

Sector and Economic Performance: Interactions and Analyzes

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Abstract

This article aims to analyze the links between companies in the same sector in terms of performance indicators. And that, by analyzing the increase of their profitability, the reinforcement of the growth of their activities, the improvement of their productivity, the stimulation of their additional investments, as well as the costs of financing by a decrease of the level of indebtedness. In order to meet this objective, a principal component analysis was used, and confirmed that "these enterprises therefore have the same characteristics at the level of the same sector of activity", because they are subject to the same institutional and environmental problems thus limiting the promotion of their performances.

Key words: Performance, PCA, SMEs, profitability, productivity, debt ratio.

Résumé

Cet article a pour objet d'analyser les liens entre les entreprises d'un même secteur en termes d'indicateurs de performance. Et cela, en analysant l'accroissement de leur rentabilité, le renforcement de la croissance de leurs activités, l'amélioration de leur productivité, la stimulation de leurs investissements supplémentaires, ainsi les coûts de financement par une baisse du niveau d'endettement. Afin de répondre à cet objectif, une analyse en composantes principales a été utilisée, et a confirmé que, « *ces entreprises ont donc les mêmes caractéristiques au niveau d'un même secteur d'activité* », car elles sont soumises aux mêmes obstacles institutionnels et problèmes environnementaux limitant ainsi la promotion de leurs performances.

Mots clés : performance, ACP, PME, rentabilité, productivité, taux d'endettement.

Introduction

Our study consists in empirically testing the performance of the 80 Oranian SMEs surveyed in terms of branches of activity studied in 2008. In fact, it makes it possible to analyze if there exist links between the companies of the same sector in terms of performance indicators. And that, by analyzing the increase of their profitability, the reinforcement of the growth of their activities, the improvement of their productivity, the stimulation of their additional investments, as well as the costs of financing by a decrease of the level of indebtedness. In order to meet this objective, a principal component analysis will be used; We will first present a presentation of the basis of the conceptualization of performance, second, the principle of principal component factor analysis (PCA), then we will interpret the results of application of the PCA technique on our database.

1. Basis of theoretical analysis "business performance"

1.1. Ambiguity of the "performance" concept

Business performance is a central concept in management sciences. Since the 1980s, this concept has been the subject of many theoretical controversies. Indeed, many researchers have endeavored to define it (Bouquin, [1986], Bescos et al, [1993], Bourguignon, [1995], Lebas, [1995], Bessire, [1999]).

Indeed, this concept arouses today huge passions and sharp controversies in the field of managerial thinking. It appears as a dependent notion of the disciplines or schools of thought to which the authors belong, as well as the criteria and perspective of analysis chosen, each of which approaches it according to an angle of attack of its own. This made the understanding of this concept quite ambiguous.

1.2. Some definitions of Performance

Indeed, this conception was presented by Bourguignon, [1995], who considers performance as a construct, which consists of different concepts (actions), to understand the different potential reflections of this term. In addition,

it differs from the Francophone approach, which tends to conceive of only the ultimate goal, that is, the results obtained. Bouliane, Guindon, Morin, [1996], retain four criteria for measuring performance. It is the sustainability represented by the quality of the product / service, financial profitability and competitiveness; economic efficiency measured by resource efficiency and productivity; the value of human resources, expressed through mobilization, personal development, performance and social climate; and finally the legitimacy of the organization with external groups that materializes by the satisfaction of donors, customers, regulatory bodies and the community.

2. Basis of statistical analysis

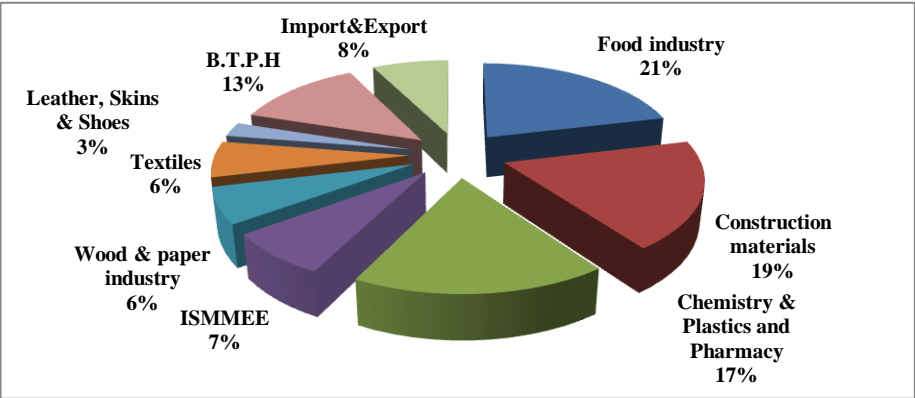
Followed by the statistical description of the data and the different variables, explained in the previous section, this paper consists of empirically testing our main hypothesis, by characterizing the performance of the 80 Oranian SMEs surveyed in terms of branches of activity. Our sample is presented as:

Table (1.): The 80 SMEs surveyed by sector of activity

Sector	Number of SMEs
Manufacturing industries (A.)	64
1. Food industry (A.A.)	17
2. Construction materials (A.B.)	15
3. Chemistry & Plastics and Pharmacy (A.C.)	14
4. ISMMEE (A.D.)	6
5. Wood & paper industry (A.E.)	5
6. Textiles (A.F.)	5
7. Leather, Skins & Shoes (A.G.)	2
B.T.P.H (B.)	10
Import&Export (C.)	6
Total	80

Source: Personal confection.

Figure (1.): The distribution of the 80 SMEs surveyed by sector of activity



Source: Personal confection.

Indeed, our analysis is based on the principle that we must elaborate and geometrically represent in a Euclidean space and of small size, the most diverse information recorded in our digital database with double entry, which, taking into account the size or complexity of the table representing our data, can't be synthesized. The fundamental purpose of this method is to provide all the digital data an image that allows at a glance, to quickly grasp all the elements presented, and highlight some essential facts.

This method makes it possible to group the initial indicators into a limited number of synthetic indicators called axis forming factors that structure the positioning of the individuals-sectors of activity in the space of the performance indicator variables. In addition to its role of synthesis, this method makes it possible to draw up a typology of the sectors of activity according to their resemblance on the basis of these factors.

3.1. The principle of P.C.A

Principal component analysis (PCA) consists of expressing a set of variables into a set of linear combinations of factors that are not correlated with

each other, these factors accounting for a decreasing fraction of the variability of the data.

This method makes it possible to represent the original data (individuals and variables) in a space of dimension less than the original space, while limiting as much as possible the loss of information. In fact, the representation of data in small spaces makes analysis much easier. Indeed, the principle of this method is to study the relationship between several variables that are nine in our case. For each Oran company (the statistical units), the indicators of value creation, productivity, debt and investment expenditure are determined.

3.2. Data and results

The data involved in our study are relative to quantitative variables, ratios calculated on the data of 80 SMEs of the wilaya of Oran, for the year [2008], of which 64 activating in the industrial sector and thus presenting the majority of the surveyed population, divided over seven (7) industrial sectors; Agribusiness, Chemical & Plastics and Pharmaceuticals, Textiles, Wood and Paper Industries, Leather, Skins & Shoes, ISMMEE, and Building Materials. So, 10 SMEs belonging to the sector (Buildings and public works "BTP"), and 6 activating in foreign trade "Import-export".

3.2.1. Applicability of P.C.A

With this in mind, it should be noted that, in order to carry out the analysis, the variables must be "factorizable", the variables having to be sufficiently correlated to be retained in the PCA. The matrix of correlations of the initial variables makes it possible to see if the analysis can be globally possible. Indeed, one of the conditions of implementation is that the initial variables are correlated, if not, the number of dimensions can't be reduced. We can only summarize what is partially redundant and linked. It is therefore necessary that a maximum of values of the matrix of the correlations is close to 1 in absolute

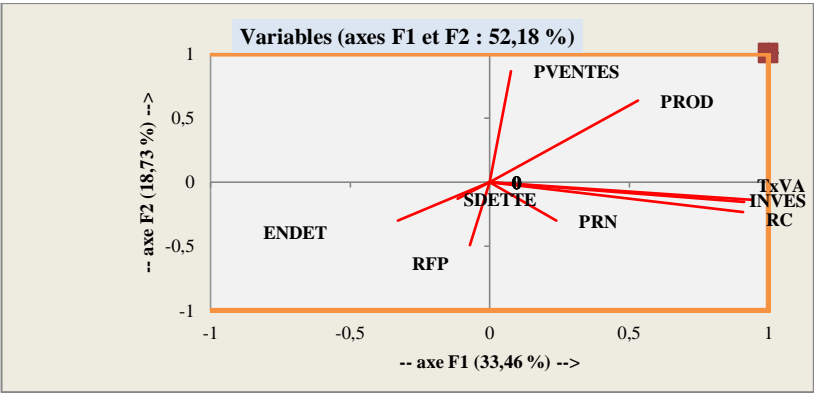
value.

3.2.2. Presentation and analysis of the variable points j of N (j) and the individual points i N (I)

The correlations (see figures below) between the factorial axes and the initial variables indicate the representation quality of the variable on the axis. The coordinates of the variables on each axis are equal to the correlations between the variables and the axes. The stronger the correlation between a variable and an axis (negative or positive), the closer the variable is to the axis. On the other hand, the position of the variables on the chart makes it possible to evaluate the quality of the representation of this variable with respect to the plan and no longer only with respect to an axis.

Figure (2.): Representation of the variable points j of N (j) in the factor space
(1, 2)

"The factorial design ($\tau_1 + \tau_2 = 52.18\%$)"



Source: From the table of factorial coordinates of the variable points of N (J).

The axes are interpreted from the most represented variables, those whose correlation is close to 1 in absolute value. This plan represents 52.18% of the explained variance. Thus, the productivity "PROD" does not seem very well represented by one axis or the other. However, it is better represented on the map

than the variable "TxVA" which seems closer to axis 1. This is because the variable "PROD" is correlated with both axis 1 and axis 2 while "Tx VA" is only with axis 1.

We can deduce that the Value Added Rate "TxVA", the Investment "INVES", and the Commercial Profitability "RC" are correlated with each other. The indebtedness "ENDET" and the structure of the debt "SDETTE" are thus correlated. In addition, PROD Productivity and ENDET Debt are negatively correlated.

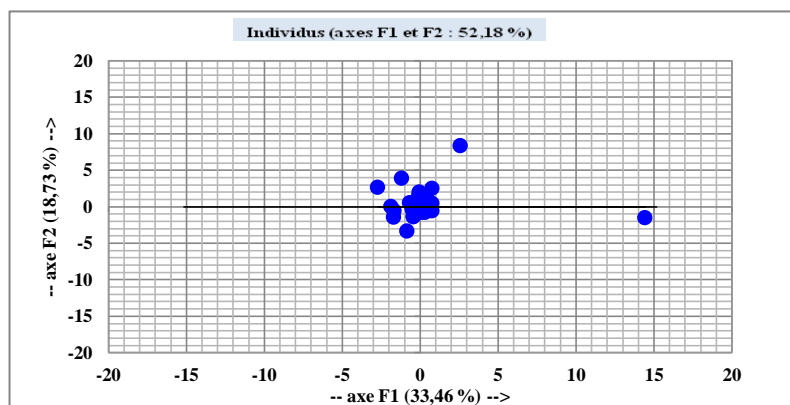
So, ENDET Debt and PRN Value Productivity are not correlated at all. Indeed, a return to the matrix of correlations confirms these interpretations almost to the extent that we study the main factorial plan (Axis 1 / Axis 2). For the other plans, the interpretations would be less obvious.

The main objective of the factor analysis is to include points in a small Euclidean space with respect to the original dimension (four dimensions in our study). The purpose of the graphical representation is to suggest, to enlighten, what the calculation does not make it possible to grasp, thus to locate the proximities between individuals according to their similarities of behavior with respect to the variables. In addition to the coordinates of each point-individual on the axes (called "principal components"), the programs edit the square cosines (or "relative contributions") which make it possible to evaluate the quality of the representation of the point compared to the other individuals. thus the "absolute contributions" which express the importance of each individual in the creation of the axes in relation to other individuals.

The correlation between the initial variables and the main components retained is represented by the variable map. According to the figure (above) relating to the principal plane (1,2), the first principal axis "1" is strongly

and positively correlated with 3 variables "TxVA, INVES, and RC", and negatively with 2 variables " ENDET, SDETTE ". The main axis "2" is strongly and positively correlated to 2 variables "PVENTES, PROD", and negatively to 3 variables "ENDET, SDETTE, and RFP". The individual points are represented in the factorial space considered as explanatory (four dimensions in our case). As for the variable points, one proceeds by projection on factorial planes. We considered the factorial plane constituted of the two first axes "factorial space (1, 2)":

Figure (3.): Representation of the individual points i of N (I) in the factor space (1, 2)



Source: From the table of coordinates of the individual points i of N (I).

The figure above represents the companies in the main factorial plan defined by the first two axes selected. The interpretation of proximities depends on the quality of representation. Indeed, this figure allows the detection of the most explanatory points, that is to say; the most representative SMEs; those which contribute the most to the inertia of the axis. This group is made up of 18 SMEs (ie 22.5% of the total), (4 of which belong to the food industry "or 23.5% of the totality of the branch", 5 to the sector of Construction Materials " almost 33% of the entire industry ", 2 in the Chemicals, Plastics & Pharmaceuticals sector" accounting for 14% of the entire industry ", while 1 in the Textiles sector" represents 20% of the SMEs surveyed in this sector ", 5 to Import-export "that is

almost 83%", and finally 1 to the BTPH sector "that is 10% of the totality of this sector"). In this context, it should be noted that it can be subdivided into two contradictory parts; "Performing companies (11)" and "non-performing companies (7), including six companies with losses".

4. Analyzes of results and conclusions

Thus, the quality of representation, measured by the square cosine of the angle that forms the projection of the initial vector in the plane (which must be close to 1), is very good for the companies "A.A.2. And A.A.5. As well as for some SMEs (such as "AA4.", "AA6.", "AB5.", "AB7.", "AB10.", "AB14.", "AB15." "AC1.", "AC3.", "AF1.", "B.9.", "C.2.", "C.3.", "C.4.", "C.5. . ", And "C.6. ").

The company "A.A.2. Seems strong in terms of TxVA, INVES, and RC, and average in terms of PVENTES, RFP, PROD, and PRN, and low in terms of ENDET, and SDETTE. It is strongly and positively related to Axis 1. Companies: "A.A.4." And "B.9. »Appear low in terms of TxVA, INVES, and RC, and average in terms of PROD and RFP, PVENTES, PRN, and strong in terms of ENDET, and SDETTE. These companies are strongly and negatively related to axis 1. Among other things, companies "A.C.3. "A.A.5.", "A.B.14. ", " C.2. ", " C.4. "C.5. And "C.6. That are strongly and positively related to axis 2, appear strong in terms of PVENTES, and PROD, averages in terms of TxVA, INVES, RC, and PRN, and they are low in terms of RFP, ENDET, and SDETTE.

4. Analyzes of results and conclusions

Thus, the quality of representation, measured by the square cosine of the angle that forms the projection of the initial vector in the plane (which must be close to 1), is very good for the companies "A.A.2. And A.A.5. As well as for some SMEs (such as "AA4.", "AA6.", "AB5.", "AB7.", "AB10.", "AB14.",

"AB15." "AC1.", "AC3.", "AF1.", "B.9.", "C.2.", "C.3.", "C.4.", "C.5. . ", And "C.6. ").

The company "A.A.2. Seems strong in terms of TxVA, INVES, and RC, and average in terms of PVENTES, RFP, PROD, and PRN, and low in terms of ENDET, and SDETTE. It is strongly and positively related to Axis 1. Companies: "A.A.4." And "B.9. »Appear low in terms of TxVA, INVES, and RC, and average in terms of PROD and RFP, PVENTES, PRN, and strong in terms of ENDET, and SDETTE. These companies are strongly and negatively related to axis 1. Among other things, companies "A.C.3. "A.A.5.", "A.B.14. ", " C.2. ", "C.4. "C.5. And "C.6. That are strongly and positively related to axis 2, appear strong in terms of PVENTES, and PROD, averages in terms of TxVA, INVES, RC, and PRN, and they are low in terms of RFP, ENDET, and SDETTE. Thus, the companies "A.C.1. "A.B.5. "A.B.7. "A.B.10. And "C.3. Which are strongly and negatively related to axis 2, appear strong in terms of RFP, ENDET, and SDETTE, averages in terms of TxVA, INVES, RC, and PRN, and low in terms of PROD and PVENTES. The company "A.A.6. Is strongly and negatively correlated with both Axis 1 and 2, and appears strong in terms of ENDET, and SDETTE, average in terms of PVENTES and PRN, and low in terms of PROD, TxVA, INVES and RC. . The company "A.F.1. Is correlated both with the two axes, positively with the axis 2 and negatively with the axis 1, and seems strong in terms of PVENTES, low in terms of TxVA, INVES, RC, and PRN, and average in terms of PROD, ENDET, SDETTE, and RFP.

In addition, companies with very small cosines (48 SMEs, or 60%) (9 of which belong to Agribusiness "accounting for almost 53% of the entire industry", 8 in the Building Materials sector " accounting for almost 54% of the entire industry ", 10 in the Chemicals, Plastics & Pharmaceuticals sector" accounting for almost 72% of the entire industry ", and 6 in the ISMMEE sector" all (100%) ", 4 in the Wood & Paper sector "80% of the total", then 4 in the

Textiles sector "ie 80% of SMEs surveyed in this sector", a "1" company in the Leather, Skins & Shoes sector "ie 50%" , and a "1" to Import-export "that is 17%", and finally 7 to the BTPH sector "that is 70% of the totality of this sector").

In fact, these companies are: ("AA1.", "AA3.", "AA7.", "AA8.", "AA9.", "AA10.", "AA11." "AA15.", "AA17.", "AB1.", "AB2.", "AB3.", "AB4.", "AB8.", "AB9.", "AB 12. ", " AB13. ", " AC2. ", " AC4. ", " AC5 ", " AC6. ", " AC7. ", " AC9. ", " AC10. " , "AC11.", "AC13.", "AC14.", "AD1.", "AD2.", "AD3.", "AD4.", "AD5.", " AD6, AE1, AE3, AF2, AF3, AF4, AF5, AG1, B. 1. ", " B.2. ", " B.3. ", " B.4. ", " B.5. ", " B.6. ", " B.8. ", And" C. 1. "). The graphical representation shows a very clear grouping of these companies which are at the center of gravity, and can be considered as weak points. This group can be subdivided into three parts; "Weak enterprises (33)", "loss-making (9)", and "other failing (6)".

The remaining SMEs can be considered as average points composed of 14 SMEs and which are thus close to the center of gravity, representing 17.5% of the total number, (4 of which belong to the food sector, ie almost 23.5%). of the entire industry ", 2 belong to the Building Materials sector" accounting for almost 13.33% of the entire industry ", 2 in the Chemicals, Plastics & Pharmaceuticals sector" accounting for almost 14% of the entire industry. », 3 in the Wood & Paper sector« that is 60% of the total », then, a« 1 »company belonging to the sector Leather, Skins & Shoes« is 50% », and finally 7 to the sector BTPH« that is 70% of the whole of this sector "). These companies are: "A.A.12. ", A.A.13. "A.A.14. "A.A.16. ", " B.7. ", " B.10. ". They are, in fact, linked to both axis 1 and axis 2. Thus, firms "A.B.6. "A.B.11. "A.C.8. "A.E.2. "A.E.4. "And" A.E.5. "A.G.2. Which are strongly and negatively related to axis 2. Among others, "A.C.12. Is positively related to axis 1. The surveyed population can be divided into three groups. In fact, the first group includes 55 SMEs, ie the majority of the surveyed population, thus presenting

68.75% for the year 2008. It can be subdivided into three subgroups characterized as follows:

- The first includes 34 weak companies in terms of performance. They are characterized by low financial profitability "RFP", low commercial profitability, an average value added rate, and a very high debt ratio that exceeds 70% for the majority. These companies in Oran are not yet able to significantly improve their productive value, financial and technical;
- The second consists of 15 loss-making companies with net loss-making results, as well as productivities, productivities of value, and negative commercial profitability. These companies are: "A.A.3. "A.A.10", "A.B.4. "A.B.8. ", A.B.13. "A.C.10. ", A.C.13. ", A.D.2. ", " A.F.1 ", " B.6. And "C.6. As well as the companies "A.A.4. "A.A.6. ", " B.9. "And" A.C.1. Which have seen very large losses in terms of sales productivities and value-added rates, with net results and negative added values. Their main characteristic is to have negative total shareholders' equity expressed by accumulated losses in previous years;
- Finally, the third is composed of 6 companies that can be considered as failing: "A.A.8. "A.C.4. ", " A.C.5 ", " A.C.6. ", " B.5. "And" B.8. ", Which did not carry out any activity by declaring defective accounting documents for the 2008 financial year.

"The SMEs of the wilaya of Oran surveyed therefore have the same characteristics at the level of the same sector of activity", because they are subject to the same institutional obstacles and environmental problems thus limiting the promotion of their performance, and the achievement of a continuous competitiveness. As a result, they are struggling to survive in order to improve their value, financial and technical productivities. They have a dual challenge from the outset, that of evolving in a still unstable local environment due to the unfinished economic transition, and having to find a place in a now global environment. Thus, several local stakeholders attribute this situation to the lack of knowledge of the factors that determine the competitiveness and performance of

these companies. This leads to a misreading of their difficulties and an overlap of measures for SMEs.

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