

Digital management and its impact on the efficiency and transparency of decentralized autonomous governments in Ecuador

Neuroarchitectural design and its ability to improve academic performance with special abilities

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ABSTRACT

Digital management is central to contemporary administrative modernization, transforming the way Ecuador's Decentralized Autonomous Governments (GADs) operate and interact with citizens. This article critically analyzes how the implementation of digital technologies affects institutional efficiency and government transparency, based on mixed-method research. A non-experimental, cross-sectional design was applied, combining documentary analysis with the evaluation of 45 institutional portals and the statistical processing of secondary data. The results show that, although 100% of GADs have achieved basic levels of digital presence, only 20% have implemented complete transactional platforms, revealing significant gaps linked to budgetary and territorial factors. In terms of transparency, average compliance with the Organic Law on Transparency and Access to Public Information (LOTAIP) reached 82%, with an emphasis on financial aspects and low coverage of procedural data, confirming a bias toward formal rather than substantive accountability. Likewise, digitization showed positive effects: a 77% reduction in processing times, 61.6% savings in administrative costs, and a 2.3-point increase in citizen satisfaction on a scale of ten. It is concluded that digital management has undeniable transformative potential, although it is limited by the digital divide, the lack of specialized talent, and institutional resistance. The

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adoption of comprehensive strategies that articulate infrastructure, human capacities, and inclusive digital governance is recommended.

Keywords: administrative modernization, e-government, public innovation, digital divide, accountability.

SUMMARY

The spatial and psychological relationship of students in classrooms according to academic components currently represents 80% of the student's physical environment throughout their career. 12.45% respond to psychological alterations due to stress and mental exhaustion, which is why the study is justified in attempting to create spaces that generate relaxation and comprehensive comfort. In the Faculty of Architecture and Urbanism, according to a sample provided by the Student Welfare Department, there is a stress level of more than 68% among FAU students, as determined by a student census, which also revealed the important fact that 5.63% have ASD and psychosensory disorders, which are attributed to their disability. This scientific document will address techniques for establishing comfortable spaces within the Faculty's classroom modules and provide criteria based on cognitive analysis and decision-making. The study evaluates how physical variables in the environment, such as temperature, humidity, and noise, influence the well-being and performance of students at the Faculty of Architecture and Urbanism at the University of Guayaquil. Through systematic measurements, environmental deficiencies that affect comfort and learning were identified. Architectural improvements are proposed that integrate principles of neuroarchitecture and bioclimatic design. However, the focus of this study is characterized by the function of bioclimatic criteria as indicators that contribute to the cognitive comfort of people with ASD and psychosensory disorders within the Faculty of Architecture and Urbanism. It is concluded that the study of individuals' own faculties contributed to deriving criteria for sizing and active contact with natural spaces that led to a 65% reduction in psychosensory

disorders and a 50% increase in concentration within the classroom.

Keywords: classroom, well-being, universities

INTRODUCTION

Public management in the 21st century is undergoing an unprecedented process of transformation, driven by rapid global digitalization and growing citizen demand for more agile, efficient, and transparent services. This phenomenon is manifested in the consolidation of the concept of digital government or e-government, understood not as the mere digitization of procedures, but as a new management paradigm that redefines the interaction between the state and society (Gil-García, Dawes, & Pardo, 2017). From this perspective, digital management is not limited to the incorporation of technological platforms, but involves a profound redesign of administrative processes, organizational structure, and institutional culture.

In the Latin American context, the implementation of digital government strategies has become a priority policy in countries seeking to strengthen democratic governance and reduce inequality gaps in access to public information (Hevia, 2022). However, this transition is not without challenges. Socioeconomic inequalities, technological infrastructure limitations, and resistance to change in public institutions have conditioned the pace and depth of these transformations. As Ramírez-Alujas (2012) points out, state modernization requires not only digital tools, but also cultural changes that favor openness, accountability, and organizational innovation.

In Ecuador, political and administrative decentralization, enshrined in the 2008 Constitution, strengthened the role of Decentralized Autonomous Governments (GADs) by granting them powers and autonomy in territorial management. The GADs, which include provincial prefectures, municipalities, and parish councils, constitute the level of government closest to the citizenry, with the responsibility of guaranteeing basic services, promoting local development, and ensuring transparency in the management of public resources (Pérez, 2002). However, this decentralization process has not always been accompanied by sufficient technical, financial, and human resources, which has created tensions between the constitutional mandate and the operational reality of local governments (Ayala-Becerra, Gavilanes-Erazo, & Alvear-Calderón, 2024).

In this scenario, digital management emerges as a strategic tool that allows the gaps between citizen expectations and the structural limitations of the GADs to be closed. The incorporation of Information and Communication Technologies (ICT) in public management allows, on the one hand, for the optimization of institutional efficiency through the automation of processes, the reduction of response times, and the decrease of administrative costs (OECD, 2019). On the other hand, it strengthens transparency by enabling the proactive publication of open data, citizen access to government information, and the creation of digital participation mechanisms (Huamán

& Medina, 2022). In this way, digital management not only modernizes administration but also promotes democratic legitimacy by expanding channels for interaction and social control.

Administrative efficiency, understood as the ability of public institutions to maximize results using the minimum possible resources, has been strengthened by the digitization of internal procedures and processes. Examples of this include the implementation of virtual one-stop shops, electronic payment platforms, and document management systems that reduce bureaucracy and streamline services. Recent research indicates that the strategic use of ICT increases institutional productivity and frees up human resources for tasks with greater added value (Gil-García et al., 2017). This aspect is particularly relevant for Ecuadorian GADs, whose resources are often limited and whose ability to respond to social demands depends on management efficiency.

At the same time, transparency is another fundamental pillar of digital government. Ecuador's Organic Law on Transparency and Access to Public Information (LOTAIP) establishes the obligation of public entities to guarantee access to relevant information on budgets, contracts, and administrative processes. However, compliance with this regulation has historically been uneven and, in many cases, formalistic. Digital platforms represent an opportunity to overcome this bias by facilitating the real-time publication of accessible data in open formats that allow for effective social control (Hevia, 2022). Digital transparency not only reduces opacity, but also contributes to citizen trust, an intangible but essential resource for democratic governance.

Despite its advantages, the implementation of digital management faces significant barriers. The digital divide between urban and rural areas is a structural challenge, as it limits equitable access to the benefits of digitization. In rural areas, lack of connectivity, scarce technological infrastructure, and low digital literacy hinder citizen interaction with the electronic systems of local governments (Muñoz, 2023). Added to this is cultural resistance within local bureaucracies, which sometimes perceive digitization as a threat to established practices or as an overload of responsibilities. Finally, limited budgetary availability restricts the ability of local governments to invest in robust and sustainable technological platforms.

Several studies have pointed out that the financial capacity of GADs is a determining factor in their level of digital maturity. Miranda, Tingo, Zamora, and Zamora (2025) show that local governments with larger budgets are able to move toward complete transactional platforms, while those with less capacity remain in the early stages of digitization. This finding reflects a structural inequality that, if left unaddressed, could deepen territorial inequality. Therefore, digital management must be understood as a process that requires not only technological infrastructure, but also public policies aimed at digital inclusion and equity.

Likewise, the literature agrees that government digitization has a direct positive impact on citizens' perception of service quality. When procedures are more streamlined and

costs are reduced, users experience greater satisfaction and trust in their local governments (Friedmann, 2004). However, citizen satisfaction also depends on the ease of use of platforms, the coverage of digitized services, and institutional support in training processes. In this sense, digital management should be understood as a multidimensional phenomenon that transcends technology and involves social, cultural, and organizational aspects.

The analysis of the Ecuadorian case is particularly relevant because it combines a favorable regulatory framework with a reality marked by structural gaps. Although the 2008 Constitution and complementary regulations have promoted decentralization and transparency, the actual capacity of local governments to implement these principles varies significantly. While some local governments have moved toward innovative models of digital government, others remain in the early stages, limited by budgetary constraints or a lack of strategic vision (Ayala-Becerra et al., 2024). This contrast raises questions about territorial equity in the implementation of digital government and about the support mechanisms that the central government should provide to strengthen the most lagging GADs.

In this context, this research seeks to critically analyze the current state of digital management in Ecuador's GADs and its impact on two key dimensions: administrative efficiency and institutional transparency. The study aims to identify not only the progress made, but also the persistent gaps and the determining factors that condition the success of these initiatives. Using a mixed methodological approach that combines documentary analysis, empirical evaluation, and statistical processing, the study aims to offer a comprehensive view that contributes both to academic debate and to the design of more effective public policies.

Specifically, this work seeks to answer the following questions: To what extent has digitization contributed to improving the efficiency of GAD administrative processes? What progress has been made in terms of e- , transparency, and citizen access to public information? What factors explain the differences in the level of digital development among different local governments? And finally, what strategies could be adopted to overcome the structural barriers that limit the consolidation of an inclusive and sustainable e-government model in Ecuador?

In short, digital management presents a historic opportunity to strengthen decentralization and promote more efficient, transparent local governments that are closer to citizens. However, its success will depend on the ability to articulate technology, financial resources, human talent, and political will in a comprehensive strategy for state modernization. This article aims to contribute to that effort by offering a critical and informed analysis that sheds light on both the achievements and the challenges that remain in building a digital state at the service of all Ecuadorians.

MATERIALS AND METHODS

This research was conducted using a mixed approach that integrated qualitative and quantitative components in order to provide a comprehensive understanding of the impact of digital management on the efficiency and transparency of Ecuador's Decentralized Autonomous Governments (GADs). The design adopted was non-experimental, cross-sectional, and descriptive-correlational, as the phenomenon was analyzed in its natural context without deliberate manipulation of the variables. The descriptive nature allowed for the characterization of levels of digital development and compliance with transparency mandates, while the correlational component made it possible to identify significant relationships between factors such as institutional budget and digital maturity achieved.

The study population consisted of the country's 221 cantonal governments. From this base, a non-probabilistic purposive sample of 45 GADs was selected, seeking to ensure territorial diversity in the three main regions of Ecuador (Coast, Highlands, and Amazon) and including both large municipalities with significant budgetary capacity and rural localities with limited resources. This selection criterion made it possible to represent the heterogeneity of digital development and the structural conditions of local governments.

The sources of information used included regulatory documents, institutional databases, and specialized academic literature. Primary inputs included the 2008 Constitution of the Republic of Ecuador, the Organic Law on Transparency and Access to Public Information (LOTAIP), the Organic Code of Territorial Organization, official GAD portals, accountability reports, and public information system records. Secondary sources included scientific articles published in indexed journals, studies by international organizations such as the OECD and ECLAC, and previous research on digital government and decentralization in the Ecuadorian context ().

The data collection process was based on a systematic review of documents under PRISMA criteria, which ensured comprehensiveness and methodological rigor. For the comparative evaluation, an analysis matrix was constructed to assess dimensions such as the provision of digital services, compliance with transparency obligations established in the LOTAIP, citizen interaction in digital environments, and efficiency in the management of procedures. The information was also supplemented with secondary data from citizen satisfaction surveys reported by the GADs themselves on their institutional websites.

Data processing was carried out using SPSS v.26 and Excel 365 software, which facilitated the cleaning, coding, and organization of the information. Descriptive statistical techniques were applied to calculate frequencies, percentages, means, and standard deviations that characterized the level of digital maturity. Pearson's correlation was used to explore relationships between quantitative variables, while one-way analysis of variance (ANOVA) was used to determine significant differences in compliance with different items of the LOTAIP. In cases where processing times and citizen satisfaction levels were compared before and after digitization, the paired

samples t-test was used. All analyses were performed with a significance level of 5%, and 95% confidence intervals were calculated to strengthen the validity of the inferences.

Complementarily, qualitative information was subjected to thematic content analysis, which allowed for the identification of discursive and conceptual patterns related to good practices, institutional limitations, and citizen perceptions of digitization. Triangulation between sources, techniques, and methods was applied systematically to ensure both the internal and external validity of the findings.

With regard to ethical considerations, the research was conducted under principles of integrity, objectivity, and respect for public information. The data analyzed were obtained exclusively from open access sources, in accordance with national transparency regulations. Neutrality was preserved in the analysis, avoiding biases that could compromise scientific validity, and the responsible treatment of sensitive records was ensured through the anonymization of information not intended for public scrutiny.

In short, the methodology used made it possible to characterize the state of digital management in Ecuadorian GADs and to evaluate, with statistical and documentary support, its impact on administrative efficiency and levels of institutional transparency, thus providing a robust framework for the critical interpretation of the results obtained.

RESULTS

The analysis of the matrix applied to the sample of 45 Decentralized Autonomous Governments made it possible to characterize the level of implementation of digital services, the degree of compliance with the transparency obligations established in the LOTAIP, and the effects of digitization on administrative efficiency. The data were cleaned, systematized, and processed using descriptive and inferential statistical techniques, which ensured the consistency of the findings and facilitated their critical interpretation.

Table 1. *Level of Implementation of Digital Services in the Sampled GADs (n=45)*

Type of Digital Service	Number of GADs	Percentage
Static Information (Level 1)	45	100
Unidirectional Interaction (Level 2)	38	84.4
Two-Way Interaction (Level 3)	22	48.9%
Complete Transaction (Level 4)	9	20.0

The descriptive analysis showed that all GADs have a basic online presence, which corresponds to the level of static information. However, only 20% of the entities

achieved full transactional development, which allows online procedures to be carried out with electronic payments. Pearson's correlation showed a strong and statistically significant positive relationship between institutional budget size and digital maturity level ($r = 0.82$, $p < 0.01$), confirming that financial capacity is a determining factor in the advancement toward more sophisticated models of digital government.

These findings are consistent with those of Miranda, Tingo, Zamora, and Zamora (2025), who note that budgetary heterogeneity conditions the scope of digitization in local governments. They also corroborate the OECD's (2019) assertion that financial resources are a key driver of administrative innovation. However, the marked urban-rural gap detected reflects that digital modernization is not advancing uniformly, which coincides with Muñoz's (2023) warning regarding territorial inequalities in access to technological infrastructure.

Transparency was assessed by verifying compliance with fifteen mandatory publication items under the LOTAIP, considering their availability on institutional websites and their presentation in accessible formats.

Table 2. Average Compliance with Publication of LOTAIP Items on Transparency Portals

Item Evaluated	Average Percentage of Compliance
Budget and Budget Execution	95
Planning (PDOT, Operational Plans)	88
Public Procurement Processes	92
Financial Statements	90
Guidelines and Manuals	45
Overall Compliance Average	82

The overall compliance rate reached 82%, reflecting a significant effort in the publication of financial and planning information. However, the standard deviation of 18.5 percentage points revealed variability between items. One-way analysis of variance (ANOVA) showed statistically significant differences in publication rates ($F(4, 220) = 35.67$, $p < 0.001$), with guidelines and manuals receiving the least attention.

These results reinforce the findings of Hevia (2022) and Ramírez-Alujas (2012), who argue that transparency in Latin America tends to focus on formal compliance with financial aspects, while procedural elements that are crucial for social control are neglected. Consequently, the digital management of Ecuadorian GADs reflects partial compliance with transparency, as it privileges the fiscal dimension over a more substantive openness of management.

Finally, the impact of digitization on the efficiency of procedures was evaluated by analyzing resolution times, administrative costs, and levels of citizen satisfaction in 30 GADs in the sample that had comparative data before and after implementing digital platforms.

Table 3. *Impact of Digitization on the Efficiency of Selected Procedures*

Indicator	Traditional Procedure (Average)	Digitized Procedure (Average)	Reduction
Resolution Time (days)	15.2	3.5	77
Citizen Satisfaction (scale 1-10)	6.1	8.4	+2.3 points
Administrative Cost per Procedure (USD)	12.50	4.80	61.6

The paired samples t-test confirmed that the differences in resolution times and citizen satisfaction were statistically significant ($t(29) = 0.1045$, $p < 0.001$, and $t(29) = 8.92$, $p < 0.001$, respectively). These results constitute empirical evidence that digitization increases efficiency and improves citizen perception of public services.

This finding coincides with the arguments of Gil-García et al. (2017) and Huamán and Medina (2022), who highlight that ICTs have a direct impact on institutional productivity and the quality of services perceived by citizens. However, as Friedmann (2004) points out, public efficiency is not limited to reducing costs and time, but must translate into management that strengthens democratic legitimacy. In this sense, digitization is a valuable tool, although its benefits are still concentrated in the GADs with greater institutional capacity, highlighting the urgency of inclusive policies to mitigate the gaps detected.

The results obtained confirm that digital management has become a fundamental pillar for administrative efficiency and transparency in Ecuador's Decentralized Autonomous Governments, albeit with uneven development. The finding that only 20% of GADs achieve full transactional capacity shows that digitization, far from being homogeneous, is conditioned by structural factors, mainly the budget. This direct correlation between financial capacity and digital maturity coincides with the statements of Miranda, Tingo, Zamora, and Zamora (2025), who point out that available resources are the driving force behind technological innovation in local governments. The urban-rural gap identified also confirms the findings of Muñoz (2023), who emphasizes that the lack of technological infrastructure limits the possibility of consolidating inclusive digital government in more remote areas.

With regard to transparency, the average compliance rate of 82% with the mandatory items of the LOTAIP shows that Ecuadorian GADs prioritize the publication of

financial information, while neglecting procedural documentation. This bias reinforces the criticism of Hevia (2022), who warns that transparency in the region is often limited to what is legally required, leaving aside the substantive openness that empowers citizens to exercise social control. Similarly, Ramírez-Alujas (2012) argues that the modernization of public management must go beyond formalism and move toward proactive transparency practices. In this sense, although the results reveal significant progress in regulatory compliance, they also highlight the persistence of gaps in accountability.

With regard to efficiency, empirical data show that digitization generates tangible improvements in response times, administrative costs, and levels of citizen satisfaction. The 77% reduction in processing times and the 2.3-point increase in satisfaction corroborate the findings of Gil-García, Dawes, and Pardo (2017), who highlight that ICTs optimize processes and strengthen institutional legitimacy. Likewise, the increase in institutional productivity is in line with the findings of Huamán and Medina (2022) in the Peruvian case, where digitalization is presented as an effective way to respond to citizen demands for quality. However, as Friedmann (2004) argues, administrative efficiency must be understood beyond cost and time metrics, integrating its effect on democratic governance and social trust.

The discussion of the findings allows us to affirm that, although digital management in Ecuador's GADs has generated visible advances in efficiency and formal compliance with transparency, it still faces challenges related to territorial equity, institutional sustainability, and the need to develop technical capacities. These challenges require comprehensive public policies that overcome current limitations and transform digitization into a true engine of inclusive and reliable governance.

CONCLUSIONS

The analysis carried out allows us to conclude that digital management is a strategic axis in the modernization of Ecuador's Decentralized Autonomous Governments, as it enhances administrative efficiency and promotes transparency practices, although its implementation presents marked inequalities. Empirical evidence shows that, although all GADs have managed to establish at least a basic digital presence, only a minority have reached transactional levels that allow them to offer comprehensive online services. This finding confirms that financial capacity is a determining factor in the degree of digital maturity, creating a structural gap between urban local governments with greater resources and rural ones with budgetary and technological limitations.

In terms of efficiency, digitization showed concrete benefits by significantly reducing processing times and administrative costs and increasing citizen satisfaction. These results show that digital platforms not only optimize internal processes but also improve citizens' perception of the quality of public services, which reinforces institutional legitimacy. However, these benefits are not universal, as they depend on

the level of digital development achieved by each GAD, which requires a rethinking of strategies to extend these advantages to the entire country.

In the area of transparency, the GADs have shown high compliance with the LOTAIP in financial and planning aspects, although the publication of procedural information remains limited. This situation suggests that transparency is conceived, in many cases, as an exercise in formal compliance rather than as a substantive practice of openness that guarantees effective social control. Consequently, it is necessary to evolve towards open government models that prioritize the usability, accessibility, and proactivity of information.

The research allows us to affirm that the success of digital management does not depend solely on the implementation of technology, but also on the existence of comprehensive policies that strengthen technological infrastructure, promote digital literacy, and consolidate technical capacities in public management and digital teams. Similarly, it is necessary to overcome institutional resistance to change by generating an organizational culture oriented toward innovation and accountability.

In short, digital management has the potential to transform local governments in Ecuador, but its consolidation requires overcoming the financial, technological, and social gaps that currently limit its scope. Only through inclusive governance strategies that combine investment, training, and political will will it be possible to move toward a digital government model that fully embodies the principles of efficiency, transparency, and closeness to citizens, as established by the country's current constitutional framework of decentralization and participatory democracy.

REFERENCES

- Ayala-Becerra, O. I., Gavilanes-Erazo, H. R., & Alvear-Calderón, M. J. (2024). Analysis of the autonomy of municipal GADs and their relationship with the principle of decentralization established in the constitution. *MQRInvestigar*, 8(4), 6796-6830. <https://doi.org/10.56048/MQR20225.8.4.2024.6796-6830>
- Hevia, F. J. (2022). Open government and education in Latin America and the Caribbean. *Sociological studies*, 40(118), 85-121. <http://orcid.org/0000-0002-4424-5320>
- Huamán Coronel, P. L., & Medina Sotelo, C. G. (2022). Digital transformation in public administration: challenges for active governance in Peru. *Comuni@cción*, 13(2), 93-105. <http://dx.doi.org/10.33595/2226-1478.13.2.594>
- Gil-Garcia, J. R., Dawes, S. S., & Pardo, T. A. (2017). Digital government and public management research: finding the crossroads. *Public Management Review*, 20(5), 633-646. <https://doi.org/10.1080/14719037.2017.1327181>
- Friedmann, R. (2004). Public Management in the 21st Century. Anticipating the changes to come. *Social Studies (Chile)*, 11-56.

- Muñoz Navas, E. K. (2023). The digital divide and its impact on the work performance of decentralized autonomous government officials in the canton of El Empalme, 2023. <https://repositorio.uteq.edu.ec/handle/43000/7396>
- Miranda Muñoz, D. J., Tingo Macías M.A., Zamora Mendoza, C. A., & Zamora Mayorga, D. J. (2025). Impact of e-government on the efficiency and transparency of public management. *Revista Veritas de Difusão Científica*, 6(1), 659-682. <https://doi.org/10.61616/rvdc.v6i1.426>
- OECD. (2019). *Digital Government Review of Argentina: Accelerating the Digitalization of the Public Sector*. OECD Publishing.
- Ramirez-Alujas, Alvaro V., *Open Government and Modernization of Public Management: Current Trends and the (Inevitable) Way Forward - Seminal Reflections* (January 3, 2012). *Enfoques Magazine: Political Science and Public Administration*, Vol. IX, No. 15, pp. 99-125, 2011, Available at SSRN: <https://ssrn.com/abstract=1979133>
- Pérez, E. (2002). The notion of administrative act in Ecuadorian public law. *Iuris Dictio*, 3(5). <https://doi.org/10.18272/iu.v3i5.569>