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Evaluación de estrategias que impulsan en el ciudadano el uso de las plataformas de e-gobierno municipal: un enfoque de dinámica de sistemas

Evaluation of strategies that mainstream the use of the municipal e-government platforms: a systems dynamics approach

Avaliação de estratégias que promovam o uso de plataformas municipais de governo eletrônico no cidadão: uma abordagem de dinâmica de sistemas

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Resumen

El e-gobierno es considerado como una herramienta estratégica de los gobiernos municipales para impulsar su transformación, pero a pesar de los beneficios que se ofrecen en sus plataformas, existe suficiente evidencia que muestran la falta de uso de sus servicios, en este contexto las características de usabilidad son primordiales en la aceptación de los portales por parte de los usuarios ya que si estos no son percibidos como una herramienta efectiva, se dificulta su aceptación, lo que repercute directamente en la confianza de las personas, promoviendo el desuso en los usuarios potenciales de un sitio. Por lo tanto es necesario generar estrategias que impulsen en el ciudadano el uso de las plataformas de e-gobierno municipal, lo que significa una tarea compleja, ya que los resultados solo pueden verse a largo plazo. Por lo tanto, en el presente estudio se empleó la metodología de dinámica de sistemas, de corte cualitativo, para generar un modelo que muestra la naturaleza recursiva y compleja de las variables lo que permite explicar el comportamiento de uso que representan las plataformas de e-gobierno bajo la perspectiva de variables de usabilidad. Este modelo ofrece la posibilidad de evaluar estrategias y diseñar planes de acción que favorezcan el uso de las plataformas de e-gobierno.

Palabras clave: Administración Pública, e-gobierno, dinámica de sistemas, usabilidad.

Abstract

The e-government is considered as a strategic tool of the municipal governments to promote their transformation, but despite the benefits that are offered in their platforms, there is enough evidence to show the lack of use of their services, in this context the characteristics of usability are paramount in the acceptance of portals by users because if they are not perceived as an effective tool, their acceptance is hindered, which has a direct impact on the trust of people, promoting disuse in potential users of a site. Therefore, it is necessary to generate strategies that mainstream the use of the municipal e-government platforms, which means a complex task; since the results can only be seen in the long term. Therefore, in the present study we used the methodology of systems dynamics, of qualitative cut, to generate a model that shows the recursive and complex nature of the variables, which allows us to

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explain the use behavior represented by the platforms of e- government under the perspective of usability variables. This model offers the possibility of evaluating strategies and designing action plans that favor the use of e-government platforms.

Keywords: e-government, Public Management, System Dynamics, usability.

Resumo

O governo eletrônico é considerado como uma ferramenta estratégica dos governos municipais para promover sua transformação, mas apesar dos benefícios oferecidos em suas plataformas, há evidências suficientes para mostrar a falta de uso de seus serviços, neste contexto as características de usabilidade são primordiais na aceitação de portais pelos usuários, pois, se não forem percebidos como uma ferramenta eficaz, é difícil aceitá-los, o que impacta diretamente na confiança das pessoas, promovendo o desuso em potenciais usuários. de um site. Portanto, é necessário gerar estratégias que promovam o uso de plataformas municipais de governo eletrônico no cidadão, o que significa uma tarefa complexa, uma vez que os resultados só podem ser vistos a longo prazo. Portanto, no presente estudo, a metodologia de dinâmica de sistemas, corte qualitativo, foi utilizada para gerar um modelo que mostra a natureza recursiva e complexa das variáveis, o que permite explicar o comportamento de uso representado pelas plataformas de e-learning. governo sob a perspectiva de variáveis de usabilidade. Este modelo oferece a possibilidade de avaliar estratégias e desenhar planos de ação que favoreçam o uso de plataformas de governo eletrônico.

Palavras-chave: Administração Pública, governo eletrônico, dinâmica de sistemas, usabilidade.

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Introduction

The vertiginous technological advances of computing and telecommunications, the globalization of markets and the knowledge-based society have impacted not only the behavior of the economy, but also on political and social behavior (Norris, 2001), transformed from Considerably, the way in which we relate and the forms of interaction with public and private organizations, driven by this, important changes in the social structure that have led governments to migrate their services to these new technological trends.

Thus, the new movements that involve the exchange of information represent new challenges in the processes of change of a country, oriented to democracy based on the principles of transparency, accountability and participation, which leads governments to develop new ways of carrying out their processes so that they are more efficient (Ruelas and Amburgo, 2006). Therefore, the implementation of online platforms to provide electronic public services, □tendencia called e-gobierno□, has been a common strategy of public administration in Mexico in recent years.

The usability that the e-government platforms present is a subject of great importance worldwide, it is necessary to integrate citizens and public entities in such a way that the satisfaction of the requirements of the different user profiles is guaranteed, since These difficulties impact the governments' objectives and their evolution towards electronic administration (Baker, 2006, Roach, 2007). Therefore, usability characteristics play a preponderant role in the acceptance of digital tools by users since if the system is not perceived as an effective tool for performing tasks, it is difficult to accept them (Garrido Palma, Lavín Tapia & Rodríguez-Peña, 2014; Grau 2000). In this sense, we can see that the inefficiency and non-compliance that is presented in the e-government portals generate a bad experience, which directly affects the trust of the people, promoting the disuse in the potential users of a site (Balci et al. ., 2010, Garrido Palma, Lavín Tapia and Rodríguez-Peña, 2014, Nielsen, 1999).

Due to the fact that the development of functionality and content in government portals happens over time as a result of complex interactions (Luna-Reyes & Gil-Garcia, JR (2013))

a tool is necessary that allows us to glimpse the effects in different scenarios that correspond to different time horizons and thus analyze alternatives that promote the use of e-government platforms, therefore, it is proposed under a methodology with a qualitative approach called systems dynamics, a model that shows the recursive and complex nature of the variables, which allows us to explain the complexity of the e-government platforms, under the approach of the theory of promulgation of technology, emphasizing usability variables, providing the possibility of analyzing alternatives that drive the citizen the use of e-government platforms.

Since several studies (Huang and Benyoucef, 2014, Venkatesh, Thong, Chan and Hu, 2016) have shown that usability features are paramount in the acceptance of portals by citizens, therefore, if these platforms do not they are perceived as an effective tool, their acceptance is difficult (Garrido Palma, Lavín Tapia and Rodríguez-Peña, 2014, Grau 2000), which directly affects their adoption.

The work is developed in three sections. In the first one, a review of the literature is made, in the second the methodology and the framework that derive in the dynamic hypothesis are addressed, and in the third, the results and conclusions are shown.

Review of the literature

e-gobierno

The e-government is understood as the use of Information and Communication Technologies (ICT) and specifically the use of the Internet as a tool to achieve better governance (OECD, 2003), which enables the transformation of relations with citizens, companies and other parts of the public administration.

Therefore, e-government serves as the government's strategic tool to promote transparency, accountability and the reduction of corruption (Luna-Reyes and Gil-García, 2011, Luna, Gil-García, Luna-Reyes and Sandoval, 2011; Rivera, 2006), because it allows the use of public

services at a distance and without the need to go to a government agency, representing benefits for citizens. In fact, the ranking of electronic governments gives guidelines to demonstrate the dynamism and benefit of the portals, but it also makes evident the need to implement processes of continuous improvement in the portals (Luna, Gil-García, Luna-Reyes and Sandoval, 2011).

The development of infrastructure and the implementation of portals provides accessibility to electronic public services, however, this does not de facto imply their use, therefore, it is essential to consider the usability factors (Venkatesh, et al, 2016). emanate from the application of these technologies

Usability

In this research the usability factors to be considered are those evaluated in software engineering, therefore, it is important to specify that the ISO 9241 standard and the ISO 14598-1 standard define usability in a general manner as the degree to which Users use a product to perform a task effectively and efficiently providing satisfaction in the way of use.

In this field of international standards, definitions have been evolving, ISO 25000 SQUARE 2005 already integrates a set of capabilities that must be evaluated in software that is used under certain conditions, such as the ease of being learned, understood, used and attractive. for the user. In short, usability can be defined as "a quality attribute of a page or website that determines the ease of the interface to be used or the speed with which you can learn to use something (Nielsen, 1993) that under the perspective of Nielsen and Mack, (1994) if a characteristic can not be used or is not used is as if it did not exist.

In this context, if the usability characteristics that drive a citizen to consider an effective e-government platform are not known, their use will be limited and in the worst case, as Nielsen and Mack (1994) mention. It exists for the citizen.

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Dynamic of systems

Due to the aforementioned, usability-oriented strategies are required that allow the public administration to face the challenges posed by the adoption of ICT, unfortunately the effect of these strategies usually can not be known, so governments prefer not to invest in this because of the political cost that this could represent, preferring to rely only on implementation and not on usability.

Therefore, for the design of these strategies, a method is required that allows us to glimpse the effects at different times and scenarios, allowing us to analyze alternatives that contribute to the decision-making process.

Under this context, the dynamics of systems is a method that allows to analyze complex systems and their feedbacks (Forrester, 1961; Sterman, 2000) that through the visualization of the relationship between the different variables allows to simulate the future environment, thus the dynamics The objective of systems is to analyze the behavior of a particular phenomenon and, through the analysis of that behavior, allows those responsible for designing strategies to understand its operation and have support in its decision-making process (Senge, 2005).

In fact, several studies indicate that systems dynamics are an appropriate tool for studying the effect of strategies and for the analysis of specific situations related to public policy and information technologies (Teekasap, 2009, Thompson and Tebbens, 2008; Richardson, Andersen and Luna-Reyes, 2004, Georgantzas and Katsamakas, 2008, Luna-Reyes, Andersen, Richardson, Pardo and Cresswell, 2007).

The study of e-government portals

Luna-Reyes and Gil-García (2011) in their article "Using institutional theory and dynamic simulation to understand complex e-Government phenomena", propose the use of institutional theory and the dynamics of the system, as an integrated and comprehensive approach to understand The phenomena of electronic government particularly focus on the strategy of content portals for citizens.

In their work "Understanding the Co-Evolution of Institutions, Technology, and Organizations: The Enactment of the State Government Portal of Puebla" Luna-Reyes and Gil-García (2013) use systems dynamics and institutional approaches to understand relationships among the factors in the development of ICT in government, showing the relevance of networks and relationships for the successful development of the portal.

Under the same framework, Fountain (2001) presents a more refined approach to the study of technology within government agencies with a view to promulgated technology. Under this same approach Orlikowski (2000) emphasizes that the forms of organization and institutional arrangements are affected by the selection, design and use of ICT.

Carvajal and Saab (2010), in their work they include elements that must be considered for the design of web sites specifically for the government, specifying five dimensions of usability: information architecture, search, content, interaction design and user interface design . In Claros (2006), it is possible to have a reference of the usability indicators of government websites, in a three-level hierarchy usability measurement model, which includes six evaluation dimensions.

However, research oriented to better understand the relationships between these variables and their implications in practice is required. Therefore, a model designed through the systems dynamics approach is proposed, in this stage emphasis is placed on usability variables, since these play a preponderant role in the acceptance of digital tools by users since the system is not perceived as an effective tool for carrying out tasks, it is difficult to accept (Garrido Palma, Lavín Tapia y Rodríguez-Peña, 2014; Grau 2000).

Systemic Methodology

At present, a methodology is required that allows us to generate future scenarios to understand the dynamics of social transformation and that these can be simulated with the purpose of evaluating the implementation of strategies and their behavior. The dynamics of

systems is a methodological tool that adapts to these requirements since it allows to better understand the complex relationships, results and involuntary consequences that occur in the study of complex systems, as it is in this case, the evaluation of strategies that promote the use of e-government platforms (Forrester, 1998, Richardson and Pugh, 1981, Sterman, 2000). The process of modeling through systems dynamics is a formal process that allows, after the appropriate analysis of reality, to develop and test hypotheses about the behavior or aspect of reality that is problematic in a complex system (Aracil, 1995; Luna -Reyes and Gil-García, 2011).

There are different styles and approaches, since there is no specific recipe for modeling, because it is inherently creative, but there is a consensus that describes a series of steps that begin with the understanding of the problem until the validation and use of the model, so that a useful model is assured (Richardson and Pugh, 1981, Roberts, et al, 1997, Sterman, 2000).

Sterman (2000) summarizes this procedure in the following activities:

1. Articulation of the problem to solve.
2. Formulation of the dynamic hypothesis.
3. Formulation of the dynamic model.

The dynamics of systems provides the formal framework for the generation of a conceptual model, which allows understanding the behavior of the variables that drive citizen use of e-municipal government platforms.

Framework of work

The variables that make up the model are identified through a qualitative method and an interpretive approach (Quintero Posso and López Muriel (2010), Mórlan (2010), Lin, Tung and Huang, 2006). Based on the review of the literature and taking as reference the usability standards ISO 9126 and ISO 14598 and the unification of these reflected in the ISO 25000 standard (SQUARE), the works of Claros (2006), Carvajal and Saab 2010. same, as recommended by Morlan (2010) experts in the area of usability and municipal government were interviewed, with which the pertinence of the variables was analyzed, as well as the

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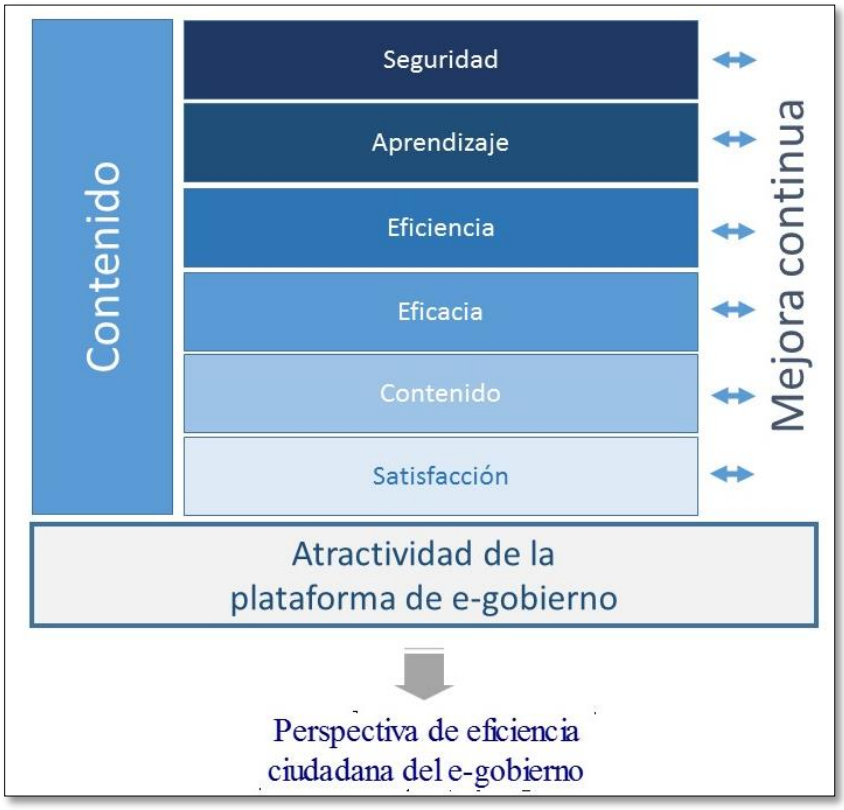
influences they exert between them and the existing relationships that thus generate the dynamic model .

Figure 1 shows the conceptual model that is used as a framework, where we can see that the content of the e-government portals must be created based on constantly improving usability determinants, this results in an e-government platform. - Attractive government that increases the perspective of efficiency of e-government promoting its use in the citizens.

Figura 1. Marco conceptual de trabajo.



Fuente: elaboración propia.

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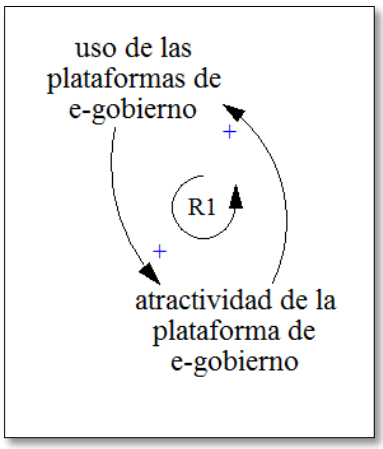
Dynamic hypothesis

The dynamic hypothesis that can be observed in Figure 2 was formulated based on the causal relationships between the variables where the behavior of the phenomenon is reflected (Sterman, 2000).

Figura 2. Hipótesis dinámica uso de plataformas de e-gobierno.



Fuente: elaboración propia.

The most important building block that can be found in systems dynamics are feedback loops, which represent closed structured causal relationships (Schaffernicht, 2009). The loop (R1) represents the positive reinforcement that exists between the use of e-government platforms and the attractiveness that these platforms can present to citizens, since this directly affects the trust of people by promoting the use of users. potentials of a site (Balci, *et al*., 2010; Garrido Palma, Lavín Tapia y Rodríguez-Peña, 2014; Peng, *et al*., 2004;).

Results

Once the dynamic hypothesis is formulated, the causal diagram that can be observed in Figure 3 is created, which illustrates the variables that make up the model and the impact they have between them through causal relationships.

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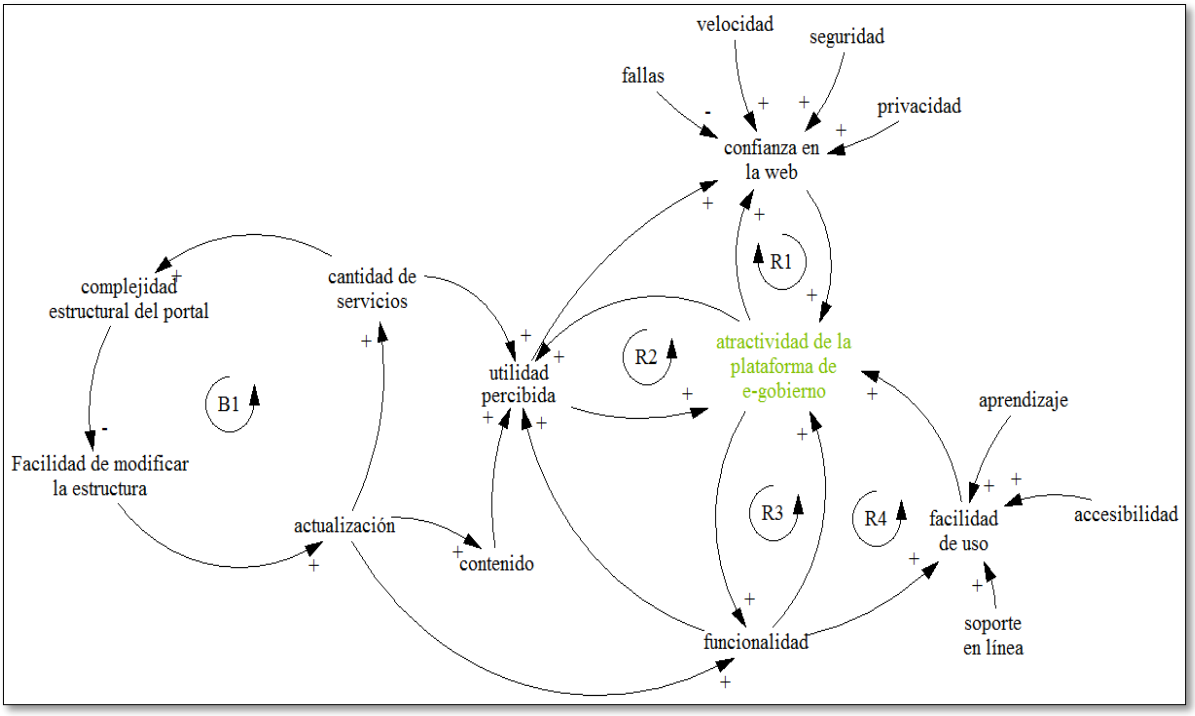
Figura 3. Diagrama causal atractividad de las plataformas de e-gobierno.



Fuente: elaboración propia.

In the model we can observe 4 positive feedback loops or reinforcers:

(R1) The variables, web trust and attractiveness of the e-government platforms present a positive relationship, reflecting a dynamism by indicating that the greater the confidence in the web, the greater attractiveness of the e-government platforms.

(R2) In this loop you can see how the variable perceived utility has a positive influence on the attractiveness of the e-government platforms and vice versa, denoting that if the platforms are perceived by citizens as useful to achieve their objectives, they will be more attractive

(R3) In the same way as the previous loops, there is a positive reinforcement where greater functionality, greater attractiveness of the e-government platforms and greater attractiveness of the e-government platforms, greater functionality will be added to these.

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(R4) in this loop are the variables attractiveness of e-government platforms, functionality and ease of use, where they are positively reinforced, indicating that when one grows, others also.

Something that makes this model interesting is the existence of a rolling loop (B1) that stabilizes the system in the presence of reinforcing loops. In this loop, the variables involved are the number of services, structural complexity of the portal, ease of modifying the structure and updating, stabilization is given by the negative feedback between the variables, where it can be observed that the greater the structural complexity of the portal the ease of modify the structure decreases.

The framework of technology promulgation (Fountain, 1995, 2001) could be considered one of the most refined institutional institutions and integrated approaches to the study of technology in organizations, particularly government agencies (see Fig. 1). The promulgation of technology focuses on the intersections between institutions, bureaucratic structures and information technologies. The basic logic of this framework is that "objective technologies" (hardware, software, networks, etc.) are shaped by organizational forms and institutional arrangements to become "promulgated technologies". In the same way, forms of organization and institutional arrangements are affected by the selection, design and use of ICTs, recognizing bidirectional relationships between ICTs and social structures. (Orlikowski, 1992, 2000).

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Conclusions

The dynamics of systems plays a crucial role in this study as it provides a systematic and formal process to establish the causal relationships and understand the impact of the different variables of usability which will allow understanding their behavior and thus analyze, in the model, Strategies that make tractiva an e-government platform and in this way boost its use.

Due to the qualitative origin of the systems dynamics methodology, variables that are little analyzed in econometric schemes could be considered, which allows to show the influence of the proposed variables, the model becomes interesting and shows both positive and negative feedback loops thus providing a useful analysis tool and a solid base, so that in future work the model can be transformed into a simulation tool capable of generating scenarios in time horizons that show the behavior of the variables that drive citizen use of e-government platforms and in this way to test the effectiveness of various strategies.

According to the resulting model, it can be said that there is a correspondence between the variables of usability (ease of use, functionality, perceived utility and trust in the web) with respect to the attractiveness of the e-government platforms, which drives in the citizen its use, but it is important to consider, at the moment of generating strategies, that the more its usability is promoted through the perceived utility, functionality and ease of use, the platform will become more complex, which will make it difficult to modify its structure and its update.

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