Use of management indicators in the Valle de Aguascalientes industrial park

Uso de indicadores gerenciales en el parque industrial del Valle de Aguascalientes

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Abstract

This research is the result of 3 investigations carried out in three of the main Industrial Parks of the state of Aguascalientes, Mexico. The industrial parks on which this research is based are the San Francisco de los Romo Park, the Industrial Park of the Aguascalientes Valley, known as PIVA and the Santa Clara Park. The purpose of this paper is to investigate which are the Management Indicators used by the Automotive companies in the Industrial Park of the Aguascalientes Valley. The most important aspects of the companies they incur in implementing the management indicators of the areas of:

- Administration.
- Human Resources.
- Production.
- Logistics.
- Maintenance.

KPI, Management Indicators, Automotive Industry, Aguascalientes

Resumen

Esta investigación es el resultado de 3 investigaciones realizadas en tres de los principales Parques Industriales del estado de Aguascalientes, México. Los parques industriales en los cuales se basa esta investigación son el San Francisco de los Romo, el Parque Industrial del Valle de Aguascalientes, conocido como PIVA y el Parque Santa Clara. El presente trabajo tiene como objeto investigar cuales son los Indicadores Gerenciales que utilizan las empresas Automotrices en el Parque Industrial del Valle de Aguascalientes. Se analiza los aspectos más importantes de las empresas en los que incurren al implementar los indicadores gerenciales de las áreas de:

- Administración.
- Recursos Humanos.
- Producción.
- Logística.
- Mantenimiento.

KPI, Indicadores Gerenciales, Industria Automotriz, Aguascalientes

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Introduction

This report presents an analysis of the use of Managerial Indicators in automotive companies in the San Francisco de los Romo Industrial Park.

A survey was carried out to analyze the use of these Indicators, here the necessary questions were formulated to contemplate the most important KPI's within an automotive company. The areas of the companies where the use of indicators was contemplated are:

- Administration.
- Human Resources.
- Production.
- Logistics.
- Maintenance.

The results of the survey applied to a sample of 4 companies from a universe of 1 company that correspond to 36% of the automotive industry in said park are shown below.

This project benefits the automotive and metal mechanical industries as it allows us to know what the strengths and weaknesses are regarding the use of these indicators in this industrial park.

Methodology

According to Hernández Sampieri (2010) the study that was applied was a "Quantitative Exploratory" study where a survey-type data recovery tool will be used.

Sampling

The type of sampling that was carried out was stratified. The advantage of this type of sampling is that it tends to ensure that the sample adequately represents the population based on selected variables. It also allows obtaining more precise estimates and its objective is to obtain a sample that is as similar as possible to the population in terms of the stratified variable (s).

The result was a sample of 4 companies out of 11 registered as automotive companies. Which represents 36% of the companies that could be explored.

Automotive companies in the industrial park of San Francisco de los Romo Aguascalientes
- San-s Mexicana SA de CV.
- K&S Mexicana Harness Systems.
- Gestamp México SA de CV.
- Kotobukiya Treves from Mexico.
- Sacred Mexicana SA de CV.
- Calsonic Kansei.
- Mabuchi Motor.
- Suncall.
- Sumimoto.
- ITW Automotive Products México SA de CV.

Table 1

Background

Currently, to measure and improve their processes, companies use statistical measures based on the objective of evaluating the performance of an organization, a system or a process through indicators. The evolution of the concept of metrics in quality management, as explained by Professor Michael A. Noble of the University of British Columbia, has been radically transformed in recent decades.

The dates of how the stages for the development of an indicator were named are listed below.

1920: plan - do - see (Walter A. Shewart).

1940: plan - do - check - take action (J. Edwards Deming).

1980: define - measure - analyze - improve - control (Bob Galvin).

Today: normalization. The era of ISO 9001 quality indicators and the rest of the families.

Companies must determine, collect and analyze the appropriate data to demonstrate the adequacy and efficiency of the quality management system and assess where it is necessary to apply continuous improvement to optimize their processes. For this it will mainly measure: efficiency, effectiveness and productivity, based on ISO 9001: 2015.

The elementary information that this normative framework offers us is that they limit efficiency as the degree to which planned activities are carried out and planned results are achieved, it tells us about productivity as the relationship between the result achieved and the resources used, and the efficiency as a relationship between the result achieved and the resources used.

Performance indicators are measurements that are made in the different stages of the vital processes of the company in order to identify with the greatest objectivity possible the degree to which said stage is contributing or harming the achievement of strategic objectives. These stages range from the inputs that a company requires to function, through the internal processes of transformation of said inputs, until reaching the deliverables to the final customers.

For the application of the use of managerial indicators in industrial parks, it is necessary to carry out a questionnaire that is divided into 5 areas to analyze such as maintenance, administration, logistics, human resources and production, each of the areas contains in turn 10 indicators. which serve to know which ones are used by companies and which ones are not.

Below is the list of areas to analyze:

Administration

The administration department. It analyzes the processes, inputs and outputs, it also offers improvements in the company and, on the other hand, based on real numbers, it must know how to expose where it is possible to reduce costs and invest. In this way, you can increase your profits. It is not just a matter of keeping the documents up to date or of keeping the accounts well, but of having a broad vision of the company and showing areas for improvement.

The indicators of the administration area are:

- KPI administrative efficiency.
- KPI financial and budget information reports.

- KPI level of innovation of the company.
- KPI inventory turnover.
- KPI utility indices.

Human Resources

The task of this area is to carry out personnel planning, that is, to determine what is the need for labor that the company will have at a certain time, what type of profiles will be necessary, what type of contracts will be done and what will be its cost.

Its indicators are the following:

- KPI Growth rate on the learning curve.
- KPI Degree of satisfaction in Kpi training courses.
- KPI Compliance with hours of training classes.
- KPI Staff turnover.
- KPI Effectiveness of advertising in personnel searches.
- KPI Average time of unfilled vacancies.
- KPI Absence rate.
- KPI Compensation or benefit ratio.
- KPI Contract cost.

Production

It is the area whose main function is the transformation of raw materials into final products. It has several levels or positions within its hierarchical structure such as workshop operators, workshop managers or team leaders, production manager or production manager, production engineers or specialized technical staff.

Its indicators are the following:

- Returns KPI.
- KPI of rejections.

- Unplanned rush production KPI.
- KPI raw material stock.
- KPI raw material inventory turnover.
- KPI machinery delays.
- KPI demand forecast errors.
- KPI of input requirements.
- KPI effectiveness in compliance.
- KPI delivery effectiveness.

Logistics

This area is in charge of carrying out the planning and control of all activities related to the obtaining, storage and transfer of materials, whether from the raw materials necessary in the first stages of the production process to the finished products that go directly to the client. final.

The indicators of the logistics area are as follows:

- KPI orders delivered with claims.
- KPI cost of unit stored.
- KPI clearance compliance level.
- KPI unit costs dispatched.
- KPI units separated or dispatched per employee.
- KPI urgent shipments.
- KPI deliveries on time (%).
- KPI transportation costs (%).
- KPI operating cost per driver.
- KPI purchase order fulfillment.

Maintenance

In this area, activities of a technical-organizational nature are carried out to restore optimal operating conditions for equipment and machinery. This measure may or may not be previously prepared according to a plan that ensures the constant work of the teams, in addition to establishing the needs of human, material, financial resources and the organizational structure to achieve the objectives set by the implemented system.

The indicators in the maintenance area are:

- KPI corrective maintenance ratio vs. preventive.
- KPI preventive maintenance tasks completed on date.
- KPI response time of maintenance department.
- KPI maintenance cost per square meter.
- KPI number of incidents resolved by first plant level.
- KPI hours used for production and unemployment.
- KPI availability for breakdowns.
- KPI corrective index.
- KPI material consumption.

Results

Administration indicators

100% of the companies surveyed in the Parque Industrial Del Valle De Aguascalientes, use administrative efficiency in kpi, their objective is to obtain if operations are becoming more efficient.

In the kpi financial and budget information reports, it measures the elaboration of the part of expenditures by expenditure chapter of the quarterly report / No. of commitments x 100. 100% of the companies implement this indicator.

In the Valle de Aguascalientes Industrial Park, 67% of the companies use the company's innovation level kpi, the main objective of this indicator is to determine the company's degree of innovation in a given period. And 33% of companies do not implement it.

Graphic 1 Use of the company's innovation level KPI

The inventory turnover kpi 100% of the surveyed companies have more than one year applying this indicator which measures the average inventory / inventory turnover.

The KPI indices of profit, which measures net margin = net profit after taxes / sales. 100% of the companies surveyed in the Valle de Aguascalientes Industrial Park apply this indicator.

Human resources indicators

100% of the companies in the Parque Industrial Del Valle De Aguascalientes have been applying the kpi growth rate in the learning curve for more than one year, which measures the average level of grades in current exam / average level of grades in previous exam x 100.

The kpi degree of satisfaction in training courses, its metric is average level of qualification in current exam / average level of qualification in previous exam x 100. 100% of the companies surveyed in the Parque Industrial Del Valle De Aguascalientes implement it.

Of the companies surveyed in the Aguascalientes Valley Industrial Park, 33% have been implementing the KPI indicator for more than one year, compliance with training class hours, this indicator provides better control of compliance with training programs. 67% do not implement this indicator.

Graphic 2 Use of kpi compliance with training class hours

100% of the surveyed companies use the staff turnover kpi, which allows measuring the number of resignations / average number of permanent employees x 100.

Of the companies consulted in the Valle De Aguascalientes Industrial Park, 33% implement the kpi effectiveness of advertising in personnel searches, its measurement is the Number of CV to interview / total CV received, 67% of the companies do not is implemented by this indicator.

Graphic 3 Use of the advertising efficiency kpi in personnel searches

The KPI average time of vacancies not covered 67% of companies have more than one year using this indicator, its metric is days vacancies / number of open positions, 33% do not implement this indicator.

Graphic 4 Use of kpi average time of unfilled vacancies

From the companies consulted in the Valle de Aguascalientes Industrial Park, it was obtained that 100% implement the kpi absence rate. This indicator allows knowing the labor supply index within the company.

The compensation or benefit ratio kpi that measures the compensation or cost of benefits / income, the companies of the Parque Del Valle De Aguascalientes 100% have been implementing this indicator for more than one year.

Of the companies surveyed, 100% implement the hiring cost kpi, this indicator helps companies to know the expenses of personnel in a company such as gross salaries and social security charges.

Production indicators

Of the companies surveyed in the Parque Industrial Del Valle De Aguascalientes, 67% apply the return kpi, this indicator measures the amount of returned products / amount of total products shipped. 33% do not implement this indicator.

Graphic 5 Use of returns KPI

Of the companies surveyed, 100% apply the rejection kpi, its objective is to identify the product out of specifications and customer requirements.

100% of companies have implemented the kpi of unplanned urgent production for more than a year, this indicator helps companies to identify machine stoppages for various reasons.

The companies of the Parque Industrial Del Valle De Aguascalientes implement 100% the KPI stock of raw materials, to reduce the inventory of raw materials, finished products, containers, spare parts, etc.

The KPI inventory turnover of raw materials 100% of companies have been implementing this indicator for more than a year, its metric is cost of products sold / average stock of finished product.

A percentage of 100% of the surveyed companies was obtained on the application of the machinery delay kpi, this indicator has as main objective to keep the record of the operations to carry the delay indicators.

100% of the companies surveyed in the Valle De Aguascalientes Industrial Park have been implementing this indicator for demand forecast errors for more than a year, which allows taking into account the assertiveness of the forecasting method. KPI of input requirements 100% of the companies use this indicator, it allows to measure the quantity of inputs used / quantity of products.

Of the companies surveyed in the Parque Industrial Del Valle De Aguascalientes, 100% implement the KPI effectiveness in compliance, this indicator presents the key elements to consider to measure customer satisfaction regarding the design of the service that will be presented to the customer.

Graphic 6 Use of KPI delivery effectiveness

67% of the surveyed companies use the kpi effectiveness in delivery, this indicator allows to measure the days or hours of delay accumulated in the dispatches / N of dispatches made. 33% do not implement this indicator.

Logistics indicators

67% have more than a year applying the kpi delivery orders with claims, this indicator keeps track of orders that present claims or complaints because the product has arrived damaged or other causes. And 33% do not implement it.

The companies surveyed in the Parque Del Valle De Aguascalientes, 67% implement this indicator kpi cost of stored unit, its main objective is to control the unit value of the cost for its own distribution storage. 33% of companies do not implement it.

The KPI level of fulfillment dispatched 67% of the companies implement this indicator, its main objective is to control the efficiency of dispatches made by the distribution center. 33% of the companies in the Industrial Park Del Valle De Aguascalientes do not implement it.

100% of the companies surveyed in the Parque Industrial Del Valle De Aguascalientes apply the kpi cost unit dispatched, this indicator carries the percentage of handling per unit on the operating expenses of the distribution center.

Of the companies surveyed, 67% have been implementing this indicator kpi for more than a year, separate units or dispatched per employee, its metric is total units dispatched / total workers. 33% do not implement this indicator.

67% of the companies in the Parque Industrial Del Valle De Aguascalientes implement the kpi urgent shipments, this indicator helps to know the amount of shipments sent urgently against the total shipments dispatched. 33% of automotive companies do not implement it.

Graphic 7 Use KPI effectiveness in delivering express shipments

The indicator deliveries on time, its metric measures the number of deliveries on time / number of total deliveries x 100, 100% of companies implement it.

100% of the surveyed companies apply the kpi cost of transport to this indicator measures the cost of transport / total sales value x 100. The indicator kpi operating cost per driver is implemented by 33% of the companies surveyed in the Parque Industrial Del Valle De Aguascalientes, its measurement is the total cost of transportation / number of drivers. And 67% of companies do not implement this indicator.

100% of companies implement the purchase order fulfillment kpi, its objective is to measure the length of the supply chain in time.

Maintenance indicators

The corrective maintenance vs. preventive, measures the number of hours spent on corrective tasks / number of preventive tasks 100% of the companies surveyed have been implementing it for more than a year. The companies surveyed in the Parque Industrial Del Valle de Aguascalientes 100% implement the KPI preventive maintenance tasks completed on that date, this indicator aims to control that the prevention tasks are carried out and completed in the planned times.

100% of the surveyed companies have been implementing the maintenance department's response time kpi for more than a year, their objective is to develop fast and efficient order service processes.

Of the companies surveyed, 67% implement the maintenance cost kpi per square meter. This indicator measures the Number of incidents resolved by PNP / total number of reported incidents x 100. And 33% do not implement it.

Of the companies surveyed in the Valle De Aguascalientes Industrial Park, 67% implement the kpi number of incidents resolved by the first level of the plant, this indicator aims to eradicate the causes of complaints about damage to the products delivered. And 33% of companies do not implement this indicator.

The KPI hours used for production and those of unemployment, 100% of the companies of the Parque Industrial Del Valle De Aguascalientes use this indicator, it measures the hours of unemployment for maintenance / hours of production carried out x 100.

The companies in which the survey was carried out 100% apply the kpi availability due to breakdowns, which allows to know the availability due to breakdown all those scheduled stops of the equipment.

Of the companies surveyed, 100% have been implementing the corrective index kpi for more than a year, it is a useful indicator to implement a preventive maintenance plan in the plant.

100% of the companies in the Parque Industrial Del Valle De Aguascalientes use the material consumption indicator, its main objective is to identify the items referring to maintenance, modifications and new facilities.

Conclusions

Of the automotive companies analyzed, it can be seen that of the 5 groups that make up the total of managerial indicators, the following results were obtained:

In a group of Management Indicators made up of 5 attributes, it can be concluded that 80% of the indicators that make up this construct, companies take them to 100%.

For the group of Human Resources Indicators made up of 8 attributes, it can be concluded that only 62.3% of the indicators that make up this construct, the companies carry them to 100%.

The Production Indicators, made up of 9 attributes, represent the structure that is most met with a total of 89% of the indicators taken to 100% by each of the companies.

Regarding the Indicators that make up the Logistics construct, which are 9 attributes, only 33% of these indicators are taken to 100% by each of the companies surveyed, which represents the construct with the lowest rate of application of them.

And as regards the indicators that make up the maintenance construct out of a total of 9 indicators, only 77% is taken to 100% by each of the companies surveyed.

Recommendations

It is recommended to carry out a root cause analysis to determine the origin of why the indicators have not been carried out 100% in those areas that are with a low percentage in their application, since they represent areas of great importance where it is unpredictable to have metrics or parameters to determine the application of improvements to make your processes more efficient.

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