

Study of integral logistics in a geological and petrographic laboratory, in the southeast region of Mexico, for the proposal of an integral model

Estudio de la Logística integral en un laboratorio geológico y petrográfico, en la región sureste de México, para la propuesta de un modelo integral

PÉREZ-GARMENDIA, Gloria†*, ZAPATA-DITTRICH, Abel, BALDERRABANO-BRIONES, Jazmín and HERNÁNDEZ-ZURITA, Pamela

Tecnológico Nacional de México / Campus Instituto Tecnológico de Mérida, Mexico.

Tecnológico Nacional de México / Campus Instituto Tecnológico de Villahermosa, Mexico.

Tecnológico Nacional de México / Campus Úrsulo Galván, Mexico.

ID 1st Author: Gloria, Pérez-Garmendia / ORC ID: 0000-0002-1215-0175, Researcher ID Thomson: G-3863-2018, PubMed Autor ID: 9bc193a7c3c31d03ea5dd794736e69950f08, CVU CONACYT ID: 291627

ID 1st Co-author: Abel, Zapata-Dittrich / ORC ID: 0000-0002-2583-7531, CVU CONACYT ID: 414742

ID 2nd Co-author: Jazmín, Balderrabano-Briones / ORC ID: 0000-0002-2925-3234, Researcher ID Thomson: G-3202-2018

ID 3rd Co-author: Pamela, Hernández-Zurita / ORC ID: 0000-0002-1693-4137, PUBLONS ID: AAW-3125-2021, CVU CONACYT ID: 1084482

DOI: 10.35429/EJROP.2021.13.7.7.11

Received July 15, 2021; Accepted December 30, 2021

Abstract

For organizations to have the growth that the global economy demands, they must bet on improvement alternatives that fully involve the entire system. One of these alternatives is to bet on the improvement of integral logistics, since it serves as a connection between production and markets. This research proposes the generation of a model for the improvement of the logistics system in a geological and petrographic laboratory, in the southeaster region of Mexico, with the sole purpose of adding value and providing alternative solutions to current or future problems that arise. It is also proposed to design an instrument that measures the current situation in logistics and provides a comprehensive scenario that serves as a starting point for improvement strategies. This instrument is created tailored to the company and introduces intangible aspects called factors so that with the help of the Likert scale they are transformed into qualitative values, and thus carefully visualize the study problem. The entire study is analysed and interpreted by the researcher, and with the help of the company's experts, it is considered to obtain reliable and secure information.

Resumen

Para que las organizaciones tengan el crecimiento que la economía global demanda, deben apostar por alternativas de mejora que envuelvan integralmente a todo el sistema. Una de estas alternativas es apostar por el mejoramiento de la logística integral, ya que ésta sirve de conexión entre la producción y los mercados. La presente investigación propone la generación de un modelo para el mejoramiento del sistema logístico en un laboratorio geológico y petrográfico, en la región sureste de México, con el único fin de aportar valor y dar alternativas de solución a las actuales o futuras problemáticas que se presenten. Se propone también, el diseño de un instrumento que mida la actualidad en cuestión logística y brinde un escenario integral que sirva de punto de partida hacia estrategias de mejoramiento. Dicho instrumento, es creado a la medida de la empresa e introduce aspectos intangibles llamados factores para que con la ayuda de la escala de Likert se transformen en valores cualitativos, y así visualizar detenidamente el problema de estudio. Todo el estudio es analizado e interpretado por el investigador, y con la ayuda de los expertos de la empresa se considera obtener información confiable y segura.

Integrated logistics, Measuring instrument, Likert

Logística integral, Instrumento de medición, Likert

Citation: PÉREZ-GARMENDIA, Gloria, ZAPATA-DITTRICH, Abel, BALDERRABANO-BRIONES, Jazmín and HERNÁNDEZ-ZURITA, Pamela. Study of integral logistics in a geological and petrographic laboratory, in the southeast region of Mexico, for the proposal of an integral model. ECORFAN Journal-Republic of Paraguay. 2021. 7-13:7-11.

* Author Correspondence (E-mail: gloria.pg@merida.tecnm.mx)

† Researcher contributing as first author.

Introduction

Currently, value creation is a concept that is constantly growing, and through comprehensive logistics companies seek to find this and generate competitive advantages.

Faced with the new contexts of a global economy, all organizations, whether they are producers of goods or services, must be at the forefront through the constant measurement and development of strategies, this will allow the application of comprehensive logistics that provides a balance of the structure of the value chain and achieve efficient interaction between the areas of the system.

Companies must develop and implement logistics strategies that make them different from their national and international competitors; that is, the company must be a low-cost producer or give customers high value in terms of product quality, proper distribution, and customer support.

The purpose of this research is to propose a logistics model that represents a competitive advantage, through the integral optimization of resources, an agile and flexible operation, and the efficiency of the processes. For this, it is essential to analyse internal and external factors that affect the system and thus, propose comprehensive scenarios to develop strategies that provide competitiveness.

Methodology to be developed

The emergence of the idea

For the present investigation, it has been delimited to guide the study in a systematic order and ensure the efficiency of the thematic unit.

Next, figure 1 shows a diagram where said delimitation is observed:

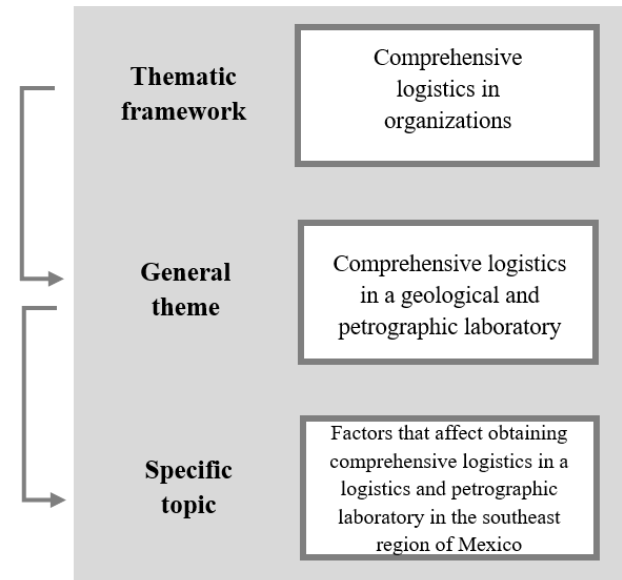


Figure 1 Thematic scheme for the delimitation of the topic
Source: Author's perception

As a first phase, integral logistics in organizations form the thematic framework, giving an initial direction to research, introducing it to organizations.

The general research topic has been called integral logistics in a geological and petrographic laboratory, consolidating and delimiting the research towards a specific entity.

Giving key points to the subject of study, the third phase is called, factors that influence the obtaining of integral logistics in a geological and petrographic laboratory, in the southeaster region of Mexico. Specifications are given about the geographical location, consolidating, and delimiting the investigation, and also covering the factors that affect the organization. These factors are aspects encountered during the development of the protocol.

Identification of experts

To identify the organization's experts, it is essential to locate the areas to study, this is achieved with the help of the organization chart. Here the leaders in charge are located, however, they are not yet called experts, so at this stage, all will be called actors. The areas to study are:

- Storage area.
- Production area.
- Administration area.

When identifying the actors, rounds of interviews are scheduled, in which relevant points about the subject of study are addressed. The researcher, subjectively determines who knows in-depth the topics covered, given the knowledge they have about integral logistics. This personnel is called experts.

Measurement instrument design

The independent variables handled in this research work are the six context variables (economic variable, social variable, cultural variable, technological variable, political variable, environmental variable). Based on the above, the measurement instrument is designed, especially for the subject of study, to take information from the research frameworks, and the experts of the organization. The instrument considers the three stages of logistics, which are:

- Stage before logistics.
- Stage during logistics.
- Stage after logistics.

The instrument is made up of factors (dependent variables) as questions, which are applied to each expert in each area of the system.

In addition, the instrument has a Likert scale where:

- 1 = Not frequent.
- 2 = Regular.
- 3 = Frequent.
- 4 = Very frequent.

N°	Stage BEFORE Logistics	1	2	3	4
1	Does the organization design suitable profiles for its employees?				
2	Does the organization establish the characteristics of a work environment?				
3	Does the company carry out weekly market research reports?				
4	Do the Facilities present a good warehouse design or warehouse location management?				
5	Does the company design optimal work areas for the transit of its employees?				
6	Are studies carried out for the optimization of the processes?				

Table 1 Measurement instrument (Stage before logistics)
Source: Author's perception

N°	Stage DURING Logistics	1	2	3	4
1	Does the company carry out weekly market research reports?				
2	Does the organization have good control of the production processes?				
3	Is a customer satisfaction study carried out?				
4	Are sales and customer service strategies properly applied?				
5	Does the company apply constant innovation methods?				
6	Does the organization show the development of the digitization of processes?				
7	Is the use of 9s used in the company?				
8	Does the company design the best logistics routes for the delivery of the product?				

Table 2 Measurement instrument (Stage during logistics)
Source: Author's perception

N°	Stage AFTER Logistics	1	2	3	4
1	Does the company analyze the use of new routes?				
2	Are the graphical representations of the optimization in the logistics processes of the company shown?				
3	Does the organization provide feedback on the marketing channels?				
4	Does the company compile the results of the market study?				
5	Are effective delivery time measurements observed?				
6	Are proposals for measures to reduce accidents or mishaps made?				
7	Are the results obtained from the customer satisfaction study analyzed?				
8	Does the organization carry out observations of results of innovations?				
9	Does the organization analyze the results of the use of the 9s?				

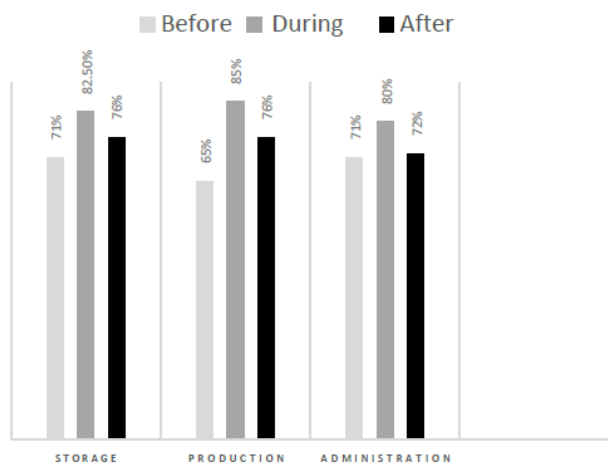
Table 3 Measurement instrument (Stage after logistics)
Source: Author's perception

Results

The results of the instrument applied to each expert is as follows:

Area	Before	During	After
Storage	71%	82.5%	76%
Production	65%	85%	76%
Administration	71%	80%	72%

Table 4 Averages by departments
Source: self-made



Graphic 1 Results of the measurement of the level of integral logistics

Source: self-made

On average, there is 97.25% in the degree of knowledge during operation, while the lowest average is 93.25%, which is before operation. This opens a small gap to improve this stage within the areas evaluated.

Improvement proposal

- Always be equipped to perform a large number of petrophysical measurements on cores and plugs.
- A geological and operational information integration platform will be offered that allows timely decisions to be made to optimize the drilling of oil and gas wells.
- The field services will offer the first evaluation of the geological formations, necessary for the success of the exploration and integration tests of new oil and gas reserves.
- Acquisition of non-destructive images will be carried out. The characterization of rocks at different scales (cores, plugs, cuttings, etc.) provides a high-value complement.
- Computed tomography (CT) scanners will be implemented, similar to those used in medical applications, they are used to take three-dimensional images of plugs and nuclei.

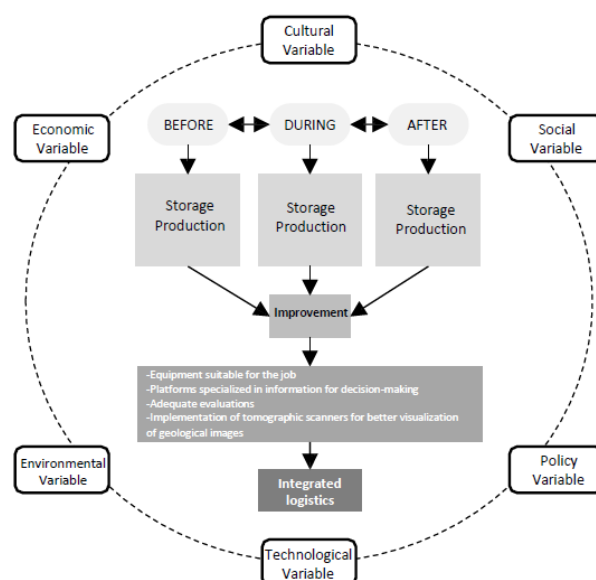


Figure 2 Logistic Model

Source: Author's perception

Conclusions

In integral logistics, certain strategies are implemented that help maintain a good balance in the company. This means that by carrying out the appropriate evaluations, analyzes based on the deficiency found can be carried out and with the same power to implement improvements.

In this research, it is possible to understand and analyze the disadvantages that can be found at all times and that although the company is large-scale, it is always necessary to constantly improve in all areas and of course, continuously improve the structure of comprehensive logistics.

Comprehensive logistics implement certain strategies that help maintain a balance in any organization. This means that by carrying out the appropriate evaluations, analyzes based on the deficiency found and improvements can be made. In addition, it is extremely important to see the system as a whole, not only systemically, but integrally, always observing the changing contexts and variables.

References

Alania Atencio, M. M. (2021). Evaluación técnica del proyecto Yanamina-distrito de Caraz, provincia de Huaylas y Región Ancash-2019.

Alvarado, G. E., Brenes-André, J., Avaró, G., Pereira, R., Galve, J. P., Campos-Durán, D., & Sánchez, R. (2021). La actividad eruptiva del volcán Turrialba (Costa Rica) en el siglo XIX: reinterpretación de los documentos históricos y de los depósitos. *Revista Geológica de América Central*, (64), 1-41.

Anaya, J. (2011). *Logística Integral, gestión operativa de la empresa*. Madrid: cuarta edición ESIC Editorial.

Carbonelli, J. P., Winocur, D. A., Belotti López de Medina, C. R., Carminatti, N., & Peisker, V. (2021). Cueva Abra del Toro, registro de la ocupación más antigua para el Valle de Yocavil, Catamarca, y su relación con la mayor erupción holocena conocida.

Chiavazza, H., Prieto-Olavarría, C., Hernández, F., Puebla, L., Quiroga, M., & Anzorena, J. (2021). Pescadores del desierto: ocupación y subsistencia en la margen oeste del río desaguadero (centro oeste argentino) entre los ca. 1200 y 400 años ap. *Chungará (arica)*, (ahead), 0-0.

Christopher, Martín. (2006) *Logística (Aspectos Estratégicos)*, Editorial Limusa. México.

Hoguin, R., Solá, P., & Yacobaccio, H. D. (2021). Antigua Motaite: una aldea temprana en Abdón Castro Tolay (Barrancas), Puna de Jujuy. *Arqueología*, 27(2), 13-39.