ABSTRACT

The present article discusses and utilizes an experimental design that applies SPPS in a lineal regression in which competitiveness represents the dependent variable and technology, commercialization, and exports are the independent variables. The experimental design is consisted in analyzing the variables running through a “Godness of Fitness”, to one another and compared to the dependent variable. Thus, the model allows for analyzing the correlation levels of each variable adjusted to the Godness of Fitness.

Keywords: Competitiveness, Spss, Experimental Design, lineal Regression, Goodness of Fitness.

RESUMEN

El presente artículo discute y utiliza un diseño experimental que aplica SPPS en una regresión lineal en la que la competitividad representa la variable dependiente y la tecnología, la comercialización y las exportaciones son las variables independientes. El diseño experimental consiste en analizar las variables que se ejecutan a través de una “Godness of Fitness”, entre sí y en comparación con la variable dependiente. Por lo tanto, el modelo permite analizar los niveles de correlación de cada variable ajustada a Godness of Fitness.

Palabras clave: Competitividad, Spss, diseño experimental, regresión lineal, bondad de la aptitud.

INTRODUCTION

The conceptual term of competitiveness was firstly established in the 16th century according to the theories of international trade based upon the several comparisions among the countries. The theorical framework was introduced by 17th Century over the coming to international trade by that time, competitive advantages covered the richness produced by a given country based upon the economic factors of production, namely, labor, capital and land. Up to now the literature review on competitiveness touches regional
development that covers the environmental agenda nowadays. Thus, the current definition of competitiveness is defined as the global economic objective that touches on the social, environmental, political and institutional traits to make up for the sustainable development (Patricia Rojas, Sergio Sepúlveda, 1999).

According to Cuervo (1993), Fernández (1993), Salas (1993), and Galán and Vecino (1997), the competitiveness is conformed by:

   a) Macroeconomics: Correlations among the economic issues that affect the competitiveness of firms, such as exports, interest rates, exchange rates, inflation, employment, and supply and demand of the economy.

   b) Free Market: Best known as open market, out of monopolies that affect the competitiveness of firms, such as supply and demand, commerce of goods and services in a competitive market.

   a) Entrepreneurship: Also known as the competitiveness of firms as a result of their inner organizations and productivity, cutting edge technology and some other cultural features.

Michael Porter defines competitiveness as added value that is produced per labor unit. This conceptualization refers to firms where added value is produced in a given market. Thus, from a macroeconomics approach the national diamond is referred to as the production factors that determine the national competitiveness. This diamond is drafted up by Porter as follows:

**Figure 1.** The figure is taken by Porter (1990), establishing four factors that determine the level of competitiveness of a given firm.

The figure is taken by Porter (1990), establishing four factors that determine the level of competitiveness of a given firm; and acquire new technologies that allow for export competitiveness.

   b) Demand conditions: Domestic demand as percentage of gross domestic product to guarantee a constant inflow – outflow of
c) production and consumption in the economy.

d) Strategy, structure and rivalry of firms: The productive structures is made up by firms in several sizes, that means, free market is conducted by free participation of firms into the market.

e) Supporting conditions: Entrepreneurship as a function of institutions, cultural traits, and cutting edge technology.

Thus, competitiveness is divided by three categories

a) Macroeconomics: Exports that gear up the world competitiveness of a given country

b) Mesoeconomics: Group cooperations at local levels, contributing to sustainable demand and supply in every single economic sector, through stockholders, traders, producers, households, governments, firms and brokers

c) Microeconomics: Economic growth rises up due to technology which is added up for competitiveness improve, translated into better capacities for the firms, organizations skills and entrepreneurship and know how, generally speaking

As a primary objective, the presente article is intended to probe Porter’ s Model, competitiveness as a function of Technology, Exports and Trade.

As secondary objective, it was run three lineal regressions in SPSS in order to prove Porter’s Model, reaching put for the best goodness of fitness.

**METHODS**

The methods applied to competitiveness measure exports, trade, and technology. The last three variables are independent. The linear regression approaches use SPSS to explain proportional relations, covariances matrix, descriptive analysis and distribution diagrams. The lineal regression allows us to establish the correlation among the variables in a given equation. It is also a known as multiple regression whe it comes multiple variables that explain a single one.

In order to measure competitiveness, this work explains in a multiple regression analysis, the goodness of fitness in experimental designs. Thus, that means how near are the events from a regression line, which is known as goodness of fitness.

The methodology used a correlation matrix with all of the variables, the independent and the dependent variables, giving a a result R2 equal 0.27. which shows in what way the dependent variable is explained by the independent variables.

In order to do an analysis of experimental designs, it was necessary to run a second lineal regression with no all independent variables as in the first regression. Thus, technology is set out of the model, so that comercialization and exports determine competitiveness. A third one regression was to explain how competitiveness is explained by technology only.

In the model number 1, it is showed that there are some residuals presenting homostedasticity due that the residual are equally distribuited all along the goodness of fitness.
The composition of the variables are: competitiveness, which is defined as the quantity of dollars as a result of a sustainable economic growth, technology, defines as the capacity of innovation of firms in the production process, commercialization, defined as the number of transactions inside or outside a given region. Finally, the exports, defined as those transactions to the rest of the region.

It is important to point out that for the purpose of this paper, the commercialization will be the transactions made inside the region between the firms and exports outside the region. Thus, there will be a downgrade relationship between commercialization and exports, as shows in SPSS.

The number of events are the several firms located at the agroindustrial mennonite community of Cuauhtémoc, Chihuahua, Mexico. The number of firms were 303, in the economic sectors of cooper, woodens, commodities, groceries and milky products.

**RESULTS**

Competitiveness of the variables (commercialization, technology and exports).

### Regression

|                          | Mean    | Std. Deviation | N  |
|--------------------------|---------|----------------|----|
| Competitividad\_dollspordia | 16657.89 | 8749.085       | 303|
| Tecnología\_indice       | 30.34   | 14.653         | 303|
| Comercialización\_numtransaccpordia | 763.33   | 843.836       | 303|
| numdeExportacionespordia | 30.34   | 14.653         | 303|

The first regression shows that the average of firms to produce monthly incomes of US 16,657 with a standard deviation of US 8,749. In other words, the firms export 30 units per month and trade 763 units. Thus, most of the units are merchandise in the same region, namely, the agroindustrial community.

### Correlations

|                       | Competitividad\_dollspordia | Tecnología\_indice | Comercialización\_numtransaccpordia | numdeExportacionespordia |
|-----------------------|-----------------------------|-------------------|-------------------------------------|--------------------------|

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The regression of matrix show a proportional upgrade relationship between commercialization and technology, and the commercialization and exports.

The level of which the dependent variable is explained by the independent variable (competitiveness), in this case R2, and the Durbin Watson is explained by the proportion of variables that come out of the model and they try to explain how far the tendencies are far away from the goodness of fitness. The frequency distribution of competitiveness is 0.997.
The scatter plots are the residuals and are known as those data outside the goodness of fitness, showing in what way the exportes deviate from the goodness of fitness.
Competitiveness measured by commercialization and exports.

Regression

| Descriptive Statistics | Mean       | Std. Deviation | N  |
|------------------------|------------|----------------|----|
| Competitividadspordía  | 16657.89   | 8749.085       | 303|
| Comercializaciónspordía| 763.33     | 843.836        | 303|
| numdeExportacionespordía| 30.34     | 14.653         | 303|

The data shows that descriptive data shows that in a second run, setting out the variable of technology, under the same number of data N, and a standard deviation of sales in dollars (Competitiveness) by 8749, out of 843, which represents the inner trade on that region and barely 14 number of exports.

Correlations

|                  | competitividadspordía | comercializaciónspordía | numdeExportacionespordía |
|------------------|------------------------|-------------------------|--------------------------|
| Pearson Correlation |                        |                         |                          |
| Comercializaciónspordía | 1.000                 | -.086                   | -.160                    |
| Comercializaciónnumtransaccordia | -.086                  | 1.000                   | .314                     |
| numdeExportacionespordía | -.160                 | .314                    | 1.000                    |
| Sig. (1-tailed)   |                        |                         |                          |
| Comercializaciónspordía | .                     | .067                    | .003                     |
| Comercializaciónnumtransaccordia | .067                  | .                       | .000                     |
| numdeExportacionespordía | .003                 | .000                    | .                        |
| N                 |                        |                         |                          |
| Competitividadspordía | 303                   | 303                     | 303                      |
| Comercializaciónspordía | 303                   | 303                     | 303                      |
| numdeExportacionespordía | 303                 | 303                     | 303                      |
The correlations features portrays direct relationships between the commercialization and the number of exports which is barely 0.314. Thus, there is no relationship at all between these two variables, so, in that term, seemingly and as the case might be, some products are domestic trade and some others are out of town, turning into exports.

| Model | numdeExportacionespordia | comercializaciónnumtransaccpordia |
|-------|--------------------------|----------------------------------|
| 1     | Correlations             | 1.000                            | -.314                           |
|       | Comercializaciónnumtransaccpordia | -.314          | 1.000                           |
|       | Covariances              | 1282.668                          | -6.997                          |
|       | Comercializaciónnumtransaccpordia | -6.997   | .387                           |

a. Dependent Variable: competitividadd1lspordia
The frequency distribution by firm fits into a normal distribution with standard deviation of 0.997. As observed, the residual scatterplots found a linear regression and exports tendencies are as expected.

![Normal P-P Plot of Regression Standardized Residual](image)

**Competitiveness and Technology**

**Regression**

|                      | Mean       | Std. Deviation | N  |
|----------------------|------------|----------------|----|
| competitividaddispordía | 16657.89   | 8749.085       | 303|
| tecnologíaindice      | 30.34      | 14.653         | 303|

The last but not least important regression is to show monthly incomes by 16657 dollars, averaging a gap of 8749 dollars, which is, de desviación estándar. Thus, firms are expected to export 30 units per month and traded at home 36 units, and so that most of the merchandise are traded innerly all along the domestic producers, vendors and salers.
### Correlations

|                  | competitividaddillspordía | tecnologiaindice |
|------------------|---------------------------|-----------------|
| Pearson Correlation | Competitividaddillspordía | 1.000 | -.160 |
|                  | Tecnologiaindice           | -.160 | 1.000 |
| Sig. (1-tailed)   | Competitividaddillspordía | .    | .003 |
|                  | Tecnologiaindice           | .003 | .    |
| N                 | Competitividaddillspordía | 303 | 303 |
|                  | Tecnologiaindice           | 303 | 303 |

The frequency distribution has a standard deviation that equals the latter run and it is observed an slightly distribution towards minus cero.

![Normal P-P Plot of Regression Standardized Residual](image)

Dependent Variable: competitividaddillspordía

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36
The scatter plot funnel is merely concentrated towards the godness of fitness, which is the best one model that perfectly explains the theory of competitiveness between two variables.
CONCLUSIONS

The three models are adjusted to the godness of fitness. Thus, three models could explain the Porter’s theory in terms of competitiveness of agribusiness sectors depending on exports, technology use, and commercialization.

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