

Digital Government In The Professional Career Service In Mexico

Edwin Bulmaro Bahena Armillas

Instituto Politécnico Nacional, México.

ebahena2000@alumno.ipn.mx

ORCID: 0009-0000-3273-3725

This article examines the relationship between digital governance variables and the professional career service (PCS), with a particular emphasis on the potential of Information and Communication Technologies (ICT) to enhance the performance of the input subsystem. The evaluative method proposed by Daniel Stufflebeam was employed in a four-phase process: context, input, process, and output. To gauge the effectiveness of this approach, a survey was conducted to active employees who entered the centralized federal civil service through the service in question in 2022. The findings indicate that the implementation of ICT by the digital government has the potential to enhance the operational efficacy of the PCS in Mexico, particularly within the revenue subsystem.

Keywords: Digital government, professional career service, information and communication technologies.

Introduction

In the face of the political, economic, and social changes that Mexico has undergone, the Federal Public Administration has sought to adapt its operations to the needs of a more open society. Thus, the Professional Career Service (PCS) was created in 2004. However, since its creation, it has faced major problems and challenges in its implementation. For example, from 2004 to 2023, only 6% of positions in the centralized public administration were advertised through this system.

Similarly, digital government is a concept that combines the use of information and communication technologies (ICT) with new ways of managing and planning public administration. The most important technologies are global fixed and mobile communication networks. However, 50% of the rural population and 22% of the urban population still do not have access to the Internet. In this context, it is proposed that an extensive application of ICT used by the Digital Government will strengthen the functioning of the PCS in Mexico, mainly in the income subsystem.

In this way, three sections are presented:

- a) Digital government and professional career service. In this axis, the conceptualizations of both categories are analyzed, as well as the study dimensions of the research.
- b) Evaluation as a method of study. The methodology proposed by Daniel Stufflebeam is used to evaluate the application of digital government technologies in the entry and

promotion subsystems of the PCS. Similarly, the survey is used as an analysis tool to know how federal government employees who have entered through the service evaluate the implementation of new technologies.

- c) Data analysis and discussion. Based on the results obtained, an analysis is carried out on three phases of the evaluation method: context, entry, and processes in the entry and promotion subsystems of the PCS.

Digital government and professional career service

An understanding of the concept of digital government requires an appreciation of its intrinsic relationship with the notions of open government and electronic governance. The initial assumption is that access to information by citizens is of paramount importance for democratic regimes. The most transparent method for its dissemination has been identified as electronic media. As stated by the Economic Commission for Latin America (ECLAC), the primary objective of e-governance is “the achievement of lasting economic, social, and institutional development, promoting a healthy balance between the state, civil society, and the market of the economy” (2010).

In light of these considerations, the category of electronic government can be defined. One of its key tenets is the application of information and communication technologies to public administration (Rivera, 2006). A more detailed definition can be found in the Ibero-American Charter of Electronic Government, which states that “electronic administration” refers to the use of information and communication technologies in public administration to improve the information and services offered to citizens, guiding the effectiveness and efficiency of public management, and substantially increasing the transparency of the public sector and the participation of citizens.

As can be observed, e-government encompasses the utilization of technological resources employed by governmental entities for the provision of services to citizens. The relationship is direct, unidirectional, and even hierarchical; citizens are not permitted to interact. In this context, the concept of digital government as an evolution emerged. As defined by the Organization for Economic Co-operation and Development (OECD), digital government represents the utilization of digital technologies as an integral component of modernizing governmental strategies, to create public value (OECD, 2016). This is based on a digital government ecosystem comprising state actors, non-governmental organizations, companies, citizens' associations, and individuals responsible for the production and access of data, services, and content through interactions with government (OECD, 2016). The principal consequence of this transformation is that the concept of digital government has evolved beyond the mere provision of services via digital platforms. Information and communication technologies serve as a conduit for governments to become more open and transparent (OECD, 2016). Four principal approaches can be identified within the field of digital government.

- A) Evolutionary. This conceptualization is based on an evolutionary-historical perspective that considers digital governments. Some authors posit that the advent of basic technologies such as computers marks the advent of digital government. Others have noted that it is only after the evolutionary process that this category can be considered (Gil-García, 2007; Layne & Lee, 2001; Moon, 2002; Ojha, 2011; Reddick, 2004; Klievink & Janssen, 2009).

- B) Relational. This approach represents an alternative perspective on the concept of digital government. To gain a deeper understanding of the evolution of digital government, it is essential to consider the interactions between this phenomenon and the agents with which it engages. This is the essence of the relational approach. Accordingly, this perspective is concerned with digital applications that facilitate the management and relationship between government and citizens (Fedorowicz, 2010; Hiller & Bélanger, 2001; Luk, 2009; Moon, 2002; Holmes, 2001). Adherents of this approach identify three fundamental relationships: citizens, companies, and other governments (Joia, 2008; Makedon, Loukis, & Ford, 2010; Zarei and Ghapanchi 2008).
- C) Enunciative. This approach is informed by the disparate and multifaceted definitions of digital government that are found in extant literature. For instance, some scholars emphasize the provision of services through digital means, primarily computers and the Internet (Scholl, 2002). Furthermore, some definitions of digital government include the commitment and participation of citizens in the administration of government, including in the political process of the state (Grönlund and Horan, 2005).
- D) Qualifiers. The classificatory approach focuses on the applications that digital government uses to carry out its processes. Peri (2001) suggests four types of applications: 1) for the electronic provision of services (E-Services); 2) to improve the government itself (E-Administration); 3) to support democracy (E-Democracy); and 4) for the implementation of public policies (e-public policy).

These approaches share a common premise: that information and communication technologies (ICT) are relevant to all individuals. These are the technologies that facilitate access, production, processing, and communication of information presented in different codes (Belloch, 2011). As posited by Manuel Castells (2010), the defining characteristics of the technological paradigm can be distilled into four key elements: the primacy of information as raw material, its capacity for pervasive penetration, its flexibility, and the capacity for seamless integration of technological systems. It is indubitable that the propagation of this phenomenon has been facilitated by two key means: the computer and the Internet. This research considers five major technologies within the field of information and communication technologies (ICT), which are utilized by the digital government in this study:

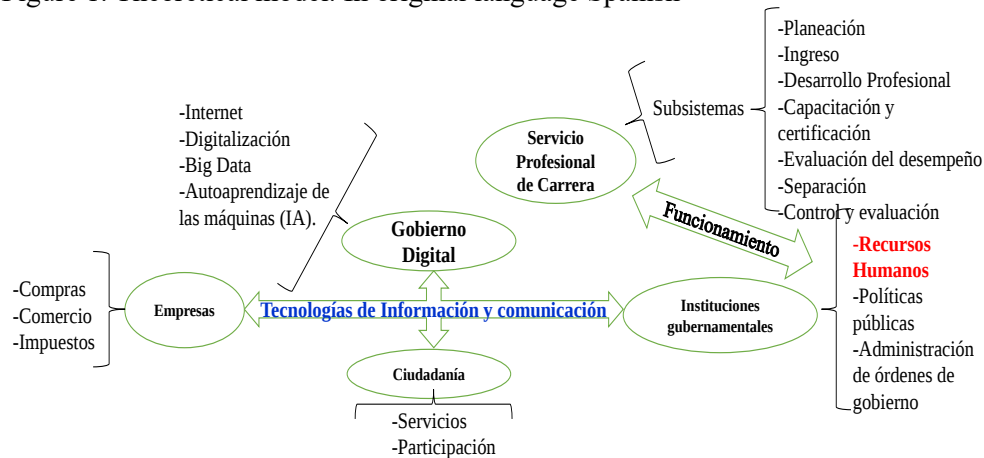
- A) Internet and social networks. The Internet consists of “networks of computer systems designed to transmit information through specific standard protocols” (López-Portillo, 2017). One of its extensions is social networks. In this context, networks are made up of nodes or vertices (they can be people, organizations, or other social actors). Initially, these are based on physical “face-to-face” interactions. However, technology has tried to make them through intermediations to be faster. When using the internet, the links can be non-face-to-face and the interaction is timelier. This foundation is carried out through digital platforms coupled to the internet that allow connection and interaction between various people (nodes), as well as the unlimited dissemination of information (links) (MPM, 2023).

- B) Digitization (QR codes and videoconferences). Digitalization is “the conversion of analog objects into digital goods for intelligent use” (López-Portillo, 2017). However, doing so generates a large amount of data that needs to be sorted. QR codes are used for this. These consist of a “system for storing information in a matrix of dots or a two-dimensional barcode, which can be presented in printed form or on a screen and can be interpreted by any device that can capture images and has appropriate software (Huidobro, 2009). Another application of digitalization is real-time videoconferencing. Cabrero (2003) defines them as “the set of hardware and software that allows simultaneous connection in real-time using image and sound that makes people who are geographically distant relate and exchange information interactively as if they were in the same meeting place”.
- C) Big data and machine self-learning (artificial intelligence, AI). In today's world, thousands of exabytes (one billion gigabytes) are produced, which doubles every three years (López-Portillo, 2017). All of this data is unstructured. This is the so-called “big data” (Tascon, 2013). Such data can be processed through the implementation of dedicated algorithms, thereby ensuring the generation of actionable insights. In this context, machines must be capable of autonomous learning through the implementation of algorithms that can effectively process the information they encounter and provide valuable insights to companies and governments. Artificial intelligence (AI) can be defined as the capacity of machines to utilize algorithms, learn from data, and apply this knowledge in decision-making processes in a manner analogous to that of humans (Rouhiainen, 2018).

It is now imperative to direct attention toward the concept of career professional service. Martínez Puón (2005) defines career professional service as “an instrument that provides public servants with stability in employment and continuous professionalization through objective and clear admission procedures based on merit and equal opportunities, as well as permanent development aimed at materializing an administrative career. The purpose of this is to enable the public administration to fulfill its programs and achieve its goals, thus meeting the needs and responding to the demands of citizens in an independent and impartial manner” (p. 12). Similarly, José Luis Méndez (2000) defines it as “systems that regulate the entry and promotion of public officials based on merit and professional capacity and not on party or personal ties.” In a similar vein, Mauricio Dessauge defines it as “packages of objectives, decisions, actions, programs, and tools that governments design and implement to achieve a capable, impartial, and meritocratic public service” (Dessauge, 2007). Juan Pablo Guerrero (2000) provides a more detailed definition, specifying that it is “a set of administrative rules and procedures that regulate the price of labor and its division into an administrative unit, as well as the rules of entry and exit, of permanence and mobility within the system, of the assignment of the activities and functions of its members, and of the rewards and punishments to them.” In a similar vein, Ricardo Uvalle (2000) defines it as “the set of administrative rules and procedures that regulate the labor market of public servants, considering their entry, permanence, and promotions based on merit and performance; their duties and obligations; as well as the conditions and elements for their separation.” Accordingly, the fundamental elements necessary to establish the existence of a professional career service are as follows: (a) the implementation of an entry and promotion system based on competition; (b) the

establishment of a continuing education and training program; (c) the implementation of a performance evaluation method; and (d) the establishment of a regulatory framework that defines the rules governing the entire system (Sarmiento Larrauri, 2013). In the Mexican context, the professional career service is comprised of six subsystems: planning, entry, professional development, performance evaluation, separation and control, and evaluation. It is important to note that the Law of the Professional Career Service stipulates that access to and retention of positions at the level of area directors is the maximum that can be attained. In this manner, the present study focuses on public employees of the Career Civil Service System of the centralized Federal Public Administration. The present study is limited to an examination of the income subsystem. This aspect is selected for analysis because it represents the core of any professional career service, namely how individuals aspire to join the ranks of the public sector. In light of the aforementioned theoretical review, a scheme is proposed that incorporates elements from various approaches and definitions about the implementation of digital government technologies in the operations of the PCS.

Figure 1. Theoretical model. In original language Spanish



As illustrated in this figure, digital government interacts with three key actors: companies, citizens, and their government institutions. This interaction serves to fulfill one of the digital government's fundamental purposes, namely, transparency. In this context, these entities are linked to transactions, purchases, and taxation. With the latter, through the provision of services and the facilitation of citizen participation. The latter is achieved through the organization of governmental levels (local-national), public policies, and the hiring of human resources. The objective of this research is to present a methodology through which the operation of the PCS in the income subsystem can be strengthened using digital government, with the application of technologies such as the internet, digitalization, big data, and machine learning.

Evaluation as a method of study.

To address this issue, the evaluation methodology, particularly the model proposed by Daniel Stufflebeam, is employed. This is defined as “the process of identifying, obtaining, and providing useful and descriptive information about the value and merit of goals; the planning, realization, and impact of a given object, in order to serve as a guide for decision-making; to solve the problems of responsibility and to promote the understanding of the phenomena involved” (Stufflebeam, 1983). This is achieved through the assessment of four phases within the operational processes of the institutions:

- A) Evaluation of the context. This consists of “identifying the virtues and defects of some object, such as an institution, a program, a population” (Stufflebeam, 1983).
- B) Input evaluation. This should “identify and assess the applicable methods (including those already operating in the main program of interest)” (Stufflebeam, 1983). The author points out that it is necessary to inventory and analyze the materials available from the organizations, in this case, from the PCS through visits or bibliography
- C) Evaluation of the process. This is “a continuous check of the realization of the plan” (Stufflebeam, 1983). It involves identifying the defects of institutional processes or organizations in order to provide information to propose possible solutions.
- D) Product evaluation. This consists of “evaluating, interpreting, and judging the achievements of a program” (Stufflebeam, 1983). “The basic use of a product evaluation is to determine whether a particular program deserves to be extended, replicated, and/or extended to other areas” (Stufflebeam, 1983). In the case of the evaluation of organizations, the decision is made on the continuation, completion, modification, or readaptation of the institutional systems. In this research, this step of evaluation is left in the final consideration as future research.

A survey was conducted among employees of the centralized federal public administration who have entered through the service to ascertain their perceptions of the implementation of new digital government technologies in the entry processes, to enhance operational efficacy. Consequently, the population comprises 15 ministries of the federal government, namely: the Ministry of the Interior; the Ministry of Foreign Affairs; the Ministry of Finance and Public Credit; the Ministry of Social Affairs; the Ministry of the Environment, Natural Resources and Fisheries; the Ministry of Energy; the Ministry of Economy; the Ministry of Public Education; the Ministry of Agriculture; the Ministry of Civil Service; the Ministry of Social Affairs; the Ministry of Labor and Social Welfare; the Ministry of Agrarian, Territorial and Urban Development; and the Ministry of Tourism. In each of the aforementioned entities, the admission subsystem is the sole aspect under review. This was conducted during the tenure of the previous government (2019-2023) and with employees who were active during the year 2022. Given the expansive nature of the universe, a sample was established using the following formula.

$$n = \frac{N \cdot Z^2 \cdot S^2}{d^2 (N-1) + Z^2 S^2}$$

where

n = sample size. The one obtained is 98

N = population size. The total population is 1258 active employees during the year 2022

Z = critical Z value, calculated in the normal curve area tables. Also called confidence level that was equal to 90%

S^2 = variance of the study population (which is the square of the standard deviation and can be obtained from similar studies or pilot tests)

d = absolute accuracy level. Referring to the amplitude of the desired confidence interval in the determination of the average value of the variable under study. In this case, a margin of 8% was set.

In this way, it was operationalized as follows:

- Admission subsystem.
 - Evaluation of the context.
 - Demographic characteristics (age, gender, education, place of work, position).
 - Characteristics of income (seniority and stability in employment).
 - Input evaluation.
 - Use of the website.
 - Digitization of school and work documents.
 - Evaluation of the experience through AI (use of big data).
 - Types of exams and interviews conducted (digital platforms)
 - Temporality in the delivery of results.
 - Evaluation of the process.
 - Reliability of Assessments
 - Transparency of interviews

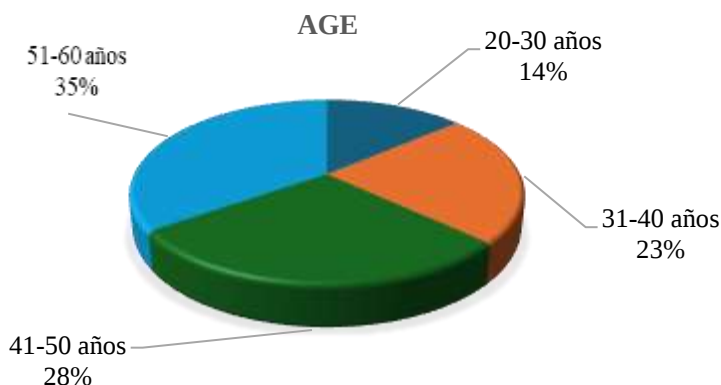
DATA ANALYSIS AND DISCUSSION

In this section, the decision has been made to present the data from the survey conducted in accordance with the initial three phases of the evaluation method, which encompass context, input, and process. The results of the evaluation of the technological applications of digital government in the operation of the PCS in its two subsystems, namely admission and promotion, are presented.

Evaluation of the context

This data point presents the general demographic characteristics of the PCS workforce, including age, gender, and educational attainment.

Figure 2. Age of PCS employees.



Source: Own elaboration from data of the survey applied to PCS employees, 2023. In original language Spanish

As illustrated in Figure 2, 63% of the service workers are between the ages of 41 and 60. This suggests that the majority of employees are individuals who were born between the 1960s and 1970s. They were not born into a fully digitized environment. They have had to learn how to navigate the transition from analog machines to digital technologies. A mere 14% of the service workers are between the ages of 20 and 30, indicating that they were born between 1992 and 2002. This generation has already had the entirety of its life experience shaped by the digital age. Nevertheless, it has not yet attained a majority status. Similarly, the cohort born during the 1980s is also observed. This cohort constitutes only 23% of the total. They are capable of comprehending both the analog technology that was prevalent during the 20th century and the new, disruptive technologies that have emerged in the 21st century. They have experienced significant technological transformations. Nevertheless, they constitute a minority among PCS workers.

Figure 3. Gender of PCS employees.

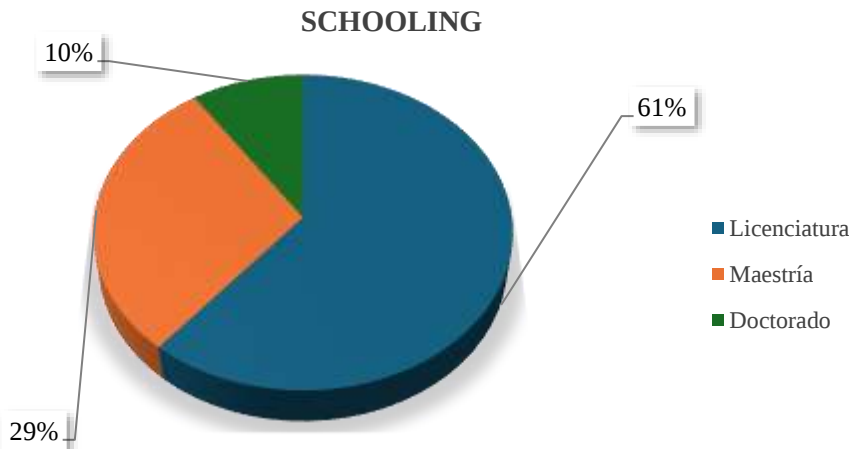


Source: Own elaboration based on PCS Employee Survey, 2023.

An additional factor to be considered is the gender of the workers. As can be observed in Figure 3, the majority of workers (61%) are male. Only 39% of the total number of workers

are female. It is noteworthy that the PCS does not have any gender quotas. The reward system is based on the merit of the employees. Both genders are afforded equal opportunity in the entrance examinations. As a consequence of this, the majority of new employees are male. This is because the men who take the entrance exams are more likely to obtain a place at the top of the list and therefore gain employment.

Figure 4. Schooling of PCS employees.



Source: Own elaboration based on PCS Employee Survey, 2023. In original language Spanish

It is crucial to acknowledge that admission to the program requires a minimum of a four-year college degree. Those with only a high school diploma or less are not eligible to apply. In this context, the overwhelming majority (61%) have obtained a university degree. It is noteworthy that 39% of the respondents already hold postgraduate degrees. Nevertheless, the majority of individuals pursue a master's degree, representing 29% of the total. However, it is notable that 10% of employees have pursued doctoral studies.

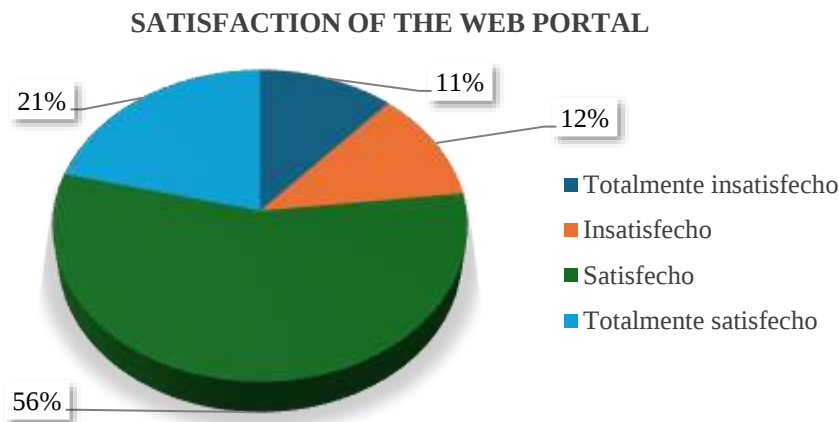
It is essential to highlight these three points in order to gain a comprehensive understanding of the profile of workers who have entered the federal government through professional career service. This will facilitate the formulation of an accurate diagnosis of the context. It is now pertinent to ascertain their views on remuneration, the technologies currently employed by the PCS, and potential future innovations that could enhance its operational efficacy.

Input evaluation

In accordance with the established evaluation methodology, the initial assessment entails the identification, cataloging, and examination of the available resources at the disposal of the organization or institution. It is also noteworthy that, from 2004 until the present, the website has constituted the sole technological avenue of interaction with the PCS. The platform allows candidates to register, upload their curriculum vitae, access calls for applications, and register for competitions. Subsequently, notifications are received regarding forthcoming physical evaluations. In addition, the website lacks significant functionality. In light of the

aforementioned, it is pertinent to ascertain the perceptions of employees within the same service regarding this portal.

Figure 5. Web portal satisfaction.

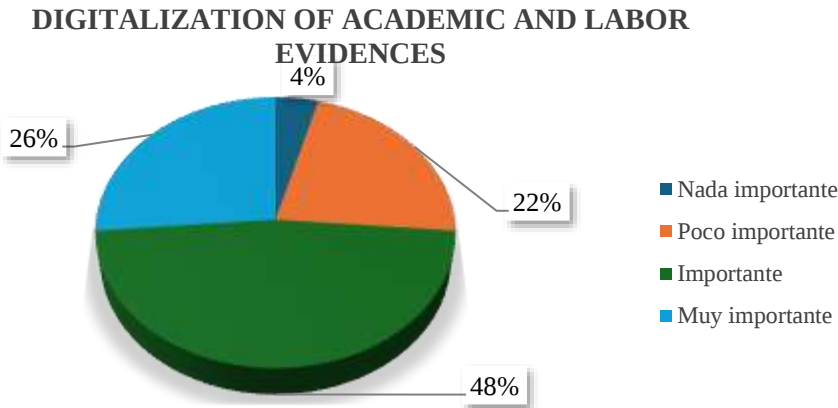


Source: Own elaboration based on PCS 2023 employee survey. In original language Spanish

A majority (77%) of the workers expressed satisfaction with the web portal as a means of accessing the service, rating it as either “totally satisfactory” or “satisfactory.” A mere 23% of respondents indicated some degree of dissatisfaction with the page. One might be forgiven for assuming that there is no need to update new tools, given that their users are satisfied with their functionality.

It is important to note, however, it is important to note that 63% of the workers were born between 1960 and 1980, which signifies that the primary modification has been the incorporation of a computer linked to the Internet. Therefore, it is reasonable to posit that this generation will evaluate the web portal in a positive light, given that they were the first to engage with this technology and, as a result, were able to access the service. This does not imply that there is a lack of updates. In this regard, the PCS workers themselves were questioned as to whether they would be amenable to the digitization of academic and work evidence recorded in the curriculum, which serves to evaluate experience and merit, via QR codes or digital signatures.

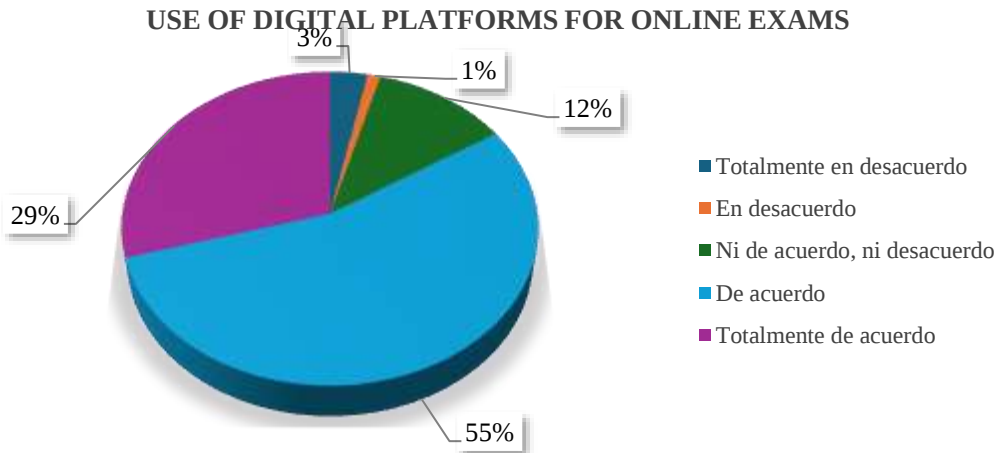
Figure 6. Digitization of academic and labor evidence for admission.



Source: Own elaboration based on PCS Employee Survey, 2023. In original language Spanish

As illustrated in Figure 6, 74% of respondents indicated support for the proposal. A mere 26% of respondents indicated that the implementation of these new technologies was unnecessary. Thus, although the workers expressed satisfaction with the existing website functionality, they demonstrated an openness to the potential integration of new technologies that could enhance the entry process. This is further evidenced when respondents were asked whether they would be amenable to utilizing digital and online platforms for knowledge, skills, and abilities assessments.

Figure 7. Use of digital platforms for online exams. Income.

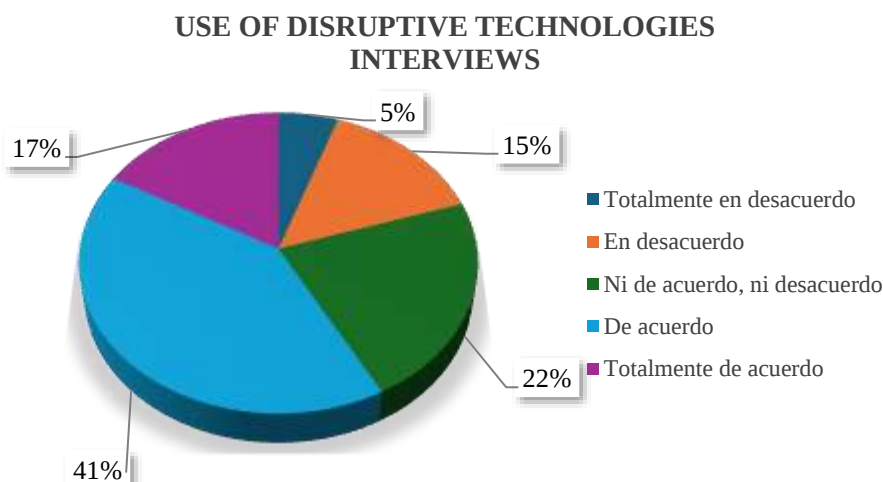


Source: Own elaboration based on PCS 2023 employee survey. In original language Spanish

As illustrated in Figure 7, 84% of respondents indicated their agreement with the proposition that the examinations and other assessments associated with the competitive process for federal government positions through professional career service should be conducted online and via digital platforms. At the time of writing, the second phase of the admission process is

still conducted in person. The PCS has been in place in the country for two decades. Over the course of this period, there has been a notable expansion in the availability of coverage for both fixed and mobile devices, accompanied by a considerable enhancement in web browsing speeds. During this period, a pandemic occurred that accelerated the technological processes of remote evaluations. Nevertheless, despite the developments, the use of face-to-face examinations and interviews persists in the present era. In this regard, the employees provided the following responses.

Figure 8. Inclusion of disruptive technologies in interviews.



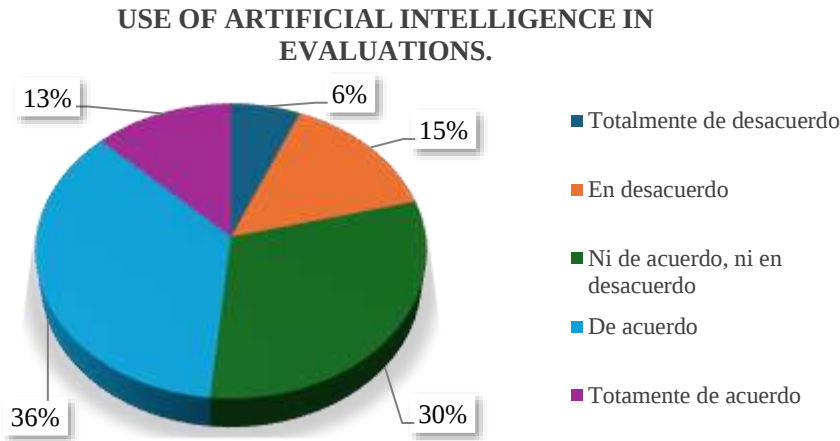
Source: Own elaboration based on PCS 2023 employee survey. In original language Spanish

As illustrated in Figure 8, 58% of respondents indicated their agreement with the proposition that interviews should be conducted online via webcam and with the assistance of artificial intelligence (AI). Approximately, 42% of the respondents indicated that they were not in favor of this possibility. This may be due to a lack of awareness of how AI assistance could be applied. It is evident that, although the web portal is a tool that is perceived favorably by PCS employees, it could be enhanced by the integration of additional technologies that would reinforce these processes. The evidence presented and the findings of the survey lend support to this assertion.

Evaluation of the process

A process evaluation entails the identification of potential deficiencies within organizations and institutions, coupled with the formulation of strategies to address these shortcomings. Consequently, one of the primary issues encountered concerning the service was that the majority of the competitions were either nullified or contested by the immediate superior. In light of these considerations, it is proposed that algorithms fed by big data for artificial intelligence be employed to assist in the evaluation process. Consequently, the results would be obtained on time, and the grades' feedback could be consulted. Upon inquiry regarding their stance on the implementation of artificial intelligence in the evaluation process, the respondents provided the responses shown in Figure 9.

Figure 9. Use of artificial intelligence in assessments.



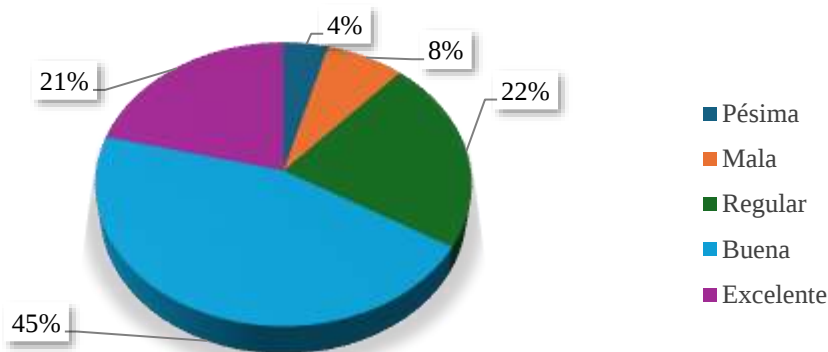
Source: Own elaboration based on PCS 2023 employee survey. In original language Spanish

As illustrated in Figure 9, there is a divergence of opinion on this matter. Forty-nine percent of respondents view the application of artificial intelligence as a beneficial phenomenon. A total of 21% of respondents indicated that they are entirely opposed to the use of artificial intelligence. A third of respondents (30%) indicated that they had no opinion on the matter. This may be due to a lack of knowledge about how it could be used. It is also important to note that the majority of employees adhere to the norms and values espoused by the cohort born between 1960 and 1980. It may therefore be surmised that they are not fully conversant with the deployment of new disruptive technologies.

It is recommended that this be utilized solely as a form of assistance during the evaluation process. With regard to the admission subsystem, its principal application would be in the interview phase. As the AI would be implemented using webcams and digital platforms, the system would record audio and images of applicants. Such skills would be encoded in an algorithm of social interactions, with a particular focus on public service aptitude, teamwork, and results orientation. These skills would be identified in the candidate profile, and the AI would evaluate the potential for the candidate to possess these skills. This would result in the generation of a note, which would not be a determining factor in the evaluation process. The proposed system would serve to supplement the evaluation conducted by human interviewers, who would also assign a rating. Based on both criteria, an average score would be calculated and added to the candidate's overall evaluation to determine the individual with the highest qualifications.

Figure 10. Reliability and transparency in entrance examinations.

RELIABILITY AND TRANSPARENCY IN ENTRANCE EXAMINATIONS



Source: Own elaboration based on PCS 2023 employee survey. In original language Spanish

Figure 10 merits particular attention, as the image illustrates that 34% of federal government employees who entered through the professional service consider the reliability and transparency of the selection processes to be unsatisfactory. While 66% of respondents rated these topics as good or excellent, this does not imply that there is an opportunity for improvement. The evaluations are conducted using a rubric, but the assessments are assigned by human beings with subjectivity. It is therefore possible to corroborate the assertion that 34% of employees in the service consider the reliability and transparency of the evaluations of the entry subsystem to be negative. Consequently, the implementation of artificial intelligence could facilitate the assessment of subjective elements through the use of algorithms that provide participants with a clear understanding of the rationale behind their assigned grades. Furthermore, this approach would facilitate more expeditious and efficient delivery of results.

Conclusions

A theoretical model has been proposed which seeks to establish a link between the variables of digital government and professional career service. A review of the literature reveals a paucity of studies investigating the relationship between information and communication technologies (ICT) utilized by digital government in the context of public administration, particularly with regard to the recruitment of its personnel. The focus of progress is on the services provided to citizens and businesses.

Since 2010, there has been a notable absence of interest in the functioning of the PCS in scientific literature. Accordingly, this research represents an update on the current state of the service in connection with digital government and its technological applications.

A review of the current scientific literature reveals a dearth of research on the admission subsystem within the service. Furthermore, no survey has been conducted to ascertain how they conceptualize the implementation of ICTs by digital government in the selection processes of public employees.

In response to the evaluative method, the answer is resounding. The same employees of the centralized federal public administration agree with the implementation of new technologies to enhance the functionality of the PCS. Most notably, the website is being updated and new technologies are being introduced, including digital platforms (QR Code, videoconferences), big data, and artificial intelligence.

The initial three phases of the evaluation method were examined: context, input, and process. The assessment of the product was put on hold. This entails the assessment, interpretation, and evaluation of a program's accomplishments (Stufflebeam, 1983). "The fundamental objective of a product evaluation is to ascertain whether a specific program merits continued funding, replication, and/or expansion to other domains" (Stufflebeam, 1983).

In the case of the PCS, there has been an evident effort to incorporate information and communication technologies (ICT), such as the Internet and websites. Nevertheless, the evidence presented indicates that the service could be expanded through the incorporation of new technologies. Proposed innovations include the use of Quick Response (QR) codes, videoconferencing platforms for examinations and interviews, and, most notably, the integration of artificial intelligence algorithms powered by Big Data for the evaluation of admission processes. What is the optimal method for integrating these technologies into the PCS? This is a topic meriting further investigation.

Founding

This research was funded by the postgraduate scholarship system of the National Polytechnic Institute.

Declaration of conflict of interest

There is no conflict of interest in this research.

Declaration of data availability

Data from this research are available at

https://docs.google.com/forms/d/e/1FAIpQLSeALEhZYt5XGrO4be0EeylLDNZ4G-_SeLytYUIA2Fu3yrt3g/viewform?usp=sharing

References

- Acosta, M. (1990), *Teoría General del Derecho Administrativo*, México, Porrúa.
- Acosta, Miguel (1999), *Derecho Burocrático Mexicano*, México, Porrúa.
- Aguilera, Gustavo (2008). El gobierno electrónico en México en *Ciencia UAT*. Vol. 3, Núm. 1, julio-septiembre, pp. 20-23.
- Aguilar-Barojas, Saraí. Fórmulas para el cálculo de la muestra en investigaciones. *Salud en Tabasco*, vol. 11, núm. 1-2, enero-agosto, 2005, pp. 333-338 Secretaría de Salud del Estado de Tabasco Villahermosa, México.
- Aguilar Villanueva, Luis F. (2015), *Gobernanza y Gestión Pública*, México, F.C.E.
- Aucoin, P. (1995). *The New Public Management: Canada in Comparative Perspective*, Montreal, Institute for Research on Public Policy.
- Bahena, Edwin. Encuesta a trabajadores del Servicio Profesional de Carrera 2023. ESCA/IPN. Versión en línea consultada el 14 de noviembre de 2023

<https://docs.google.com/forms/d/1bkgaJQJjsKUvMB1zrJgLf2ytewglekz2acpVn4mH74/edit#responses>

- Belloch, Consuelo (2011). Las tecnologías de la información y comunicación. Universidad de Tecnología Educativa. Valencia, España.
- Benavides, Carlos (2000). Tecnologías, innovación y empresa. Madrid, Pirámide.
- BID/OCDE. (2016). Políticas de banda ancha para América Latina y el Caribe: un manual para una economía digital. Capítulo 12.
- Bozeman, Barry (Coordinador) (1998). La Gestión Pública, su situación actual. México, Fondo de Cultura Económica.
- Cabero, J. (1998) “Impacto de las nuevas tecnologías de la información y la comunicación en las organizaciones educativas” en Lorenzo, M. Enfoques en la organización y dirección de instituciones educativas formales y no formales Editorial Universitario. Granada, España.
- “Carta Iberoamericana de la Función Pública”, aprobada por la V Conferencia Iberoamericana de Ministros de Administración Pública y Reforma del Estado. Santa Cruz de la Sierra, Bolivia. Centro Latinoamericano de Administración para el Desarrollo (CLAD) y el Departamento de Asuntos Económicos y Sociales de las Naciones Unidas (26-27 de junio de 2003).
- “Código Iberoamericano de Buen Gobierno”, Centro Latinoamericano de Administración para el Desarrollo (CLAD), Montevideo, Uruguay (23 de junio de 2006).
- “Informe sobre la situación del servicio civil en América Latina”, Banco Interamericano de Desarrollo (BID), Washington, DC. 2006.
- Castells, Manuel (2010). Internet y la sociedad red. Lección inaugural del programa de doctorado sobre la sociedad de la información y el conocimiento. Valencia, España.
- Castro Valdez, R. Las tecnologías de la información y comunicación en el marco de la innovación gubernamental en México. BUAP, México.
- Cejudo Guillermo, M., (2011). Nueva gestión pública. México, Siglo XXI.
- Chacón Medina, Antonio (2003). La videoconferencia: conceptualización, elementos y uso educativo. Grandad, España. Revista Ética.
- Dawes, S. S. y T. A Pardo (2002). “Building Collaborative Digital Government Systems. Systematic Constraints and Effective Practices.” In *Advances in Digital Government. Technology, Human Factors, and Policy*, W. J. McIver y A. K. Elmagarmi, Norwell, MA: Kluwer Academic Publishers.
- Dawes, S. S. (2002). “Government and Technology: User, Not Regulator.” *Journal of Public Administration Research and Theory*.
- Dawes, S. S., y M.R Nelson (1995). “Pool the Risks, Share the Benefits: Partnership in It Innovation.” In *Technology Trendlines: Technology Success Stories from Today’s Visionaries*, edited by J Keyes. New York: Van Nostry Reinhold.
- Dawes, S. S., T Pardo, y A DiCaterino (1999). “Crossing the Threshold: Practical Foundations for Government Services on the World Wide Web.” *Journal of the American Society for Information Science* 50 (4): 346–353.
- Diccionario de la Real Academia de la Lengua Española. Versión en línea, consultada el 28 de agosto de 2012.
- De Carbajal, Colón (2011). “Hacia un modelo social de Administración Pública: de la burocracia a la gobernanza” en *Noticias jurídicas*, versión electrónica.
- Gil-García, J. Ramón (2008). Et. Al. Gobierno electrónico en México. CIDE, México. 2008
- Gil-García, J. Ramón (2012). *Enacting Electronic Government Success: An Integrative Study of Government-wide Websites, Organizational Capabilities, and Institutions*. 2012th ed. Springer.
- Gil-García, J. Ramón, y L.F. Luna-Reyes (2006). “Integrating Conceptual Approaches to E-Government.” In *Encyclopedia Of E-Commerce, E-Government, and Mobile Commerce*, Hershey, PA: Idea Group Reference.

- Gil-García, J.Ramón., y I. J. Martínez-Moyano (2007). “Understanding the Evolution of E-government: The Influence of Systems of Rules on Public Sector Dynamics.” *Government Information Quarterly*.
- Holmes, Douglas (2001). *E.gov. E-business Strategies for Government*. London: Nicholas Brealey Publishing. Homburg, V. 2008. Understanding.
- Huergo, Jorge (2013). Los procesos de gestión. México, Inédito.
- Huidobro, José Manuel (2009). Código QR. México, Revista Bit. Dic-Enero.
- Longo Francisco (2001). Diagnóstico institucional de los sistemas de Servicio Civil. Barcelona. BID.
- Kettl, D. F. (2000), *The Global Public Management Revolution: A Report on the Transformation of Governance*, Washington, Brookings Institute Press.
- Ley del Servicio Profesional de Carrera en la Administración Pública Federal, (2006 [2003]), en <http://www.diputados.gob.mx/LeyesBiblio/pdf/260.pdf>, consultado el 25 de agosto de 2014.
- López-Portillo, José Ramón (2017). Retos y oportunidades del cambio tecnológico exponencial. México, FCE.
- Luna-Reyes, Luis F., J. Ramón Gil-García, y Mireya Estrada-Marroquin (2008). “The Impact of Institutions on Interorganizational IT Projects in the Mexican Federal Government.” *International Journal of Electronic Government Research*.
- Luna-Reyes, Luis. Et. Al (2015). *Avances y retos del gobierno digital en México*. México, Universidad del Estado de México.
- Lugo Dávila, Aida Alicia (2013). “La función pública en México: de la selección y profesionalización en el servicio profesional de carrera”. España, Universidad Complutense de Madrid.
- Martínez, Rafael (2003), *La profesionalización de la administración pública en México: Dilemas y perspectivas*. México, INAP.
- Martínez, Rafael (2006), “Alcances y resultados del Servicio Profesional de Carrera en México. Un ejercicio de evaluación a tres años de su implementación” en *Gestión y Política Pública*, Volumen XV, número 2, II Semestre de 2006, pp. 457-483.
- Martínez, Rafael (2005). *Servicio profesional de carrera: ¿para qué? México*, Miguel Ángel Porrúa.
- Méndez, José Luis (2000). *Lecturas básicas de administración y políticas públicas*. México, El Colegio de México.
- Meny, Yves (1992). *Las políticas públicas*. Barcelona, Ariel.
- Mora, José María Luis, (1827), *Discurso sobre los perniciosos efectos de la empleomanía*, Disponible en línea en: <http://www.inap.mx/portal/images/RAP/discurso%20sobre%20los%20perniciosos%20efectos%20de%20la%20empleomana.pdf>, consultado el 30 de agosto de 2014.
- Merino, Mauricio (2005). “El desafío de la transparencia. Una revisión de las normas de acceso a la información pública en las entidades federativas de México” en *Documentos de trabajo del CIDE*. México, CIDE, agosto.
- Morales Gómez, Juan Miguel, (2009), *Actualidad y prospectiva de la profesionalización de los servidores públicos municipales en el Estado de México*. México, Miguel Ángel Porrúa, Cámara de Diputados, UAEM y IAPEM.
- Naser, A. (2011). *Gobierno Electrónico en la Gestión Pública*. ILPES/CEPAL.
- Peters, B. G. (1996), *The Future of Governing: Four Emerging Models*, Lawrence, University Press of Kansas.
- Pollitt, Ch. (1990), *Managerialism and the Public Services: The Anglo-American Experience*, Oxford, Blackwell.

- Pardo, María del Carmen (1995), “El Servicio civil de carrera en México: un imperativo de la modernización”, revista Gestión y Política Pública, vol. IV, núm. 2, México, segundo semestre, Ed. CIDE.
- Prats, Joan (2004), “De la burocracia al management y del management a la gobernanza”, en Instituciones y Desarrollo, núm. 3.
- Stufflebeam, D y Anthony Shinkfield (1983). Evaluación sistemática. Guía teórica y práctica. Barcelona, España, Paidós.
- Subirats, Joan (2008). Análisis y gestión de políticas públicas. Barcelona, Ariel.
- Uvalle, Ricardo, (2000), Institucionalidad y profesionalización del servicio público en México. Retos y perspectivas, México, Plaza y Valdés editores.
- Uvalle, Ricardo, (2005), La transformación procedimental y democrática de la administración Pública, México, IAPEM.