Principle Characteristics in Firms' Competitiveness Endeavour: Use of Managerial and Strategic Reasoning Technics for (SMEs)

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Abstract- The purpose of this paper is to study the characteristics of competitiveness in firms' sectors of the Greek manufacturing industry, based on firm level accounting and qualitative data attempting to identify key issues regarding Greek SMEs. An unbalanced data set of 407 Greek manufacturing SMEs is implemented, covering the period of 2003-2011 with the use of a multivariate regression model (EGLS) with explanatory variables characterizing firms' operational activity. Although considerable empirical work has been done on this subject, research on the topic is limited and non-existent for Greece. An Index is developed in order to measure competitiveness characteristics in the Greek SMEs. The method to determine these characteristics in Greek manufacturing SMEs is novel using factors related to knowledge management, information technology, innovation in comparison with accounting data presenting main competitiveness characteristics especially in the during the crisis period .

Keywords— *Greek SMEs, qualitative accounting, crisis, Knowledge management.*

1. Introduction

The survival, growth and success in periods of economic turbulence depends on competitiveness

In recent days, competitiveness has become buzzword, receiving attention from researchers, governments and business organizations because of its close association with the success of an entity [4]. Competitiveness originates from Latin word, competer (i.e. involvement in business rivalry for markets), defined as the ability to achieve dominance and steadiness in the competition between the individual companies and competitors on a micro level and it is a sum of properties and activities of a given production unit, by means of which it can increase its market share and or profit on a given market, during a given period. Tangible and intangible innovation investments and R&D expenditures positively affect firm competitiveness [30]. Knowledge creation and information management are also potential competitiveness sources [10].

Considering the fundamental role played by small and medium sized enterprises (SMEs) in the Greek economy, representing 99.9% of the total enterprises [21]) and the considerable attention placed on issues related to firms' competitiveness, the purpose of this study is to investigate the performance level of manufacturing SMEs, creating a competitive index model. To the best of our knowledge, research on the measurement of a firm level competitiveness index based on accounting and qualitative (managerial and strategic firm characteristics) data, is limited.

There are many studies on competitiveness and factors affecting it, calculation of competitiveness index, but mainly on regional, country or industry level, based on industry and macro sphere factors, [12]-[31]-[17]. However, empirical research on determinants of firm level competitiveness, based on quantitative accounting and qualitative data, is limited abroad and non-existent in Greece. This research attempts to cover this gap, providing evidence about factors impact competitive dynamic

of Greek manufacturing SMEs taking into account aspects of IT, knowledge management, training, innovation and ratios.

In this paper we do not intend to provide evidence on the influence of firms' competitiveness on viability, but we seek to formulate a pattern that describes firms' competitiveness characteristics. We assume that a firm which has an increase Based on theory and literature, we choose parameters of the market share and profit increase to assign a ratio of sustainability in terms of performance, i.e. the Competitiveness index (CI) which uses the change in Market Share and the change in Return on Assets Ratio, as the components of the proposed index. And, especially, we are particularly interested in providing new evidence on firms' characteristics regarding Personnel Education and Training, R&D activities as well as technology relating with organizational practices and perceptions.

The study is structured as follows: the next section presents a literature review on this subject, while section 3 highlights the methodology as well as the model approach of the study. In section 4, the empirical results of the study are presented and in section 5 the main findings are discussed.

2. Literature Review

Firm's competitive position depends on its ability to produce products and/or services of superior quality and lower costs than its domestic and international rivals. In today's rapidly changing economic environment, other qualities such as, flexibility in adjusting to changes, speed and adaptability to changes, are becoming increasingly important for competitiveness.

SMEs in economic crisis may suffer disproportionately from economic downturns, because of their limited financial resources and dependence on banks' lending, paying such high interest rates [6]. Survival and success is dependent on the strategic decision-making and positioning for competitiveness. Ref. [31] refers to argue that competitiveness in manufacturing is the development of relative profitability combined with viable growth of the firm. Ref. [1] refers to investigate the factors used measuring competitive position of Turkey against its rivals and concluded that Turkey in order to be more competitive in international level should give special emphasis in: productivity of firms and industries, current account balance, fiscal and monetary policies.

The bulk of the studies on SMEs focus on the determinants of their survival and performance such as financing, innovation and ownership. Traditionally, the main measures of competitiveness are in accounting, financial or marketing terms [14]. Firm competitiveness can be measured by its market share, its relative value and its profitability over a time period [34]. Ref [20] refers to examine the competitiveness of the food and beverages sector in the Greek environment, using profitability and growth as separate independent variables, to investigate the relative importance of firm and industry factors for the time span of 2003–2007. On firm level, competitiveness [16] developed a competitiveness index based on survey data, R&D, market dynamics, attitudes toward changes, marketing expenditures, and participation in strategic alliances. Additionally, used the index in order to classify firms.

The factors that determine competitiveness at firm level can be internal and external. Dynamic capabilities of firms allow the accomplishment of new opportunities in an extremely competitive business environment and the conversion of organizational resources into both intangible and tangible assets and capabilities [7]. The knowledge-based economy offers unlimited resources. Strategies that seem to increase competitiveness are the development of cooperation, clustering of firms, R&D and application of new IT [27] - [37]. Additionally, the development of internal capabilities has been more significant than limited financial/accounting resources in the competitiveness race. Inadequate technologies and poor financial/accounting resources can be significant barriers to SMEs' competitiveness, since lack of resources does not allow for smaller firms developing expensive software such as Enterprise resource planning (ERP) systems [35]-[36]. However, sources of firm-competitiveness are the assets and procedures that have the ability to provide competitive advantage to a firm against its competitors. Innovation and the development of internal technological capabilities (ICT) in SMEs, enhance the creation of sustainable competitive advantage that is translated to superior market position. Ref [31] refers to in their empirical study concluded that development of internal capabilities such as soft technology (methods and processes that support the firm) and hard technology (innovation in raw materials, in-house machinery development and externally acquired equipment) lead to the development of competitive advantages. R&D factor is an internal source of knowledge and innovation that has the ability to generate a competitive dynamic (higher growth and productivity) in firms [5]-[14]. Ref. [24] refers to defined as main components of microeconomic competitiveness as company sophistication and strategy, the quality of national business

environment and the state of cluster development.
Competitive advantages correlated with company strategy and operational effectiveness, in which vital are technology adoption, company spending on R&D and level of staff training. Absorptive capacity of firms measured by the number of employees with university education [8] or the proportion of scientific and technical personnel relative to the total number of employees [29], is gradually gaining recognition as it leads on promoting financial performance firm and its competitive advantage [15]-[38]. According to the resource-based view, employee training is considered as an investment in human capital that provides employees with unique knowledge, skills and abilities that add value and result in positive organizational-level outcomes. Taking care of employees can be defined as providing better pay, ongoing training, and making employees feel secure [9]. In addition, there is evidence of positive relationship between training activities and growth rate of profit [19]-[11]-[23] for Greek firms found that there is a significant correlation between the employee perceived training effectiveness and their commitment, job satisfaction and motivation.

Research on the size-profitability relationship remains a frequent theme in strategic management research [32], while it is widely shown in previous and resent research that the size of a firm explains in a positive way its profitability level due to the effect of economies of scale [25] and a higher degree of corporate diversification [3]-[39].
Also, through the research there is clear that the firm-oriented approach has greater impact than the industry-oriented approach in explaining firms' profitability, especially for US firms [2]. In the literature different alternatives for measuring performance do exist, i.e. for example the return on assets (ROA) is the most commonly ratio used [26]-[41].
To address this lack of competitiveness, firms should give priority to the enhancing of their innovation, by increasing private R&D investments and by strengthening the linkages between businesses, research organizations, universities and government [18]-[28]-[40]. Similarly, ref. [22] refers to regard cooperation with other firms and development of links with knowledge centers as key factors for enhancing SME innovation.

3. Methodology -Data

Traditionally, the main measures of competitiveness are in accounting or marketing terms. A competitive business might be expected to achieve one or more of the following:

- Higher growth rate than competitors
- Higher than average net profit margin
- Higher than average return on investment (ROA)
- High market share
- The strongest brand reputation in the market
- A clearly defined unique selling point
- Significant access to, or control of, distribution channels in the market.

Therefore, we could assume that a firm, which has an increase in market share as well as in ROA, suggest that it is competitive. Profit increase can be used to proximate a notion of sustainability of performance. Based on theory and literature [33], we choose the following accounting factors, as the components of the index:

- CMS = CHANGE IN MARKET SHARE
- CROA = CHANGE IN RETURN ON ASSETS

Therefore: Competitiveness index (CI) =CMS +CROA

The research is based on unbalanced accounting data of 407 Greek manufacturing SMEs in 9 Sectors (Table 1), due to our main tendency to covering a time period where one could take information between the pro crisis period and during the crisis period, i.e. by taking a sample between 2003 to 2011 (i.e. 9 years), as well as on qualitative variables characterizing firms' operational activity. We picked up 407 manufacturing firms, due also to limitations we came through in taking appropriate number of answered questionnaire.

Table 1. Data sample

SECTOR	NUMBER OF FIRMS	PERCENTAGE
AGRICULTURAL PRODUCTS	44	10,81%
FOOD AND BEVERAGES	104	25,55%
WEARING APPAREL AND FOOTWEAR	25	6,14%
FURNITURE	18	4,42%

Table 1. Data sample		
SECTOR	**NUMBER OF FIRMS**	**PERCENTAGE**
METALLIC PRODUCTS	42	10,32%
MACHINERY	13	3,19%
NON-METALLIC MINERAL PRODUCTS	33	8,11%
PAPER PRODUCTS	14	3,44%
OTHER INDUSTRIES	114	28,01%
TOTAL	407	100,00%

The accounting data were derived from the financial statements of the sample firms from the data base of ICAP Hellas, a private Data base company and the qualitative data derived from a survey via questionnaire. The questionnaire (47 questions) investigates the integrated and individual effects of innovation, R&D and technology on firms' competitiveness, while other factors enhancing firm competitiveness are examined. Firm executives (owners, general managers or CEOs) were asked to rate the existence and the importance of each factor for their firm on a five-point Likert scale (i.e.: 1 - Very low, 5 - Very high).

Based on previous literature, this research attempts to provide new evidence on Personnel Education and Training, R&D activities as well as technology relating with organizational practices and perceptions. In addition, it is attempted to identify the critical factors, which affect competitiveness of the firms for each industry sector. This is used to derive policy implications for firm managers and the State that could help firms increase their competitiveness and growth.

Table 2. Variables selection			
Meaning		**Variables**	**Expected sign (relation)**
Working capital/total assets	Accounting Data	WORK	(+)
Retained earnings/total assets		RET	(+)/(-)
EBIT/total assets		EBIT_TA	(+)
Book value equity/total assets		BOOKVAL	(+)/(-)

Table 2. Variables selection			
Meaning		**Variables**	**Expected sign (relation)**
R&D Investment (Likert scale)	Qualitative Data	RD	(+)
ERP systems use (Likert scale)		ERP	(-)
Educational level of personnel (Likert scale)		EDUC	(+)
Personnel Training (Dummy, 0=No, 1=Yes)		TRAIN	(+)
Cooperation among firms on domestic and foreign level (Likert scale)		COOPER	(+)
Use of knowledge management (Likert scale)		KNOWMAN	(+)

In order to do that, we run a multivariate regression model (EGLS), on a panel data, using as dependent variable the calculated CI index of each firm in the sample and as independent variables the accounting measurements and qualitative variables. This model takes into account accounting data of Greek manufacturing firms as well as qualitative data derived from survey research through a questionnaire.

The model used in our empirical work is the following:

Comp. index = a0 + a1 RD + a2 ERP + a3 EDUC + a4 COOPER + a5 KNOWMAN + a6 BOOKVAL +a7 RET + a8 WORK + a9 TRAIN +a10 EBIT_TA + ε

- N (number of obs.) = 3663 (407 firms x 9 years)

The results of the regression (Table 3), showing that R&D investments, ERP systems, absorptive capacity (i.e. education level), knowledge management, training and profitability in terms of EBIT to total assets affect firm-competitiveness, while other ratios and cooperation do not.

Table 3: Empirical Results	
Variables	**Coefficients**
C	-0.334351** (0.00354)
RD	0.037363* (0.0188)

Table 3: Empirical Results	
Variables	**Coefficients**
ERP	-0.045992** (0.0041)
EDUC	0.000126** (0.0009)
COOPER	0.020887 (0.1987)
KNOWMAN	0.046305** (0.0177)
BOOKVAL	-0.563418 (0.4306)
RET	-0.081595 (0.5541)
WORK	0.278976 (0.5397)
TRAIN	0,031388* (0,0243)
EBIT_TA	1.584470** (0.0010)

Notes: Dependent Variable: Firm Competitiveness (CI) Method: EGLS regression (White Heteroskedasticity-Consistent Standard Errors & Covariance). R-squared =0.68, Prob. is in parentheses. *: statistical significant at 5% level of significance and **: significant at 1% level of significance

Several approaches can be found in literature for measuring companies' performance. This paper applies profitability and market share measures for SMEs and a multivariate regression model to estimate firms' competitiveness characteristics that describe a firm-level approach; it then stresses the results obtained in showing that R&D investments in a firm-level and the use of ERP systems affect firm-competitiveness. The negative effect of ERPs in competitiveness level shows that the sample firms are using traditional technology levels to promote their competitiveness, which ultimately show their lack in the use of new technologies as key factors for promoting their competitiveness.

Also, the higher the education level the higher levels of competitiveness is gained, while at the same time also the knowledge management has a significant effect to their competitiveness levels.

4. Discussion of results

According to the results, investments of R&D, proxy of innovation contribute to better competitiveness of Greek manufacturing. In contrast, computerization of firm operations using ERP systems has negative sign, indicating that Greek manufacturing SMEs do not depend their competitiveness on Information systems (lower productivity levels). Absorptive capacity measured by employees' education level and their development through trainings tend to increase firms' competitiveness level and exploitation of knowledge management has positive effect indicating that capturing, developing, sharing, and effectively using organizational knowledge provides a better firms' competitiveness level. In addition, ratio EBIT/total assets have positive impact as increased earning give better positioning in market in terms of higher levels of Efficiency and better Market Share, thus higher competitiveness.

5. Conclusion

This study examines the drivers of Competitiveness measured by a Competitiveness index in a data set of 407 Greek manufacturing firms during the time period of 2003-2011. Expect of ratios, qualitative factors included in the econometric analysis, in order to identify which of those factors are important for the competitiveness of SMEs. According to the results, the drivers of competitiveness in Greek manufacturing SMEs are R&D investments, education and employees' training as well as knowledge management. In contract, use of ERP systems seems to have negative impact on competitiveness.

The existing results can be improved through future surveys with more explanatory variables for firms' competitiveness. The data will be on the sphere of managerial planning, marketing strategies, technology application, foreign ownership, clustering, innovation, etc. and other important factors affecting firm level competitiveness. The outcome of this research may place more adequate analysis to assist business managers, policy makers and academics to optimize their performance, especially during the period of economic turbulence that the country experiences.

We must not forget to mention that this study has some limitations, mainly related to the database used. First, it does not provide accounting and qualitative data disaggregated by business units. For this reason, in the analysis we provided SMEs separated by sectors but by including the whole sample and not the sub-samples for each sector separately due to lack of available data, which surely meant a poorer measure of this effect.

Second, our study does not contain data from other countries, with quite comparable sizes of firms, especially for the firms of the South European Countries, where the SMEs percentages are quite representative, which prevents further generalization of the results obtained.

Finally, as far as future research is concerned, we find it quite interesting to provide evidence with appropriate analysis for groups of sectors not only for manufacturing firms but also for the services context. In our opinion, a future analysis with the inclusion of service companies would provide a more solid framework for the SMEs entrepreneurship in terms of competitiveness.

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