International Journal of Sustainability Management and Information Technologies
2015; 1(1): 1-5
Published online June 23, 2015 (http://www.sciencepublishinggroup.com/j/ijsmit)
doi: 10.11648/j.ijsmit.20150101.11

Benefit / Cost Study for Modernization Technological the Attention in of the Municipally Public Services

Patiño, Israel

Department of Accounting and Administration, Technologic for Higher Studies of Ecatepec, Ecatepec State of Mexico, Mexico

Email address:
ispa_ga@hotmail.com

To cite this article:
Patiño, Israel. Benefit / Cost Study for Modernization Technological the Attention in of the Municipally Public Services. *International Journal of Sustainability Management and Information Technologies*. Vol. 1, No. 1, 2015, pp. 1-5. doi: 10.11648/j.ijsmit.20150101.11

Abstract: In this paper a cost benefit study for public projects in order to propose the infrastructure based organizational, educational and technological aspects, to ensure the technological modernization of administrative and operational processes carried out in the public administration in Mexico, in specific the municipally public services. The analysis and research is done to ensure their implementation in the short, medium and long term. The Foregoing it did use scientific and technological methodologies, supported with the implementation of field research.

Keywords: Benefit Cost Analysis, Technological Modernization, Municipally Public Services

1. Introduction

Technological modernization of municipal utilities in Mexico requires joint efforts between citizens and the local government, so they need to conduct research to support its incorporation, development and permanence. From the above it is urgent the modernization, as the demand for such services by the population has increased exponentially, due to this increase in population and hence the demand for municipal public services. According to the National Institute of Statistics and Geography in 2005, Mexico had a population of 103,263,388 and in 2010 spent a population of 112,336,538, representing an increase of 8.7% compared to 2005. In the case of this article Benefit Cost analysis of technological modernization is to meet the demands of such services. Specifically is propose basic infrastructure, taking all information provided as data collected and analyzed the municipality in of Ecatepec de Morelos, State of Mexico, Mexico, where the cost benefit study focuses. To detail the present work, it obtain of the theoretical framework, scientific and technological methodologies, case studies and finally the cost for technological modernization to the attention of municipal utilities, in the case of the municipality of Ecatepec.

2. Contextual Frameworks for Cost Benefit Analysis of Projects in Public Administration

2.1. Projects of the Public Sector

The public sector projects are used and are funded by citizens; while projects in the private sector are owned by corporations, associations and individuals [1]. The products and services of the private sector projects are used by consumers and customers individually. The public sector projects (also called public ownership) do not generate profits; these have benefits for the citizens that are paid by the government. The Benefits and Costs are:

- Costs. Cost estimates by the government entity for the construction, operation and maintenance of public project.
- Benefits. Advantages that will be experienced of the own, ie, the public
- Contra Benefits. Disadvantages for the owner when carrying out the project under consideration. The benefits may be against indirect economic disadvantages of alternative.

2.2. Cost Benefit Analysis

This section presents and analyses the economic nature that takes place in the public sector, such as cost / benefit analysis, in which the owners and users (beneficiaries) of public projects involved. The state agencies provide

mechanisms to increase capital and operating funds for these projects through taxes, royalty payments and loans. The ratio benefit / cost (B / C) are included in the present, in order to show objectively the economic analysis of public sector evaluation, which reduces the effect of political interests.

The public projects highlight the benefits that are provided to the public by means of proposed expenditures [2]. The method calculates the benefit-cost of the users and to the project cost for state. The public sector projects are state-owned and therefore of citizens, and these projects produce a benefit to society itself, but also cause contra-benefits or losses, and this additional project costs are the monies invested by the state [3].

The benefit / cost (B / C) ratio is considered the method of fundamental analysis for public sector projects. This analysis B / C was created to give greater objectivity in public economics. Exist different variation of the cost B / C ratio benefit; however, the basic approach is the same.

All calculations of costs and benefits should be converted to a common currency unit equivalent (Present Value (PV) / Annual Value (VA) or Future Value (FV)).

The conventional ratio B/C is calculated of the next form:

B/C = VPBenefits / VPCost = VABenefits / VACost = VFBenefits / VFCost

The Converting signs for analysis B / C consists of positive signs as well, costs will be preceded by a + sign. When salvage values are calculated, the costs are deducted. The contra-benefits are considered in different ways, depending on the model used. Common way, the contra-benefits subtracted from the benefits and placed in the numerator.

The decision of directress is simple:

- If (B / C) > = 1.0, it is determined that the project is economically acceptable to the estimates.
- If (B / C) < 1.0, the project is not economically acceptable.

If the value B / C is equal to or very close to 1.0, the non-economic factors will help decide the best alternative.

The ratio B/C is also used is the next:

- B/C = (Benefits – contrabenefits) / costs = ((B-CB) / C).

The contra-benefit is the disadvantage for the owner when carrying out the project under consideration. These may be indirect economic disadvantages. The ratio B / C modified includes the costs of maintenance and operation (M & O) in the numerator and treated similarly to contra - benefits. The denominator, then, includes only the cost of initial investment. Once all amounts are expressed in terms of VP, VA or VF, the ratio B / C is modified and calculated as follows:

- B/C = (Benefits – ContraBenefits – Cost M&O) / Initial Investment = (B-CB-M&O) / C

Any salvage value is included in the denominator as a negative cost. Indeed, the ratio B / C modified can produce a different value than flinging B / C of the conventional method, however, as with contra benefits, the modified procedure can change the magnitude of the reason but not the decision to accept or reject the project. The measure of value expressed as the difference between benefits and costs, implying no ratio based on the difference between the VP, VF or VA benefits and costs, ie, B - C. If (B - C) > 0, the project is acceptable.

Before calculating the ratio B / C with any formula, verify if the alternative with the highest VP or VA also produces higher costs of benefits in VP or VA. It is possible that an alternative with fewer benefits generate higher costs than other alternatives, which makes it unnecessary to consider the more expensive alternative.

3. Incorporation Process of the Information and Communications Technology

The incorporations process is recommending the next [4]:

1. Preparing the environment. The preparation of the environment involves two preliminary events, one to define the scenario where the change will take place (organizational culture) and another to define the strategic management process through the creation of a unit responsible
2. Sensitization of Innovation. The initial phase of this process includes the socialization of current issues
3. Exploration Technology Resources. The exploration phase of technological resources may be called " Directed Test Phase "
4. Exploration Educational Resource. The focus of this phase is focused on the development of training, which incorporates the active participation of stakeholders (administrative, operational and citizens)
5. Generating proposals or prototypes. This phase is to establish ICT proposals that involve project work , collecting resources and with technological training , previously evaluated in the previous stages , allowing reuse and adaptation , through specific projects
6. Feedback. This phase is aimed at the interaction between ICT and operators of the same incentive to make suggestions for improvement or technology upgrade

4. Methodology of the Scientific and Technological Research

4.1. Methodology of Scientific Research

This research was developed from the qualitative and quantitative, the purpose of qualitative research is to understand and interpret the view of reality, as is understood by the subjects participating in the contexts studied [5].

Quantitative research is directly based on the explanatory paradigm, in which quantitative or quantifiable is based to describe or try to explain the phenomena studied information [6].

Due to the nature of this study the following methodologies were also used:

1. Analysis and synthesis. Analysis is a procedure by which a complex whole is broken down into its various parts and qualities. While synthesis provides the connection between the parties and allows previously analyzed and discover essential relations and general characteristics between them
2. Systemic functional structure. Its action is evident in the interplay of ideas, connecting concepts, systems coupled with recommendations and strategies; it becomes an important way for the explanation of the research object [7].
3. Inductive. Is reasoning from the knowledge that the necessary character of the objects of a class a universal conclusion follows about objects of that class [8].

4.2. Methodology of Technological Research

The technological methodology is a systematic to perform, manage and administer a project to perform with high chances of success [9]. By other hand, the intervention technological methodology, aims to generate tangible and intangible artifacts to modify reality, leading to a model actually raised. That is, it is a finished item, which includes the application of knowledge in a specific product that solves a problem, meets a need, facilitates the task, a task done efficiently or provides comfort [10].

5. Benefit Cost Analysis for the Technological Modernization in the Attention of Municipal Utility

The benefit / cost analysis focused on three components that are considered strategic to technologically modernize municipal utilities. The exercise was conducted in the municipality of Ecatepec de Morelos, State of Mexico, the above information derived from municipal budget 2013 of the municipality of Ecatepec de Morelos, State of Mexico, which is to $ 3,183, 821, 370 (US $ $250,509,179.82), such proposals pursuing different objectives each of the three items. Moreover it is proposed to reallocate resources for items, as indicated in the following points.

For purposes of this article the general data analysis are included. On the other hand the costs and benefits are presented in Mexican pesos and U.S. dollars, according to the Bank of Mexico [11] (exchange rate January, 2013).

5.1. Benefit / Cost of Technology Component

This analysis of the technological aspect, is focused on the technical infrastructure necessary to operate the technologies that are intended to incorporate and meet the demand for municipal public services, acquire technological equipment to cover such care, such as computers, furniture desk, telecommunications equipment, among. That is why the following benefit / cost analysis is proposed.

Objectives of the analysis:

- Objective 1. Successfully incorporate the technology component.
- Objective 2. Improving efficiency in management control of MPS Component

Table 1. *Detail and amounts of key technological component costs.*

Concept	Amount (Mexican pesos)	Amount (American dollars)
Materials and tools for hardware and informatics goods	$166,346.00	US $13,088.42
Telecommunications Service	$10,551	US $830.17
Maintenance of IT assets	$55,800	US $4,390.45
Information goods.	$382,467.36	US $30,093.27
Installation, repair and maintenance of computers and ICT	$0.00	US $0.00
Total	$615,164.36	US $48,402.31

Source: Based on the general catalog of key statistics of municipal public finance (2010). catalog_EFIPEM.pdf, www3. Inegi.org.mx. 14/01/2013 Viewed

The benefits of technological component are presented below.

Table 2. *Concepts and amount of the benefits of technological component.*

Concept	Amount (Mexican pesos)	Amount (American dollars)
0.45% the costs of ceremony	$165,976.79	US $13,059.37
2.37% advertising	$464,581.67	US $36,554.18
Total	$630,558.45	US $49,613.55

Source: Based on the general catalog of key statistics of municipal public finance (2010). catálogo_EFIPEM.pdf, www3. Inegi.org.mx. 14/01/2013 Viewed

5.2. Benefit / Cost of Organizational Component

The Benefit / Cost proposed about the organizational component is divided into two, the first one is related to the creation of an organizational structure and the second related to hedging programs, dissemination and reach of SPM.

The benefits sought are the efficiently and effectively allocation and distribution of resources. The costs of creating a direction of citizen services are sought coverage program generation, dissemination and outreach. The contra benefits are the reallocation of economic resources derived from the distribution proposed in this analysis.

Regarding the creation of a Directorate of attention Citizen of Municipal Utilities (DACMPS), aims to:

- Objective 1. Creating of the directorate of Care MPS
- Objective 2. Reallocate the resource.
- Objective 3. Leveraging resources for the implementation of outreach programs, coverage and scope.

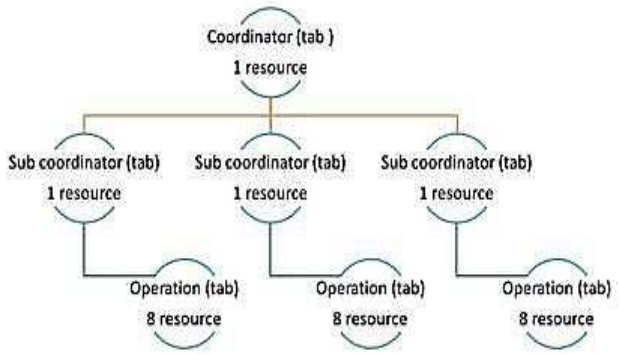
The proposal provides an annual cost of $ 1,925,472.00 (U.S. $ 153,901.84). Since it is necessary to have 32 resources, distributed as follows:

Table 3. *Distribución de recursos y montos propuestos para el personal de MPS.*

New position	Number of resources	Net monthly pay (mexican pesos)	Net monthly pay (American Dollars)
Directorate of attention citizen of municipal public Service	1	$ 16,456.00	US$1,294.79
Departments	3	$ 9,000.00	US $708.14
Operation of AC (Attention citizen)	8	$ 4,500.00	US$354.07
Operation Coordination	8	$ 4,500.00	US$354.07
Operation diffusion	12	$ 4,500.00	US$354.07
Total	32	$1,956,000.00	US$153,901.84

Source: Based on the information tab for each position, and obtained from http://www.ecatepec.gob.mx/transparencia/operativos.php, accessed on 09/01/2013.

The following is the flowchart of DACMPS with the proposed distribution of resources.



Source: own

Flowchart 1. *Proposed distribution of resources of the Citizen Care SPM.*

Are presented in Table 4, the following costs associated with the rent of the premises, where it is proposed to locate the given directorate.

Table 4. *Concept and amount of costs associated with the local rent.*

Concept	Amount (Mexican pesos)	Amount (American dollars)
Buildings and locals	$132,240.00	US $10,404.90
Electricity service	$14,400.00	US $1,133.02
Water service	$1,500.00	US $118.02
Telephone Service	$51,600.00	US $4,059.99
Vehicles and transport equipment	$10,800.00	US $849.76
Total	$210,540.00	US $16,565.69

Source: General catalog of key statistics of municipal public finance (2010). catalog_EFIPEM.pdf, www3. Inegi.org.mx, viewed 14/01/2013

Are presented below in Table 5 the costs associated with the proposed of diffusion programs and coverage.

Table 5. *Key Detail and amounts of costs.*

Concept	Amount (Mexican pesos)	Amount (American dollars)
Servicing and maintenance of vehicles	$ 1,455,166.86	US $114,495.32
Radiolocation service	$ 48, 000	US $3,776.73
Materials and supplies printing and reproduction	$ 161, 280	US $12,689.82
Total	$ 1, 664, 446.86	US $130,961.88

Source: General catalog of key statistics of municipal public finance (2010). catalog_EFIPEM.pdf, www3. Inegi.org.mx, viewed 14/01/2013

In relation to the benefits, are presented below the corresponding keys.

Table 6. *Detail and amounts of the key benefits of the organizational component.*

Concept	Amount (Mexican pesos)	Amount (American dollars)
Educational services	$1,397,886.79	US $109,988.42
Health services	$865,358.49	US $68,088.07
Economic promotion	$443,773.58	US $34,916.96
Social development	$754,415.09	US $59,358.83
Public records	$66,566.04	US $5,237.54
1.8 % Advertising and promotion expenses	$352,846.83	US $27,762.67
Total	$3,880,846.82	US $305,352.48

Source: Based on the general catalog of key statistics of municipal public finance (2010). catálogo_EFIPEM.pdf, www3. Inegi.org.mx. 14/01/2013 Viewed

5.3. Benefit / Cost of Educative Component

The objective in the analysis of this component is encouraged the educational levels and continuously technological training and use the infrastructure for the education. In regard to this section, have the following objectives are:

- Objective 1. Harnessing the use of technology for the training
- Objective 2. Raising educational levels

The show the detail the costs associated with technological training of the proposed model is presented in Table 7.

Table 7. *Keys detail and amounts of costs of technology training.*

Concept	Amount (Mexican pesos)	Amount (American dollars)
Support training of public servants	$275,600	US $21,684.74
Education institutions and programs	$3,625,000	US $285,221.96
Various services and information dissemination	$732,120	US $57,604.61
Total	$4,632,720	US $364,511.31

Source: Based on the general catalog of key statistics of municipal public finance (2010). catálogo_EFIPEM.pdf, www3. Inegi.org.mx. 14/01/2013 Viewed

The benefits of this component are presented below.

Table 8. *Concepts and amount of transfers corresponding to the proposed benefits.*

Concept	Amount (Mexican pesos)	Amount (American dollars)
5.6 % Institutions and educational programs	$3,050,829.23	US $240,045.10
4.85% Expenditures ceremony	$1,788,860.91	US $140,751.01
Total	$4,839,690.14	US $380,796.11

Source: Based on the general catalog of key statistics of municipal public finance (2010). catálogo_EFIPEM.pdf, www3. Inegi.org.mx. 14/01/2013 Viewed. * Distribution of own expenses, based on the overall distribution of salaries of municipal utilities obtained from INEGI (2012). http://www.inegi.org.mx/lib/olap/consulta/general_ver4/MDXQueryDatos.asp?c=11289, 19/01/2013 Viewed.

6. Discussion

The results that can be obtained are mainly social, because on one hand the citizen does not absorb the costs of the proposed components, because it is focused on using resources they currently have the municipality. It is proposed that the development and implementation of technological modernization, it will make by with the municipalities, states and the federation.

- Social benefits. Bringing the technology, raising educational levels, disseminate quality information throughout the country through well-structured programs, taking into account citizens and mainly for feedback and interaction between municipal authorities and citizen
- Economic profit. Transportation savings because the proposal is intended to implement programs where citizens will apply for public service without physically moving to the direction that offers that service. Savings paper, time, as the technological component will be active 24 hours per day.
- Government Benefits. Improve efficiency in the management control of municipal utilities; eliminate redundant paperwork, which will absorb the technological and strategic component: in using the proposed components several benefits are achieved. Raise educational levels of the population (citizens and municipal authorities). Continuous technological training and feedback for the use of the technology. Gradually eliminate the use of stationery. Evaluate procedures, and staff throughout the process of municipal utilities. Getting feedback from those involved. Bring technology and provide alternatives so that citizens have several options to apply for a municipal utility.

7. Conclusion and Recommendations

It is important to analyse the context in the implementation of technologies, efforts should be made to facilitate their implementation permanence and evolution of the technologies, in this case aims to create the necessary infrastructure to start and propose its successful implementation based on the three proposed components and from perspective the cost benefit analysis. The technological modernization, gradually seeks incorporate the use of technologies such as support to facilitate the administrative and operational processes of governments, involving the authorities and citizens. Creating a culture of interaction for citizens and municipal authorities, with the feedback vital part, as well as to support local authorities to continue with the combined efforts, without leaving aside the research would be carried out to substantiate adequately proposals.

References

[1] Blank P.E, L., & Tarquin, P.E, A. (2006). Ingeniería Económica (págs. 322-348). México: MCGraw Hill, Interamericana.

[2] Fabrycky, W. (1997). Decisiones Económicas, análisis y proyectos. New Jersey, EUA: Editorial Prentice Hall.

[3] Baca, C. (2005). Ingeniería Económica. Bogotá Colombia: Fondo Editorial Panamericano.

[4] Montaño Vásquez, V. (2008). Modelo de incorporación de TIC en el proceso de innovación. México: UNAM.

[5] Rodriguez Gómez, G., Gil Flores, J., & Garcia Jiménez, E. (1996). Metodología de la investigación cualitativa. Málaga: ALJIBE.

[6] Briones, G. (2002). Metodología de la investigación cuantitativa en las ciencias sociales (págs. 17-18). Bogotá, Colombia: ARFO.

[7] Fernández, Narez, & Garcia. (2008). En Metodología de la investigación en ciencias sociales (págs. 54 - 58). México: Grupo Editorial Patria.

[8] Castillo de la Peña. (2010). Metodología para la elaboración del trabajo científico (págs. 228 - 229). México: Instituto Politécnico Nacional.

[9] Dante, C. (2006). Implementacion y debugging (págs. 20-34). Chile: Zigzag.

[10] García Córdoba, F. (2005). La investigación tecnológica. Investigar, Idear e Innovar en Ingenierías y Ciencias Sociales. México: Limusa Noriega.

[11] Banco de México (2013), Tipo de cambio, http://www.banxico.org.mx/SieInternet/, consultado el 05 de Febrero del 2013.