Available online at www.jlls.org

JOURNAL OF LANGUAGE AND LINGUISTIC STUDIES

ISSN: 1305-578X

Journal of Language and Linguistic Studies, *18*(3), 674-684; 2022

Quantitative Model Of Measurement And Standardization Of Intangible Resources For The Manufacture Of Women's Ballet Flats In The Footwear Sector In Colombia

Palacios-Alvarado Wlamyr [a1] , Caicedo-Rolon, Alvaro Junior[b], Davila Perez, Marvin Vladimir [c]

[a] *PhD in Business Administration, productivity and competitiveness research group, Orcid: https://orcid.org/0000-0002-0953-7598, E-mail: wlamyrpalacios@ufps.edu.co, Universidad Francisco de Paula Santander, Cúcuta – Colombia*

[b] *Doctor in Engineering, emphasis in Industrial Engineering, Director of productivity and competitiveness research group, Orcid: https://orcid.org/0000-0002-3651-3364, E-mail: alvarojuniorcr@ufps.edu.co, Universidad Francisco de Paula Santander, Cúcuta, Colombia.*

[c] *Master of business management, Orcid: https://orcid.org/0000-0002-6935-2413, E-mail: marvinvladimirdp@ufps.edu.co, Universidad Francisco de Paula Santander*

APA Citation:

Wlamyr, P.A., Junior, C.R.A., Vladimir, D.P.M., (2022). Quantitative Model Of Measurement And Standardization Of Intangible Resources For The Manufacture Of Women's Ballet Flats In The Footwear Sector In Colombia. *Journal of Language and Linguistic Studies*, *18*(3), 674-684

Submission Date: 04/11/2021

Acceptance Date: 09/02/2022

Abstract

The purpose of this research is to obtain the standardization of the production process, with which it will be possible to satisfy the needs of the system to respond adequately to a given demand, decrease of reprocessing, identification of bottlenecks through the development of macro tools, the whole process will be known in detail, improvements in working conditions, product reliability, technical data sheets of machinery and equipment that will be used in the process will be obtained in order to propose maintenance initiatives, new proposals for improvements that will help the development of new working methods that will increase productivity and efficiency in the production process of ballets will be able to be proposed.

Keywords: activity, standard, method, process, process, variable.

1. Introduction

To improve performance within a company, it is important to systematize the value chain and its respective support processes, which are those processes directly necessary to provide customer service. Standardization is the process that adjusts or adapts the characteristics of a product, service or procedure so that they resemble a standard model or common norm; the term standardization comes from the term standard, which refers to an established mode or method accepted and normally followed to perform some activity or function.

[1] Corresponding author.
E-mail address: *wlamyrpalacios@ufps.edu.co,*

In accounting in general there are two types of information, the first is financial accounting, which is the information system of a company oriented towards the preparation of external reports that gives importance to the aspects either historical and also considers the financial reporting standards, on the other hand, it is also established what is the management accounting, This accounting is nothing more than a company's information system, but here it is oriented towards the preparation of reports for internal use, that is to say, it is for the use of the company itself without extending to external users, and this will allow the functions of planning, control and, above all, administrative decision-making to be much simpler.
The cost accounting friends is nothing more than an information system, which is used primarily for what is to determine, record, acular, control, analyze, direct, interpret and even inform all related to costs, basically cost accounting shares financial and corporate information, thus standardizing the processing times and with them the benefit of faster productions with high rates of efficiencies, generates a production model recommended for the claims of the company.

Having mentioned the above, the present investigation contemplates the quantitative analysis of a system of production of women's footwear, which is desired to standardize from the improvement of the production costs, in addition to the minimization of the minimum resources to be used, for this an accounting and numerical analysis of the different intangible aspects of the system was used, for this a descriptive analysis of the process was used through the integration of instruments of the information such as interviews, surveys, cause and effect diagram, etc.

Article structure

2.1 Diagnostic tools

***Surveys*.** is a procedure within the designs of a descriptive research in which the researcher seeks to collect data by means of a questionnaire previously designed in giving an interview to someone, without modifying the environment or the phenomenon where the information is collected either to deliver it in the form of a triptych, graph or table. The data are obtained by asking a set of standardized questions addressed to a representative sample or to the total set of the statistical population under study, often composed of individuals, companies or formerly institutional, in order to know states of opinion, ideas, characteristics or specific facts.

***Group dynamics*.** Sociological designation to indicate the changes in a group of people whose mutual relations are important, being in contact with each other, and with collective, continuous and active attitudes.

***SWOT matrix*. It** is one of the most important tools for the formulation of administrative strategies, although sometimes its usefulness is not always clear. The importance of the SWOT matrix lies in the fact that it makes a real diagnosis of the company or business, it tells how it is, how it is doing, which provides the main element required to make decisions, which is none other than the awareness of reality, because when we know the reality, we almost always know what to do. The SWOT matrix clearly shows which are the weaknesses, opportunities, strengths and threats, elements that, when clear, give a global and integral vision of the real situation.

***Continuous improvement strategies*.** Continuous improvement, understood in its broadest sense, can be used to obtain improvements in any of the dimensions of the business (e.g. costs,

quality, time reduction, among others). At all times this continuous improvement requires a great involvement of all personnel directly related to the company. In order to carry out this continuous improvement within business organizations, specific techniques are available, among which we can highlight:

The problem-solving cycle: In its simplest definition we can consider continuous improvement as a cycle that consists of finding and solving problems.

Brainstorming**:** It consists of quickly pooling all kinds of ideas that a group of people is capable of generating. In this line the Quality Circles in which ideas are collected to solve operating defects or improvements in production systems.

Cause-effect diagrams: A technique used to identify the possible causes of a problem or defect (fishbone).

Review lists**: This is a** very useful tool for recording and organizing data.

Flowcharts**:** Diagrams used to describe the activities of a process as well as their evolution through the different states. 89% of the companies that use continuous improvement openly declare to have achieved substantial improvements in productivity, quality, product deliveries, or some combination of these.

2.2 Exploratory tools

Checklist. The checklist is a type of informative job aid. It also goes by the names: checklists or check sheets. The checklist, as a methodological tool, is composed of a series of items, factors, properties, aspects, components, criteria, dimensions or behaviors, necessary to be taken into account to perform a task, control and evaluate in detail the development of a project, event, product or activity. These components are organized in a coherent manner to allow the presence or absence of the individual elements listed or by percentage of compliance or occurrence to be effectively evaluated (Oliva, 2009).

Pareto diagram. Problem areas can be defined using a technique developed by economist Vilfredo Pareto to explain the concentration of wealth. In *Pareto analysis,* the items of interest are identified and measured on the same scale and then arranged in descending order, like a cumulative distribution. Typically, 20% of the items evaluated account for 80% or more of the total activity; as a result, this technique is often referred to as the *80-20 rule*. For example, 80% of the total inventory is in only 20% of the inventory items, or 20% of the jobs cause approximately 80% of the accidents, or 20% of the jobs account for 80% of the employee compensation costs. Conceptually, the methods analyst concentrates most of the effort on only a few jobs that generate most of the problems. In many cases, the Pareto distribution can be transformed into a straight line, using the normal transformation, from which further quantitative analysis can be done (Herron, 1976).

Cause-effect diagram. Also known as fish diagrams were developed by Ishikawa in the early 1950s while working on a quality control project for Kawasaki Steel Company. The method consists of defining the occurrence of an undesirable event or problem, i.e., the effect, as the "head of the fish" and

then identifying the factors contributing to its formation, i.e., the causes, as the "fish bones" attached to the backbone and head of the fish. Generally, the main causes are subdivided into five or six main categories - human, machine, method, material, environmental, administrative - each of which is further subdivided into its causes.

The process continues until all possible causes are identified and listed. A good diagram will have several levels of spines and will provide a good picture of the problem and the factors contributing to its existence. The factors are then analyzed critically, in terms of their likely contribution to the whole problem. This process may also tend to identify potential solutions. Fish diagrams have been very successful in Japanese quality circles, where the contribution of all levels of workers and managers is expected. It can be shown that such diagrams have not been as successful in U.S. industry, where cooperation between labor and management may be less efficient in producing the desired solutions and results (Cole, 1979).

Time study. The time study is a work measurement technique to record the time and pace of work for the elements of a specific task, performed under given conditions, and to analyze the data to determine the time required to perform the task at a defined level of performance. This organizational technique is used to calculate the time required by a skilled operator to perform a given task, following a pre-established method.

To perform a time study, the operations are divided into two:

Constant Operations. When the speed of the operation does not depend on the speed, skill or ability of the operator.
Variable Operations. When the speed of the operation depends entirely on the speed, skill or ability of the operator.
Time studies are made only on variable operations.

The rating factor (RF) is the process by which an industrial engineer converts the time obtained in a time study into a normal time, just for all operators. This is because when an operation is performed by several operators, not all work at the same pace, some go faster than others or, when an operation is performed by a single operator, he may vary his pace during the course of the time study; thus, the normal time (TN) is adjusted using the rating factor.

The normal rate is that at which trained operators can do the job effectively (using the minimum amount of energy necessary and with natural, restful movements, whenever the job requires or permits). It is described as the time required by the normal or standard operator to perform the operation, when working at standard speed, without any delay due to personal reasons or unavoidable circumstances.

$$TN=TC*RF$$

Fatigue supplements (FS) represent the loss of productivity that an individual has for ergonomic reasons at his or her workstation. No operator can maintain a standard pace for all the minutes of the workday. Three types of interruptions can occur, for which additional time must be allocated. The first are personal interruptions, such as trips to the restroom and water fountains; the second is fatigue that affects the strongest individuals on lighter jobs; and finally, there are unavoidable delays, such as tool breakage,

supervisor interruptions, minor tool problems and material variations, all of which require extra time allowances.

There is constant fatigue (the loss of productivity of an individual, regardless of his ergonomic quality) and variable fatigue (the loss of productivity of an individual directly related to his ergonomic quality). For a man, constant fatigue is 9% and for women 11%.**Standard Time:** It is the standard that measures the time required to determine a unit of work, using standard method and equipment, by a worker who possesses the required skill, developing a normal speed that can be maintained day after day, without showing symptoms of fatigue:

STANDARD TIME (TS)=TN*(1+SF)

Standard operation time (TS) = Timer time (TC) * Rating Factor (RT) * ∑Fatigue supplements (SF).

Stopwatch Time: This is the time taken only by the operation of a qualified operator, presenting delays due to personal reasons or unavoidable circumstances.

Rating Factor: Determines the behavior of the work rhythm of a qualified operator in time taking, both of an observation and of a process as such.

Job analysis: Identifies problems within an area, department or workplace. Before collecting quantitative data, the analyst visits the area and observes the worker, the task, the location, and the surrounding environment. In addition, he or she identifies administrative factors that may affect the worker's behavior or performance.

Elements of the time study. To carry out the time study, the following elements are taken into account:

Choice of operator. The operator must be well trained in the method, like the work and show an interest in doing it well. He should also be familiar with time study procedures and practices and have confidence in both the time study methods and the analyst.

Time study equipment. The minimum equipment required to conduct a time study program includes a stopwatch, a chart, time study forms, and a pocket calculator. Video recording equipment may also be useful.

Time study form. All details of the study are recorded on a time study form. The form provides space to record all pertinent information about the method being studied, tools used, etc. The operation under study is identified by such information as name and number of the operator, description and number of the operation, name and number of the machine, special tools used and their respective numbers, the department where the operation is performed, and the prevailing working conditions.
Observer position. The observer should stand, not sit, a few feet behind the operator, so as not to distract him or interfere with his work. During the study, the observer should avoid any type of conversation with the operator, as this could distract him or modify routines.

Division of the operation into elements. To facilitate measurement, the operation is divided into groups of movements known as elements. To divide it into its individual elements, the analyst observes the operator for several cycles. These should be separated into divisions as fine as possible, but not so small that the accuracy of the readings is sacrificed.

Selection of the time-taking technique. One of two techniques can be used to record elementary times during the study. The continuous timing method, as the name implies, allows the stopwatch to run throughout the study. In this method, the clock is read at the terminal point of each element and time continues to run. In the zero returns technique, after reading the stopwatch at the terminal point of each item, the time is reset to zero; when the next item is performed, the time advances from zero.

Handling difficulties. During the study, the operator may encounter unavoidable delays, such as another employee or supervisor interrupting or a tool breakdown. He may also intentionally cause a change in the order of work by going to get a drink of water or stopping to rest. Such interruptions are known as extraneous elements.

Study cycles. A work cycle is the sequence of elements that constitute the work or series of tasks under observation. The number of job cycles to be timed depends on the degree of accuracy desired and the variability of the times observed in the preliminary study.

3.Method

According to Frank Morales (1989), descriptive research, also called diagnostic research, basically consists of characterizing a phenomenon or concrete situation by indicating its most peculiar or differentiating features.

Based on the above definition, this project is identified with this type of research, because through the initial diagnosis will know the customs and prevailing attitudes that are occurring within the company Creaciones Pamela JD, so as to know the current situation, then an accurate description of the activities, processes and objects that are in the environment to investigate without interfering in the development of the process, then through the development of a time study may establish proposals for improving the production process and formulation of micro tools, in order to standardize the process.

Population. The total population of the present project is the 8000 pairs of ballets produced in one month, which correspond to the 7 references of women's ballet shoes that presented the highest demand in the last 6 months of the companies.

Sample. Considering that the company Creaciones Pamela JD, needs to standardize the manufacturing processes of the ballets, the line of ballets for women references f06, f48 and f318 will be taken as a sample for the development of the project, which corresponds to 4800 pairs of ballets produced in one month.

Primary sources. The collection of information, for the purposes of manufacturing the line of ballets for women references f06, f48 and f318 through visits to the company Creaciones Pamela JD through direct observation of the execution of operations, an interview with the manager of the company, a checklist will be made in order to know the current conditions of the work environment.

Secondary sources. They are made up of the bibliography consulted, related to the object of the research, such as texts, internet, professionals specialized in the topics, degree projects and other documents.

Table 1. Number of articles by country of publication.

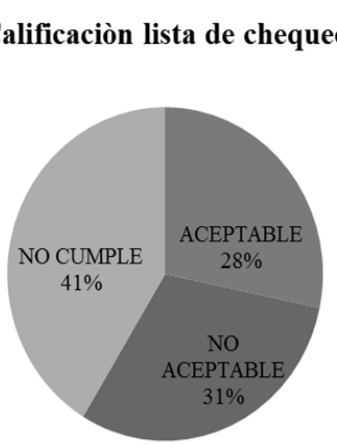
Country	Percentage
USA	50%
Canada	20%
Europa	5%
Latin America	5%
Colombia	10%

Source: Own elaboration

4.Results

In order to determine the current conditions in a qualitative manner, a checklist was used, obtaining current information on the situations presented there, through the collection of information .

Table 2. Diagnostic Checklist Results



Source: Own elaboration

In the company, this is evidence that no time records of operations are kept. CREACIONES PAMELA JD has not developed any type of method and time studies. It was observed that the company does not have an occupational health and safety program because there is no signage at the workstations; this increases the risk of injuries and accidents, as the worker is deprived of the most elementary information about the risk and how to avoid them.

There is also a lack of storage space for leftover material and finished product, due to the company's facilities. The company's structure has deteriorated in terms of walls, floors and ceilings, which makes safety conditions in the workplace inadequate. There are also insufficient toilets and they are not in good condition for the number of employees, which means that the hygienic and sanitary conditions are not adequate for good employee performance.

There is no adequate management and storage of waste and flammable substances used in the production process, which shows a lack of organization, order and cleanliness to provide a safe and pleasant environment for the company's workers.

Interview. In the interview with the Manager and Owner of the company Creaciones Pamela JD, it was possible to highlight her vision of expanding nationally with points of sale. Another aspect, which can be highlighted is the variety of styles in ballet shoes for both girls and women, she also considers that it is important to participate in national fairs that are presented each year nationwide, Although she affirms that the competition in the shoe store is becoming more difficult every day because every 2 to 3 months new models of ballet shoes must be handled, and that is where innovation plays an important role, says Sandra Lizarazo.

The operations diagram was drawn up, under the respective symbol and color standards, for the manufacture of f06, f48 and f318 reference vanes. Figures 12, 13, 14 show the summary of the current operation diagrams.

Table 2. Summary of the operating flow diagram of baletas reference f06

Event	Number	Total production time
Operations		30.99 min
Inspections		

Source: Own elaboration

Table 3. Summary of the operating flow diagram of baletas reference f48

Event	Number	Total production time
Operations		34.74 min
Inspections	5	

Source: Own elaboration

The flow chart allows the analysis of hidden costs that do not generate productivity, such as transportation, temporary storage, delays, being more detailed than the operations diagram, generating value for the global appreciation of these activities. The respective flow charts were drawn up for the manufacturing process of the f06, f48 and f318 reference ball bearings, following the respective standards of colors and symbols.

Table 4. Summary of process flow diagram of baletas reference f06

	Current
Operations	
Transportation	

Delays	0
Inspections	
Temporary storage	
Time (minutes)	33,66
Distance (meters)	80,5

Source: Own elaboration

The time study is a method used to determine a fair working day, where the operator, working at a normal pace, neither slow nor hurried, can perform their tasks correctly and thus receive their respective economic remuneration. To carry out the study and time recording, a Smartphone cell phone was used to make video recordings and timekeeping.

Table 5. Summary of standard manufacturing time of reference pallet

ESTANDARIZACIÓN DE TIEMPOS BALETA F318						
Ítem	Operación	Tiempo estándar (Seg/Und)		Ítem	Operación	Tiempo estándar (Seg/Und)
1	Marcar el molde en el material	38.88		16	Estampar la plantilla	90,72
2	Cortar el material	84,17		17	Clavar plantilla estampada a horma	62,14
3	Marcar el molde en el forro	33.58		18	Marcar el molde en el contrafuerte	17,80
4	Cortar el forro	89,41		19	Cortar el par de contrafuerte	46,00
5	Coser material con el forro	101,56		20	Pegar laterales entre forro y material	38,27
6	Pegar forro y material	103,08		21	Ensamblar material sobre plantilla	346,19
7	Marcar el molde de la tira	17,78		22	Pegar suela a plantilla	391,32
8	Cortar el material del taco	17,67		23	Retirar la horma de la baleta	43,00
9	Doblar los orillos izquierdo y derecho	17,05		24	Marcar el molde de la tira	17,80
10	Pegar los orillos	16,95		25	Cortar el material del adorno	34,07
11	Coser el taco a la parte de atrás de la camisa	28,40		26	Armar adorno	51,17
12	Marcar el molde en el forro de plantilla	17,16		27	Pegar adorno a baleta	23,27
13	Cortar el forro de plantilla	65,56		28	Limpiar la baleta	85,29
14	Pegar forro a la plantilla	69,03		29	Empacar baleta	50,10
15	Coser el forro a la plantilla	72,01				
Tiempo estándar total de producción (Seg/Und)						1996,96
Tiempo estándar total de producción (Min/Und)						33,28

Source: Own elaboration

5.Conclusions

Although the increase in trade may be an opportunity for the sector, it also represents a challenge for it, as it will now have to compete more directly with companies from developed countries, which have better infrastructure and technology. In addition to this, the search to generate an added value and differentiate their products has strongly affected the economy of most economic sectors, including the footwear sector, present in the city of Cúcuta and its Metropolitan Area. The footwear manufacturers in Cúcuta have not been able to balance production with commercialization, one of the factors that originates the crisis that has been occurring due to the problems with the neighboring Venezuelan country that decreased in a notorious way the production of footwear in the city, Under this crisis, the city's footwear manufacturers have gone out to look for new national and international markets. The production process used by the city's manufacturers is empirical, although 1 out of every 10 footwear factories uses more technified machines; the main material used in the manufacture of footwear is synthetic due to its low cost.

References

Business, D. (2019). *World Bank Birf.* Retrieved from https://espanol.doingbusiness.org/

Carvajal, A. M. (2004). Strategic planning of the plant. Retrieved from http://eprints.uanl.mx/1513/1/1020146704.PDF

Chase, R. B. (2015). Operations management.

Chavez, M. (2018). *Portfolio*. Retrieved from https://www.portafolio.co/negocios/empresas/fruco-la-marca-local-que-pesa-en-el-portafolio-de-unilever-529371

Chavez, M. (2019). *Fruco, the local brand that weighs on Unilever's portfolio.* Retrieved from https://www.portafolio.co/negocios/empresas/fruco-la-marca-local-que-pesa-en-el-portafolio-de-unilever-529371

Chiavaneto, I. (2008). *Human Resources Management.* Retrieved from file:///C:/Users/crist/Downloads/Thesis/ADMINISTRACION_DE_RECURSOS_HUMANOS-_Chia.pdf

Chiavenato, I. (2012). *Administracion de recursos Humanos.* Mexico: McGRAW-HILL. Retrieved from https://cucjonline.com/biblioteca/files/original/aec4d0f8da9f45c14d9687966f292cd2.pdf

colombia, C. (2020). Retrieved from https://www.claro.com.co/personas/servicios/servicios-moviles/postpago/planes/

Colombia, U. N. (2005). *Compilation and construction of the road network of Cucuta.* Retrieved from https://amc.gov.co/informacion/proyectos/transportemasivo/informe2.pdf

Copoica, C. d. (2006). *Tomato cultivation under greenhouse.* Medellin Antioquia. Retrieved from https://repository.agrosavia.co/bitstream/handle/20.500.12324/1224/43125_50546.pdf?sequence=1&isAllowed=y

Díaz, J., Pulido, J., Pérez, A. and Ortegón, M. (2012). Methods study report. Retrieved from https://docs.google.com/document/d/1YjxrQYe7pJK_hz6EOkYPBgQ2lFweuW0dp88aL3avQM/edit?pli=1#

Fernández, I., González, A., Puente, J. (1996). Diseño y medición de trabajos. Mexico: Servicio de Publicaciones.

Fierro Martínez, A. (2009). Theory of business diagnosis. Libro Diagnóstico Empresarial. Bogotá: UNAD.

Forero Torres, Y. (2013). Study of methods and times of the manufacturing process of lunchbox furniture in the company Aceros Daza S.A. Degree thesis, San José de Cúcuta, Universidad Francisco de Paula Santander.

Galán, M. (2014). Research methodology. Retrieved from: http://manuelgalan.blogspot.com/2012_08_26_archive.html

Gerencie (2020). *Gerencie*. Retrieved from Gerencie: https://www.gerencie.com/vida-util-de-los-activos-fijos.html

Colombian Institute of Technical Standards and Certification (2012). Normative reference NTC 4734, Bogotá: ICONTEC.

Lopez, V. Y. (2016). *Market study, administrative and legal, for the constitution of the collection center of agricultural products in Puerto Wilches Santander.* Bucaramanga. Retrieved from http://tangara.uis.edu.co/biblioweb/tesis/2016/165080.pdf

Monar Flores, L. and Rojas Niño, D. (2014). Study of methods and times of the manufacturing process of the set of cauldron type pots. Degree thesis, San José de Cúcuta, Universidad Francisco de Paula Santander.

Niebel, B. and Freivalds, A. (2009). Industrial engineering methods, standards and work design. 12 ed. Mexico: Mc Graw Hill.

Sánchez Jabba, A. (2014). Crisis at the border. Retrieved from: http://www.banrep.gov.co/docum/Lectura_finanzas/pdf/dtser_197.pdf

Makalenin Türkçe başlığı buraya yazılır....

Özet

Türkçe özet.

Anahtar sözcükler: anahtar sözcükler1; anahtar sözcükler2; anahtar sözcükler3

AUTHOR BIODATA

Insert here author biodata**.**