

Study and measurement of the productivity in the printing industry in Villahermosa Tabasco to develop an improvement proposal

Estudio y medición de la productividad en la industria impresora en Villahermosa Tabasco, para desarrollar una propuesta de mejora

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DOI: 10.35429/EJROP.2021.13.7.20.26

Received July 25, 2021; Accepted December 30, 2021

Abstract

Productivity is one of the paths that a company must take to achieve its objectives, goals and purposes, working effectively and efficiently. To achieve a culture of measurement, it is important to perform a productivity analysis, which will help to obtain adequate information to create development recommendations in the near future. This work provides information on the results obtained from a productivity measurement study in a sample of companies in the printing industry, in Villahermosa Tabasco, which helps to understand and adapt business needs within the cultural, environmental, technological, economic and political variables. To carry out this study, a measurement instrument has been used that obtains specific information on the elements that an organization must have for the development of productivity, this tool is called Comprehensive Productivity Assessment Technique (TIEP), the which will give us results that serve to generate a model for improving productivity, which will be of great help for the growth of this business sector with positive results that bring benefits to the region and society.

Productivity, Printing, Improvement

Resumen

La productividad es uno de los caminos que una empresa debe tomar para lograr sus objetivos, metas y propósitos, trabajando de manera eficaz y eficiente. Para lograr una cultura de medición, es importante realizar un análisis de productividad, que ayudará a obtener información adecuada para desarrollar recomendaciones de desarrollo en un futuro próximo. Este trabajo proporciona información de los resultados obtenidos de un estudio de medición de la productividad en un muestreo de empresas de la industria gráfica, en Villahermosa Tabasco, que ayuda a comprender y adaptar las necesidades empresariales dentro de las variables, culturales, ambientales, tecnológicos, económicos y políticos. Para la realización de este estudio, se ha utilizado un instrumento de medición que obtiene información específica de los elementos que una organización debe de tener para el desarrollo de la productividad, esta herramienta se llama Técnica integral de evaluación de la productividad (TIEP), la cual nos dará resultados que sirven para la generación de un modelo de mejoramiento de la productividad, que será de gran ayuda para el crecimiento de este sector empresarial con resultados positivos que traigan beneficios a la región y a la sociedad.

Productividad, Impresión, Mejoramiento

Citation: LÓPEZ-CASTRO, Carlos Adolfo, CASTRO-DE LA CRUZ, Jucelly, ESTEBAN-CONCHA, José Manuel and HERNÁNDEZ-ZURITA, Pamela. Study and measurement of the productivity in the printing industry in Villahermosa Tabasco to develop an improvement proposal. ECORFAN Journal-Republic of Paraguay. 2021. 7-13:20-26.

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Introduction

Productivity is defined in a few words as the sum of effectiveness and efficiency, which is the fulfilment of objectives through the correct use and optimization of available resources.

In the present work it can be appreciated through the study of a group of companies focused on the printing business, the approach to the problem of lack of productivity in this business sector.

The main hypothesis is that these companies are being affected by the change in context variables. The data and information presented have been taken through the use of a comprehensive productivity measurement tool, which covers ten key criteria that every organization must have for the development of productivity, which help us to study it and relate it to the environment. internal and external of the organization, this is important because this means that the tool takes into account factors and that perhaps within the organization they can be controlled and at the same time, the interaction that these have with factors, mainly outside the organization that they cannot be controlled, and how the change of one can affect or favour one or more areas of the company.

Also, the improvement proposal that aims to help the business sector studied is presented.

Problematic

Some of these companies have fallen into a stagnation in their continuous improvement, losing their vision for the future and presenting lack of innovation, each of these factors directly affect productivity, causing obstacles and non-conformities in the fulfilment of the objectives and the achievement of desired results, leading to some of the companies in this sector to cease their work.

Investigation methodology

To obtain the data and information that were necessary to carry out this productivity study, it was necessary to know the size of the study field in the city of Villahermosa Tabasco, this was to carry out the necessary sample for the study and focus mainly in this one.

The printing companies that met the requirements to be considered in this study were four, and for the investigation to be as equitable as possible, it was required to determine the areas in which these companies are divided, highlighting those departments that have in common and that they have greater participation in the productive processes of each organization.

The departments that were analyzed in each of these companies were:

- Administration.
- Accounting.
- Marketing.
- Human Resources.
- General management.

Obtaining the information required several visits to the companies, trying to obtain valid and true information, referring to the following context variables:

- Social.
- Economic.
- Political.
- Technological.
- Cultural.
- Environmental.

Measuring instrument

The measurement tool must be structured in such a way that these key elements that an organization must have can be directly related to each of the context variables to be analyzed, this will allow biases to be avoided in the collection of information. and that each data collected is of great importance for the study, since there is no conditioning for some element in the interaction to omit some variable from the context.

The main information that the instrument obtains is the degree of knowledge that the employee within the organization of this business sector has regarding each of the elements of the instrument, and the way it interacts with the variables of the context, as well.

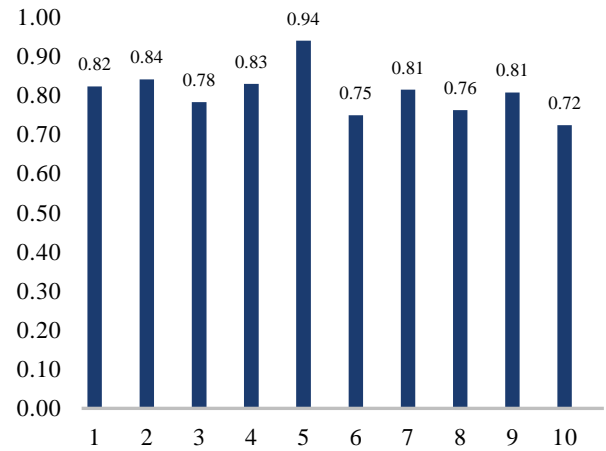
The ten elements that make up the productivity measurement tool are the following, and their numbering helps to interpret the graphs that are presented in the results section.

1. Conceptual approach of the company
2. Knowledge of the processes
3. Social scope of the organization
4. Planning administration
5. Management participation
6. Creativity and organizational innovation
7. Knowledge of the client (s)
8. Technological development
9. Macroeconomic knowledge
10. Comprehensive development of human resources.

Results

Obtaining the information has been carried out through interviews with each of the workers involved from each of the selected departments of each organization in the sample, all in an impartial way without taking a preference from one to another, several were required. visits and sessions so that the information obtained does not have biases at some stage of the application of the productivity measurement instrument.

Below are the graphs that show the results of both the simple averages of each of the elements, as well as the composite average of them.

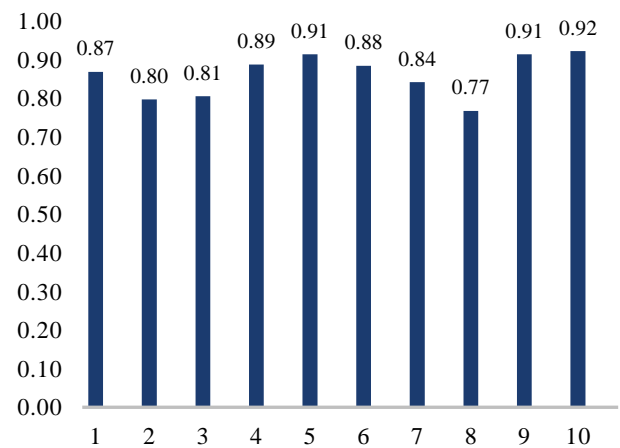


Graphic 1 Results obtained in composite averages of company 1

Source: Author's perception, 2021

In this graphic the quantitative evaluations are taken into account, but with the difference that in this case they are being averaged together with the weights of each of the elements in relation to the context variables. Therefore, in the results, it can be seen that the directive participation in this organization has the best of the scores presented in the graph, marking a slight difference with the planning administration.

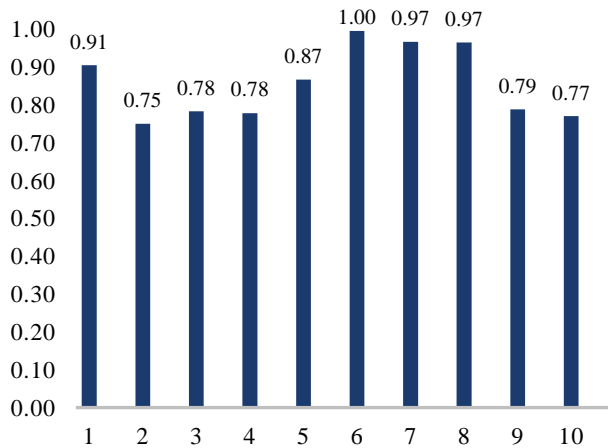
However, results are presented to take into consideration in the creativity and organizational innovation qualifications with the integral development of human resources, these having the lowest score in the graph.



Graphic 2 Results obtained in composite averages of company 2

Source: Author's perception, 2021

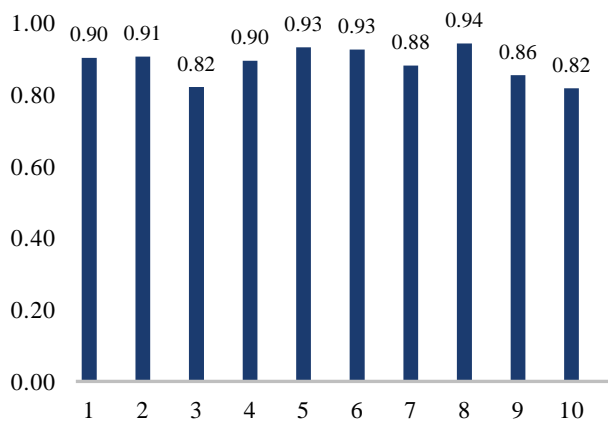
It is clear that this organization requires attention in the social sphere, without neglecting the other elements, trying to reach some elements such as managerial participation, and therefore also, seeking to increase the numbers in a general way.



Graphic 3 Results obtained in composite averages of company 3

Source: Author's perception, 2021

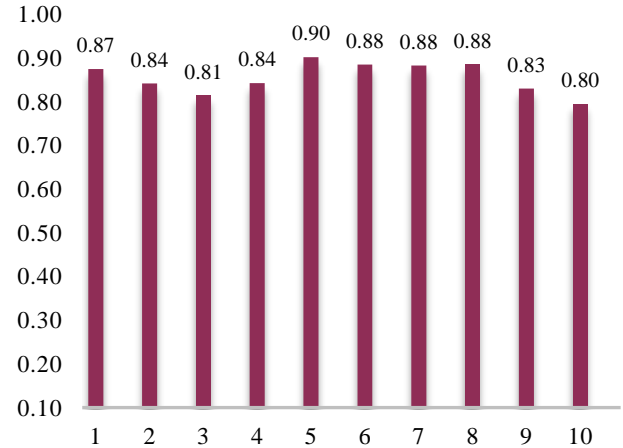
In this graphic, a value with a good score is presented, which is creativity and organizational innovation, almost like the knowledge of customers and technological development, however, most of the other results are below 0.8, this means that the organization requires comprehensive attention, since, apparently, the work is focusing on specific elements of the organization, instead of general ones.



Graphic 4 Results obtained in composite averages of company 4

Source: Author's perception, 2021

In the graphic of the compound averages of this company, we can see that there is an area of opportunity for improvement in the third and in the tenth of the elements considered in the applied measurement tool, likewise the highest score in managerial participation is presented, and in technological development, which is truly consistent because a large part of the important decisions of the procedures carried out in the organization go through the general management and the knowledge of the production processes is high.



Graphic 5 Results obtained in composite averages of the entire business sector studied.

Source: Author's perception, 2021

Compound averages show us general results in which the relevance of each of the elements of the tool directly intervenes in tune with the context variables but focused on each of the organizations studied.

It is evident that not all companies have the same rating in weighting in each point analyzed, which is why this graph is very useful to determine the areas of opportunity that will be obtained to carry out the improvement proposal. In this case, in relation to the previous graph, the third and tenth is the element that is a little below the others, however, we cannot go unnoticed to the other ideal elements of the organizations, since each one needs the due proper care in order to increase the score in possible future measurements.

Proposal to improve productivity

One of the ways in which productivity is achieved in organizations is the follow-up of methodologies designed in such a way that, through their observation, analysis and compliance, the company is directed towards a work that integrally involves all the elements of the company having a specific purpose and results that favour the organization.

That is why productivity improvement models are of great help in any business environment and are specifically designed for the main needs of a particular company. These are elaborated as a result of a previous diagnosis, which serves as the basis for the realization of said model and directly or indirectly attacks the different areas of opportunity that were detected.

The graphic representation of the series of steps that a model has, serves to a great extent so that its interpretation is easy and correct, either by senior managers or any of the collaborators in general, and contains the key elements for the improvement of the productivity.

The monitoring of a productivity improvement model should not be an underestimated job, and it has to be given the appropriate importance and due interest, this in such a way that the entire organization is aware of its monitoring and is generally engaged in each of the steps that the model presents, contributing as much as possible the part of the work that each member of the work team corresponds to.

The results of the follow-up of a model are not always immediate, they can occur gradually while the appropriate feedback is given that serves to feed the model for future applications.

Model

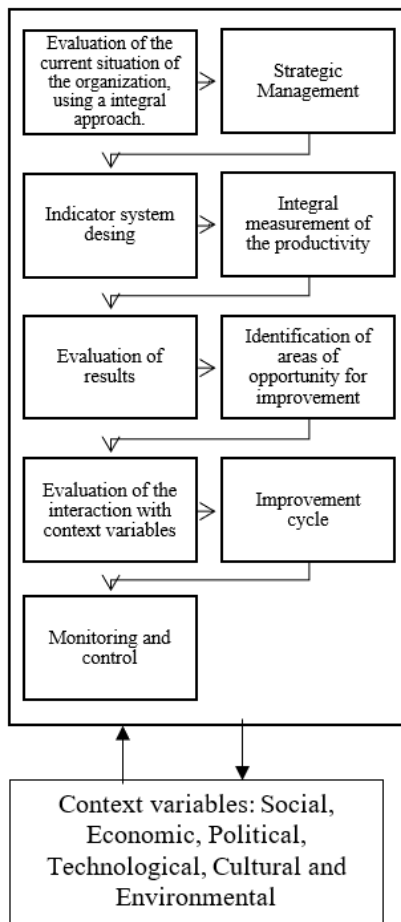


Figure 1 Productivity improvement model
 Source: Author's perception, 2021

Explanation of the productivity model

Evaluation of the current situation of the organization, with an integral approach

This first evaluation can be done in a general way in the form of checking or supervision of each of the activities that are practiced in the company, gathering information in a general way of the irregularities that are detected with less effort, and that this information will be of great help in the next step of applying the model. The human resource is the most important part of any organization, since, through this, it is how each of the products and services that a company offers to the market is elaborated and prepared, and since the human resource is composed of the decision-making capacity, as well as for each factor and need that is important for human life, this resource must be taken care of at all times.

Strategic management

The second stage of the model is one that should be given a lot of attention, since, when talking about strategic management, this goes hand in hand with planning. This is where the right strategies are formulated for process improvement, and consequently, productivity improvement.

For this stage, each of the contributions of the collaborators is taken into consideration, and each comment, idea or suggestion must be taken into account. All this through meetings of the board of directors, these must be the necessary ones with the necessary time to carry out a correct administration and planning.

Indicator system design

The indicators must be clear, and as many as necessary to achieve the objectives must be carried out. These should be archived to have a history of the procedures that have been used that will help feedback in the improvement cycles.

Times and dates should be established for evaluating the results of the indicators, this will help streamline the work of employees.

Integral measurement of productivity

This should be done based on the indicator system previously developed and put into operation, since the integral measurement of productivity occurs through constant monitoring of the progress in the results of the indicators.

Evaluation of results

The evaluation of the results is a task that must be done with adequate care, so as not to lose any information that the measurement has generated, and in this way avoid biases when making the improvement cycles. The results have to be interpreted as objectively as possible and there should be no inclination to disguise the results or to deny the results of the measurements. It is also evaluated if each of the indicators used were raised in the correct way, and if the times and strategies were the most successful.

Identification of areas of opportunity for improvement

After analyzing the results, the indicators and measurement instruments will mark by themselves the areas of opportunity in which the company must pay priority attention, without neglecting the others. This does not refer to attending only to those areas of opportunity and later attending to the others, since while one is strengthened, another could present a decrease in productivity, what must be done is to work on the integral increase of the results, but without losing sight mainly of those alerts that the results gave in the evaluations.

Evaluation of the interaction with the context variable

Something that is important to consider at all times is that context variables are highly relevant in making future decisions, because they are changing and largely are shaped by factors external to the organization and these cannot be controlled. The organization must have the ability to respond to any of the changes that may arise in any of these variables.

Improvement cycle

This stage of the model helps to provide adequate feedback on the information collected by each of the previous elements of the model, establishing and establishing the procedures, measurement and strategic indicators that will continue to be used in the advancement of the organization's work. in order to follow the culture of measurement and improvement that the company is expected to adopt.

Monitoring and control

The monitoring and control should be done at the end of the activities of the model, this is so, since in future possible applications of the comprehensive program for strengthening human resources, the monitoring of the previous application of the model will continue to be relevant, this also refers to that the results of the monitoring and follow-up of the increase in productivity will serve as a precedent in the future strategic management and it is determined which of the past strategies continue to have the desired results for the company and which should be changed in order to improve productivity and never stop.

Acknowledgments

To CONACYT, for granting a scholarship for postgraduate studies and thus being able to carry out this research.

To the Tecnológico Nacional de México Campus Villahermosa, for the support of the teachers and for the opportunity to study at the institute.

Conclusions

We must remember that perfection at work is something that is never achieved, but it must be sought at all times, therefore, we must be aware that each of the strategic objectives, measurement systems or decisions that the company makes, never it will be an absolute result that should always be used.

Organizations must be open to what happens outside their four walls, this helps to a great extent to know that the world we live in is constantly changing, and that, as it changes, the company must also change gradually, to have a harmony between the macro and the micro.

Changes are good, and should always be seen in this way with the openness to change your mind in case some of the decisions taken are not the most correct properly, this is part of being human, making mistakes, but it is also important the attitude we have in correcting these, and in the ability to face difficulties with the entire work team.

It is important to take into account not only the scope of the established goal, but also how that achievement is reached, because complying with each of the activities that are presented could be confused with being productive, and this goes beyond that, beyond the generation of economic resources, and beyond the grabbing of customers in the competitive market.

Recommendations

Administrative systems update

These systems must be fully adequate and optimized for the organization and meet the needs of the company. These systems must include a correct administration of the material resource, trying as far as possible to consider the resources used for each of the jobs requested from the company, and automatically indicating the next requirements of these resources.

Adopt a comprehensive measurement culture

This refers to understanding that continuous and systematic measurement helps the company to have a constant evaluation of the fulfilment of the strategic objectives. When the constant and adequate measurement of the processes is not carried out, it is very difficult to detect the areas of opportunity in which there can be continuous improvement

Development of indicator systems

Indicator systems must be based on the development of strategic objectives. These must include all areas of the organization, either independently, that is, have specific indicators that measure in a particular way each area of the company, but at the same time, the system of indicators must include the measurement of the achievement of the objectives that involve the entire organization, and that each area is directly or indirectly involved in their fulfilment.

Focus on the social development of human resources

The good organizational climate that the company has had must be maintained, seeking to improve it and increase job satisfaction in the company and the interaction between employees, either among themselves and with senior managers. It is important to continue listening to the suggestions and contributions that they have, and to keep track of the growth or decrease of attitudes and skills.

References

Baltodano-García, G., & Leyva Cordero, O. (2020). *La productividad laboral: Una mirada a las necesidades de las Pymes en México*. Revista Ciencia Jurídica y Política, 6(11),15–30.

Chacón Mendía, E. A. (2021). *Reducción de tiempos improductivos a través del manejo eficiente de los materiales para el mejoramiento en los procesos de impresión en empaques y tecnología gráfica* (Doctoral dissertation, Universidad de San Carlos de Guatemala).

Guevara Portal, J. R. (2021). *Gestión logística y productividad de una empresa del sector industrial de metales, Lima 2019*.

INEGI. (2015). *Cálculo de los índices de productividad laboral y del costo unitario de la mano de obra 2015*. Metodología. Instituto Nacional de Estadística y Geografía, 59.

Lengyel-Almos, K. E., Alamilla-Gachuz, I., & Cervantes-Siurob, M. D. C. (2020). *Impacto de IED en la productividad y salarios en México*. Ensayos de Economía, 30(57), 120–147.

López Campos, K. D. (2021). *Redistribución de planta para mejorar la productividad en un camal municipal, Lambayeque-2020*.

Sanchez Ochoa, F. A. (2021). *Mejora de la productividad aplicando un modelo de gestión de procesos para la Empresa FARBA SA en la Ciudad de Arequipa para el año 2019*.

Tello Cortegana, E. (2021). *Planeamiento y control de la producción para incrementar la productividad de la empresa Maquipesa ingenieros SAC Cajamarca 2018*.