

## Process management, tool change and challenge in resource optimization

Ever A. Fuentes Rojas<sup>1</sup>, Diana C. Roa Pava<sup>2</sup>, Laura J. Cárdenas Cortés<sup>3</sup>

<sup>1</sup>(MBA, Universidad Libre, Colombia)

<sup>2</sup>(Ingeniería industrial, Universidad Libre, Colombia)

<sup>3</sup>(Ingeniería industrial, Universidad Libre, Colombia)

Corresponding Author: Ever A. Fuentes Rojas

---

**Abstract:** The purpose of continuous improvement is to increase the value of a process, product or service within an organization for which, the present article, describes the development of a proposal for standardization of Pharmaceutical Service processes in a private health entity in order to promote the use of resources, increase productivity and facilitate decision making for the benefit of staff and users. The methodology used consisted of background review and direct observation. From this, we describe the development of a proposal for improvement from Kaizen philosophy through four stages: contextualization at the normative and institutional level, internal and user diagnosis, proposed improvement starting from the characterization of processes and identification, selection, description and documentation of operations carried out by eliminating unnecessary activities and identifying entries, departures, providers, controls points and management indicators to finally carry out an impact analysis from which it is evidenced the value generated in the human, material, financial and infrastructure factor and facilitate decision making for the benefit of the personnel involved and those receiving care. This is validated by the results achieved in the documentation, which was reduced by 38 %, as was a 50 % reduction in the implementation times of activities in the time survey conducted. Finally, it is concluded that the articulation of technology, knowledge and cooperation between interest groups are essential factors for generating competitiveness, innovation and achieving new objectives.

**Keywords** -characterization, continuous improvement, impact, processes, value added.

---

Date of Submission: 20-08-2019

Date of acceptance: 02-09-2019

---

### I. INTRODUCTION

The development of a society should be measured not only by the level and growth of material goods, but also for the welfare of the individuals who compose it. Health systems as core classes for the development of welfare should seek to meet the needs of patients so that they have greater access to services and better quality of life, in order to overcome the disease.

Given the above, it is important to consider that the Colombian health system has undergone significant transformations when coupled with the regulations in recent decades, placing him as one of the Latin American countries with greater sectoral public spending and where families spend a smaller proportion of health resources [one]. WHO (World Health Organization) estimates that total expenditure and investments for health in Colombia, both public and private entities have a coverage of 97% and an investment of GDP (Gross Domestic Product) of 6.1% [ 2, p.3]. That is why, in terms of productivity is essential to understand that the health sector has not only the services component, is also directly linked to the pharmaceutical industry and the industry of medical equipment, which make barely 4% the industry [2, p.4] and are key elements in quality of care.

In some organizations that offer the pharmaceutical service is recurrent that complaints and grievances arise due to the delay in service times users also becomes difficult to meet legal requirements, documentation and communication, which is made necessary to organize operations in such a way that is practical and agile execution. Sometimes short-term solutions occur; however, you must constantly think about creating value not only the processes performed but each of whom runs. Similarly, since the WHO is trying to bring pharmaceutical policies to systems and health services, considering access to medicines and technologies as one of the six elements necessary to strengthen health systems [3].

On the other hand, the processes of health reforms implemented in recent decades in Latin America included oriented separation of functions, underwriting changes, increased coverage, changes in human resources policy and implementation of new management models [4] through the decline in activities that do not add value by incorporating product enhancements that increase performance, the improvement of human activity (organizational culture, leadership, motivation, climate, learning) [5].

To achieve the above described, it is essential to the adoption and implementation of a quality management system as a strategic decision in order to improve overall performance and provide a solid basis for sustainable development initiatives [6], besides attending the need to contain costs while maintaining quality of care [7].

For this reason, and supported the concept of process standardization, it is necessary to implement strategies to be more efficient and effective through the articulation of each of the activities with the management system, since it is important to consider: the resources those who have the knowledge and skill of all those involved in growing operations and provided coverage. Thus standardization becomes the tool that helps in strengthening processes adding value to the activities.

To accomplish this, you must return to the point made by Masaaki under the slogan "Today better than yesterday, tomorrow better than today", strengthening teamwork, seeking to eliminate overproduction, reduce inventory and defects, rework and hope in order to contribute to the growth of the entity providing health private, where the project was carried out.

Therefore, and aware of the important contribution that has been provided for over 50 years by preventing and transforming the experience of patients, their families and society, the entity uses the application of tools that allowed him to work on continuous improvement and thus not only increase patient satisfaction, but each of the people who make it possible to provide this service; through the establishment of points required and management indicators to facilitate decision-making control. To achieve this, a reorientation based on corporate goals is done by identifying the needs not only in compliance with the regulations of the country but for the benefit of the institution, focusing efforts on improving each of the activities.

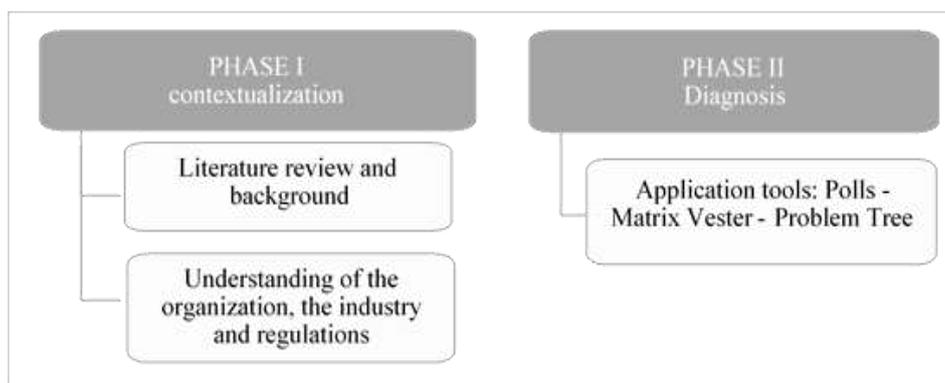
Finally, this process improvement requires an understanding of the impact assessment in a social environment implies assuming, integrate and build knowledge from systematic reviews in a social group, focusing his eyes on the effects generated by the policies, plans, programs, projects in which individuals manage to become participants [8].

## II. METHODOLOGY

This study presented a descriptive scope, where the goal was to describe situations, contexts and events, detailing the characteristics and needs of stakeholders and processes.

From the above, the project is implemented in four stages as shown in Fig. 1 and 2. The first phase contains the literature review and background for the identification of instruments that are feasible application, adaptation or modification of the processes for the area as well as a diagnosis in the Pharmaceutical service. In a second phase, the actual information is captured in an objective and systematic manner to allow meaningful analysis and make a diagnosis to serve as a reference for the improvement phase.

In the last phase, impact analysis is approached from a social point of view, through the adaptation of Leopold matrix defining factors associated environmental activities, considering the economic, social and managerial variables, together with the decisive action of the operations identified in the characterization made previously. From this, a score from 0 to 5 of the impact and importance on defined criteria supported by the address area identifying activities that generate greater positive and negative impact on operations performed.



**Figure 1.** Phases implemented prior to the standardization process.

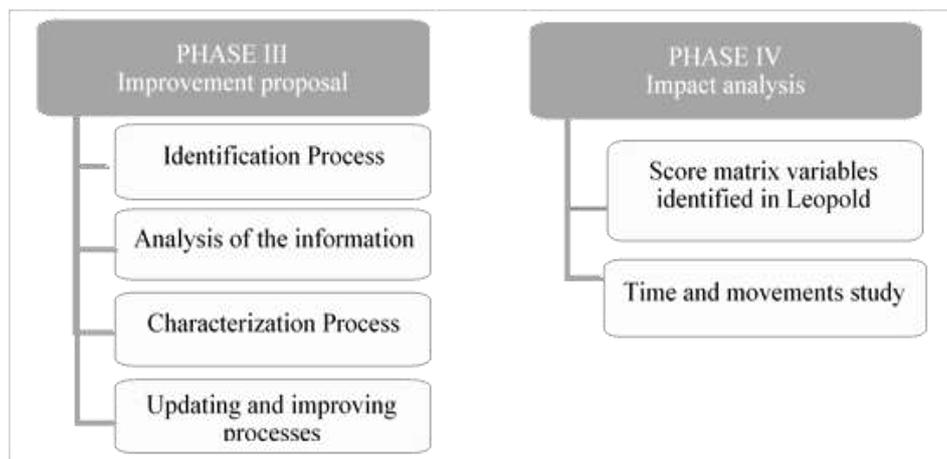


Figure. 2. Phases implemented for the development of standardization.

As for the time and motion study, frequent operations such as generating benefits and benchmark service evolution are evaluated once improvements are implemented, this considering that in considering human labor in all its dimensions and investigate all factors influencing the efficiency of performance can increase productivity without resorting to large capital investments or require more effort labor [9].

### III. RESULTS

#### 3.1 DIAGNOSIS

The diagnosis from the internal point of view, evidenced through the matrix Vester (prioritizing problems) identifying 12 incidents factors in service delivery, among which are: long waiting times for treatment, lack of control due to drugs, lack of rotation or programming purchases of drugs, inadequate conditions for transport of drugs (cold chain), lack of material support for health education and shortages in medicines and medical supplies among others.

From this, a rating together with the head area of 0 to 3 where 0 is no effect and 3 the maximum value of dependency was performed. passive, active, critical and indifferent where it is evident: product qualification, four quadrants were identified:

- **Liabilities:** four variables as effects of the 12 identified, which are used as indicators of change and efficiency of intervention problems identified are located.
- **Assets:** two factors as the primary cause of the difficulties encountered and thus require attention and priority management at the proposal stage for improvement are identified.
- **Critics:** located six of the 12 factors identified by what are seen as problems therefore require great care in their analysis and management since its intervention depend largely on what final results of improvement.
- **Isolated:** not isolated problems within the identified variables are obtained

Moreover, according to the information provided by users, simple random sampling is performed, considering the number of patients seen in the span of three months and a confidence level of 95%. This, 250 surveys are conducted and the results are translated as follows:

- **User expectations:** improvements to existing facilities, other features, new ways to make delivery of drugs and the desire to optimize the communication and dissemination of information for administrative processes, prevention campaigns and support.
- **Perception of performance:** the complexity is evaluated in the process of delivering drugs, resulting in the 83.5% do not consider complicated, while 16.5% considered complicated if this process because:
  - Much documentation is required and processing
  - Drawbacks authorized by mail
  - Difficulties authorizations
  - Others do not confirm the order in time
  - Management effective dates between entities of different formulas

Another factor to consider is the delivery time drug users. Thus, 44.1% of patients were delayed less than 20 minutes to receive considering this a reasonable time for your request and only 24.9% of users have had to wait more than 30 minutes to receive your request expressing dissatisfaction with the service provided.

Finally, and as a result the problem tree done in conjunction with the personnel involved, some of the most important factors are identified to be considered during the improvement process such as:

- Receiving pharmaceuticals
- Inventory management
- Management indicators
- Safety and timeliness of information
- Use and availability of products and services access
- Redistribution of functions

### 3.2 IMPROVEMENT PROPOSAL

Verification and updating documentation in the entity providing health, running with an approach in which each action could generate value. For which it was structured from the institutional objectives the process map the Pharmaceutical Service considering operations and legal requirements, identifying internal and external factors, in addition to the flow of information and resources in order to build the characterization of processes for the provision based on the continuous improvement cycle (Deming cycle) and service elements: P: "Plan" establish the objectives and activities to do. H: "Do" implement planned. V: "Check" track. To act out".

From the above product and direct observation, the objective, scope, stakeholders, inputs, suppliers, outputs and the controls necessary for the sub-processes identified is identified: selection, acquisition, technical receipt, storage, adaptation, dispensing - distribution and pharmaceutical care, as well as consider the mission, strategic and support processes.

The results of the characterization made reflect a decrease of 38% of the reviewed and validated by the Directorate of Drug Facility as seen in Fig. 3 documentation.

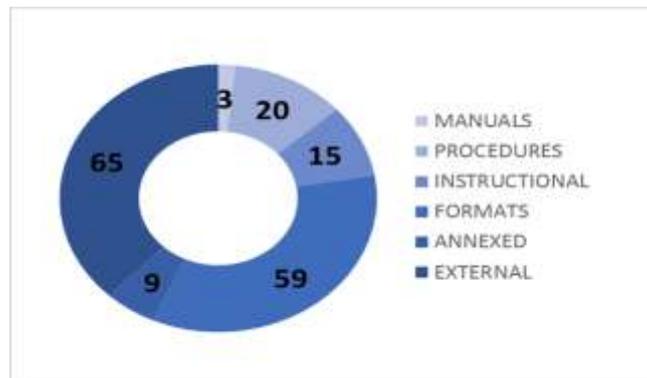


Figure 3. Results achieved in the documentation

In addition, considering that an organization can not manage what you cannot measure [10], the indicators become a tool that is evaluated quantitatively or through qualitative observation implementation of activities carried out over a period of while facilitating decision-making and continuous improvement.

Therefore, the institutional needs are assessed and legal requirements resulting in a system of indicators, through their management create value and opportunities for improvement in key operations that enable service delivery and organizational growth. For which the factors were considered What?, Where?, How?, When?, Who? And why are you going to measure? This, in order to structure the indicators needed to monitor, establish control and make sound decisions and maintain, optimize and innovate in each of the processes managed.

Next, it is shown in Fig. 4, the distribution of the indicators generated considering the management of the Pharmaceutical Service regarding efficiency (optimal use of resources), coverage (important health interventions) and opportunity (receive service at the time required).

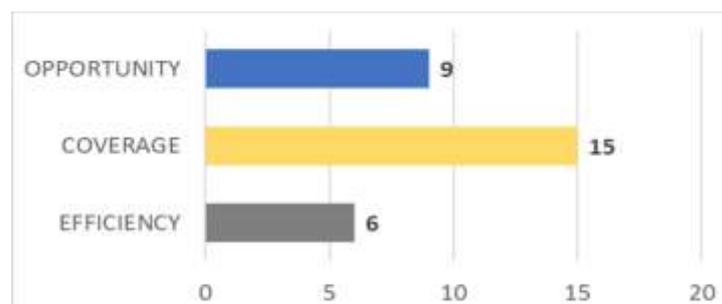


Figure 4. Results achieved for the management of indicators.

It is important to note that the set of balanced measures between documentation, controls and measurement of the management through indicators provide an appropriate way to communicate the vision, mission, organizational strategy and joint march on search achieve a common goal.

### 3.3 IMPACT ANALYSIS

Matrix Leopold, becomes the tool to analyze the importance and both positive and negative impact that continuous improvement generates the entity providing health, for which factors and effects evaluated magnitude and importance of 1 to 5 are taken. The activities against the operations can be seen in Fig. 5.

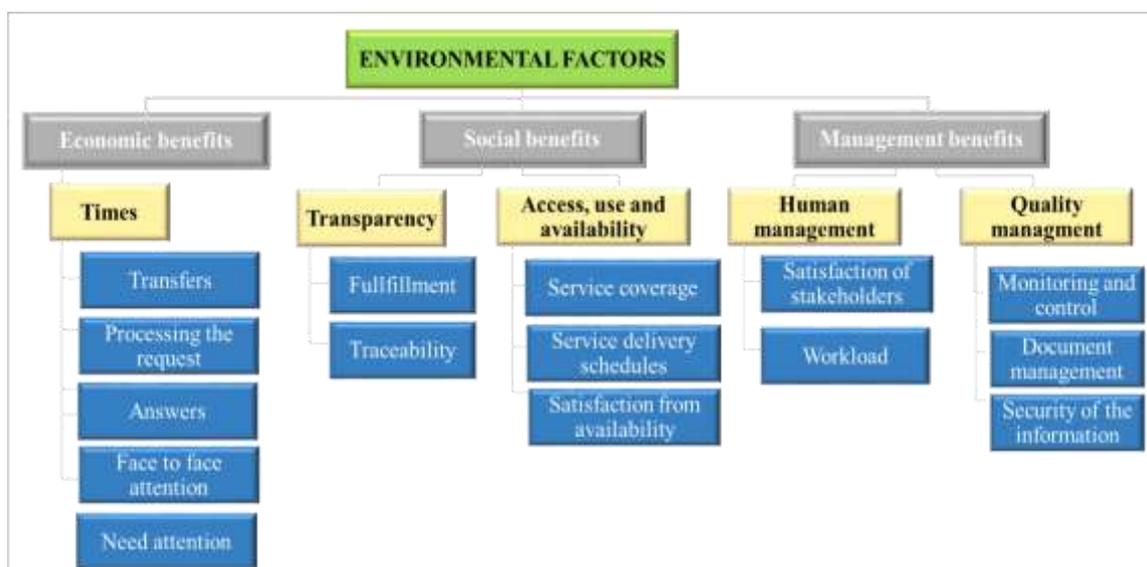


Figure. 5. Identification of influential factors of the environment.

From the above, it is evident that the greatest positive impact on the organization and the Pharmaceutical service particularly on: identifying needs, technical skills, quality control of products, returns, billing management, supporting documentation and workload balance. a total of 46 effects and 15 factors were evaluated, obtaining as greater positive management billing impact of 15, 85% of the other factors evaluated scored positive above 10 additionally medium 13 is obtained. it is important to include the identification of needs was found to have the greatest negative impact with a rating of 1 and 24% of the 46 evaluated effects are below this negative rating.

Finally, it can be concluded that the impact generated for the entity generates positive effects in terms of economic, social and managerial benefits in 98% of the process.

### 3.4 TIME STUDIES

The time study, is an activity that involves the technique of setting a standard allowable time to perform a given task, based on measuring the content of work prescribed method [11].

Given the above, this tool was applied in the project developed, in order to obtain standards against which to assess the transformation and improvement in the implementation of activities that allow successfully meet customer requirements, without neglecting the internal needs that may have, why the selection of the 13 routine processes Service, where frequent activities performed particularly selected.

Once such a selection, the time corresponding to 10 cycles (number of observations by activity) are recorded. the diagram for operation and analysis by means of the tool box and whisker is made. Through this diagram, the information is summarized using 5 statistical measures delimiting four areas: the minimum value (lower limit of one of the whiskers), the first quartile (bottom line of the box), the median (internal line symmetry box representing 50% of the data), the third quartile (upper line of the box) and the maximum value (upper limit of another mustache) [12].

As an example, it can be seen in Figure 6, the box and whisker diagram obtained for the transfer of consumer products where can evidence:

- Generating the application activity represents more symmetry data, followed by physical delivery of the products and enlistment. Activity with greater asymmetry is the transfer of institutional software products, however, this asymmetry is positive because less time is spent in the execution of the activity.

- It is evident that in generating the application and the physical delivery of the products the data have a higher symmetry, because the median (inner box line) is more focused, and the distribution is symmetrical given that distances between the box and the minimum and maximum values are similar.
- Regarding the transfer of institutional software products, a positive asymmetric distribution is evident, since the median is not centered in the box and is closer to the minimum value recorded.
- It is noteworthy that for example no outliers (timeouts average) occurred, however, in the acquisition and technical reception if presented as are external variables involved impossible to control.

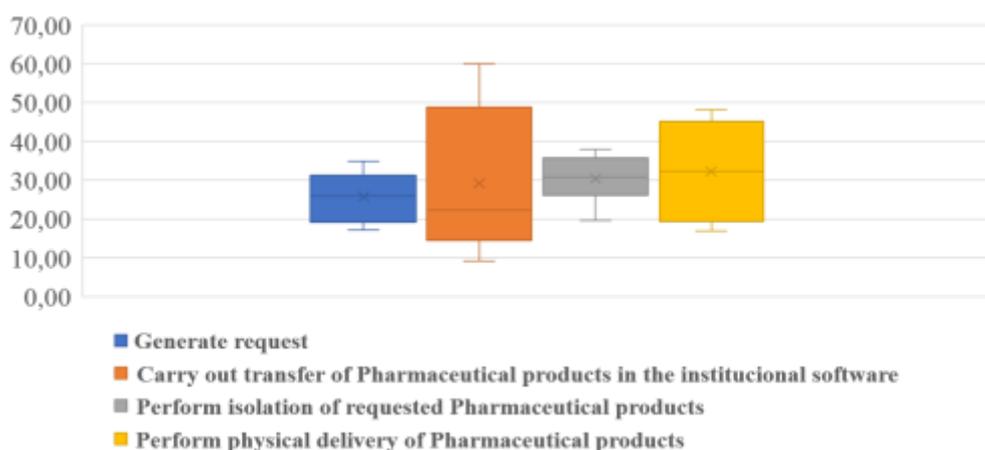


Figure 6. Results achieved time study -. Transfer of consumer products.

Referring to the total runtime of the processes evaluated, it is evident that the acquisition of products represents the most time with 18.44 hours, followed by the suitability of the products with 4.21 hours while the process less time involved is that of counts random inventory with 1.19 hours, followed by dispensing products with 1.41 hours (including review time billing). From this, under the leadership concept Pharmaceutical Service, it is considered a 50% improvement in operating times in general.

#### IV. DISCUSSION

Redesign experiences in specific processes and organizational level in the health sector have been incorporating the concepts of quality of care, increasing efficiency, reducing time, etc. [13].

With this, the interest of generating changes that contribute to the provision of health service quality is evident in the project developed by Carvajal [14], where the design of the physical layout, but the documentation arises not only, standardization and implementation processes.

In this particular case, perform a diagnosis based on resolution 1403 and 0444, however, the developed project is evident that this regulation is not the only one to consider for Drug Facility, which could lead to exclude important criteria to be account for generating documentation breaches in the regulations, which do not exempt of responsibility to ignorance.

Furthermore, it is agreed in the stages of diagnosis, planning, management process map, awareness and ideas for improvement, however, in the development of project Carvajal, the application of tools that prioritize the findings in no evidence diagnostic stage. In addition, no inclusion of performance indicators for the documentation generated, factor that was essential to the project presented is shown.

The Pharmaceutical Service of the health entity, seeking continuous competitiveness improvement and committed to providing care based on quality generated by the proposed change under the Kaizen philosophy (can generate results quickly and without major trauma on operations and staff related to inventory, rework and waiting times), and the application of different methodologies for diagnosis, which identified the root causes of the problem and develop the documentation of all processes that bring together the area, taking into account threads as selection, procurement, distribution and dispensing of pharmaceutical products in addition to the adequacy thereof, and subsequent follow-up care and medication use.

We must mention the importance of the diagnosis support surveys, as seen in the project developed by Hernandez & Ramirez [15], in this case they apply to both staff and patients by identifying both the needs and expectations stakeholders.

It is also important to note that in the process of improving the management, control, condition and time (physical - magnetic) storage included documentation as well as those responsible for what was not considered by the other authors.

Furthermore, to assess the impact generated by the development and implementation of the proposal, the matrix Leopoldo was performed, which is identified as the matrix of importance of the first evaluation of impacts [16], with the ratio of evidenced the effects that arise in relation to the most important factors considered according to the preparation of documentation and other methodologies based on the expected improvement to address the root cause, reaching verification and measurement of the benefits provided from the investigation. Said impact analysis is not referenced in the project previously developed, arises only because the execution of post-implementation audits.

Another consideration and considering that the time study aims to determine the facts about how an individual operation or group of operations within the workplace [17] is performed, data is recorded and interpreted that provide management Pharmaceutical Service key information used to assess the effectiveness and use of resources within the system and likewise increase productivity and user satisfaction as the critical points of the processes are identified. Therefore it is important to consider extending the time study has been performed once implemented all of the documentation for within the project which was to contrast the importance of assessing the required staffing capacity is particularly identified.

The above evidence process management goes beyond together, include, add or collect, it is perfect in terms of organization and planning to avoid duplication and optimize resources [18] seeking that processes are flexible and inclusive with different stakeholders.

## **V. CONCLUSIONS**

The proposal made it possible to apply engineering tools in the Pharmaceutical Service contribute to decision-making and facilitate their management through a documented system renewed and backed by indicators of coverage, timeliness and efficiency.

On the other hand, the established process map was essential to guide and combine strategic actions (Generation value), operating (Organizational knowledge) and support (resource management) and to facilitate the approach of monitoring, evaluation and control necessary for reducing financial costs, time and (human, physical and material).

In addition, to address change management in implementing the proposed improvements required think systematically about the difficulties, needs and objectives, manage a culture of teamwork with which to share responsibilities, commitments and generate customer satisfaction. Thus, the transformation and learning that is achieved through the practice of process management becomes a strategy not only to deploy competitive advantage, but for the deployment of skills, abilities and resources aimed at optimizing the effectiveness and productivity the provider of health.

It is noteworthy that for the development of this project awareness and training conducted in conjunction with the area quality of the institution facilitated the understanding and identification of needs for observation and improvement stage.

As a result of the changes proposed in the document management Pharmaceutical Service, a decrease in workload evidenced in the study by the Leopold matrix and time study was obtained.

Regarding the time study, further studies are required once they have implemented all of the proposed improvements, as the processes of appropriation of the changes brought contributing implemented in time for the implementation of activities.

Finally, standardization carried out should be linked to technology (information and communication), with the knowledge and cooperation among stakeholders in order to generate competitiveness and innovation, thus renewing the system, area, processes and tools to measure and actual results.

## **REFERENCES**

- [1]. J. Bonet Borón and K. Guzmán Finol, A regional analysis of health in Colombia, in Working papers on regional economy, Banco de la República (CEER), Cartagena, vol. 222, p.4, 2015.
- [2]. Semana magazine and EPS COOSALUD, The health sector as a driving force of the economy, in Forum Conclusions Week, Metropolitan Club, Bogotá D.C., pp. 2-4, 2016.
- [3]. World Health Organization, Everybody business: Strengthening Health Systems to Improve Health Outcomes: WHO's framework for action, Geneva, Switzerland: WHO Document Production Services, 2007.
- [4]. C.A. Mendéz and M.C. Torres A., Hospital management autonomy in Chile: the challenges for human resources in health, Revista de Saúde Pública, vol. 44 (2), pp. 366- 671, 2010. DOI: <http://dx.doi.org/10.1590/S0034-89102010000200019>
- [5]. A. Medina León, D. Nogueira Rivera and A. Hernández Nariño, Relevance of Process Management in Strategic Planning and Continuous Improvement, EIDOS, vol.1 (2), pp. 65-72, 2009. DOI:<https://doi.org/10.29019/eidos.v0i2.62>
- [6]. NTC ISO 9001: 2015, Systems Quality Management, Colombia: ICONTEC
- [7]. J. Breckenkamp, C.W. Wiskow and U. Laaser, Progress on quality management in the German health system - a long and winding road, Health Research Policy and Systems, vol.5 (7), 2007. DOI:<https://doi.org/10.1186/1478-4505-5-7>
- [8]. C.C. González R and J.R. Calcetero G, Social Impact Assessment: a research strategy for Social Work, Trends & Innovations Journal, vol. 14, pp. 46-57, 2009.
- [9]. International Labour Organization, The human factor in the application of work study, in Limusa S.A.(Ed.), Introduction to work study, 4 th (Geneva, Switzerland, 1996) 25- 34.

- [10]. J. Puell Palacios, The management philosophy of Peter Ducker, Management in the Third Millennium, Journal of Research Fac. Of Administrative Sciences, vol. 12 (24), pp. 49-53, 2009.
- [11]. B.W. Niebel, Time Study, in McGraw- Hill (Ed.), Industrial Engineering, Methods, time and motion, 12 th (Mexico, 2009) 327-340.
- [12]. H. Llinás and C. Solano Rojas Álvarez, Descriptive statistics, in Uninorte (Ed.), Descriptive statistics and probability distributions, 1st (Barranquilla, Colombia, 2006) 1-98.
- [13]. A. Hernandez Nariño, D. Nogueira Rivera, A. Medina León and M. Marqués León, Inserting process management in hospitals. Design, methodology and practice, Revista de Administração - RAUSP, vol. 48 (4), pp. 739-756, 2013. DOI: <http://dx.doi.org/10.5700/rausp1118>.
- [14]. L.F. Carvajal Criado, Design of physical distribution; documentation, standardization, and implementation of processes Pharmaceutical Service at the Heart Institute of the FCV Bucaramanga under resolutions 1403, 2007 and 0444: 2008, report of business practice, Fac. Ing. Ind, Univ Pontificia. Bolivariana.Bucaramanga, Santander, Colombia, 2010.
- [15]. Crnl. Emc.Lic. R.O. Hernandez Arauz and Dra. M. A. Ramirez Valarezo, Evaluation of management, design and documentation processes for pharmacy General Hospital Enrique Garcés, work prior to obtaining the title of Master in Hospital Administration Management, VIITT.Sangolquí, Pichincha Province degree, Ecuador, 2016.
- [16]. I.D. Coria, The environmental impact study: characteristics and methodologies, Invenio, vol. 11 (20), pp. 125-135, 2008.
- [17]. N.L. Tejada Diaz, V. Gisbert Soler and AI Pérez Molina, Methodology of time and motion study; Introduction to GSD, 3CEmpresa, research and critical thinking, vol. Special Edition, pp. 39-49, 2017. DOI: <http://dx.doi.org/10.17993/3cemp.2017.especial.39-49>.
- [18]. M. Llanesfont, CL Godínez Isaac, M. Moreno Pino and G. Garcia Vidal, From process management to integrated processes, Industrial Engineering, vol. 35 (3), pp. 255-264, 2014

Ever A. Fuentes Rojas" Process management, tool change and challenge in resource optimization" International Journal of Engineering Science Invention (IJESI), Vol. 08, No. 08, 2019, PP 27-34