efficiency to produce revenues.

### **1.2. Profitability and Return on Assets**

Often, if it is about competitiveness at business level it is about profitability, about firm financial performance. Measuring firm's financial performance is a very challenging job, which consists in identifying and analyzing the indicators or ratios that better reveal the real standing (Delen, Kuzey and Uyar, 2013). Depending on the circumstances, many authors use return on assets (ROA) as a metric to measure firm financial performance (Cascio, Young and Morris, 1997; Core, Holthausen and Larcker, 1999; Hagel, Brown, Davison, 2010; Hansen and Wernerfelt, 1989; Verwaal, 2017), based on its capacity to capitalize the contribution of assets to profitability and competitiveness for all types of industries (from assets-heavy to assets-light).

### **1.3. Effectiveness and Total Assets Turnover**

Another important ratio is total assets turnover (TAT), that expresses the level of assets effectiveness to generate revenues or sales (Ertuğrul and Karakaşoğlu, 2009; Moyer, McGuigan and Rao, 2007, p. 109), on one hand, and the "management's capability in dealing with competitive conditions" (Altman, 1968), on the other hand. By using TAT as ratio for effectiveness companies will be able to forecast their growth both in terms of assets and revenues (sales) (Baker and Xuan, 2016; Fairfield and Yohn, 2001; Martani and Khairurizka, 2009).

### **1.4. Sustainability – Dow Jones Sustainability Index**

Companies have to be constantly preoccupied for sustainability. They have to be a part of the solution, not only a part of a problem (Kolk and Van Tulder, 2010).

One of the most important indicators that measure sustainability, at the firm level, is Dow Jones Sustainability Index (DJSI), "the first global index to track the leading sustainability-driven companies" (DJSI Annual Review, 2016). According to RobecoSAM's and S&P DJI's robust index methodology, companies' sustainability performance is based on 9 pillars: Brand performance; Strategy for emerging markets; Innovation management; Product stewardship; Operational eco-efficiency; Environmental policy & management systems; Occupational health and safety; Human capital development; Labor practice indicators and human rights. The 3,400 largest companies in the world – from both developed and emerging countries – have participated in 2015 to the annual Corporate Sustainability Assessment.

In order to achieve a given level of DJSI companies have to adopt a sustainability-oriented organizational culture (Linnenluecke and Griffiths, 2010; McDonough and Braungart, 2002). They have to link corporate social responsibility or corporate social performance to corporate value or financial performance, and vice-versa (Barnett and Salomon, 2012; Baumgartner, 2009; Ferrell, Liang and Renneboog, 2016; Kolk, 2008; Michelon, Boesso, Kumar, 2013; Servaes and Tamayo, 2013).

Accordingly, we formulate the first hypothesis:

***Hypothesis 1:*** *There are direct and positive interrelations between the following items: number of employees, revenues, net income and total assets, but the degree of correlation between them is different, both at overall level and at industry level.*

But, given the complexity of the world business environment, in order to achieve business sustainable competitiveness and to identify the best solution for future development companies have to use nanoeconomics (Klepper, 2011), by “digging below the microeconomics level”, and “developing and analyzing data at level bellows those customarily employed” (Braguinsky and Hounshell, 2016). Under these circumstances, to investigate business sustainable competitiveness requires first the analysis of industry structure and attractiveness (McGahan and Porter, 1997; Porter, 1985) – as a top-down approach, followed then by the analysis of each company from each industry based on the above mentioned indicators (from the conceptual model) – as a bottom-up approach.

***Hypothesis 2:*** *When considering the industry, there are gaps between the following variables: revenues per employees, return on assets and total assets turnover – from one group of companies (resulted from our own clusterization of industries) to another; more, there will be differences among the business sustainable competitiveness function scores for the 500 companies – if consider them both as overall and by industries/groups.*

Our model for business sustainable competitiveness tries to emphasize the importance of taking into consideration dimensions like ecology and environment, besides the economic/financial ones, into a company’s global strategy, on one hand, and to offer a possibility to compare companies within and between industries/groups, on the other hand.

### **3. Methodology**

The article is about proposing a function or functions in order to measure business sustainable competitiveness (**businessness**). There is no such composite index (function) for measuring business sustainable competitiveness in the literature.

Managers/investors/shareholders need to know more about business sustainable competitiveness because not only revenues or net income are important in order to classify companies (see Global Fortune 500) in terms of their long-run competitiveness. All stakeholders should be interested in many other aspects, such as: productivity, effectiveness, corporate social responsibility and sustainability.

To empirically develop the conceptual model of businessness we collected data from the companies that were ranked in 2015 into Global Fortune 500 and were included into Corporate Sustainability Assessment according to Dow Jones Sustainability Index Annual Review 2016 (with results from 2015). The sample consist of 500 companies and 2000 observations.

As we mentioned before (in the description of the conceptual model) we considered relevant information for our study the following: number of employees, revenues, net income, total assets and Dow Jones Sustainability Index.

Table 1 presents key data collected from the Balance Sheets and Income Statements of the 500 companies ranked in Global Fortune 500 in 2015 – by emphasizing the following items: number of employees, revenues, net income and totals assets, as total level, average, standard deviation and correlations matrix. It can be observed that the 500 largest companies in the world engage almost 67 million employees, generate 27.6 trillion in terms of revenues and 1.5 trillion in terms of net income, and pose over 118 trillion in assets (in USD). By comparison, according to the World Bank (2015), the level of World GDP was 73.892 trillion USD, which means that the total revenues generated by the Global Fortune 500 companies represent 37.35% from the World GDP.

**Table 1: Items and descriptive statistics**

		<b>Total</b>	<b>Mean</b>	<b>S.D.</b>	<b>1</b>	<b>2</b>	<b>3</b>
<b>1.</b>	<b>Number of Employees</b>	66,862,552	133,725.10	174,544.37	1		
<b>2.</b>	<b>Revenues (Mil. USD)</b>	27,683,730	55,367.46	47,096.97	0.63	1	
<b>3.</b>	<b>Net income (Mil. USD)</b>	1,483,123	2,966.25	6,002.02	0.22	0.37	1
<b>4.</b>	<b>Total Assets (Mil. USD)</b>	118,278,183	236,556.37	478,126.40	0.12	0.26	0.47

Note: for correlation it was used Pearson correlation, n = 1000, sig 2 tailed, at p<0.01. Number of observations 500 for each item, df-499.

Global Fortune 500 refers to companies from 21 sectors and 54 industries. Given the complexity of the analysis and the heterogeneity of companies' results we grouped the companies in 5 categories, as shown in Table 2, based on the most comprehensive economic sectors – because approaching business sustainable competitiveness without considering industries is not a realistic one. Businesses compete in a specific industry, which offers different ways to increase productivity, different opportunities to leverage assets, different path for grow and long term profitability.

**Table 2: Groups of companies**

I.	Energy sector (88 companies)
II.	Motor Vehicles & Parts, Materials, Industrials, Engineering, Aerospace & Defense, Apparel, Chemicals (111 companies)
III.	Health Care, Food & Drug Stores, Food & Beverages & Tobacco, Hotel, Restaurants & Leisure, Household, Media, Retailing, Transportation, Wholesalers (137 companies)
IV.	Technology, Telecommunications (50 companies)
V.	Financials (114 companies)

**Table 3: Items. Average on groups**

Groups	No. of employees*	Revenues**	Net income**	Total assets**
I	110,025.19	63,241.72	458.31	102,394.02
II	142,345.46	52,728.55	1,964.27	71,350.73
III	158,224.34	50,594.12	2,637.32	56,537.12
IV	175,975.10	62,368.12	5,405.96	96,725.48
V	95,653.51	54,524.47	5,203.04	778,646.65

\*people, \*\*million USD

According to the average levels from Table 3, there are significant differences between items from one group to another. For instance, there are big gaps between net income (group I registers an average of 458.31 mil. USD, while group IV has an average of 5,405.96 mil. USD) or total assets (group III registers an average of 56,537.12, while group V has a very high average level of 778,646.65 mil. USD, even if it is about the financials).

Considering that, in Table 4 are presented the Pearson correlation results of the 4 items for each group. According to Ghauri and Gronhaug (2005, p. 181), „Pearson product-moment correlation examines the strength of the linear relationship between to variables”.

**Table 4: Pearson correlation for every group**

Group I		1	2	3	Group II		1	2	3
1.	Number of Employees	1			1.	Number of Employees	1		
2.	Revenues (Mil. USD)	0.66	1		2.	Revenues (Mil. USD)	0.66	1	
3.	Net income (Mil. USD)	0.19	0.17	1	3.	Net income (Mil. USD)	0.11	0.46	1
4.	Total Assets (Mil. USD)	0.74	0.86	0.22	4.	Total Assets (Mil. USD)	0.64	0.86	0.29
Group III		1	2	3	Group IV		1	2	3
1.	Number of Employees	1			1.	Number of Employees	1		
2.	Revenues (Mil. USD)	0.71	1		2.	Revenues (Mil. USD)	0.43	1	
3.	Net income (Mil. USD)	0.23	0.26	1	3.	Net income (Mil. USD)	0.04	0.74	1
4.	Total Assets (Mil. USD)	0.40	0.18	0.24	4.	Total Assets (Mil. USD)	0.17	0.77	0.61



Group V		1	2	3
1.	Number of Employees	1		
2.	Revenues (Mil. USD)	0.73	1	
3.	Net income (Mil. USD)	0.72	0.68	1
4.	Total Assets (Mil. USD)	0.58	0.59	0.68

As we expected, the items taken into consideration – number of employees, revenues, net income and total assets – are strong or very strong correlated in most of the groups. For example, revenues and number of employees received Pearson value of 0.66 in Group I and II, 0.71 in Group 3 and 0.73 in Group 5. Also, total assets and revenues are very strong interrelated: in both Group 1 and 2 the value is 0.86, and in Group 3 we find 0.77.

So, after the calculation of Pearson correlation between the 4 items in Table 1, at total level (overall sample), and at group level (Table 4) we have selected 3 indicators to be included in our model: revenues per employees (Pearson = 0.63) for productivity, net income per total assets (Person = 0.47) for profitability and revenues per total assets (Person = 0.26) for effectiveness. We select ROA for profitability given the higher level of Person instead of profit margin (net income per revenues).

Considering the literature review, the conceptual model presented in previous section, and the Pearson correlations between variables, the proposed function to measure businessness (BSCF) will be based on 4 indicators: Revenues per employee (RPE), Return on Assets (ROA), Total Assets Turnover (TAT) and Dow Jones Sustainability Index (DJSI).

### *The businessness function*

The proposed function is a multiple linear regression, or a multiple discriminant analysis, such as:

$$Z = a_{1i}X_1 + a_{2i}X_2 + a_{3i}X_3 + a_{4i}X_4 + \Sigma b_i \quad (1)$$

Or, more specific

$$BSCF = a_{1i}RPE + a_{2i}ROA + a_{3i}TAT + a_{4i}DJSI + \Sigma b_i \quad (2)$$

Where, i represents the Group, I, II, III, IV or V

$a_i$ ,  $b_i$  represents discriminants coefficients

RPE, ROA, TAT, DJSI – independent variables

To test the discriminant validity and the overall discriminating power of the business sustainable competitiveness function(s) we used F-statistic (F-value). This test is appropriate because it can determine if there are meaningful differences between groups considering several variables simultaneously (Klecka, 1980), and it allows to identify those variables which best discriminate between-groups variability

and which are most similar within-groups variability (Altman, 1968). It F-statistic is largest than F-distribution the functions are valid.

**Table 5: F-statistic for variables**

	RPE	ROA	TAT
F-statistic	2.71*	19.20**	42.07**

Note: *F-distribution with K-1, N-K degrees of freedom under the null hypothesis.*

*K (groups) = 5, N = 500 (overall sample size).*

*F-value (K-1=4, N-K=495) for a probability level of 0.05\* = 2.3899*

*and for a probability level of 0.001\*\* = 4.6942*

According to Table 5, F-statistic is higher than F-distribution in all cases, with a probability level of 0.001 for TAT and ROA and with a probability of 0.05 for RPE.

#### 4. Results and Discussion

To test our hypothesis, we calculate Pearson correlations between items and perform a discriminate analysis for variables.

First, we find that, as predicted in Hypothesis 1, the items: number of employees, revenues, net income and total assets – are directly correlated for the samples used, as it is reported in Table 1, but the power of correlations are different: form 0.63 for revenues with number of employees (t Stat=11.73 against 3.31=t Critical two-tail, p<0.001), to 0.47 for net income with total assets (t Stat=10.98 against 3.31=t Critical two-tail, p<0.001) and 0.26 for revenues with total assets (t Stat=8.65 against 3.31=t Critical two-tail, p<0.001). Therefore, the *Hypothesis 1 is valid*.

In order to determine the independent variables (RPE, ROA, TAT and DJSI), we first identified the minimum and maximum value for each variable, at overall samples and in each group. For the value of DJSI we collected information from DJSI Annual Review 2016 – Results, released by RobecoSAM 2016, more specifically from reports on Industry Group Leaders 2016. The maximum score for DJSI is the score of the industry leader. The minimum score is zero because not all the 500 companies from Global Fortune 500 are ranked in Dow Jones Sustainability World Index. Finally, we computed the business sustainable competitiveness function (BSCF).

In order to calculate  $a_i$  and  $b_i$ , as we already mentioned, a discriminant analysis was applied. But first, we calculated RPE, ROA, TAT for all 500 companies grouped by group (average levels are illustrated in Table 6).

**Table 6: Group means (centroids) for each variable**

Groups	RPE	ROA	TAT
I	1.91	0.75	0.94
II	0.47	3.63	0.89
III	1.74	5.16	1.6
IV	0.47	5.01	0.96
V	1.45	0.85	1.15
<b>Overall sample mean (500)</b>	1.3	3.05	0.94
<b>SD</b>	4.49	5.26	1.01

**Table 7: Descriptive statistics and business sustainable competitiveness overall function**

	RPE	ROA	TAT	DJSI	BUSINESSNESS FUNCTION (BSCF)
<b>Min</b>	0.05	0	0.02	0	$BSCF_1 = 1.42RPE + 2.86ROA + 11.89TAT + 1.06DJSI - 0.31$
<b>Max</b>	70.49	35,01	8.63	94	
<b>I a</b>	1.42	2.86	11.89	10.6	
<b>b</b>	-0.07	0	-0.24	0	

Note: all the results of RPE, ROA AND TAT discriminant coefficients was multiply by 100 in order to be comparable and to have the same weight, on one hand, and to offer a larger interval of variation (form 0 to 400), on the other hand.

In Table 7 we computed the variables for all 500 companies in order to identify the *business sustainable competitiveness function without considering the groups/industries*. The most important variable here is Total assets turnover (TAT) with an 11.89 value.

The BSCF cannot be apply as a single function, with the same parameters, to all industries/groups. When comparing companies, you have to consider first the group or the industry level. In fact, some other variables could have a high impact on *business sustainable competitiveness functions if considering industry/group*. As it shows in Table 6 all variables impact differently the business sustainable competitiveness functions, starting with different levels for minimum and maximum and finishing with different discriminant coefficients.

The maximum value of BSCF is 400 and the minimum value is zero. Those variables with the largest regression coefficients are the ones that contribute the most to the business sustainable competitiveness. If we analyse each discriminant coefficient from every group related to an independent variable, we find huge differences between them. For instance, the value of the RPE discriminant coefficient is the lowest in group III (1.42) and the highest in group IV (49.26, actually 34 times higher); the value of the ROA discriminant coefficient is the lowest in group III (2.86) and the highest in group V (22.93); the value of the TAT discriminant coefficient is the lowest in group I (11.8) and the highest in group II (42.73). The value of the DJSI discriminant coefficient is not a volatile one because the maxim value of this variable is over 90 and the minimum is zero in every group.

Once the values of the discriminant coefficients are estimated, it will be possible to calculate the business sustainable competitiveness score for each company, based on the functions determinate in Table 7 and Table 8, and to compare them. BSCF score obtained by every company will rank them at any level: industry, sector, national or global.

To apply the BSCF and to reveal the managerial relevance of the businessness, we selected some companies from every group and different origin counties, and we calculated the BSCF score.

**Table 8: Descriptive statistics and business sustainable competitiveness functions per group**

		RPE	ROA	TAT	DJSI	BUSINESSNESS FUNCTION (BSCF)
<b>I</b>	Min	0.13	0	0.19	0	$BSCF_I = 2.65RPE + 10.6ROA + 11.8TAT + 1.08DJSI - 2.6$
	Max	37.84	9.43	8.63	92	
	a	2.65	10.6	11.8	1.08	
	b	-0.35	0	-2.25	0	
<b>II</b>	Min	0.1	0	0.24	0	$BSCF_{II} = 38.46RPE + 5.08ROA + 42.73TAT + 1.08DJSI - 14.1$
	Max	2.7	19.67	2.58	92	
	a	38.46	5.08	42.73	1.08	
	b	-3.85	0	-10.25	0	
<b>III</b>	Min	0.05	0	0.06	0	$BSCF_{III} = 1.42RPE + 2.86ROA + 13.71TAT + 1.06DJSI - 0.9$
	Max	70.49	35.01	7.35	94	
	a	1.42	2.86	13.71	1.06	
	b	-0.07	0	-0.83	0	
<b>IV</b>	Min	0.09	0	0.32	0	$BSCF_{IV} = 49.26RPE + 5.29ROA + 42.55TAT + 1.11DJSI - 18.04$
	Max	2.12	18.91	2.67	90	
	a	49.26	5.29	42.55	1.11	
	b	-4.43	0	-13.61	0	
<b>V</b>	Min	0.14	0	0.02	0	$BSCF_V = 3.57RPE + 22.93ROA + 14.66TAT + 1.06DJSI - 0.79$
	Max	28.18	4.36	6.84	94	
	a	3.57	22.93	14.66	1.06	
	b	-0.5	0	-0.29	0	

Note: all the results of RPE, ROA AND TAT discriminant coefficients was multiply by 100 in order to be comparable and to have the same weight, on one hand, and to offer a larger interval of variation (form 0 to 400), on the other hand.

**Table 9: BSCF score for selected companies**

S	Company	Rank in GF500	RPE	ROA	TAT	DJSI	BSCF Score <sub>c</sub> without group/industry	BSCF Score <sub>o</sub> considering group/industry
I	Thai Oil LTD	na	10.97	6.33	1.52	92.00	148.96	210.86
IV	HP	48	0.36	4.26	0.97	88.00	117.16	161.06
V	Swiss Re AG	282	2.80	2.34	0.18	88.00	105.81	158.89
II	BMW	51	0.84	3.78	0.55	90.00	113.58	157.82
III	INDITEX	463	0.15	16.89	1.23	81.00	148.65	150.30
III	Unilever NV	147	0.35	9.59	1.04	92.00	137.48	138.79
III	Roche Holding AG	167	0.57	12.17	0.69	89.00	137.87	138.54
III	METRO AG	101	0.35	2.49	2.31	94.00	134.40	138.02
III	Nestle SA	66	0.28	7.61	0.74	92.00	128.21	128.97
V	Westpac Banking	336	0.88	1.10	0.05	94.00	104.38	128.03
I	Ibedrola	295	1.28	2.36	0.31	90.00	107.34	126.67
III	Sodexo	466	0.05	4.99	1.41	88.00	124.15	126.13
III	LG Electronics Inc	180	0.65	0.36	1.61	88.00	114.10	116.45
IV	Telecom Italia SpA	404	0.32	0.00	0.34	90.00	99.34	112.41
V	UBS Group AG	257	0.64	0.68	0.04	88.00	96.32	111.07

In Table 9 we computed BSCF for 15 companies based on two functions: a general one (without considering group/industry) – from Table 7, and a specific one, according to the companies' activity group – from Table 8. The two BSCF scores are different and place companies in different positions. Our findings reflects that BCSF scores of companies (without or considering the group) are very different for groups I, II, IV and V, while BSCF scores of companies from group III are not very different, no matter if we consider or not the group (as it can be observed the functions are likely similar with exception of TAT).

On the other hand, by comparison with Fortune Global 500 it can be observed that the rank is changed. For instance, Thail Oil LTD is not ranked in Fortune Global 500 but the company has the highest score for business sustainable competitiveness from all 15 companies that we apply the functions. Similar, in the case of Inditex: the company is ranked on the last position into the group III in terms of revenues but it is placed on first position in terms of business sustainable competitiveness.

According to our results reported in Table 6 and Table 9, and based on the functions developed and presented in Table 7 and Table 8, *the hypothesis 2 is confirmed*: there are gaps between REP, ROA TAT at group level, which drive to different business sustainable competitiveness functions with different discriminant coefficients and different scores.

#### *Limitations and future research*

Even if our contributions, results and findings are significant, the present study is subject to limitations. First of all, the lack of data or our limited access to primary data such as DJSI (Dow Jones Sustainability Index) restricted some of the empirical results, like Pearson correlations with others variables. We had data for DJSI only for industry leaders. Second, given the fact that the 500 companies from our analysis are from 21 sectors and 54 industries, placing them in 5 large groups is also limitative. Third, the lack of references in the field of “business sustainable competitiveness” (according to Google Scholar if you search for this particular collocation it will offer only 5 results) was at the same time a concern, but also, after a first glance, a great challenge. Considering that, a more detailed analysis, with more samples, for a longer period of time, will be the subject of future research (if will be possible through a grant application). Also, in the future, to develop and update business sustainable competitiveness index, we will use triangulation – because, according to Altrichter et. Al (2008), it “is an important method for contrasting and comparing different accounts of the same situation” – and nanoeconomics – for digging deeper into the companies input in order to improve companies output and implicit the businessness.

#### *Managerial relevance*

Given the complexity of competitiveness, translated into the firm capacity to compete in a specific market or industry, to create value or to achieve sustainable growth and profitability (Bris, Cabolis and Caballero IMD, 2015; Cetindamar and Kilitcioglu, 2013), and the importance of sustainability at firm level as a driver of

business competitiveness (Gelhard and von Delft, 2016; Ki-Hoon and Ball, 2003; Wagner and Schltegger, 2003), the present study has several implications and practical relevance. First of all, we developed an integrated model that allows practicing managers to conduct their businesses in order to become more responsible. By synergistically approaching different variables – revenues per employee, return on assets, total assets turnovers and DJSI – we conducted an analysis that had as main reason the urge to leverage companies' results differently, considering industry specifics. This model of businessness can be applied to all companies and it is very easy to use. Managers should be aware that more and more investors or customers are interested about responsible businesses (Cheah et. al, 2014; Hammann, Habisch and Pechlaner, 2009; Hummels and Timmer, 2004; Zadek, 2006) and they have to drive their companied towards the business sustainable competitiveness direction. Considering all that, we expect that our findings will be considered by managers, and they will use our business sustainable competitiveness function in order to determine their company's score. The BSCF score will give them the possibility to compare with their peers, on one hand, or to make all the effort to be included into Corporate Sustainability Assessment if they are not yet there, on the other hand. Nevertheless, the BSCF can be a very good instrument for both managers and investors because there are many studies that emphasize a strong connection between business profitability and sustainability (Cerin and Dobers, 2001; Knoepfel, 2001; López, Garcia and Rodriguez, 2007; Székely and Knirsch, 2005).

## **5. Conclusion**

In our study, we have synergistically approached productivity, profitability, effectiveness and sustainability – by integrating them into a model for measuring business sustainable competitiveness (businessness). Our findings support the hypothesis that there are direct and positive interrelations between the following items: number of employees, revenues, net income and total assets, but with different degree of correlations between groups. It is also important to note that our results for independent variables (revenues per employees, return on assets, total assets turnovers, DJSI) at group level have generated different business sustainable competitiveness functions, with different discriminant coefficients. According to the results, those variables with the largest regression coefficients are the ones that contribute the most to the business sustainable competitiveness. When analysing each discriminant coefficient from every group related to an independent variable, it was identified huge differences between them.

By applying the business sustainable competitiveness functions to reveal its managerial relevance on 15 selected companies, we can concluded that: the two BSCF scores (without or considering the group) are different and place companies in different positions, on one hand and by comparison with Fortune Global 500 it can be observed that the rank is changed, on the other hand. More, companies that are ranked in higher positions in terms of revenues are ranked in lower positions in terms

of businessness and vice-versa because business sustainable competitiveness is about productivity, profitability, effectiveness and sustainability not only about revenues or profit. Therefore, it is very important to consider industry/group when conducting an analysis on business sustainable competitiveness, because otherwise the results are not comparable between companies.

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