

Development of a Pert Model for Project Management

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Abstract: In the present investigation a strategic planning model was carried out, which was applied in a management process in the organization, which was implemented in the Project Evaluation and Review Techniques (Pert) model which was implemented in order to determine the time of completion of the project, to avoid downtime and increase the productivity of the activities that are carried out in organizations when structuring their organizations to increase productivity.

Keywords: Simulation, attention process, productivity.

INTRODUCTION

In recent times it is important to highlight that a Pert model will determine the completion time of a project, since it is a model that serves to manage activities and processes.

Project management: It is the set of knowledge, skills, tools and techniques, applied to the activities to be carried out to meet the requirements of the project.

While it is important to know that when talking about projects according to Terrazas (2009) you must differentiate between what is the preparation, evaluation and administration of projects. Depending on what is involved, the techniques and tools may be different, but complementary. In this work it is about focusing with a holistic and holistic vision the world of projects in attention to their management and development.

Specifically, the notion of projects, the concept of project management, the functions of project management and the structural bases to focus on this discipline are specified; which are developed explaining and exemplifying with its essential characteristics. The idea is to motivate public and private organizations to give a little more attention to the planning and

monitoring of projects in the understanding that the good implementation of these are the heart of the development of the regions.

For Sánchez & Cuadros (2014) in practice, two types of control can be used in the projects, one with a managerial and strategic approach that allows the project to be effective, efficient, effective and productive. The other approach is the technical control that occurs in the engineering phase of the project and has to do with the risks and quality that adds value to the final product. As presented in Graph 1, the monitoring and control process group is an activity that begins with the conception of the project itself and the authorization to carry out the product, until closing, when the interested parties are completely satisfied.

LITERATURE REVIEW

In 1958, the US Department of Defense-Navy, the Lockheed Missile Systems Division (ballistic projectile manufacturers) and the Boaz consultant, Allen & Hamilton (consulting engineers), proposed a new method to solve the problem of planning, programming and control of the project of construction of atomic submarines armed with projectiles (Yepes, 2015).

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Ballestin (2002) points out that the problem of programming or sequencing of PSP projects (Project Scheduling Problem), seeks to determine the start and end time of each activity that belongs to the project, in order to achieve the best possible performance in terms of a or several evaluation functions, respecting the execution times of each activity, the logical precedents and the availability of means for its execution.

That is why for the implementation of the model in the following process: I help to standardize the times, also to have a better decision making, and that is why to make a Pert model it is essential to know the components of a Pert model.

According to Vargas (2008) a project is defined as a non-repetitive venture, characterized by a clear and logical sequence of events, with beginning, middle and end, which is intended to achieve a clear and defined objective, being conducted by people within the Defined parameters of time, cost, resources involved and quality. According to Garrido & Carrillo (2013) they mention that uncertainty in projects is usually an inevitable aspect. Project managers prevent it by managing the known risks in the phases prior to the execution of the project. Despite these efforts, unidentified or uncontrollable risks may arise during the project execution phase, which negatively affects its Key Performance Indicators (DCI) and the proposed objective.

While it is important to mention that, according to López (2005), he points out that the large number of studies on the impact on strategic planning and performance have not been sufficient to generate concrete results that support the usefulness of strategic planning as an appropriate instrument for develop alternatives, make strategic decisions and have a positive impact on organizational performance. On the other hand, the controversy has not only been in the impact of PE on financial performance, but also in the concept, in the elements that form it and in the way of operationalizing strategic planning; Likewise, the use of various variables that measure financial performance has generated different results depending on which one is used.

On the other hand, it is important to mention according to Lago (2013) that what is evaluated is the possible change of scenarios in future times, having to be considered backup or backup plans, which allow adaptation to changing circumstances with such flexibility that do not depart from the proposed goal, but that in advance they illuminate the way forward and thus avoid fatal mistakes that prevent the prolongation of the life of the organization.

It is important to consider that in the strategic field it is important to consider the following elements for a strategic diagnosis.



Figure-1. 12 step technique.
Academic source: Aguilar & De la Maza (2002).

The authors Govea, Cabral, Aguilar, Cruz, López & García (2016) mention that when applying the technique of strategic planning it is possible to give rise to a competitive and efficient company, with the capacity to face new markets. The interviews were applied to the different key actors, during the process of their application the conversations were recorded where the interviews were subsequently processed, which were supportive to formulate the strategic planning of the company. The results indicate that the company is important in the agricultural sector, which has achieved many successes.

With good planning, the aim is to increase productivity, as Nagles (2006) mentions, that today organizations need to respond effectively and with great speed to the challenges that are generated in the environment in which they carry out the different activities. This requires highly trained people with the ability to decide what to do and how to act in a given situation, an annoying customer, a provider that has not met or has not been paid.

Business planning is a technical, economic and organizational process that helps companies to channel their actions in the fulfillment of their objectives in the short and medium term. However, for our country, in addition to these ideas, planning is a process that expresses the interest of making proper use of available resources and the willingness to prioritize the contribution of state-owned companies to society, above any interest. collective or individual.

PURPOSE OF THE INVESTIGATION

Determine the completion time of the project by developing a Pert model.

Specific objectives

- Schedule activities.
- Optimize time.
- Make a correct decision making.

METHODOLOGY




This tool defines the duration of the activity as a random variable that is defined from the following three estimates. These three estimates represent the uncertainty of the duration of the activity. The larger this uncertainty, the wider the range of estimates will be (Winston, 2011).

For this it is important to take into account that to make a pert diagram, it is important to know the elements that compose it:

- Description of activities.
- Target time.
- Most likely time.
- Pity time.
- To get the expected time.

Once you have the elements mentioned above it is important to know the components to make a Project Evaluation and Review Techniques model better known as PERT (see table 1).

Table-1. Elements of a PERT model

Description	Symbology
Node	
Arrow	
Slack	H
Critical route	

That is why the following model was made, which helped to make the calculations of the project. Table 2 represents the activities that make up the project.

Table-2. Project activities,

Coordinates	Activity
A	Diagnose the need
B	Identify the need.
C	Set the mission
D	Set the vision.
E	Plan and develop goals
F	Perform strategic analysis
G	Strategy Construction
H	Strategy implementation
I	Strategy monitoring.
J	Watch the strategy.
K	Strategy monitoring
L	Stay in stability.
M	Feed back

To calculate the expected time, the following formula is used:

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$$Te = \frac{a + 4m + b}{6}$$

Where:

- a = Optimistic time
- m = Most likely time
- b = Pessimistic time.

Table 3 shows how the expected project time is calculated.

Table-3. Calculation of expected time

Activity	Predecessor	Optimistic Time	Probable Time	Pessimistic Time	Expected time
A	-	2	7	9	7
B	-	3	5	8	5
C	B	1	2	3	2
D	C	7	9	11	9
E	A, D	3	7	10	7
F	D	5	9	13	9
G	A, D	3	7	10	7
H	E, F	4	6	10	6
I	G, H	7	10	15	10
J	I	10	13	16	13
K	G	9	14	18	14
L	J, K	8	10	13	10
M	L	9	11	17	12

Once the previous table is made, the PERT diagram is carried out. Figure 2 represents the Pert diagram of the project.

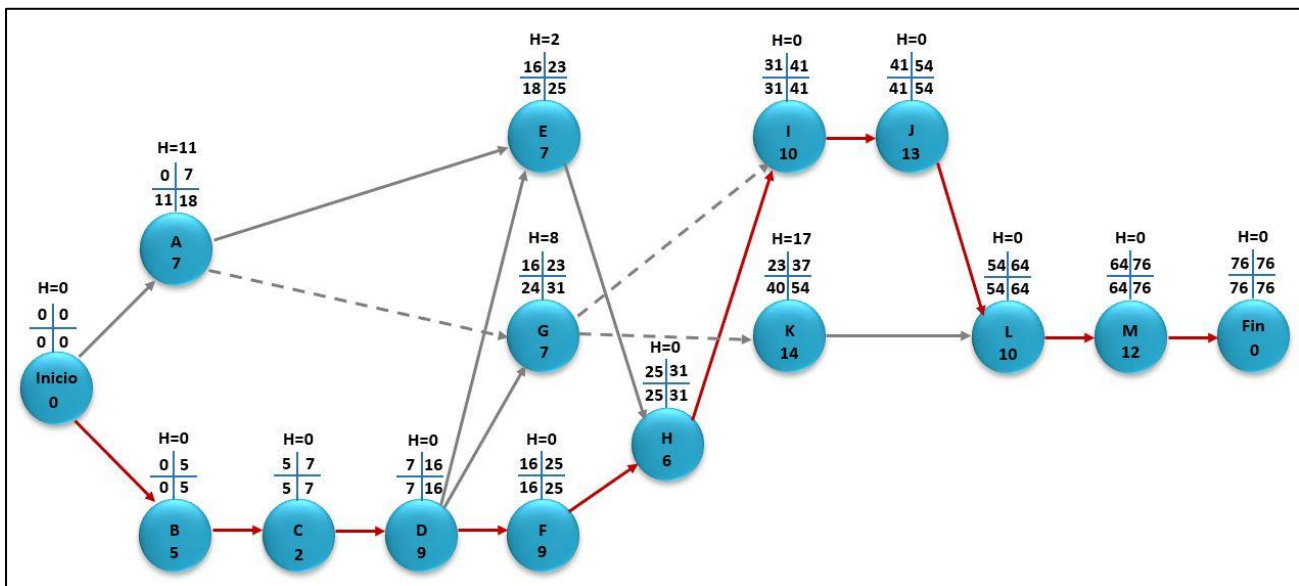


Figure-2. Pert diagram of the project.

Although the culmination of said project is 76 days, it is the standard time that said management project is completed in a timely manner.

CONCLUSIONS

Thanks to the implementation of the PERT model it was possible to determine the culmination of said project is 76 days, so this number is standard, and that way the time will be optimized, avoiding delays,

changes of waste, as well as rework, to make the project more efficient. Activity management process.

The Benefits Obtained By Carrying Out Said Project Were:

- Improves planning,

- Greater integration of activities,
- Time optimization,
- Easy interpretation.
- Promotes the development of a master plan.

RECOMMENDATIONS

That each activity that is executed in the organization is standardized in the times so that later they can be fulfilled and thus avoid retrofits and especially wasted time so that it does not affect subsequent plans and the impact is more fruitful.

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REFERENCES

1. Aguilar, V. A. y C. De la Maza J. (2002). Planeación estratégica (Guía de estudio). 3a Edición. Universidad Autónoma de la Laguna. Torreón, Coahuila, México.
2. Ballestin, F. (2002). Nuevos métodos de resolución del problema de secuenciación de proyectos con recursos limitados. 1a ed. Ed. *Universitat de Valencia-Servei de publicacions*. Valencia (España). pp. 5-9.
3. Garrido, A., & Carrillo, J. (2013). Programación reactiva en la administración de proyectos: aproximación conceptual y aplicaciones prácticas. *Revista Escuela de Administración de Negocios*, (74), undefined-undefined. [fecha de Consulta 19 de Noviembre de 2019].
4. Govea Cortés, A. G., Cabral Martell, A., Aguilar Valdés, A., Cruz Hernández, M. A., López Trujillo, R., & García Elizondo, R. (2016). Aplicación de la planeación estratégica y fundamento normativo en una empresa procesadora de carne. *Revista Mexicana de Agronegocios*, 39(), undefined-undefined. [fecha de Consulta 25 de Noviembre de 2019].
5. Guía a los fundamentos de la dirección de proyectos. (2004). (Guía del PMBOK®, Project Management Institute, EUA.
6. Lago, A. B. (2013). Capacitación en Planificación Estratégica. Impulso del Desarrollo Local con Microempresas. *Observatorio Laboral Revista Venezolana*, 6(11), undefined-undefined. [fecha de Consulta 25 de Noviembre de 2019].
7. López Salazar, A. (2005). La planeación estratégica en la pequeña y mediana empresa: una revisión bibliográfica. *EconoQuantum*, 2(1), undefined-undefined. [fecha de Consulta 25 de Noviembre de 2019].
8. Nagles García, N. (2006). Productividad: una propuesta desde la gestión del conocimiento. *Revista Escuela de Administración de Negocios*, (58), undefined-undefined.
9. Sánchez Montoya, J. P., & Cuadros Mejía, A. (2014). Análisis de técnicas de seguimiento y control de proyectos. aplicación en la industria de construcción de botes. *Revista Ciencias Estratégicas*, 22(31), undefined-undefined. [fecha de Consulta 19 de Noviembre de 2019].
10. Terrazas Pastor, R. A. (2009). Modelo conceptual para la gestión de proyectos. *Perspectivas*, (24), undefined-undefined. [fecha de Consulta 19 de Noviembre de 2019].
11. Vargas, R. (2008). Análise de valor agregado en Projetos. *BRASPORT. 4ª Ed.; Brasil*.
12. Winston, W. L. (2011). Investigación de Operaciones, Aplicaciones y Algoritmos. *México, DF: Cengage Learning*.
13. Yepes, V. (2015). Organización y Planificación de Obras. *Recuperado de <https://victoryepes.blogs.upv.es/2015/01/28/los-origenes-del-pert-y-del-cpm>*.