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EFQM of clusterization model of SMEs in the middle east of the State of Mexico

Modelo EFMQ de clusterización de PYMES en el oriente del Estado de México

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Abstract

Small and medium enterprises are a sector of growing importance in the economic development of the State of the State of Mexico, which can be modified very quickly. Thus, every day there is an increasing interest to understand more and better than the way in which the economies are energized, however, although there are the conditions of infrastructure and technology that allow for transactions of distribution and supply of goods in a Effective, There are several factors that limit, which SMEs use as an instrument for continuous improvement and the productivity of them, an internal level. SMEs are responsible for the efficient planning, administration and control systems, as well as the own technologies for the management and development of their productive activities, due to the lack of a geographical concentration of companies and associated institutions in a particular field, which It would help to be linked by common characteristics and continuous improvement. This project has the participation of companies in the realization of activities related to the value of housing and the value of housing. an objective, rigorous and structured analysis of its operation, resulting in an optimal renewal in its management and continuous improvement.

Objectives, methodology: Design a new business cluster system using multivariate statistics in combination with an EFQM model, as a comprehensive quality tool, that allows SMEs in the State of Mexico to maximize competition by taking advantage of opportunities in the networks and value chains of the products resulting in an optimal renewal in its management and continuous improvement.

Contribution: The following project will consolidate and potentiate the competent business management in its different typologies; the importance of creation and innovation factors in the competitive development of an SME compared to the traditional archetypes of the business world; High performance teams in small and medium organizations; the role of vision in the functioning of SMEs; making strategic decisions, both from the point of view of a potential entrepreneur and that of a manager whose organization is in the process of development; the design and implementation of quality strategies with an EFMQ model; the need to implement business contact networks as a substantial element of organizational development and the constituent base of the company's social capital; empower human talent; the marketing tools for the benefit of our region and the inclusion of university students in said project, seeking the strengthening and growth of Mexico.in vector control systems and direct control of DC motors, this relatively new technology is used to efficiently replace equipment that no longer works optimally according to technological advances Which is essential to an emerging country like ours. The data necessary to train the artificial neural networks will be obtained firstly from the results of simulations of the system formed by the motor and its control and secondly from experimental results. To this end, a DC motor model is implemented that will be tested with different nominal values and controlled with different control systems by training it with neural networks.

SMEs, EFQM, Cluster, Quality, Competitiveness

Resumen

La pequeña y mediana empresa es un sector de creciente importancia en el desarrollo económico del Oriente del Estado de México, ya que dichas organizaciones se pueden adaptar rápidamente a los cambios en el entorno. De esta manera, cada día se incrementa el interés por comprender más y mejor la forma en la que se dinamizan las economías, sin embargo, si bien existen condiciones de infraestructura y tecnología que permiten realizar transacciones de distribución y suministro de mercancías de manera efectiva, hay varios factores que limitan, el que las SMEs las utilicen como instrumento para una mejora continua y productividad de las mismas, a nivel interno las SMEs carecen de "sistemas de planeación, administración y control eficientes, así como de tecnologías propias para la gestión y desarrollo de sus actividades productivas, debido a la falta de una concentración geográfica de empresas e instituciones asociadas en un campo particular, lo cual ayudaría a estar vinculadas por características comunes y a una mejora continua. Este trabajo propone la implementación de un nuevo sistema de clúster empresarial en combinación con un modelo EFQM de Excelencia que permita ayudar a las SMEs a maximizar la competitividad aprovechando las oportunidades en las redes y cadenas de valor de los productos y a conocerse mejor a sí mismas realizando un análisis objetivo, riguroso y estructurado de su funcionamiento dando como consecuencia una renovación optima en su gestión y mejora continua.

Objetivos, metodología: Diseñar un nuevo sistema de clúster empresarial utilizando estadística multivariada en combinación con un modelo EFQM, como herramienta integral de calidad, que permita a las SMEs del Oriente del Estado de México maximizar la competitividad aprovechando las oportunidades en las redes y cadenas de valor de los productos dando como consecuencia una renovación optima en su gestión y mejora continua.

Contribución: El siguiente proyecto, consolidara y potencializara la dirección empresarial competente en sus diversas tipologías; la importancia de los factores de creación e innovación en el desarrollo competitivo de una PYME frente a los arquetipos tradicionales del mundo empresarial; los equipos de alto desempeño en pequeñas y medianas organizaciones; el papel de la visión en el funcionamiento de las SMEs; la toma de decisiones estratégicas, tanto desde el punto de vista de un emprendedor potencial como del de un directivo cuya organización se encuentra en proceso de desarrollo; el diseño y la implementación de estrategias de calidad con un modelo EFMQ; la necesidad de implementar redes de contacto empresarial como elemento sustancial de desarrollo organizacional y base constitutiva del capital social de la empresa; potencializar el talento humano; las herramientas de marketing en beneficio de nuestra región e inclusión de jóvenes universitarios en dicho proyecto, buscando el fortalecimiento y crecimiento de México.

SMEs, EFMQ, Clúster, Calidad, Competitividad

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Introduction

We live in a competitive and globalized world in which the growing activity of the SME sector within the economy has resulted in a greater interest in knowing the organizations that provide services. Only at the beginning of this year in Mexico the aggregate index of the income obtained by the SMEs benefit registered a growth of 2.5% and that of the total remunerations of 1.8% according to INEGI data.

One of the most relevant issues for improving the analysis of the knowledge of organizations in the SME sector is the possibility of classifying them in subsets with the greatest possible homogeneity, since this would allow a more complete analysis and knowledge of their nature and evolution that could result of the general analysis of the set with results that guarantee high efficiency and effectiveness in the results of the processes. Several authors have analyzed aspects of the international character of the supply chain in business clusters, where it is verified that most of them focus on the international analysis of the environment rather than on the possibility of its use from a point of clustering in the systems; that leaves, a huge vacuum to be able to investigate these issues.

The need to investigate in the field of logistics from the scope of the supply channel has been raised by several researchers. Thus, proposals such as Dresner and Xu (1995), Luque (2005), Denis and Czellar (2003), Van Der Veeken and Rutten (1999) or Mentzer and Williams (2001) have raised the need to pay more attention to the investigation of different aspects of the logistic function such as the speed of response, the physical execution, and the management of the information systems.

On the other hand authors such as: Denis and Czellar (2003), Llaur Burnham (1999), Fletcher (2004), Chinn and others have conducted research on the subject paying attention to the possibilities and perspectives of countries on the "structural aspects" "Basic such as the development of the information infrastructure of the location of the companies, attention to the fiscal and customs aspects, protection of the client's privacy, security, development and regulations on the content, technical standards and interoperability, education and employment.

If the aforementioned constituent components of a continuous improvement or Integral quality are visualized, it is understood the need to manage it as an essential part of the administrative model adopted by the organization, to achieve profound and lasting changes, to facilitate the harmonious development of the organization, and Lastly, to guarantee the sustainability over time of the company.

Despite not having matured yet, this issue is growing at great speed, incorporating new achievements in the production and distribution cycle. It is interesting to analyze these implications taking into account their potential both economically and socially.

But, above all, what really makes this issue relevant is the great impact of having conglomerates of logistically designed companies with the ability to manage and formulate themselves in an appropriate manner, achieving that communication and marketing or distribution channels focused directly towards the customer, wholesalers and retailers, form a vital connection between the company and its customers.

2.- Method description

Materials

A mixed analysis will be carried out that intends to classify entities into homogeneous groups using multivariate methods and quality engineering, which consists first of all of a factor analysis according to the nature of the data and then a classification based on a mixed algorithm; later a hierarchical classification will be made with the method of Ward and aggregation around mobile centers (K-Medias) which is a method of grouping, which has as objective the partition of a set of n observations in k groups in which each observation belongs to the group closest to the average.

The grouping of the data set can be illustrated in a partition of the data space in Voronoi cells (Thiessen polygons). With this we will finally obtain a partition of the data set and the characterization of each of the classes according to the active and illustrative variables.

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Make an alternative analysis using EFQM as a tool for continuous improvement and Netlogo as a simulator that can be used for the solution and forecast of the cauterization systems with application to SMEs to form estimates of the average values of cyclic index, valence and perimeter. In addition, it will serve to study the shortest scope between the percolation that occurs between the clusters, analyzing their properties and helping them to know each other better and to carry out an objective, rigorous and structured analysis of their operation and, consequently, to improve their management.

Multivariate Statistics tools will be used in order to simultaneously analyze multivariate data sets in the sense that there are several variables measured for each individual or object studied, which with univariate and bivariate statistical methods that are unable to achieve.

With this it will be possible to finally obtain a partition of the data set and the characterization of each of the classes according to the active and illustrative variables that will be compared with an analysis by means of the use of the Netlogo software.

Results

Information was taken from 1000 small and medium-sized companies in the region based on a single factor if there was a close relationship with other. As an initial process, basically, the classification of these entities into homogeneous groups consisted. To carry out this, several partitions of the initial set were made, using different centers each time and maintaining as stable groups the sets of elements (or individuals) that in each of the partitions were always assigned to the same class.

Following the idea that is exposed in Lebart et al. (2006), the steps to find stable groups are:

1. Determination of S partitions each one from a set {Ci1, . .,Ciq} con i= 1, . . . , s.
2. For the set S of the partitions {P1, P2, . . . , Ps} each in q classes, in the product partition, the class indexed by {k1, k2, . . . , ks} contains the individuals belonging to the class k1 of the partition P1, then the class k2 of P2 up to reach the class ks of Ps.
3. Stable groups are formed with classes that contain more than one individual of the product partition.

The idea is to obtain 6 homogeneous groups from the group of 1000 individuals (SMEs). Initially a partition of the set is made in 6 classes around mobile centers, then the procedure is repeated twice, obtaining for each of the partitions the results presented.

According to the steps mentioned above, you must now find the product partition. Since there are 3 partitions each with 6 classes, the product partition has a total of 36 = 216classes.

The individuals in each of the 216 classes are those that in each of the partitions were always grouped together.

In general, the number of classes obtained in the product partition is very large and, in fact, many of them have low frequencies. Therefore, one suggestion is to take classes that have significant frequencies. The number of these groupings can be identified by a jump in a bar graph of the frequencies of the groups. In this case the first 7 clusters have significant frequencies Lebart et al. (2006)

The initial method allows us to have a common framework in the conglomerate formation process. For the classification process, the previous factor analysis is a pre-treatment, which transforms the original data into uncorrelated continuous variables. Taking all the factors for the formation of conglomerates is equivalent to making a classification of the rows of the data table using the original variables.

Taking fewer factors involves filtering: it is assumed that the axes used for the classification have the relevant information and that the rejected ones are due to the random fluctuations that constitute the noise. The eigenvalue diagram guides the decision on the number of axes used in the classification. Sometimes, especially in small tables, all axes are used.

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Recommendations

As we have seen when developing and implementing an EFMQ clustering model in SMEs in the East of the State of Mexico, productivity has been increased in this sector, so it is recommended that researchers interested in continuing with the research refine the system and concentrate in determining the variables that intervene to accelerate the penetration of the systems in all SMEs in an optimal and reliable way.

Conclusions

The growing interest and concern of the economies to reach favorable growth rates has been a constant challenge, which is why it was intended to present the development of clusters as alternatives to achieve regional growth. We used an analytical method that compares different theories and identify the most convenient to obtain beneficial results for interest groups and society in general.

The analysis of the clusters studied shows how these contribute to the dynamism in the creation of companies, and stimulate the productivity of innovative SMEs derived from the different sectors within the clusters. In addition, in the creation of companies, clusters exert a great influence due to the increase in demand for indirect services.

With the development and implementation of an EFMQ model of clusterization of SMEs in the East of the State of Mexico, it has been possible to promote, contribute and strengthen the families and young entrepreneurs of our region, since the income that they have generated has raised employment rates and increased export rates.

With this, the importance today of the initiative of a powerful company within the cluster is clarified and as this system is consolidated, the competent business management in its different typologies of creation and innovation factors in the competitive development of an SME will be strengthened. facing the traditional archetypes of the business world.

The role of the vision in the operation of SMEs, strategic decision making, both from the point of view of a potential entrepreneur as well as that of a manager whose organization is in the process of developing, designing and implementing strategies for quality with an EFMQ model, the need to implement business contact networks as a substantial element of organizational development and the constituent base of the company's social capital will achieve the strengthening and growth of Mexico.

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