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Journal-Public Economy

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Support the international scientific community in its written production Science, Technology and Innovation in the Field of Social Sciences, in Subdisciplines of Structure and scope of government; Taxation, Subsidies, and Revenue: Efficiency, Optimal taxation, Incidence, Externalities redistributive effects, Environmental taxes and subsidies, Personal income and other Nonbusiness Taxes and subsidies, Business taxes and subsidies, Tax evasion; Fiscal policies and behavior of Economic Agents: Household, Firm; Publicly provided goods: Public goods, Publicly provided private goods, Project evaluation, Social discount rate; National government expenditures and related policies: Government expenditures and health, Government expenditures and education, Government expenditures and welfare programs, Infrastructures, Social security and public pensions, National security and war, Procurement; National budget, Deficit, and Debt: Budget, Budget systems, Deficit, Surplus, Debt, Debt management; State and local government; Intergovernmental relations: State and local taxation, Subsidies, and Revenue, State and Local budget and expenditures, Interjurisdictional Differentials and their effects, State and Local Borrowing, Intergovernmental relations, Federalism; Miscellaneous issues: Governmental loans and credits, Governmental property, International fiscal issues.

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RINOE Journal-Public Economy is a Journal edited by RINOE® in its Holding with repository in Taiwan, is a scientific publication arbitrated and indexed with semester periods. It supports a wide range of contents that are evaluated by academic peers by the Double-Blind method, around subjects related to the theory and practice of Structure and scope of government; Taxation, Subsidies, and Revenue: Efficiency, Optimal taxation, Incidence, Externalities redistributive effects, Environmental taxes and subsidies, Personal income and other Nonbusiness Taxes and subsidies, Business taxes and subsidies, Tax evasion; Fiscal policies and behavior of Economic Agents: Household, Firm; Publicly provided goods: Public goods, Publicly provided private goods, Project evaluation, Social discount rate; National government expenditures and related policies: Government expenditures and health, Government expenditures and education, Government expenditures and welfare programs, Infrastructures, Social security and public pensions, National security and war, Procurement; National budget, Deficit, and Debt: Budget, Budget systems, Deficit, Surplus, Debt, Debt management; State and local government; Intergovernmental relations: State and local taxation, Subsidies, and Revenue, State and Local budget and expenditures, Interjurisdictional Differentials and their effects, State and Local Borrowing, Intergovernmental relations, Federalism; Miscellaneous issues: Governmental loans and credits, Governmental property, International fiscal issues with diverse approaches and perspectives, That contribute to the diffusion of the development of Science Technology and Innovation that allow the arguments related to the decision making and influence in the formulation of international policies in the Field of Social Sciences. The editorial horizon of RINOE® extends beyond the academy and integrates other segments of research and analysis outside the scope, as long as they meet the requirements of rigorous argumentative and scientific, as well as addressing issues of general and current interest of the International Scientific Society.

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The works must be unpublished and refer to topics of Structure and scope of government; Taxation, Subsidies, and Revenue: Efficiency, Optimal taxation, Incidence, Externalities redistributive effects, Environmental taxes and subsidies, Personal income and other Nonbusiness Taxes and subsidies, Business taxes and subsidies, Tax evasion; Fiscal policies and behavior of Economic Agents: Household, Firm; Publicly provided goods: Public goods, Publicly provided private goods, Project evaluation, Social discount rate; National government expenditures and related policies: Government expenditures and health, Government expenditures and education, Government expenditures and welfare programs, Infrastructures, Social security and public pensions, National security and war, Procurement.

National budget, Deficit, and Debt: Budget, Budget systems, Deficit, Surplus, Debt, Debt management; State and local government; Intergovernmental relations: State and local taxation, Subsidies, and Revenue, State and Local budget and expenditures, Interjurisdictional Differentials and their effects, State and Local Borrowing, Intergovernmental relations, Federalism; Miscellaneous issues: Governmental loans and credits, Governmental property, International fiscal issues and other topics related to Social Sciences.

Presentation of the content

In the first article we present, *Dichotomous representation of fractal recursivity*, by RAMOS-ESCAMILLA, María, with adscription in the RINOE-Mexico; in the next article we present, *Diagnosis of quality in the production process of industrial warehouses in the Grecon company*, by ORTIZ-SANTAMARÍA, Alberto, GÓMEZ-GONZÁLEZ, María Concepción, CÉSAR-MAULEÓN, María Guadalupe and MORALES-TORIBIO, Leticia, with adscription in the Universidad Tecnológica de Nezahualcóyotl, in the next article we present, *Perception of educational inclusion of students in higher education institutions in the Comarca Lagunera*, by CARRILLO-ROBLES, Diana, ORTÍZ-FAUDOA, María Argentina, VALENCIA-GARCÍA, Julieta and MATA-ORTIZ, Gerardo Edgar, with adscription in the Universidad Tecnológica de Torreón, in the last article we present, *Collaborative processes as one of the factors to drive innovation in rubber and plastic manufacturing SMEs in Mexico*, by AMADO-SÁNCHEZ, Beatriz, WENCES-DÍAZ, Martha Fabiola, VELAZQUEZ-SANTANA, Cesar Eugenio and PICO-GONZÁLEZ, Beatriz, with adscription in the Universidad Popular Autónoma del Estado de Puebla.

Content

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Dichotomous representation of fractal recursivity

Representación dicotómica de la recursividad fractal

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Abstract

Fractals connect immediately with chaos theory and dynamical systems and this brings us very quickly closer to a more harmonious and integral understanding of reality than the geometry used at the time, based on rectangles, circles, triangles, ellipses, this new geometry describes sinuous curves, spirals and filaments that twist on themselves giving elaborate figures whose details are lost in the infinite. In fact we can understand fractal geometry as the geometry of nature, of chaos and order, with forms and sequences that are locally unpredictable, but globally ordered, hence the importance of "intermittency" and "attractors" as information inherent in "iteration".

Fractal, Chaotic, Recursive

Resumen

Los fractales conectan de inmediato con la teoría del caos y a los sistemas dinámicos y esto nos acerca muy rápido a una comprensión un poco más armónica e integral de la realidad al contrario que la geometría utilizada entonces , basada en rectángulos, círculos, triángulos, elipses,esta nueva geometría describe sinuosas curvas, espirales y filamentos que se retuercen sobre sí mismos dando elaboradas figuras cuyos detalles se pierden en el infinito.De hecho podemos entender la geometría fractal como la geometría de la naturaleza, del caos y del orden, con formas y secuencias que son localmente impredecibles, pero globalmente ordenadas por ello la importancia de la “intermitencia” y los “atractores” como información inherente a la “iteración”.

Fractal, Caótico, Recursivo

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† Researcher contributing as first author.

Introduction

Fractals are geometric structures that combine irregularity and structure, although many natural structures have fractal-like structures. A mathematical fractal is an object that has at least one of the following characteristics: it has detail on arbitrarily large or small scales, it is too irregular to be described in traditional geometric terms, it has exact or statistical self-similarity, its Hausdorff-Besicovitch dimension is greater than its topological dimension, or it is recursively defined.

Fractal forms, the forms in which the parts resemble the whole, are present in the economic matter, together with symmetries (the basic forms of trends need only half the information of the prices on the market) and spirals (the forms of growth and development of the basic form towards the occupation of a larger space), i.e. they enable catastrophes (extraordinary events) that give rise to new, more complex realities.

But fractal forms (from this intuitive conception) are not only present in the spatial forms of objects but are also observed in the evolutionary dynamics of complex systems, which consist of cycles (in which, starting from a simple established reality, they end up creating a new, more complex reality) which in turn form part of more complex cycles which in turn form part of the development of the dynamics of another great cycle, and the dynamic evolutions of all these cycles present the similarities typical of chaotic systems.

Fractal creation

We start with the Fractal Matrix:

We start with the Fractal Matrix:

$$\text{North: } 108° \rightarrow 90° - \int_{e}^{N} \frac{ne}{d(NE)}$$

$$\text{South: } 270° \rightarrow 180° - \int_{S}^{e} \frac{es}{d(ES)}$$

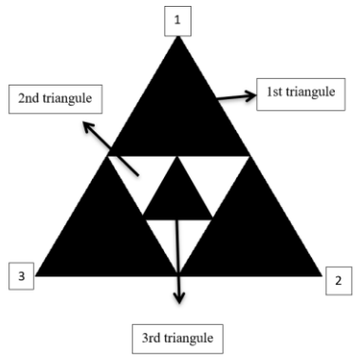
$$\text{East: } 360° \rightarrow 270° - \int_{S}^{O} \frac{os}{d(OS)}$$

$$\text{West: } 90° \rightarrow 360° - \int_{O}^{N} \frac{NO}{d(NO)}$$

By entering the Fractal Pivot, we get:

$$f(PV) = \int_{\lim d\frac{(ne\ es\ os\ no)}{(NE\ ES\ OS\ NO)}}^{\lim (180°-90°,270°-180°,360°-270°,90°-360°)} \frac{}{1(PV)} pv, \qquad (1)$$

The prototype of R3 can be the following Fractal:



$Rr = (F) \int_3^7 \frac{d}{d'''}$

Actual part (R) =3

Imaginary part (I)=7

Hamiltonian:

$$f(PV) = \overline{H} \begin{vmatrix} \frac{d(180°\rightarrow 90)}{d\frac{ne}{NE}} & \frac{d(270°-180°)}{d\frac{es}{ES}} & \frac{d(360°-270°)}{d\frac{os}{OS}} & \frac{d(90°-360°)}{d\frac{no}{NO}} \\ \frac{1}{x} & \frac{1}{y} & \frac{1}{z} & \frac{1}{\alpha} \end{vmatrix} \qquad (2)$$

We derive the level of fractal recursion for the finitesimal body:

$$\overline{RH}\ degree1 = \left[\frac{\frac{\partial d(90°)}{d^{II} ne(-NE)'} \frac{\partial d(90°)}{d\ es(-ES)'} \frac{\partial d(90°)}{d\ os(-OS)'} \frac{\partial d(270°)}{d\ no(-NO)}}{\frac{1(x,y,z)}{\alpha-1}} \right]$$

$$\overline{RH}\ degree2 = \left[\frac{\partial d(90°)^{III}}{\frac{d^{IV} ne\rightarrow es\rightarrow os\rightarrow no}{1-1\int(x,y,z)}} \right] \left[\frac{207°}{no} \right] \left[\frac{\log(PV)}{lm\ (pv)} \right]$$

$$\overline{RH}\ degree3 = \frac{\partial d3-1[\log 90°]}{\frac{1}{d(\alpha)} \int \frac{ne\rightarrow es\rightarrow os}{(x,y,z)}}\ d(\alpha) \left\{ \frac{ne-207°}{anti\log \frac{PV}{pv}} \right\}$$

$$\overline{RH}\ degree4 \int \left[\frac{1(ne,es,os)}{d\left(\frac{1}{\alpha}\right)} \right] \frac{-90°}{d(\alpha)} + \frac{\log(PV)-lm\ (pv)}{no-\ 270°}$$

The rescaled range would be the perfect sphere:

We determine the finite walk:

$$\propto_g = \frac{\beta(X),\beta_1(X^{n+1})}{\beta_2(X^{n-1})} \int_{\lim \beta_2\ (n-1)^{\lambda}}^{\lim \beta_1\ (n+1)^{\lambda}} \left[\frac{(n+1)}{n-1}\right]^{1/2} + \left\{\frac{1}{2}\right\} \frac{\beta_1+\beta_2+\beta_n}{\beta_n-\beta_2-\beta_1} \left[\frac{\propto_y}{\propto_{-g}}\right]^{1/2} + \frac{d}{dx} \ldots\ldots\ldots\ldots\ldots \propto^{+} \qquad (3)$$

We integrate the fractal recursion level for the infinite body:

$$\int \frac{\frac{ne}{-es} + \frac{os}{-\alpha}}{1} + \frac{90°-\alpha}{\frac{d}{x-1}} = \frac{\log(PV)-lm\ (pv)}{no-\ 270°}$$

$$= \int \frac{\frac{ne+\alpha}{-es+os}}{1} + \frac{\frac{90°\alpha}{x-1}}{\alpha} + \frac{270°}{\frac{\log(PV)}{lm\ (pv)}}$$

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$$= \int \frac{\frac{-ne}{es}\left(\frac{\alpha}{os}\right)}{1} - \frac{\alpha^{x+1}}{\frac{90°}{dx}} - \frac{anti\log PV - pv}{270°}$$

$$= \int \frac{\frac{no}{es} - \frac{os}{-\alpha} - \frac{1}{x}}{\frac{\alpha^{x-1}}{d(x)}} - \frac{PV - pv}{anti\log(270°)}$$

$$= \int \frac{-\alpha - anti\log x}{\frac{ne}{es} + \frac{os}{-\alpha}} + \frac{d\left(PV\frac{-\partial}{pv}\right)}{\partial(270°)}\left[\frac{1}{x}\right]$$

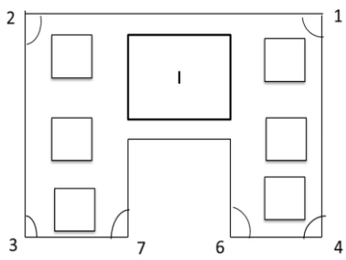
$$= \left[\frac{\frac{1}{x}}{\frac{\frac{ne}{es}}{\frac{os}{-\alpha}}}\right]\left[\frac{\frac{PV}{pv}}{\frac{anti\log}{\frac{270°}{x}}}\right] = \left[\frac{\frac{anti\log}{ne}}{\frac{es}{os}} \frac{\left[\frac{1}{-x}\right]}{270°+x}\right]$$

$$= \frac{\log ne}{\mathrm{lm}\ es - \mathrm{lm}\ (es)} - \frac{270°}{\frac{1}{x}}$$

$$= \frac{\mathrm{anti}\log ne - es + os}{270° - x}$$

$$= \frac{ne - es + os}{270°} = \alpha$$

And we return to R3 with limits in Ln-4, represented as follows:



$Rr = (F)\int_6^7 \frac{d}{d^{VI}}$

The gaps are worth 1/2

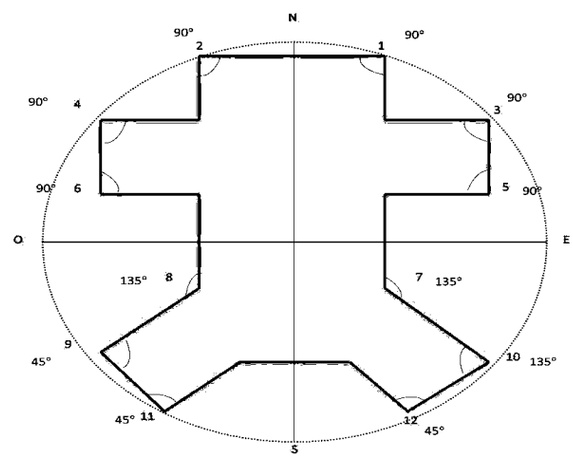
Real=6

Imagi=7

We determine the Infinite Walk:

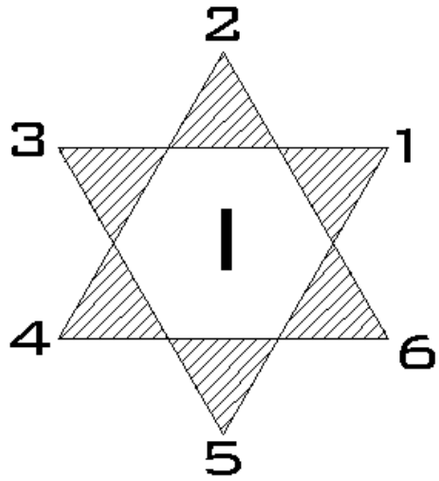
$$\propto_{-g} = \frac{n_1(\lambda).n_1(\lambda^{n+1-\propto})}{n_2(\lambda^{n-1+\alpha})} \int_{\lim n_2(n-1)^{\lambda}}^{\lim n_1(n+1)^{\lambda-1}} \left[\frac{n+1}{\lambda}\ \frac{\lambda}{n-1}\right] + \frac{1/2}{1/\lambda} = \frac{\beta_{0\ldots\beta_n}}{\propto_g + \propto_g} + \frac{d}{dx} \ldots \propto^{-} \quad (4)$$

We represent the complete fractal structure:



We dimension your fractal network:

$$\int \left[\frac{\rightarrow 90°}{\lambda - E(N)}\right] + \left[\frac{2 \rightarrow 90°}{\lambda - N(0)}\right] + \left[\frac{3 \rightarrow 90°}{\lambda - E(N)}\right] + \left[\frac{4 \rightarrow 90°}{\lambda - N(0)}\right] + \left[\frac{5 \rightarrow 90°}{\lambda - E(N)}\right] + \left[\frac{6 \rightarrow 90°}{\lambda - N(0)}\right] + \left[\frac{7 \rightarrow 135°}{\lambda - S(E)}\right] + \left[\frac{8 \rightarrow 135°}{\lambda - 0(S)}\right] + \left[\frac{9 \rightarrow 90°}{\lambda - 0(S)}\right] + \left[\frac{10 \rightarrow 45°}{\lambda - S(E)}\right] + \left[\frac{11 \rightarrow 45°}{\lambda - 0(S)}\right] + \left[\frac{12 \rightarrow 45°}{\lambda - S(E)}\right] + \frac{d}{d\propto} \quad (5)$$



We obtain the Chaotic fractal - which contains an imaginary part:

R=6

I= 1

*HB with Brownian$\frac{1}{2}$

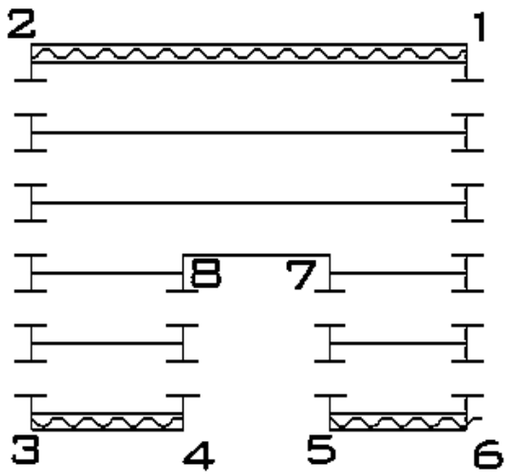
$Rr = (f)\int_1^6 \frac{d}{d}$

Fractional fractal network:

$$\boldsymbol{f} = \left\{\frac{1 \leftrightarrow (90°)^{IV}}{\lambda - \left[\frac{E^{\mathrm{m}}}{6}\right]} + \frac{7 \leftrightarrow (135°)^{II}}{\left[\frac{E}{0(2)}\right]} + \frac{9 \leftrightarrow (45°)^{IV}}{\lambda - \left[\frac{0^{\mathrm{n}}}{E^{\mathrm{n}}(4)}\right]}\right\} \frac{\boldsymbol{d}}{\boldsymbol{d}\propto} \quad (6)$$

And we obtain the dichotomous ranges from 1 to 0 in their real part:
R=8

I= 3 * Imaginary are all the unbroken lines



* It is fractal.

$$Rr = (f)\int_3^8 \frac{d}{d''}$$

We implement the Fourier scaling with Fresnel scheme for ln-4:

$$f = \frac{\frac{\overset{\rightarrow 1}{d(90°)}}{\overset{\rightarrow 7}{d(135°)}}\frac{\overset{\rightarrow 9}{}}{d(45°)}}{1/\lambda} \left[\frac{E^{IV}+0^{II}}{6\,[0(2)][E^{II}(4)]}\right] + \frac{d}{d\propto}$$

$$f = \frac{\frac{\overset{\rightarrow 1}{d\,(1)}}{\overset{\rightarrow 7}{d(1)}}\frac{\overset{\rightarrow 9}{}}{d(1)}}{1/\lambda} \left[\frac{E^{IV}-E^{II}(4)+0^{II}}{12\,(0)}\right] + \frac{d}{d\propto}$$

$$f = \frac{\frac{\overset{1\rightarrow 7\rightarrow 9}{}}{d'''(3)}}{1/\lambda} \left[\frac{4(E^{II}+0^{II})}{\frac{12}{-0}}\right] + \frac{d}{d\propto}$$

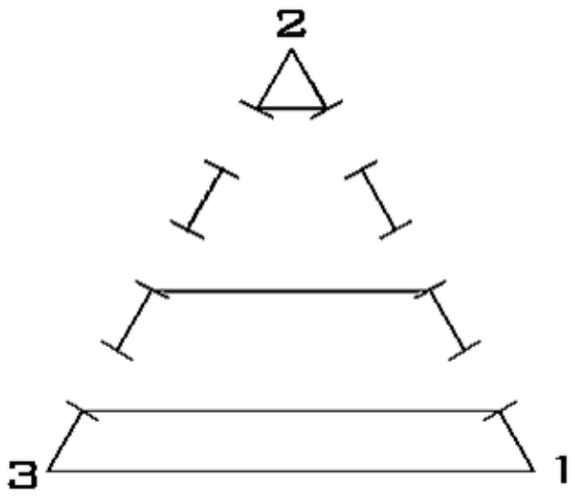
$$f = \frac{1\rightarrow 7\rightarrow 9}{\frac{3}{-d'''}} \left[\frac{4(E\rightarrow 0)^{IV}}{\frac{\frac{12}{-0}}{\frac{1}{\lambda}}}\right] + \frac{d}{d\alpha}$$

$$f = \frac{\left[\left(\frac{1\rightarrow 7\rightarrow 9}{3(4)+\left[\frac{E\rightarrow 0}{-0}\right]}\right)\frac{IV}{\frac{1}{\lambda}}.|d'''|\right]}{-12} + \frac{d}{d\alpha}$$

$$f = \frac{1\rightarrow 7\rightarrow 9}{\frac{(12)+E}{-12}}\frac{\frac{IV}{1}(d'')}{\lambda} + \frac{d}{d\alpha}$$

$$f = \frac{1+1+1}{12+E+12}\left(\frac{\frac{IV}{1}}{\lambda}\right)\frac{(3)}{d} + \frac{d}{d\alpha}$$

We get the Complex Fractal that has an imaginary part with interaction.



R= 3

I=2

* It is fractal

$$Rr = (f)\int_2^3 \frac{d}{d''}$$

Identify the Infinitesimal Indiscriminant.

$$c_1 \rightarrow c_{18} = \int_{\frac{1}{\alpha}}^{2}{}_{1/2} + \int_{\frac{1}{\alpha}}^{4}{}_{1/2} + \int_{\frac{\delta d}{d\alpha}}^{1}{}_{1/2} + \int_{\frac{1}{\alpha}}^{4}{}_{1/2} + \int_{\frac{\delta d}{d\alpha}}^{1}{}_{1/2} + \int_{\frac{1}{\alpha}}^{2}{}_{1/2} + \int_{\frac{1}{\alpha}}^{4}{}_{1/2} + \int_{\frac{\delta d}{d\alpha}}^{1}{}_{1/2} + \int_{\frac{1}{\alpha}}^{4}{}_{1/2} + \int_{\frac{\delta d}{d\alpha}}^{1}{}_{1/2} +$$

$$\int_{\frac{1}{\alpha}}^{2}{}_{1/2} + \int_{\frac{1}{\alpha}}^{4}{}_{1/2} + \int_{\frac{\delta d}{d\alpha}}^{1}{}_{1/2} + \int_{\frac{1}{\alpha}}^{4}{}_{1/2} + \int_{\frac{\delta d}{d\alpha}}^{1}{}_{1/2} + \int_{\frac{1}{\alpha}}^{2}{}_{1/2} + \int_{\frac{1}{\alpha}}^{4}{}_{1/2} + \int_{\frac{\delta d}{d\alpha}}^{1}{}_{1/2} + \xi^2 \qquad (7)$$

We use the Dichotomous Variables - isolated each in its fractal iteration:

$$\log 1 + \ln 2/_{0.618} = 1.12$$

$$\log 2 + \ln 4/_{0.618} = 2.73$$

$$\log 3 + \ln 1/_{0.618} = 0.77$$

$$\log 4 + \ln 4/_{0.618} = 3.22$$

$$\log 5 + \ln 1/_{0.618} = 1.13$$

$$\log 6 + \ln 2/_{0.618} = 2.38$$

$$\log 7 + \ln 4/_{0.618} = 3.61$$

$$\log 8 + \ln 1/_{0.618} = 1.46$$

$$\log 9 + \ln 4/_{0.618} = 3.79$$

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$\log 10 + \ln 1 / 0.618 = 1.62$

$\log 11 + \ln 2 / 0.618 = 2.81$

$\log 12 + \ln 4 / 0.618 = 3.99$

$\sum$ de dichotomous var. = 45.77 Real

Rank = number of var.

$\frac{\Sigma}{rango} = \frac{45{,}77}{18} = 2.54$ Imaginary

Thus, a fractal structure satisfies one or more of the following properties:

(i) It possesses detail at all scales of observation of measurable risk at 2.4%, it possesses some kind of self-similarity, possibly statistically acceptable at 45%, its fractal structure is larger than its topological dimension and its algorithm serving to describe a fractal structure is very simple, and recursive in character.

Conclusions

In an attempt to integrate the aspects that are most relevant in a large number of definitions, the following definition is proposed: Fractals are shapes (either found in nature, or mathematically created, or derived from the graphical characterisation of the behaviour of a system), which possess an irregularity, expressed in a non-integer dimensionality, which is maintained and is characteristic at different scales of analysis, thus fulfilling one of their most remarkable qualities, self-affinity, which means that the part is similar to the whole.

Now that we have a definition with which we can identify a fractal object, we can analyse its fundamental characteristic, namely self-similarity. A structure is said to be self-similar if it can be arbitrarily cut into small pieces, each of which is a small replica of the whole structure.

Strictly speaking, the concept of self-similarity applies only to mathematical fractals, while in natural or physical fractals (those found in nature such as a fern leaf, a bronchial arborisation, blood capillaries, etc.), the concept of self-similarity applies.) the concept of self-affinity applies, since their fractality is only statistical and they possess, consequently, an anisotropic scaling (which does not have the same properties in all dimensions of analysis), which does not allow an amplified part of a figure to maintain exactly the characteristics of the figure as a whole.

It is interesting to note that the irregularity of fractal objects becomes a particular characteristic of the object and accounts for the similarity of its parts to the whole, regardless of the scale of analysis used.

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Diagnosis of quality in the production process of industrial warehouses in the GRECON company

Diagnóstico de la calidad en el proceso productivo de naves industriales en la empresa GRECON

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Abstract

Within GRECON Company the rework of some metal structures was held due to not keeping assembly specifications. To solve this problem a diagnosis of the quality in the production process was performed, so checklists and staff interviews were selected and designed to identify quality and process conditions, and the company visiting procedure was mapped as well. Following the information analysis with SWOT supporting, these were identified as improvement proposals 8D, FMEA and operation register. The systematization of these tools will allow continuous improvement on the processes.

Diagnostic, Quality, Process, Improvement

Resumen

En la empresa GRECON se llevó a cabo el retrabajo de algunas estructuras metálicas debido a que no se cumplieron las especificaciones de ensamble. Para solucionar este problema se realizó un diagnóstico de la calidad en el proceso productivo, por lo que se seleccionaron y diseñaron listas de verificación y entrevistas al personal para identificar las condiciones de calidad y proceso, además se mapeó el procedimiento de visitas a la empresa. Después del análisis de la información con apoyo del FODA, se identificaron como propuestas de mejora 8D, AMFE y registro de operaciones. La sistematización de estas herramientas permitirá la mejora continua de los procesos.

Diagnóstico, Calidad, Proceso, Mejora

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Introduction

Currently, quality in production processes is essential to compete with other companies and continuously improve by increasing customer satisfaction. That is why organizations seek to improve based on the diagnosis of their processes, as GRECON did, a micro company that is dedicated to the development of metal structures to produce industrial buildings.

GRECON's mission is to fulfil the customer's total satisfaction by offering them services of: structural calculation, roofing and manufacturing of supports for industrial buildings. These have a double water slope, this means that when it rains it causes the rain to go to the sides and not remain stagnant in the upper part of the industrial building.

Among its objectives is to manufacture a quality product with customer requirements and improve production tools. Likewise, for the provision of its services, it has the following production processes:

- Cut. In this process, the drawing, measurement and cutting with oxyacetylene of the different pieces that make up the metal structures are carried out.
- Welding. In this stage, the pieces that make up the metallic structures are joined, and 7018 electrodes are used.
- Clean. In this process, the parts are cleaned with a polishing machine and a metal grinding disc.
- embossed. It consists of applying a layer of Gray primer to all parts to prevent corrosion.
- Placement of pieces. In this stage, the assembly of the structure is carried out with the pieces previously made.

The quality of the metal structures used in the installation of industrial buildings is the responsibility of the operators and the production manager. However, in the last half of 2014, there were some complaints from customers, attributable to errors in the joints of the structures.

Likewise, the GRECON production manager identified through his records that the reprocessing of some parts that did not meet the assembly specifications was increasing.

To solve this problem, it was decided to carry out a diagnosis on the quality in the production process of the GRECON company in order to identify improvements that allow reducing rework and improving customer satisfaction.

Literature review

The diagnosis is a methodological practice that must be applied in a certain time and in defined periods, to know the behaviour of the systems within a company or in any of its parts, to plan and guide actions at any time.

The results of a diagnosis tend to sustain, improve, or overcome the current situation of the process and/or system. Likewise, through its practice, trends and situations are evaluated, facts, strengths and weaknesses (SWOT) are explained; or problems, causes and effects. Its objective is to conclude about the causes that prevent each of the company's systems and the organization, from operating efficiently and effectively (Rebollo Lozano, 2005).

According to Rebollo Lozano (2005), we can divide the organizational diagnosis into three main stages:

Generation of information, which in turn encompasses three aspects

- The way in which information is collected, the tools and processes used.
- The methodology used to collect information, which follows two streams, the methods used to obtain information from the client (interviews, questionnaires) and those used to obtain it from the consultant (observation).
- The frequency with which the information is collected, which depends on the stability of the system.

Organization of information, where it is necessary to consider three key aspects:

- The design of procedures for the information process.

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- The proper storage of data.

- The ordering of the information, so that it is easy to consult.

Analysis and interpretation of the information, which consists of separating the basic elements of the information and examining them to answer the questions raised at the beginning of the investigation.

Within the company, when the diagnosis is made, it is possible to see the quality in the company and/or in the process, to evaluate and be able to improve, for the benefit of GRECON's clients.

Total quality involves and commits each person in the organization and focuses on getting things done right the first time. Quality allows to offer the client what has been promised, it also helps to identify, accept, satisfy and continuously exceed the expectations and needs of the clients.

Total quality, according to Ferrando Sánchez & Granero Castro (2006), requires a constant process, called continuous improvement, this is a process that very well describes the essence of quality and reflects what companies need to do if they want to be competitive over time.

To carry out a diagnosis, various tools are used that are selected according to the type of company and the objective pursued. According to Ishikawa (1986), among the tools that can be used are:

- Ishikawa's diagram. It allows identifying the real causes and facilitates the analysis of problems and their solutions in areas such as: quality of processes, products and services.

- Verification Sheet. It is a table or diagram format, intended to record and compile data through a simple and systematic method, such as the annotation of marks associated with the occurrence of certain events. This data collection technique is prepared in such a way that its use is easy and interferes as little as possible with the activity of the person who performs the registration.

- Pareto chart. It is a graph to organize data so that they are in descending order, from left to right and separated by bars. The diagram allows to graphically show the Pareto principle: few vital, many trivial.

- Process map: Helps to identify and select the processes, it is useful to make a graphic representation that defines and reflects the structure, relationship and the different processes of the organization's management system, while allowing them to be grouped. The purpose, according to Alcalde San Miguel (2010), is to simplify and obtain a joint vision.

- The level of detail of the process map will depend on the size of the organization and the complexity of its activities. It also allows you to know what they are like inside and thus observe how the transformation of inputs into outputs is carried out.

- The SWOT allows to identify the strengths (F), opportunities (O), weaknesses (D) and threats (A) present in a process, system, or company. It allows to determine the true possibilities that the company must reach the objectives that are the initially established. Likewise, it makes the owner of the company aware of the size of the obstacles that he will have to face. It also makes it possible to explore positive factors and neutralize or eliminate the effect of negative factors more effectively. (Jones & George, 2006)

On the other hand, from the SWOT, improvements must be identified as part of the diagnosis methodology. Said improvements, in the field of quality, can contemplate, as Alcalde San Miguel (2010) refers, the application of planning tools and quality improvement, such as the 8 disciplines (8) and the potential failure mode and effect analysis (FMEA), whose characteristics are indicated below:

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8 Disciplines. It is a systematic methodology to identify, correct and eliminate problems. According to Gutiérrez Pulido (2005), the 8D allow the development of competitive advantages by quickly and effectively solving problems, maintaining customers through good service and quality in the products provided, reducing the number of problems within the organization. The stages that make up the 8D are:

1. 1-D Establish a work team. Here the team that will develop the diagnosis will be chosen.

2. 2-D Identify and state the problem. The problem that arises in the company will be sought and it will be presented to the team looking for practical solutions.

3. 3-D. Implement containment actions. Actions will be implemented to detect potential failures.

4. 4-D. Identify the root cause. Here we will try to identify the main cause for which the problem exists.

5. 5-D. Implement corrective actions. Actions will be implemented which will correct the problem at its root.

6. 6-D. Select corrective actions. Will be the action what EU correct and the problem.

7. D-7 Prevent recurrences. It will try to prevent with quality tools, so that the problem does not happen again.

8. D-8. Recognize team effort. The team will be congratulated for their achievement.

FMEA. This tool helps find all the potential flaws in a design, product or process, before they occur. It allows analyzing the possible ways in which it can fail as well as the effects that these failures could cause. It helps to reduce the smallest error that may arise.

Methodology

To carry out the diagnosis in the GRECON company, the activities indicated in Figure 1 were applied, which are described.

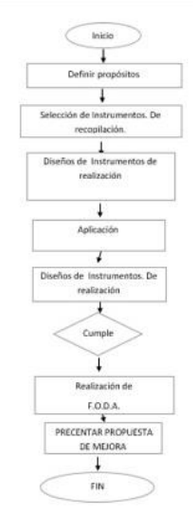

Figure 1 Flowchart of the methodology

1. Define purpose of diagnosis. The purpose was to identify the activities that generated re-processes in the production of metal structures.

2. Selection of instruments and information gathering techniques. Instruments such as: semi-structured questionnaire, checklist and process map were chosen to collect the information. It was also decided to apply field and documentary research with the techniques of observation, interview and documentary review.

3. Design of instruments for collecting information. Two checklists were designed, the first based on Ishikawa (1986), to identify the characteristics of quality in the processes (see Figure 2a.); while the second was designed based on OIT (1999) to identify quality conditions in the production process of metal structures (see Figure 2b).

	Criterios	si	no	Comentarios
1	¿El personal responde rápido ante una situación con la maquinaria?			
2	¿La maquinaria tiene buen estado?			
3	¿En ocasiones el proceso de los productos tiene errores?			
4	¿El personal pone su mejor esfuerzo en los procesos?			
5	¿Los productos se entregan a los clientes a tiempo?			
6	¿El entorno de trabajo esta acomodado?			
7	¿Las herramientas de trabajo están a la mano?			
8	¿Se almacenan por días los productos?			
9	¿El proceso se detiene cuando se detecta falla?			
10	¿Se revisan las unidades producidas antes de la entrega?			
11	¿Se soluciona el problema inmediatamente cuando se detecta?			
12	¿Se inspecciona cotidianamente el proceso y maquinaria?			

Figure 2 Quality checklist

	Criterios	Respuestas
1	¿Qué se hace en realidad?	
2	¿Por qué hay que hacerlo?	
3	¿Cuándo lo hacen? ¿Por qué lo hacen en ese momento?	
4	¿Quién lo hace? ¿Por que lo hace esa persona?	
5	¿Cómo se hace? ¿Por que se hace de ese modo?	

Figure 3 Table and quality conditions

On the other hand, the following guiding questions were established to conduct the interview:

- What measures or tools are applied for quality?
- How do you know that the process has control?
- Is a tool applied in all processes?
- In which process do you have more quality problems?
- Finally, to identify the processes of the company, the process map was made, under a process approach as shown in Figure 4.

Figure 4 Process map

1. Application of the instruments. 12 interviews were conducted with 12 people from GRECON, who were General Manager, production manager, 5 workers and 5 clients. 4 visits to the company were made to characterize the process and identify improvements, plans and process diagrams were reviewed to understand the sequence of production processes.

2. Analysis of the results. The analysis was carried out based on the information that was collected from the visits and interviews, this allowed identifying the problems that were found in the GRECON production process.

3. Identification of improvements. From the results, a SWOT was elaborated, which allowed to identify the improvements.

4. Improvement proposal. Based on the results of the SWOT and considering the weaknesses and strengths, the application of the following tools was proposed: AMEF, 8D'S and Annual Operating Certificate.

Results

Once the checklist (see Figure 4) on quality was applied, it was found that one of the weaknesses that the Grecon company has is that in the cutting process, it continually has defects and this directly affects the production process of the blades. metallic structures. There is also another weakness, which is delays, since you have to wait for night to transport the metal parts.

	Criterios	si	no	Comentarios
1	¿El personal responde rápido ante una situación con la maquinaria?	*		Se le comunica a la persona en cargada de la producción.
2	¿La maquinaria tiene buen estado?		*	La maquinaria ya está un poco deteriorada por el uso de ella en el exterior (en obra).
3	¿En ocasiones el proceso de los productos tiene errores?	*		El proceso tiene errores en las medidas para el proceso de corte.
4	¿El personal pone su mejor esfuerzo en los procesos?	*		El personal está comprometido con la empresa para entregar productos de buena calidad.
5	¿Los productos se entregan a los clientes a tiempo?	*		Se acuerda una fecha de entrega entre el ingeniero y le cliente.
6	¿El entorno de trabajo esta acomodado?	*		El entorno se encuentra acomodado por el tipo de maquinaria que se ocupa, tiene designado su lugar.
7	¿Las herramientas de trabajo están a la mano?	*		Las herramientas tiene su lugar de colocación para su rápido uso
8	¿Se almacenan por días los productos?	*		Hasta que se tiene al menos el 50% del producto se empieza a mandar a obra.
9	¿El proceso se detiene cuando se detecta fallas?		*	Se continua con el proceso y se atiende aparte el error
10	¿Se revisan las unidades producidas antes de la entrega?	*		Se le da una pequeña inspección que cumpla con todos los requisitos
11	¿Se soluciona el problema inmediatamente cuando se detecta?	*		Se hace una pequeña reunión entre el encargado de producción y el encargado de los empleados para darle solución.
12	¿Se inspecciona cotidianamente el proceso y maquinaria?	*		Se le da una compostura a las maquinas después de cada terminación de obra.

Figure 5 Verification list

Likewise, an interview was conducted with company personnel (general manager, production manager and workers) and the following responses were obtained (see Figure 5).

	Criterios	Respuestas
1	¿Qué se hace en realidad?	Se fabrican piezas para las extructuras
2	¿Por qué hay que hacerlo?	por que en obra civil no se puden solventar los gartos de produccion
3	¿Cuándo lo hacen? ¿Por qué lo hacen en ese momento?	Lo hacen 2 mese antes de la colocasion. Lo hacen en ese tiempo por que es el tiempo estimadode fabricasion
4	¿Quién lo hace? ¿Por que lo hace esa persona?	el encargado de produccion, lo hace por que es la persona con los conocimientos y experiencia necesaria parallarla a cavo
5	¿Cómo se hace? ¿Por que se hace de ese modo?	Se realizan las piezas en el taller y despues se mandan al lugar acordado con el cliente, y se realiza de este modo por que es el unico modo para las nave industriales

Figure 6 Table and quality conditions

The results that the interview gave us is that the cutting process has more quality problems, since sometimes the pieces are cut in the wrong way.

On the other hand, from the visits to the company and the review of its production documents, the process map and the production diagram were made, which are shown in Figure 6.

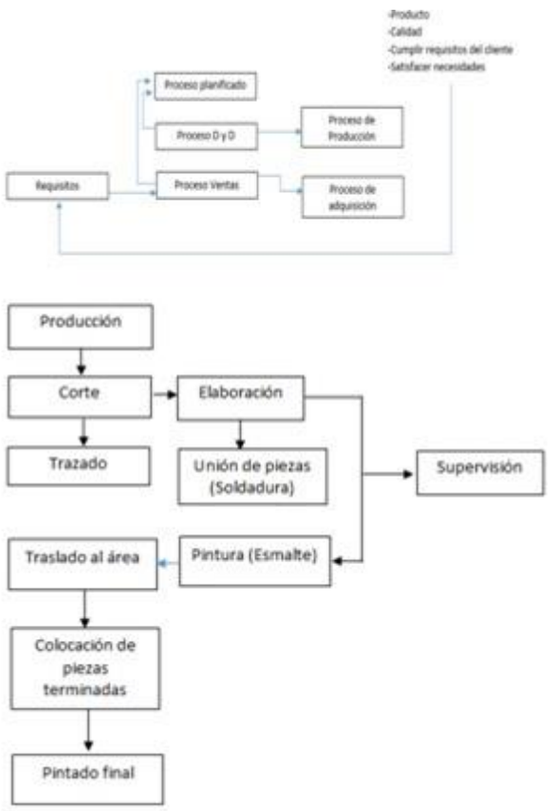

Figure 7 Diagram and process map

To classify the information obtained from the interviews and the observation, the SWOT was carried out, which shows the strengths, weaknesses, opportunities and threats of the company (see Figure 7)

Fortalezas	Oportunidades
-La empresa tiene un trabajo en conjunto muy eficiente. -La empresa tiene altos de experiencia creando naves industriales. -Toda persona que labora en la empresa tiene experiencia.	-La empresa puede hacer cualquier nave industrial en el lugar donde se le solicite. -Las herramientas que tienen dentro de la empresa para crear las naves industriales son de las mejores para así no tener ningún fallo al crearlo.
Debilidades	**Amenazas**
Falta de documentacion del proceso de produccion. Falta de una metodologia de análisis que permita prevenir y/o elimina problemas. Limitación en el cumplimiento de la normatividad legal para el cuidado del medio ambiente Falta de estandarización en el proceso de corte	-Al tener esa dificultad de transportar puede que algunos clientes lo quieran de día, y no soliciten su pedido. -Esto puede afectar tanto al proceso (en el tardado de la misma) como en el personal, el cual le afecta para poder realizar cada actividad.

Figure 8 Table the SWOT

The results that we were able to observe is that the company is good, but the faults it has make it take it as a company not dedicated to total quality, since it allows problems in the processes to continue to occur.

So, based on the results of the diagnosis, it is proposed to use the following tools:

- Identification card.
- Process FMEA
- 8-D

The weakness that will be reduced with these tools will be the cutting process, since it is the most notable weakness that the GRECON company has. Since they will help us prevent and correct errors that may occur in court.

Thes improvements that were proposed, are indicated below.

Annual Operating

To meet one of the legal requirements regarding the environment, the proposal for the annual operation certificate was made (see Figure 8), which allows identifying the pollutants generated by the company.

		ENTRADAS				GENERACION EMICION DE RESIDUOS			
Numero de punto	Nombre de maquinaria o actividad	Insumo directo	Insumo indirecto	agua	Combustibles	aire	Aguas residuales	Residuos peligrosos	Residuos solidos
1	cortado	x		x	x			x	x
2	soldadura				x	x		x	x
3	limpiado	x			x	x		x	x
4	pintado		x		x	x			

Figure 9 Table de annual operation of the process

FMEA

Figure 9 shows the process FMEA for GRECON, which allows documenting the production process and reducing the possibility of problems not only in the cutting process, but in all processes.

proceso	propósito	Modo potencial de fallo	efecto	Severidad	actuales control
Trazado	*marcar las dimensiones especificadas	*dimensiones mal especificadas	*piezas mal trazadas y?o fuera de especificación	4	*inspecciones de dimensiones
Corte	*hacer los cortes para la fabricación de las piezas	*dimensiones mal especificadas	*Piezas fuera de especificación en la medidas	7	*chequeo de dimensiones
Armado	*armar las piezas para formar la pieza	*piezas mal colocadas o mal posicionadas	*Piezas torcidas o piezas que no coincidan	8	*chequeo de posturas y colocación de piezas

Figure 10 Process FEM

ocurrencia	detención	causa	índice prioritario de riesgo	acciones	responsable y fecha
1	7	*no hay chequeo en el diseño *falta de comunicación	28	*hacer chequeos a los diseños *tener pláticas para checar errores	En cargado de producción 22/05/2015
2	8	* no hay chequeo de dimensiones	112	*Hacer chequeos de dimensiones	En cargado de producción 22/05/2015
4	7	*no hay chequeos de procedimiento	224	*hacer chequeo de procedimiento y capacitar al	En cargado de producción 22/05/2015

Figure 11 Process FEM (continued)

8 Disciplines

The proposal for the application of the 8D in GRECON, was carried out with the problems that were caused in the installation process of the metallic structures, since it did not have a problem analysis method as indicated in the SWOT (see Figure 7), particularly in the cutting process, where the structures had incorrect measurements. The application is shown below.

- 1-D Establish a work team. The team was integrated with the civil works engineer and the metal structures engineer.

- 2-D Identify and plan the problem. In this case, the Pareto diagram was used to identify the faults that exist in the 4 axes of the anchor structures (Figure 10).

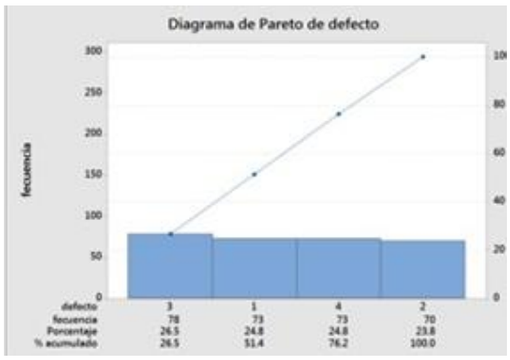

Figure 12 Pareto chart

Based on Figure 10, it was identified that one of the causes is damaged ropes with a 26.5% incidence.

- 3-D Implement containment actions. It was established to check the anchors when they are delivered by the supplier and place them in a place where they will not be mistreated.

- 4-D notify the Accuses rotis

Using the Ishikawa diagram, the causes were identified with their respective effects, the main one being the wrong installation (see Figure 11).

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Figure 13 Cause effect diagram

- 5-D. Implement corrective actions.

The actions that were implemented based on the causes were:

a. Inspect the raw material upon arrival at the site.

b. Supervise personnel when placing and handling anchors.

- 6-D. Select corrective actions. Based on the corrective actions, the following plan was established:

Project title: Quality control in the reception and installation of the anchors.

Objective: Establish the activities to verify the material as well as to verify the installation of the anchors.

Workplan. It included activities such as:

a. Check the anchors upon arrival at the work.

b. Review and update the installation procedure.

c. Training for installation personnel

– 7-D. Prevent recurrences. It was proposed to verify the material every 2 days and continuous training.

– 8-D. Recognize the effort of the team- In this regard, in addition to congratulations, it was proposed that based on GRECON policies they be invited to dinner.

Conclusion

In the quality diagnosis, it was observed that the GRECON company has several problems regarding the quality of the metallic structures and they were thoroughly analyzed, in order to be able to give improvement proposals for its production process, which will benefit the company. making it more competitive with other leading companies in the market.

Different information on the process was collected, which allowed us to analyze the problem that exists and as a consequence some solutions that can be implemented, in order to have a quality product and also that errors do not occur again in the process.

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Perception of educational inclusion of students in higher education institutions in the Comarca Lagunera

La percepción de los docentes sobre la inclusión de personas con discapacidad en las Universidades de la Comarca Lagunera

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Abstract

In Mexico, the National Institute for Geography and Statistics, INEGI has calculated a population of 5.1% with a disability. Approximately 6 million Mexicans suffer from disability. Less than the 30% of children with disabilities study. This research arises as a concern to meet existing data on the issue of inclusion and its perception after taking a course at the Technical University of Torreon. In this situation the objective of this research is to identify among students in higher institutions both public and private, the level of knowledge of the regulatory framework on human rights and disability, knowledge of visual, auditory, motor, psychosocial disability and if their institutions are informed and have a universal design that allows accessibility to people with a disability in their environment, in order to conduct educational inclusion. The results show that most students have no knowledge of the regulatory framework and the institutions do not have a universal and needed infrastructure for people with disabilities. However, they are interested in the subject.

Inclusion, Education, Disability, Mexico

Resumen

En México, el Instituto Nacional de Geografía y Estadística, INEGI, ha calculado una población del 5,1% con discapacidad. Aproximadamente 6 millones de mexicanos padecen discapacidad. Menos del 30% de los niños con discapacidad estudian. Esta investigación surge como una inquietud de conocer los datos existentes sobre el tema de inclusión y su percepción después de tomar un curso en la Universidad Politécnica de Torreón. Ante esta situación el objetivo de esta investigación es identificar entre los estudiantes de instituciones superiores tanto públicas como privadas, el nivel de conocimiento del marco normativo en materia de derechos humanos y discapacidad, el conocimiento de la discapacidad visual, auditiva, motriz, psicosocial y si sus instituciones están informadas y cuentan con un diseño universal que permita la accesibilidad a las personas con alguna discapacidad en su entorno, con el fin de llevar a cabo la inclusión educativa. Los resultados muestran que la mayoría de los estudiantes no tienen conocimiento del marco normativo y las instituciones no tienen una infraestructura universal y necesaria para las personas con discapacidad. Sin embargo, están interesados en el tema.

Inclusión, Educación, Discapacidad, México

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Introduction

According to the statistics of the United Nations organization, there are approximately 650 million people in the world with some type of disability, whether physical, sensory or intellectual, that is, 10% of the world population.

Faced with this situation, on December 13, 2006, the United Nations General Assembly approved the Convention on the Rights of Persons with Disabilities, for which Mexico signed the convention and ratified its optional protocol on March 30, 2007, whose fundamental purpose ensure the full and equal enjoyment of all human rights for all persons with disabilities, becoming the first international convention on human rights approved in the 21st century.

Following up on this convention, it is presented in the Education Sector Program 2013-2018, where it mentions that quality education is of the utmost importance for the political, social, economic and cultural development of Mexico. And that it is the way to achieve a respectful and harmonious coexistence, in a democratic, fair, peaceful, productive and prosperous society. Quality education should be a true instrument that helps overcome the serious inequalities that millions of Mexicans suffer and favor a panorama of opportunities available to all.

The National Development Plan 2013-2018 (PND) prioritizes quality education by including it as one of its five national goals. The high hierarchy that it grants to education is because today, more than ever, the country's development possibilities depend on quality education.

A good educational system must be inclusive, favour equity and never a means to maintain or reproduce privileges. Although the task of educational inclusion for all population groups still needs to be completed, work is already being done on this issue.

In the 2013-2018 Education Sectoral Program (PSE), six objectives are foreseen to articulate the educational effort in this sexennial, the first three being those related to this investigation, each of these objectives is accompanied by their respective strategies and lines of action.

Objective 1: Ensure the quality of learning in basic education and the comprehensive training of all population groups.

Objective 2: Strengthen the quality and relevance of upper secondary education, higher education and training for work, so that it contributes to the development of Mexico.

Objective 3: Ensure greater educational coverage, inclusion and equity among all population groups for the construction of a fairer society.

The PND points out that in order to guarantee inclusion and equity in the education system, opportunities for access to education, permanence and advancement in studies must be expanded to all regions and sectors of the population. This requires creating new educational services, expanding existing ones and taking advantage of the installed capacity of the campuses, as well as increasing support for children and young people at a disadvantage or vulnerability.

Relating it to the above in days past, the Technological University of Torreón (UTT), received from the Ministry of Labor and Social Welfare.

“Gilberto Rincón Gallardo” Inclusive Company Distinction, which is given to distinguish public, private and social institutions that are committed to good labour practices towards vulnerable groups.

The basis for this distinction is that the university is creating favourable conditions for the participation of people in vulnerable situations without discrimination and with equal opportunities in access, permanence, remuneration and promotion in employment.

Quality education is of the utmost importance for the political, social, economic and cultural development of Mexico. It is the way to achieve a respectful and harmonious coexistence, in a democratic, fair, peaceful, productive and prosperous society. Quality education should be a true instrument that helps overcome the serious inequalities that millions of Mexicans suffer and favour a panorama of opportunities available to all.

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The educational task must benefit all groups of the population; hence the importance of strengthening the principle of inclusion. Coverage will have to be extended to facilitate access to education at all levels. The increase in coverage must necessarily be complemented with actions that address the particularities of vulnerable groups that, for various reasons, face barriers that prevent access and permanence in education. The education system must consider cultural and linguistic diversity, the requirements of the population with disabilities and other factors that limit the exercise of the right of men and women to a quality education. Equally important is offering options to adults who are illiterate or who have not completed basic education.

Comprehensive education is a human right and a mandate of article 3 of the Constitution. The proposed task is aimed at training people who are responsible with themselves and with their environment, aware of their rights and respectful of those of others, capable of dialoguing, respecting differences and learning from them. The educational task must be nurtured by the philosophical, humanistic and social foundations that have sustained public education. Physical and sports activities, art and culture, science and technology have a place in the comprehensive training that the Federal Government will support.

The educational task is everyone's responsibility. Authorities, teachers, students, parents, researchers, civil society organizations, philanthropic groups and society as a whole will have to work harmoniously and constructively for the educational improvement that the country requires.

The Education Sector Program 2013-2018 is designed to give a place to all those who participate or join the educational task. Only with the collaboration of all will we achieve the progress in education that the country requires. Education in all its types, levels and modalities constitutes a priority commitment of the Government of the Republic.

The Educational reforms should not forget that educating is not limited to reading and writing, or acquiring only some skills, it is about guaranteeing mechanisms of inclusion and social mobility to give all citizens' status (UNESCO).

Hypothesis 1: Students have little knowledge about the regulatory framework on human rights.

Hypothesis 2: Students are regularly aware of visual, hearing, motor, and psychosocial disabilities.

Hypothesis 3: The students think that there are no facilities in their university with a universal design to be used by all people.

Hence our next hypothesis:

Hypothesis 5: There is a great lack of knowledge about disability among students.

Consequently, the following hypothesis is proposed:

Hypothesis 6: There is a great lack of interest in the topic of disability in universities. Therefore, the following hypothesis is proposed:

Hypothesis 7: If there is enough of a climate of cooperation and empathy among your classmates, AND the students consider that there is a relationship of respect for diversity among all those who belong to their university

Hypothesis 8: The students consider it quite necessary to improve the infrastructure in their university.

Hypothesis 9: We believe that universities do not report on the importance of disability and inclusion within their institution.

Methodology

This research, which is exploratory and descriptive, information was collected from secondary sources and the primary information was obtained through the use of surveys through the structured questionnaire instrument composed of 12 variables using a Likert scale, and applied online.nThe reference instrument is made up of several sections, in the first of which the instructions and the identification of the respondent are specified, in the second the signal variables appear with a total of 12. A simple random sampling without replacement was used, surveying to 58 students from 7 public and private universities in the region of the 32 registered in CIESLAG Laguna region.

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Results

At the beginning of the investigation, there was the perception that with the educational reform, there would be more information in the universities and that they would be carrying out more actions in terms of improving their infrastructure.

But the results were as follows:

When students are asked if they have knowledge about the regulatory framework on human rights, 74% chose regular and little, the least chosen option being A lot with "1.72%" affirming the proposed hypothesis.

Regarding the question about the knowledge of the types of visual, auditory, and motor disabilities, the hypothesis is affirmed since 74% regularly know about the subject, but in psychosocial disability the hypothesis is ruled out since 68 % chose that they know little about said disability."

When students are asked if their universities have universal design facilities, they choose "56.90%" Regular, discarding the hypothesis since we thought that universities do not have universal design.

The students consider that there is a lack of knowledge about disability by choosing with a "62.07%" much, affirming the hypothesis. Likewise, it is considered enough with a "62.07%" the lack of interest in the institutions on the issue of disabilities.

In the question about the climate of cooperation and empathy among your classmates, we found that there is enough with "72.41%" and regarding the relationship of respect for diversity among all those who belong to their university, "67.24% "They also chose quite a lot. Affirming both hypotheses.

When the students are asked if they consider it necessary to improve the infrastructure in their university, they chose with "72.41%" the option a lot, being reasonable since when they are asked if their university has facilities of universal design they choose they think that on a regular basis, because they have certain infrastructure, such as accesses, elevators, etc.

The results as for if your university has informed them about disability and inclusion was little with a "58.62%", also affirming the hypothesis.

Conclusions

In this research, a quantitative analysis of the knowledge of educational inclusion between students has been presented.

The results indicate that students do not have sufficient knowledge about the normative framework on human rights, since in the universities they are informed little about this topic.

It is also concluded that there is a lack of knowledge about the type of visual, auditory and motor disabilities, and that in general they have little knowledge about psychosocial disability.

It is also important to highlight that the results obtained show that the students consider that there is a great lack of knowledge about disk opacity and their universities and that there is also a lack of interest on the subject of educational inclusion. It is important to highlight that there is a lot of empathy and cooperation among the students and that there is a relationship of respect among them in terms of diversity, so we do not doubt that by presenting the importance of the subject, they would be sensitized to such a situation.

In general, the students consider that it is necessary to improve the infrastructure in their university since most of them do not have a universal design. The students stated that in their university they at least have advances in their infrastructure, the basic ones by law, such as: access, elevators etc.

We can conclude that more work needs to be done on this issue, since these are the bases, it is necessary to know the way in which the subjects will be adapted, the preparation of the teacher, and the complete adaptation of the institutions, it is known that all this is expensive and it requires time and preparation, but it is necessary, if we want educational inclusion to take place, we will have to work on these aspects.

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Collaborative processes as one of the factors to drive innovation in rubber and plastic manufacturing SMEs in Mexico

Los procesos colaborativos como uno de los factores para impulsar la innovación en las PYMES manufactureras de hule y plástico de México

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Abstract

The plastics industry is one of the most dynamic sectors of the Mexican economy, the vast majority of businesses are micro, small and medium, and these companies in Latin America are considered of moment for competitiveness, however, they need to face the global challenges of the competitive environment for SMEs it should use their advantages to adapt to the creation and development innovation, to innovate now need to work with all the major players in the value chain, That in order These businesses can Consolidate and Achieve a sustainable competitive advantage over time and this May That Facilitate Their lead to stability, prosperity, Through This research was to identify identity the Processes That relate to collaborative innovation in SME manufacturing rubber and plastic Mexico.

Correlational study between, Collaborative, Processes, and Innovation in manufacturing

Resumen

La industria del plástico es uno de los sectores más dinámicos de la economía mexicana, la gran mayoría de las empresas son micro, pequeñas y medianas, y estas empresas en América Latina son consideradas de momento para la competitividad, sin embargo, tienen que hacer frente a los desafíos globales del entorno competitivo para las PYME debe utilizar sus ventajas para adaptarse a la creación y desarrollo de la innovación, para innovar ahora necesitan trabajar con todos los actores principales de la cadena de valor, que con el fin de que estas empresas puedan consolidarse y lograr una ventaja competitiva sostenible en el tiempo y esto pueda que facilite su camino hacia la estabilidad, prosperidad, a través de Esta investigación tuvo como objetivo identificar la identidad de los Procesos que se relacionan con la innovación colaborativa en las PYMES manufactureras de hule y plástico de México.

Estudio Correlacional entre, Colaboración, Procesos e Innovación en la manufactura

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Introduction

The global rubber and plastic industry covers a great diversity of needs of consumers in the construction industry and personal needs, it is important to highlight their participation in the global structure since they respond to the needs of the population in their use daily.

Innovation is the engine that allows companies to make their way through so much uncertainty, this is a way by which organizations manage to generate greater value, seeking to surprise customers with new or improved products, trying to satisfy their demands, this need of companies to innovate is often not given, the problem is aggravated in SMEs due to their limited number of people, the scarcity of their economic and production resources.

However, these types of companies have as strengths their flexibility, the speed of decision-making, a greater degree of cooperation between the people of the company, which can be taken as a starting point to work on their relationship with the different agents that make up their environment.

Collaborative processes are important in SMEs and they allow an exchange of knowledge between people or companies, in order to generate new ideas or products, therefore this type of company increases its profitability and competitiveness, in addition to increasing its power of negotiation with its stakeholders.

In this sense, the purpose of this research is to identify the collaborative processes that are related to innovation in rubber and plastic manufacturing SMEs in Mexico.

Unlike this research, among other works, it focuses on the identification of collaborative processes within this type of company in order to promote innovation. To achieve this purpose, a section with the theoretical framework was presented with topics related to the variables of the investigation, later, a section with the methodology that consisted of a mixed approach was established, in which a hypothesis was established, of the same In this way, it was explained how the variables were measured and the determination of the sample, consecutively, a section was presented with the analysis of the results obtained and finally the conclusions were stated.

Literature review

There is research that indicates that SMEs are at the forefront and their contribution is important in fast-growing economies (Peres and Stumpo, 2000). However, these face important challenges derived from the competitive pressures that globalization provides, the adoption of concrete measures is required to improve the capacities of the personnel, as well as the rationalization of the business organizational structure for decision making (Díaz et al., 2005).

These types of companies are vital for competitiveness in developed and emerging countries, however, in the latter their nature is fragile due to the lack of economies of scale that allow them to develop competitive advantages (Díaz et al., 2005). Innovation within manufacturing SMEs is the only way to survive when facing global challenges (Gopalakrishnan et al., 2005; OECD, 2010).

Several studies have been carried out on innovation through various dimensions, among which the following stand out: the type of innovation and the factors that affect it (Roger, 1983).

With respect to the types of innovation, a classification has been provided, taking into account different criteria, such as the object of the innovation - product innovation and process innovation, its impact - incremental or radical -, the effect of the innovation - continuityist, disruptive-, and the scale in which it is carried out,- its origin and the nature of the innovation- (Boer and During, 2001).

In relation to factor-based studies are:

A. The internal factors that explain the innovative attitude of companies which are: the sector of activity, size of the company, the age of the company, training or educational level, management support for innovation, its strategic attitude – reactive or proactive- centralization in decision-making, the level of formalization existing in the organization, as well as the perceived effects or barriers associated with innovation (Del Águila, Padilla, 2010).

B. The external factors, innovation is a response to changes in the organization's environment, for some researchers this is one of the most important factors influencing innovation, most companies adopt innovations to respond to changes that environment suffers, therefore, environmental change is a driving force for organizational innovation (Damanpour and Gopalakrisknan, 1998).

Various theoretical models have been developed to study innovation, among which the open innovation model stands out, which determines that the future of the company is something that is created, invented and innovated with all its stakeholders – employees, partners, customers, communities. locals, shareholders, suppliers-, companies are not capable of addressing the entire innovation process by their own means and must rely on external resources -intellectual property, ideas, products, people, institutions- (Chesbrough, 2004, 2005).

Currently, companies today are organized by collaborative processes, these are given by a set of activities, technologies, means, systems, which allow the client to receive added value (Ramos, 2008). Additionally, collaborative processes involve several people or organizations, which need to agree on an action plan to achieve a common goal, this is based on communication and exchange of knowledge, generation of new ideas and conclusions within the context of the organization (Maiera et al., 2009).

In a study carried out in Japan in the manufacturing sector of Kansaim in SMEs of metalworking, electrical, machinery in general, plastic and chemical, it was observed that collaborative processes in some SMEs are still low, mainly with universities, research centers and collaboration between Companies also found three main motivations to collaborate with other actors in the effort to innovate, which are: a) to obtain information about technology and markets, b) to serve new markets and c) to do research and development (Kodama, 2008).

The plastics industry worldwide has been characterized as the most dynamic manufacturing activity in the last three decades, it is a transversal sector that impacts the competitiveness of the packaging, consumption, construction, electrical/electronic, furniture, automotive, industrial sectors. , agricultural and medical (ANIPAC, 2012).

The National Association of Plastic Industries AC (ANIPAC), states that said industry is part of one of the most dynamic sectors of the Mexican economy, since it maintains an annual growth rate of over 7%, which demonstrates its strength and its prospects development for the coming years.

The plastics industry in Mexico has the necessary natural resources -oil, labor and creativity-, however, this industry is small compared to others, because its evolution depends on the national market and external factors, such as the price of oil and its impact on raw materials. In addition, the companies in this industry are micro and small, of which the vast majority are family businesses (Vega, 2009).

According to a study carried out by ANIPAC, it was found that the internal factors that inhibit the competitiveness of rubber and plastic manufacturing companies are: their commercial and logistical capacities, production and innovation capacities, technological capacities and sustainable development, work environment, financial capacities, economic support resources, organizational capacity and competitive environment.

Additionally, he mentions that the key for rubber and plastic manufacturing SMEs to be successful is that they need to be oriented towards development from their creation.

Innovation and training, investment in research and development of new products. The plastics industry is an important sector for both developed and emerging countries.

In this sense, this industry is mostly made up of micro and small companies and therefore, they present clear problems in their organizational structure, as well as in their collaboration strategies, for this it is necessary to develop future cross-sectional and longitudinal research on innovation and collaboration in manufacturing SMEs, which allows the support of these with their special problems, according to the review of the literature there is research that delves into these issues oriented to large companies, however, there are few studies related to this type of companies and industry.

Methodology

This research was non-experimental descriptive transactional type, because the data was collected in a single moment, in a single time, the purpose is to describe and analyse the incidence and interrelation at a given time, with the objective of investigating the incidence of the modalities or levels of one or more variables in a population, for this research, in addition, the data collection was based on the measurement and analysis of statistical procedures of correlational type, (Hernández, Fernández and Baptista, 2010).

Figure 1 Design of the investigation

In accordance with the objective presented, the present investigation was found framed in the limits of correlational and field type investigations.

Hernández et al., (2010), states that correlational studies seek to know the relationship or degree of association that exists between two or more concepts, categories or variables in a particular context, measure each of them and then quantify and analyze linkage, such correlations are based on tested hypotheses, in the particular case of this work, this was based on the association that existed between collaborative processes and the innovation of rubber and plastic manufacturing SMEs in Mexico.

Together, this was a field investigation and therefore, a descriptive perspective coexisted (Sabino, 1992). For this research, a survey was applied to the managers of the rubber and plastic manufacturing SMEs, in order to obtain the information directly from the primary source.

Research hypothesis

After reviewing the theoretical framework, the following hypothesis was defined:

H: To major and from are collaborative, greater innovation.

Through the operationalization of the hypothesis, it was described what activities or operations should be carried out in order to measure the variables of the investigation (Table 1).

Variable	Definición Conceptual	Definición Operacional
Innovación	De acuerdo a Freeman (1982), la innovación es la invención más la comercialización, conjuntamente el Manual de Oslo (2010), la define como la concepción e implantación de cambios significativos en el producto, el proceso, el marketing o la organización de la empresa con el propósito de mejorar los resultados.	Escala de grado para determinar los factores determinantes de la innovación en las PyMEs manufactureras a través de las sub-variables: • Tipo de Innovación • Innovación organizacional • Financiero • Estrategia de cooperación • Políticas gubernamentales.
Procesos colaborativos	Un proceso colaborativo debe ser ágil, eficiente y preciso, con el fin de desarrollar los productos que demandan los clientes en el menor tiempo posible, lo cual, incluye las actividades de investigación y desarrollo (Chiang, Trappey y Ku , 2006)	Escala de grado para determinar los factores de los procesos colaborativos a través de las sub-variables: • Colaboración vertical • Tecnologías de la Información (TI) • Cooperación interna-externa.

Table 1 Conceptual and operational definition of variables

Mour

The sample of this research included all those plastic and plastic manufacturing companies located in Mexico in 2012, whose states have more than 299 economic units, a Gross Production greater than 10 million and that had more than 11 employees and less than 250.

Since its design, this sample was considered probabilistic, taking as a reference a population of 900 rubber and plastic manufacturing SMEs according to ANIPAC.

Therefore, the states that met these characteristics are the Federal District, Nuevo León and Jalisco. As a next step, the sample size was determined through the finite population formula, according to the choice of the states with the highest representation in this type of industry (Fischer, 1996).

$$n= N * Z\infty 2\ p * q / d2 * (N -1) + Z\infty 2\ p$$

For this study:

N=Total population (900)

(Z) $\propto$ = 1.96 squared (because the security is 95%)

p= expected proportion (in this case 5% is equal to 0.05)

q= 1-p (in this case 1-0.05=0.95)

d= precision (6% was used for this research)

$$n= 900 * 1.962 * 0.05 * 0.95 / 0.062 * (900-1) + 1.962 * 0.95 = 48$$

The sample number was 48 rubber and plastic manufacturing SMEs.

Instrument design and validation

An electronic questionnaire was applied, which was elaborated based on the SERVQUAL format, using the Likert-type scale of five points from "Totally agree" (5) to "Totally disagree" (1), whose purpose was to measure the relationship between the Collaborative processes and innovation within the rubber and plastic manufacturing SMEs of Mexico. This questionnaire was descriptive, it was also explored and validated by 50 rubber and plastic manufacturing SMEs that were not part of the theoretical sample. A pilot version was developed with these SMEs, which was approved and adjusted.

Results

To evaluate reliability or consistency, Cronbach's Alpha (σ) was used according to Sierra (1994) and George and Mallery (1995), to consider the statistic as acceptable; and, consequently, the reliability of the scale must exceed the critical level of 0.7, which, following the recommendations of Nunnally (1987) and Peterson (1994), is considered the minimum for preliminary research. The levels reached exceed the established critical value (Table 3).

Instrumento	Alfa de Cronbach
General	.952
Innovación	.900
Procesos colaborativos	.861

Table 2 Results of the reliability analysis of the instrument

According to the results, it was concluded that the scales used in this research can be considered acceptable (Hernandez et al., 2010, p.208). Once Cronbach's Alpha was calculated for each variable, it was calculated for each of the sub-variables (Table 4). The value obtained for each dimension is greater than 0.7, which means that the instrument is reliable.

Variable	Dimensión	Alpha de Cronbach
Innovación	Tipo de innovación	.777
	Innovación organizacional	.805
	Financiero	.708
	Estrategia de cooperación	.824
	Apoyo gubernamental	.793
Procesos colaborativos	Colaboración vertical	.837
	Tecnologías de la Información (TI)	.719
	Cooperación interna-externa	.770

Table 3 Results of the reliability analysis of the instrument

General validity of the instrument

A correlational analysis was carried out between the dimensions of the variables and the levels reached by them, exceeding the critical value of 0.3 established, with these values it was confirmed that the scales used in this research can be considered valid (Table 5 and Table 6).

	Tipo de innovación	Innovación organizacional	Financiero	Estrategia de cooperación	Apoyo Gubernamental
Tipo de innovación	.777**				
Innovación organizacional	.647**	805**			
Financiero	.582**	.584**	708**		
Estrategia de cooperación	.633**	.801**	.715**	.824**	
Apoyo Gubernamental	.557**	.520**	.566**	.523**	.593**

Table 4 Results of the validity of the Innovation variable

The results showed that the variables collaborative processes and innovation showed an average positive correlation of 0.583 with a positive direction (Table 7), which meant that collaborative processes have an association with innovation within the rubber and plastic manufacturing SMEs of Mexico, therefore the hypothesis is accepted.

		Procesos colaborativos	Innovación
Procesos colaborativos		1	.583**
Innovación	Correlación de Pearson	.583**	.1

** La correlación es significativa al nivel 0.01 (bilateral)

Table 5 Result of hypothesis H

Conclusions

According to the results obtained in this investigation, it is concluded that within the SMEs that manufacture plastic rubber in Mexico. The type of innovation of this type of company is incremental in its products according to the needs or requirements of its client in relation to the development of new products; Together, this type of innovation is due to the fact that the SMEs analysed in this study are proactive oriented to a Push strategy, in addition, these companies consider that by innovating they obtain greater profits and this impacts their profits. It was determined that the innovation process emanates from a set of relationships of the main actors in the value chain (customers and suppliers).

Together, the rubber and plastic manufacturing SMEs in Mexico are often left out of public aid programs, often due to ignorance or because of the formalization and documentation they require to access this type of support.

In addition, the development of its products is carried out in accordance with the expectations of its clients and that when innovating, the opinion of its workers is important, finding more creative and innovative solutions when developing its products.

Thes IT' are important in SMEs since it facilitates collaborative processes within their areas or departments and that by collaborating allows them to reduce their costs and production times.

In conclusion, considering that the objective of this study is to identify the collaborative processes that are related to innovation in rubber and plastic manufacturing SMEs in Mexico, it is verified through the analysis of the data that there is an average positive correlation between the innovation and collaborative processes.

The results of this research are important since they provide guidelines to entrepreneurs of rubber and plastic manufacturing SMEs in Mexico, about the types of factors that must be taken into organizations in order to improve the performance of innovation within your industry.

The limitations of the study are the size of the sample, which is relatively small, preventing some statistics from being significant, which would have allowed a more precise analysis of the results taking into account the size of the company (micro, small and medium).

Another limitation was that said survey was only applied to company managers and it is advisable to use informants from different levels to limit the possibilities of perceptual bias.

Derived from the above limitations, the possibility of generating new lines of research is opened where a more significant sample of companies is considered first, likewise, instruments for data collection can be applied to more individuals within each organization and where you can delve into some important results of this research.

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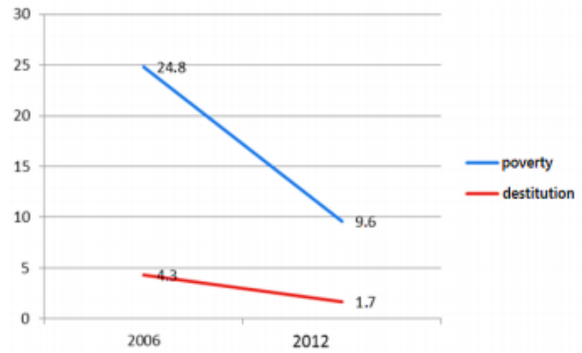

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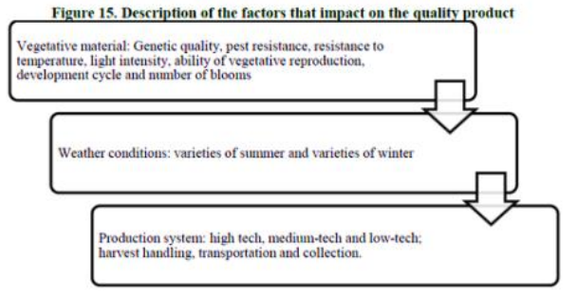

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