Municipal Services Performance Index for Hidalgo (MSPIH)
Claudia Lizeth Gil Velázquez¹, Talina Merit Olvera Mejía², Erik Gerardo Jiménez Proa³

¹Doctoral Student in Public Policy, Instituto de Ciencias Sociales y Humanidades – Universidad Autónoma del Estado de Hidalgo, México
²PhD. Political Sciences and Public Administration, Universidad Complutense de Madrid, España
³PhD. Population Studies Political, Instituto de Ciencias Sociales y Humanidades – Universidad Autónoma del Estado de Hidalgo, México

Received: 14 Nov 2022; Received in revised form: 09 Dec 2022; Accepted: 15 Dec 2022; Available online: 22 Dec 2022
©2022 The Author(s). Published by Infogain Publication. This is an open access article under the CC BY license (https://creativecommons.org/licenses/by/4.0/).

Abstract—The action evaluation of the Public Administration emphasizes the compromise with the appropriate management and results; therefore, it is necessary to get the instruments that evaluate it. In Mexico, the inclusion of the evaluating process has been differentiated in the local area since heterogeneity of the municipal governments, and the capacities of the institutions have caused as a consequence that at this level there are no specific instruments that help the evaluating processes, in this way information becomes learning. In the case of performance, indexes can contribute to strengthening decision-making, because they are based on the information gathered from these instruments, so the results of actions are related directly to the increase in the quality of people’s lives. The main objective of this article is to do a diagnostic evaluation of the public services of the 84 municipals of Hidalgo State. Consequently, in constructing the performance index, it was possible to identify through three sub-indexes the services with a greater supply. According to the literature checked, the reasons or motives that caused the public administrations to have better attention were explained through the identification of the generation of own resources, symbolic value, and the importance of taking care of the inhabitants’ health with the correct benefit.

Keywords—evaluation, public services, municipal, performance index, use of information.

1. INTRODUCTION
During the last decades and because of the constitutional mandate in Mexico there have been incorporations within the evaluating processes of public administration, which have made the government use of adequate and efficient public resources. (Fernandez, 2002). Nevertheless, referring to Merino (2005) at a municipal level, there are wide discrepancies among the municipal governments that generate a problem in the institutional design impeding the implementation of effective processes of evaluation due to the lacking of the major tools, instruments, and personnel with technical capacities of the subject. As a result, there are few significant advancements related to that, hence facilitating the systematization of information is appropriate to a necessity in these levels, on account accessing the knowledge allows making decisions based on the basis.
In this article, the concept of evaluation is not limited not only to generating evaluative information about the supply of public services, but also demonstrating that the information can be turned into learning, so that, the use of instruments like the Municipal Services Performance Index for Hidalgo (MSPIH) allowed to explain through a diagnostic evaluation the state of supply of the public services in its 84 municipals.
The institutional restructuring that resulted in the constitutional reforms implemented from the decade of 1980 to the decade of 2000, modified the foundation of the municipal since it gave it basis and legal certainty to the local governments as the supplier of public services (IDM, 1999; García, 2011; H. Congress of Union, 1978 & 2019).
As a consequence of that, the municipals were obligated to know better the needs of their inhabitants, in a way that the people in charge were responsible to attend them and providing those services as efficiently as others given by the levels of government. However, the empirical evidence has demonstrated that even though this attribution of functions and the substantial increase of resources still have trouble in the supply of public services in diverse territories (Broid, 2010; Cabrero, 2011; Moran & Ayvar, 2020).

For this article, the evaluation of public politics is defined as the generation of systematic information that by the use of tools originating from the Public New Management (PNM) let us know the condition of the public actions before, during, and after its implementation (Chica-Velez & Salazar-Ortiz, 2021).

It is suggested by Ortegón, Pacheco & Prieto (2005) who claimed that the data obtained gives the decision maker the chance to appreciate quantitatively and qualitatively the level of achievement in the goals of its management in terms of compromises, in that way the evaluations start showing the values of continuity, expansion, reduction, and eradication of an action taken with foundations established in the evidence authorizing that its utility will not be limited to the political will of the decision maker or administrative time of governments, instead of that, considering the use of its influence over public future actions taking into account legal, institutional and technical aspects. (Majone, 1997).

Apart from the foregoing, the concept of evaluation goes from theory to practice, changing it as a useful tool, that together with instruments such as the management index function as support to the public officials that is why both use efficiently the possibility of having evidence about the government performance through the use of information generated; being this as a different part to readjust or redesign the public actions taken in a specific moment. In consequence, the use of these instruments results in a key element for the process of deciding since they have as a result the upgrading of public management.

Performance Index\(^1\) is important to take into consideration that the objective of this work looked for associating public services, in response to the problem faced in the municipals without knowing the situation in which they are. These instruments create quantitative information concerning a result in the supply of goods and services. At the same time, following the interpretation of the variables, this index also permits detecting which variables when matching giving as a result high or lower attention to the provision of some public services on the part of authorities.

The public services must be regulated, insured, and controlled by the governing; due to the fact they represent a broad range of instruments and measurements with which the citizenship must develop its maximum human, economic, and social potential. Furthermore, as it is claimed by Duguit, 1921; Antúnez, 2003 & Jaramillo, 2005, its provision corresponds to the governments through the implementation of a coordinated job to satisfy the basic needs and expectations of the population to rise their life conditions. All in all, is stated in Constitutional article 115; as well as, taking into account the tasks of organization, management, operation, construction, and evaluation of the services (NIFMD, 2019).

It is noteworthy that the methodology used for the elaboration of this article was qualitative; this is why by factorial analysis technique and the obtaining of a correlation matrix among the variables, it was determined by the factors that originated the Municipal Services Performance Index for Hidalgo (MSPIH) which proceed in the addition of Index of Drainage and Cemeteries (IDC); the Index of Drinking Water, Drainage and Streets (IDDS); and the Index of Wastewater, Parks and Drinking Water (IWWPDW).

II. METHODOLOGY

Correlation matrix of the original variables

In the correlation matrix is observed some variables are correlated; so that, they can be grouped into factors (Graphic 1). There is a correlation X1 (Drinking water) con la variable X2 (Drain), as well as X10 (Pantheon service) con X9 (Trace service).

\(^1\) Performance indexes are instruments that provide quantitative information on the performance and achievements of an institution, program, activity or project in favor of the population or object of its intervention, within the framework of its strategic objectives and mission.
Calculation of factors

One of the key elements in the adjustment of the factorial modeling is that:

$$\lim_{e^{(2\to0)}} \{\text{var}(e_{i^2})\} = 0;$$

it is a good adjustment.

The first calculation result indicates that “3” of the factors are enough to explain the modeling, P-value is 0.884, and it is higher to 0.05, thus each one of the variables composed is analyzed. This modeling is meant to estimate the provision of public services in the municipalities.

It is detected that variables X5 (Public lighting), and X7 (Cleaning and waste) will be excluded from the creation of the modeling. To have a better adjustment of the modeling, it is considered the uniquenesses of the variables that must have a “0” value, and if they are apart from this, and are close to “1” are not significant for the modeling, for this reason, X5 and X7 are not grouped in any of the three indexes (Chart 1).

Interpretation and designation of the factors

To construct the index (MSPIH), it was necessary to name the factors concerning the variables which were part of, so the first factor was named Index of Flea Markets and Cemeteries (IFMC) since it is associated with the variables X9 (Trace Service) with a weight of 0.981 and X10 (Cemetery service) with a weight of 0.656 (Graph 2). This factor explains 16.4% of the total variability, which is equivalent to 46.06% of the variability of the three factors.

As a way of establishing the relationship among these variables, first, we have to comprehend the corresponding necessities to each one. Firstly, In the case of trace service, the activity not only limits the sacrifice of animals but also the importance of creating hygienic and sanitary conditions that all of this could cause future expenses in other aspects like health or economic ones to regulate the introduction of animals and the revenue acquired to commercialize and take advantage of sub-products derived from animal slaughtering, which originate a considerable growth in the flow of the local economy (Fernández, 2021).

Secondly, the Pantheon service or known as Cemetery is different from the Trace service since it has a symbolic value, seeing that it contains spaces in which traditions, uses and customs take place (Espinoza, 2019).

Nonetheless, the growing and necessary sanitary regulation caused by inhumations, exhumations, graves, crypts, and vaults looked for avoiding the spread of diseases due to its bad administration has increased the attention shown by the councils to this service, with the intention of not originating future expenses in other areas like medicine (Vázquez, 2021). In both variables, the common factor is the care of the health in the population through the sanitary regulation of the trade and pantheon services, which can explain the relationship as an index factor, although we must not forget other relevant aspects of value that also represent these services to the inhabitants.

The Second factor was named Potable Water, Drainage and Streets Index (PWDSI), it is associated with the variables X1 (Drinking water service) with a weight of 0.791, X2 (Drainage service) with a weight of 0.539, and X4 (Street quality) with a weight of 0.539, and X4 (Road quality) with a weight of 0.791. (Chart 3). This factor illustrates 11.7% of the total variability, which is equivalent to 32.86% of the variability of the three factors.

Referring to the variables, both are related to potable water and drainage services, which altogether represent a fundamental pillar in the development of people’s quality of life, for the reason that correspondence with health, growth, and the development of health, in turn, these services satisfy the basic needs of the daily life of the population and as well as its biological existence.

Under the information mentioned in the literature, corresponding to the Street quality that is also part of this factor, it is important to mention that street paving produces positive impacts over other variables within households, which can be explained as a cost-benefit in the service supply (González-Navarro & Quintana-Domeque, 2016).

In the first case, both variables have a common factor, the vital value to the municipalities. Also, in the words of Aguilar & Monforte (2018) represents a natural monopoly since competence is technically impossible because would imply the overlapping of water and sewage networks bringing the unnecessary rise of expenses to the municipalities.

Regardless, the relationship that has with the variable of street quality is that all common factors are reduced because of the infrastructure improvements, connexion in...
households to the distribution of water nets and/or drainage reducing the transmission of stomach illnesses. While street paving can be improved in the economic sector in disadvantaged areas.

The third factor was named as Wastewater, Parks, and Drinking Water Index (WSPDWI) is linked to the variables X3 (Wastewater treatment) with a weight of 0.523, X6 (Parks and gardens) with a weight of 0.365 and X1 (Drinking water) with a weight of 0.339. This factor explains 7.5% of the total variability, which is equivalent to 21.06% of the variability of the three factors. It is relevant for the municipals to implement wastewater treatment, given that the activity is performed with greater efficiency incrementing human well-being, and reducing the levels associated with the diseases of stomach bacteria (Saneamiento, 2022). Another value offered by this service is the potential to mitigate water shortage through the safe use of wastewater for irrigation initiating lower costs to medical attention, more productivity, and fewer premature deaths to inhabitants. Moreover, drinking water service is viewed as a resource that brings secure nutrients to food production, and its main purpose is to feed the growing populations, especially the urban ones. In addition, the implementation of daily activities related to food and hygiene.

The park and garden service is a key factor because of different aspects which include: the management of quality of life in the municipals regulated by the temperature and humidity of these spaces; absorption of pollutants and amortization of noises, causing a domestic economic spillover that stimulates the informal micro-economy, and which are part of cultural activities because of the closeness to the centers and the identification that the inhabitants have with them. As a result, a symbolic value is retributed which gives relevance to its historical and equity dimension (Nogué & de San Eugenio, 2011). The common factor that this index has is the importance of increment of quality of life of the inhabitants throughout elements that are found in the environment, and with an appropriate administration produce optimal results to the development of the population, whether from economic, symbolic, or healthy aspects, minimizing future expenses on behalf of municipals in parts originating a bad usage and approach.

III. CONSTRUCTION OF MUNICIPAL SERVICES PERFORMANCE INDEX FOR HIDALGO (MSPIH)

The construction of the modeling regarding each municipal is part of Hidalgo State, will be the following:

\[ E (\text{MSPIH}) = \text{IFMP} + \text{PWDST} + \text{WPDWI} \]

Where:
- \( E (\text{MSPIH}) \) is the expected value of the Municipal Services Performance Index for Hidalgo
- IFMP is the Index of Flea Markets and Pantheons
- PWDST is the Potable Water, Drainage, and Streets Index
- WPDWI Wastewater, Parks, and Drinking Water Index

That means that IFMP +PWDST +WPDWI are indicators that produce positive effects, implying the way they rise, the performance of municipal services will expand too.
The expected value of MSPIH keeps 35.6% of the total variability, that is to say, the addition of IFMP +PWDST +WPDWI tells that 35.6% of the Municipal Services Performance Index for Hidalgo (Chart 1).

### Prediction of the phenomenon

In chart 2, it can be observed that the municipal of Tizayuca has more IFMP, followed by WPDWI; the municipal of Pachuca de Soto has PWDST and IFMP; while Huejutla de Reyes has much more preference for WPDWI.

On one hand, in chart 5, it can be seen that the municipals of Tizayuca, Pachuca de Soto, Huejutla de Reyes, Tulancingo de Bravo, and Mixquiahuala de Juárez are the ones that have greater Municipal Services Performance Index for Hidalgo. On the other hand, the municipals that show a lower MSPIH are Yahualica, Xochiatipan, La Mision, Huautla, and Nicolás Flores.

While observing the rotation of the factors, (the PWDSI) Potable Water, Drainage, and Streets Index, this last one has a greater reach in the municipals such as El Arenal, Cardonal, Zimapán, Tenango de Doria, Cuautpec, Tepeji del Río, San Agustín Tlaxiaca, Molango de Escamilla and Mixquiahuala de Juárez. Even so, the municipals Tulancingo de Bravo, Progreso, and Pachuca de Soto showed important results to PWDSI, but not as previously mentioned.

On one side, the PWDSI (Potable Water, Drainage, and Streets Index) has had great importance, for example, Tecozautla, Alfajayucan, San Felipe Orizatlan, Lolotla, Metepec, Huasca de Ocampo, Acaxochitlan, Acatlan, Chapantongo, San Bartolo Tutotepec, and Pacula. On the other side, the municipals such as Atlapexco, Xochiatipan, and Huautla have tried to be part of the PWDSI, but they still have not done that as previously mentioned.

In the (ITC) Index of Trace and Cemeteries, the municipals which provide great importance are the following: Atitalaquia, Tepeapulco, Ajacuba, Tezontepec de Aldama, Singuilucan, Tlanchinol, Tlahuelilpan, and Epazoyucan. The quadrant in which there is not any factor in the municipals not given importance to the indexes of ITC, PWDST, and WPDWI are San Salvador, Jacala de Ledezma, Juarez Hidalgo, San Agustín Metzquititlan, Metepec, Atotonilco el Grande, Omitlan, Tianguistenco.

Source: Own authorship with data of yearbooks of Hidalgo 2018.
and La Mision. To conclude, the municipals are farther from the three factors that are part of MSPIH (Chart 6).

### Validation of the modeling

As it has been mentioned throughout this article, to implement the total adjustment of the modeling, there were only 3 needed factors, so the hypothesis is the following:

$H_0$: Factors $= 3$ vs $H_a$: factors $\neq 3$

If $P$-value $> 0.05 \rightarrow$ it is accepted $H_0$

Through the output in R to calculate the common factors, it can be observed that $P$-value $>0.05$, accepts $H_0$, therefore, with the three factors can be created MSPIH and foresee the performance of the municipal services for Hidalgo (Chart 3).

The expected value of the factors must be zero $E(f_i) = 0$. Based on chart 4, it is seen the average of the three factors of zero, this assumption is fulfilled.

|       | IMAP | IHCP | IMDP |
|-------|------|------|------|
| Min   | -4.0755 | -1.65644 | -1.81720 |
| 1st Qu.| -0.3102 | -0.50975 | -0.54300 |
| Median | 0.1513 | 0.02728 | 0.04393 |
| Mean  | 0.0000 | 0.0000 | 0.0000 |
| 3rd Qu.| 0.7148 | 0.46978 | 0.47124 |
| Max   | 1.1629 | 3.23723 | 1.29644 |

With a level of confidence of 95% and with a margin of error of 5%, the modeling can be applied since it fulfills the assumptions of inference, as well as it has an adjustment of 35.6%.

### IV. CONCLUSION

In a conclusion, the following aspects are emphasized. First of all, the legal weight that the municipal has about the provision of public services that are established in the Constitution since those must have certain juridic and special characteristics, and without those, we could run the risk of distorting and not achieving its function. It is important to say, that this was the element that was considered to create Municipal Services Performance for Hidalgo (MSPIH).

Secondly, as claimed by Ariño (1968)” public service was a progress and socialization instrument, especially in poor states, to which allow them to have a better situation for everyone”. If it is not a recent definition, its elements are still in force currently, which is why they have a relationship with the benefit obtained by the population in general, but particularly the advantages acquired by the most vulnerable groups who have access to those. In this sense, public services can be identified, whose main objective is to satisfy the necessities and interests of a general nature, and whose nature corresponds to the assumption of activities that require the control of the statal authority, emphasizing the following aspects:

- a) Since the public service must be according to the legal regulations, it must have regularity.
- b) It must exist the necessity, that means the satisfaction provided to the population without people demanding that.
- c) The technical activity needs to be planned, budgeted, regulated, monitored, and controlled.
- d) The statal intervention, because just through it it can create, submit to the juridic regime which let us assume its essential features.

The phenomenon studied has had as its main objective to comprehend which are the characteristics that the variables related to public services, and which permit relating among themselves. Because for MSPIH local governments had the result to focus more attention on the variables with public services that have lower attention, and together they can be checked through the logic about the development of the inhabitants to the municipal level, taking as reference the appropriate implementation of the public services.

The growing necessity of the municipals to know about the state of their actions has become a priority task, since generating and implementing instruments that show information that allow us to make decisions based on the basis, and whose result is incrementing the evaluative culture that let us obtain, generate, and use the information to avoid that the most vulnerable continue being the
inhabitants, leading to the creation of good governments.

REFERENCES

[1] Aguilar, I. and Monforte, G. (2018). Water utilities, public value, and sustainability: The case of the Monterrey metropolitan area. Management and public policy, 27(1), 149-179.

[2] Antunuez, I. (2003). Urban public services and local management in Latin America: problems, methodologies, and policies. Santiago de Chile: ECLAC, United Nations.

[3] Bertranou, J. (2019). Monitoring and evaluation of public policies Models available to produce knowledge and improve the performance of public interventions. MILLCAYAC-Digital Journal of Social Sciences, 6(10), 151-188.

[4] Broid, D. (2010). The evolution of the predial in Mexico: The cross incentives of fiscal and political decentralization, 1990-2007. Public Finance, 2(3-4), 69-192.

[5] Cabrero, E. and Arellano, D. (2011). Municipal governments under debate. An analysis of the municipal institution through the survey Inegi 2009. México DF: CIDÉ.

[6] Chica-Veléz, S., y Salazar-Ortiz, A. (2021). Posnueva gestión pública, gobernanza e innovación. Tres conceptos en torno a una forma de organización y gestión de lo público (Post-new Public Management, Governance and Innovation. Three Concepts regarding Organizational Form and Public Management). Tres conceptos en torno a una forma de organización y gestión de lo público (Post-new Public Management, Governance and Innovation. Three Concepts regarding Organizational Form and Public Management) (January 22, 2021). OPERA, (28).

[7] Duguit, L. (1921). Constitutional Law Manual. MIMEO.

[8] Espinosa, M. (2019). “5 cemeteries to die in Mexico". Available at: https://www.agenespanol.com/lugares/5-cementerios-para-morirse-en-mexico/ (Accessed March 15, 2022).

[9] Fernández J. (2021). Administrative Law of the State of San Luis Potosí. Institute of Legal Research, Legal Doctrine Series. Núm. 946. UNAM.

[10] Fernández, J. (2002). Municipal Public Services. México DF: UNAM.

[11] Garcia, R. & Gómez, P. (2011). Public services in local governments: An analysis through municipal surveys. En E. Cabrero (ed.), Municipal governments under debate. An analysis of the municipal institution through the survey. Inegi 2009 (pp. 157-213). México DF: CIDÉ.

[12] Gonzalez-Navarro, M., & Quintana-Domeque, C. (2016). Paving streets for the poor: Experimental analysis of infrastructure effects. Review of Economics and Statistics, 98(2), 254-267.

[13] H. Congress of the Union (1978). National Law of Fiscal Coordination. Congress of the Union,

Municipal Services Performance Index for Hidalgo (MSPIH)

[14] H. Congress of the Union (2019). Political Constitution of United Mexican States. Congress of the Union., http://www.diputados.gob.mx/LeyesBiblio/htm/1.htm.

[15] Jaramillo, R. (2005). The crossroads of public services. Bogotá: Norma.

[16] Merino, M. (2005). Municipal governments in Mexico: the problem of institutional design. A. Aziz Nassif and J. Alonso Sánchez, Globalización, poderes y seguridad nacional, Mexico, CIESAS-Miguel Ángel Porrua-H. Chamber of Deputies, LIX Legislature, 287-305.

[17] Ministry of Economy and Finance General Directorate of Public Budget (2010) Instructions for the Formulation of Performance Indicators. June, Lima.

[18] Moran J. & Ayvar F. (2020). Municipal efficiency and public services in Michoacán, Mexico. Journal of Institutional Economics, 22(43), 277-299

[19] Municipal Development Institute (IDM) (1999). The ABC of Municipal Governments, [https://bibliotecavirtualceug.files.wordpress.com/2017/06/a-b-c-del-gobierno-municipal.pdf].

[20] National Institute for Federalism and Municipal Development (NIFMD), 2012, p. 20-22.

[21] Nogue, J., & de San Eugenio, J. (2011). The communicative dimension of landscape: A theoretical and applied proposal. Journal of Geography Norte Grande, (49), 25-43.

[22] Ortegón, E., Pacheco, J. & Prieto, A. (2005). Logical framework methodology for planning, monitoring, and evaluation of projects and programs. ECLAC.

[23] Sanitation (s/f). Who? int. Retrieved October 4, 2022, from https://www.who.int/es/news-room/fact-sheets/detail/sanitation.

[24] Vázquez, M. (2021). Municipal regulation. The case of the public cemetery service in the municipality of Texcoco, State of Mexico.