**Municipality digitalisation and local engagement: The case of Chile**

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**Abstract**

[Acá falta un buen marco teorico] ]This paper analyses the elements and contextual factors related to the digitalisation of local governments and examines the impacts of municipal digitalisation on political engagement—both attitudinal and behavioural. Our findings are twofold. First, at the national level, considering 343 local administrations, the results suggest that population size, rurality, municipal income, and professional workforce are associated with the level of digitalisation in each municipality, though these relationships vary by region. In southern Chile, population size and municipal income appear more influential, whereas in central Chile, income and workforce factors play a greater role. Second, based on 9,924 face-to-face cases collected in Chile’s Valparaíso region from 2018 to 2024, results indicate that living in a digitalised municipality is positively and meaningfully related not only to the likelihood of using digital services but also to the belief that the Internet empowers citizens politically. On the other hand, living in a municipality with a wealthy local government shows an opposite relationship, suggesting that it is not necessarily the budget but rather the efforts toward digitalisation that are crucial for enhancing local engagement. These findings provide additional evidence to better understand the role of local government digitalisation in citizen engagement, shedding light on potential causes and direct consequences of spatial digital inequalities.

**Keywords:** local governments; digital inequalities; democratisation; civic engagement; online participation

**INTRODUCTION**

One of the key challenges for both emerging and established democracies is the modernisation of local governments, with digitalisation as a central component. Digitalisation has the potential not only to streamline processes and improve efficiency but also to make the state more accessible to individuals, thereby fostering higher levels of civic engagement. Therefore, digitalisation holds particular significance for spatial inclusion, considering the growing evidence that residents of left-behind areas are more likely to experience heightened political disengagement and negative sentiments towards politics and its processes (De Ruyter et al., 2021).

Chile, our case study, is no exception, especially given the pronounced centralism and concentration that has long shaped the state, resulting in unequal citizen experiences depending on geographic location (OECD, 2017). Within this context, digitalisation has become a priority for policymakers (OECD, 2020); however, its broader consequences are not always fully appreciated.

This paper has a dual objective. First, it seeks to identify the factors that may explain the digitalisation of local governments. Second, it examines, at an individual level, the relationships between these digitalisation processes and political engagement, in terms of attitudes and behaviours.

To achieve these objectives, we use official data from the Chilean government and the Digital Municipal Index, recently developed by the Millennium Nucleus of Inequalities and Digital Opportunities (NUDOS). Additionally, to analyse the phenomenon at the individual level, we draw on survey data from 9,924 face-to-face survey interviews conducted by Fundación P!ensa in the Valparaíso region of Chile.

Since the beginning of the “electronic revolution,” the Internet was envisioned as a tool to transcend physical boundaries and foster the inclusion of politically marginalised areas. Over time, however, the reinforcement thesis—suggesting that offline inequalities are simply replicated online—has gained traction. The results of this study offer pathways for achieving greater inclusion in the digital age. By making the state more accessible and fostering greater civic engagement, digitalisation has the potential to bridge these gaps and address the disparities faced by marginalised communities.

1. **Theoretical background** 
   1. **Discontent, Local Government and Online Political Engagement**

Over the last decade, scholars have argued that there are places that have been left behind, where inhabitants experience feelings of anger, frustration, or abandonment due to their economic decline (Dijkstra et al., 2020; McCann, 2020; Rodríguez-Pose, 2018; Rodríguez-Pose et al., 2024), as well as political or cultural marginalization (Cramer, 2012; Fierro et al., 2024). This issue extends beyond individual experiences to include contextual factors that may also explain the rise of populism, anti-elitism, and nationalism in both consolidated and emerging democracies (Essletzbichler & Forcher, 2022; Faggian et al., 2021; Ziblatt et al., 2023). In this context, a critical question emerges: How can marginalised territories—and their inhabitants—be effectively included in political processes?

Since the onset of the digital revolution, some scholars have argued that the Internet would progressively diminish the relevance of users' physical location (Cairncross, 1997). This led to the proposition that the public sphere could become deterritorialised, resulting in a redistribution of power (Kneuer & Datts, 2020). Within this framework, the Internet was implicitly seen as a tool to integrate excluded territories. However, this optimism faced criticism early on. As Gillespie and Robins (1989) have argued since the creation of the World Wide Web, “new communications technologies do not just impact places; places, and the social processes and social relationships they embody, also shape how such technological systems are designed, implemented, and used” (Gillespie & Robins, 1989, p. 7). This idea has been further supported by more recent research, which demonstrates that information and digital participation remain spatially bound, with certain citizens—and places—exerting control over others. (Graham et al., 2018). Moreover, studies have argued that many platforms do not create new digital spaces but merely replicate the power dynamics embedded in existing physical spaces in the online realm (Stephens & Poorthuis, 2015; Takhteyev et al., 2012), This aligns with earlier assertions that, rather than merely shrinking spatial distances, new communication technologies may establish new forms—or reinforce existing forms—of geographical inequality and uneven development (Gillespie & Robins, 1989). And so, during the last decades it has been shown that spatial dynamics influence not only access (Sylvester & McGlynn, 2009) but also the types of connections formed (Mossberger et al., 2012) and the specific digital interactions people engage in (Agarwal et al., 2009).

These debates on the relationship between the Internet and local engagement have extended into the realm of public administration, particularly concerning the activities of local governments. With the increasing need—or inevitability—of digitalising local governments (Gasco Hernandez, 2024), scholars have explored how the Internet influences the civic development of local communities. For instance, in Spain, Haro-de-Rosario et al. (2016) found that online transparency, interactivity, and local governments' activity on social media are key drivers of citizen engagement. Similarly, in Greece, Lappas et al. (2022) highlighted the importance of dialogic approaches and the promotion of offline activities through social media platforms in fostering online citizen engagement.

However, not all research focuses on authorities' activities on social media; some studies examine the role of official municipal platforms. Torpe and Nielsen (2004), for instance, analysed 275 municipal websites in Denmark, concluding that there is substantial heterogeneity in performance, with some authorities demonstrating superior practices in terms of transparency and dialogue promotion. Understanding the causes and consequences of these differences remains an important area of inquiry. To address this gap and considering the lack of consensus on this topic, this study proposes the following research questions:

**RQ1:** What contextual factors explain variations in digital performance across municipalities?

**RQ:** What is the relationship between the digital performance of local governments and the political engagement of their inhabitants?

[Acá hay que reconsiderar si lo major es tener preguntas amplias como estas. Quizás podríamos extender la interpretación algunas contribuciones previas al nivel individual, sugiriendo que las comunas más grandes y ricas tendrían (1) mayores niveles de digitalización y (2) habitantes con mayor participación/engagement online]

* 1. **Digital Inequalities in Civic Engagement**

[Acá hay algunas ideas] ]Most of the literature on digital inequalities has focussed on systematic inequalities between socio-economic (e.g. income, education, class) and socio-cultural (e.g. gender, age, ethnicity) groups in their access to infrastructure, devices and connectivity (Correa, etc) and in their digital skills (Van Deursen, Van Dijk, Hargittai). This research shows that groups that have been historically disadvantaged also tend to be disadvantaged in the digital realm, in ways that reflect and, therefore, amplify inequalities in societal participation (Helsper, 2021; Van Dijk, 2020; Ragnedda; Robinson). Research into digital inequalities between geographical areas rather than social groups is still in its infancy. Though studies by Graham and by Mossberger show that. This research is mostly focussed on the first level of digital divide (infrastructure, access, connectivity) because this is the data that is most readily available for smaller areas. There is research done in the US, Europe and China but for the rest of the world there is next to no per reviewed academic research on regional inequalities in this area. Because this research is focussed on infrastructure and access the explanations for inequalities are often sought in the economic resources of these areas, with poorer areas receiving government support to lay down pipes and broadband and richer areas having the kind of well-educated and wealthy population that can afford and demands high levels of connectivity (Mossberger).

There has been less research into how these inequalities are reflected in use of egov services or civic participation online. The research that is out there suggests that those who are less likely to engage with government offline are less likely to have quality access and digital skills but when they do acquire these they are actually more likely to participate digitally (Helsper, 2021; Dodel, others). The explanation for this might be that there is less accessibility to these services in areas where they live and that they are higher users of government services than those who are better off historically and in terms of digital access and skills.

However, there is also evidence that the outcomes these individuals obtain from using these services is of lesser quality, they are more frustrated and less satisfied with the results, than for those who are in a more privileged position in society.

* 1. **Case Study: Chile**

1. **METHODS**

All data considered in this study is publicly available.

* 1. **Municipal-Level Data**

First, municipal-level data was considered, covering the 343 mainland municipalities of Chile (excluding Juan Fernández and Easter Island).

* 1. **Municipal-Level Variables**

***Digital Municipality Index.*** The level of digitalization was measured using the Digital Municipality Index, developed by the Millennium Nucleus of Inequalities and Digital Opportunities (NUDOS). The index is based on 34 potential services offered by municipal websites. These 34 services were grouped into two categories: “Payments, procedures, and online services,” which includes 13 activities, and “Information and transparency,” which includes 21 activities (see Figure 1).

**Figure 1** Map of Digital Municipality Index

A map of chile with different colors

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Own elaboration with data publicly available at https://indice.nudos.cl/

***Population.*** The population was measured as the projected number of people living in each municipality in 2023, expressed in log terms. The data comes from the National Municipal Information System (SINIM).

***Municipal Income.*** Municipal income was measured as own-source revenues, meaning the income generated independently by each municipality, expresed in log terms. The data comes from the National Municipal Information System (SINIM).

***Rurality.*** Rurality was measured as the percentage of the population living in rural areas within each municipality in 2023. This data was also obtained from the National Municipal Information System (SINIM).

***Qualified Municipal Workforce.*** To capture the professional resources of each municipality, the number of employees with a university degree was considered, expressed in log terms. The data comes from the National Municipal Information System (SINIM).

* 1. **Individual-Level Data**

Secondly, we use data from the Political Opinion Survey (EOP), developed by Fundación P!ensa and conducted with IPSOS and Datavoz-STATCOM. This paper considers seven iterations of the survey from 2018 to 2024, encompassing 9,924 face-to-face interviews conducted in the ten largest cities in the Valparaíso region of Chile. The survey employs a probabilistic, non-proportional design with a three-stage random sampling method (by block, household, and individual), targeting men and women aged 18 and older.

* 1. **Individual-Level Variables**

***Online Political Efficacy.*** To measure online political efficacy, we follow the approach proposed by Sasaki (2016, 2017), asking respondents to indicate their agreement with the following statements:

1. Using the internet, people like me have more political power (ope1).
2. Using the internet, I can have a greater voice regarding what the government does (ope2).
3. Using the internet, it is easier for me to understand politics (ope3).
4. Using the internet, public officials are more concerned about what I think (ope4).

Each of these questions was measured on a 5-point Likert scale, where 1 indicated strong disagreement and 5 indicated strong agreement.

***Awareness and Use of Municipal Website.*** To measure specific uses of the official local government website, respondents were asked to indicate their agreement with the following statements:

1. I am aware of the existence of the municipal website (know\_web).
2. I have used the municipal website to complete administrative procedures and/or make service payments (use\_adm).
3. I have used the municipal website to seek information from the municipality (use\_info).
4. I have used the municipal website to request transparency information (use\_transp).
5. I have used the municipal website for other purposes (use\_other).

Each of these questions was measured as a dummy variable, coded as 1 for “yes” and 0 otherwise.

***Living in a Digitalized Municipality.*** To examine contextual factors that may influence our variables of interest, we included a variable to determine whether individuals live in a highly or minimally digitalised municipality. Specifically, the value of the Digital Municipality Index (measured at the municipal level) was assigned to individuals based on their place of residence. To prevent misinterpretations and ecological fallacies, it is essential to clarify that this variable represents an individual-level attribute: living in a municipality with a strong digital services offering.

***Living in a Wealthy Municipality.*** Additionally, we considered the impact of residing in a wealthy municipality. This was measured by assigning the Municipal Income level to individuals based on their municipality of residence. Similar to the previous variable, it is important to emphasise that this measure does not reflect individual income (as we have a separate socioeconomic variable described in the following sections); rather, it captures only the effect of living in a municipality classified as affluent or economically disadvantaged.

***Political Interest:*** Political interest was measured using a self-reported approach. Specifically, all respondents were asked how interested they were in the following areas:

1. Politics
2. Issues happening in the world
3. Issues happening in the country
4. Issues happening in their region
5. Issues happening in their neighbourhood

Each question was measured on a 4-point Likert scale, where 1 indicated 'no interest' and 4 indicated 'strong interest.' Using confirmatory factor analysis (CFA), a factor for political interest was constructed from these responses (Cronbach's alpha: 0.86).

***Control Variables***. Various sociodemographic variables were included as control variables, such as age, education, gender, and socioeconomic status.

* 1. **Analysis**

**[TO DEVELOP]**

1. **RESULTS**
   1. **National analysis at the municipal level**

First, the analyses focused on the national context, using aggregated data at the municipal level. Starting with a descriptive approach (see Figure 2) to examine the Digital Municipality Index, we observe an apparent relationship between population size, rurality, income, and workforce professionalisation in each municipality. The distribution of the index shows that more urban, densely populated municipalities with a more qualified workforce tend to score higher. However, an inferential approach provides a slightly different perspective. While municipal income appears to be the most important factor explaining a higher digitalisation index, rurality and the formal qualifications of the municipal workforce do not have significant coefficients. Population, though close to significance, also plays a role. Thus, the results suggest that the most populated and wealthiest municipalities tend to offer more digital services to their residents (see Table 1).

**Figure 2.** Dispersion diagram of the Digital Municipality Index, considering population, rurality, municipal income and qualified municipal workforce.

**A blue and yellow dotted graph

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Source: Own elaboration with data from SINIM and the Digital Municipality Index publicly available in https://indice.nudos.cl/

**Table 1** OLS for Digital Municipality Index at the municipal level

|  |  |
| --- | --- |
|  | **Coef.** |
| Population (log) | 0.016† |
|  | (0.009) |
| Rural Population (%) | 0.003 |
|  | (0.025) |
| Municipal Income (log) | 0.03\*\*\* |
|  | (0.007) |
| Qualified Municipal Workforce (log) | 0.015 |
|  | (0.011) |

Note: Std. err. In (). p-value < ,1 †; p-value < 0,05 \*; p-value < 0,005 \*\*; p-value < 0,001 \*\*\*.

Moreover, in the context of a highly centralised country, these results vary when analysing different regions separately. In southern Chile, population size and municipal income appear to be more influential, whereas in central Chile, income and workforce factors play a greater role (see Figure 3).

**Figure 3.** OLS for Digital Municipality Index at the municipal level (central, southern and northern Chile)

**A diagram of a model

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Note: In the figure are presented the coefficients with the confidence interval at the 90%. The big circle indicates a significance with a p-value < 0.1.

* 1. **Local analysis at the individual level**

Secondly, the specific case of the Valparaíso region in Chile was analysed using individual-level data. In this context, the aim was to test whether municipal digitalisation affects online political engagement by examining both attitudinal and behavioural components. The attitudinal component presents a complex picture (see Table 2). Living in a digitalised municipality does not appear to impact online political efficacy—defined as individuals' beliefs that the internet empowers citizens politically. However, the other contextual factor, living in a wealthy municipality, shows a negative and significant relationship with these attitudes. In other words, individuals in marginalised areas with poorer municipalities tend to view the Internet as a valuable tool for enhancing their political voice.

**Table 2** OLS for Online Political Efficacy at the Individual Level

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **OPE (Factor)** | **ope1** | **ope2** | **ope3** | **ope4** |
| ***Contextual dimension*** |  |  |  |  |  |
| Living in a digitalised municipality | 0.159 | 0.366\* | 0.153 | 0.195 | -0.019 |
|  | (0.119) | (0.168) | (0.173) | (0.167) | (0.162) |
| Living in a Wealthy Municipality | -0.026\* | -0.023 | -0.027 | -0.041\* | -0.041\* |
|  | (0.012) | (0.018) | (0.018) | (0.018) | (0.017) |
| ***Attitudes*** |  |  |  |  |  |
| Political Interest | 0.39\*\*\* | 0.422\*\*\* | 0.501\*\*\* | 0.516\*\*\* | 0.369\*\*\* |
|  | (0.019) | (0.028) | (0.028) | (0.025) | (0.027) |
| ***Sociodemographic*** |  |  |  |  |  |
| Sex | -0.122\*\*\* | -0.025\*\*\* | -0.155\*\*\* | -0.16\*\*\* | -0.097\*\*\* |
|  | (0.018) | (0.025) | (0.026) | (0.025) | (0.024) |
| Age | -0.005\*\*\* | -0.001\*\*\* | -0.007\*\*\* | -0.014\*\*\* | 0 |
|  | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Socioeconomic Status | 0.034\*\* | 0.022\*\* | 0.035\* | 0.043\* | 0.046\*\* |
|  | (0.012) | (0.017) | (0.017) | (0.017) | (0.016) |
| Education | 0.018\*\*\* | 0.007\*\* | 0.021\*\* | 0.037\*\*\* | -0.006 |
|  | (0.005) | (0.008) | (0.008) | (0.008) | (0.007) |

Note: Std. err. In (). p-value < ,1 †; p-value < 0,05 \*; p-value < 0,005 \*\*; p-value < 0,001 \*\*\*.

Interestingly, the influence of a digitalised municipality changes when analysing specific measures of online political efficacy. Specifically, results indicate that the digitalisation of local government has a positive and significant relationship with OPE1, or the belief that "by using the internet, people like me have more political power."

Regarding the behavioural dimension of online local participation, the results are consistent and robust (see Table 3). Living in a digitalised municipality has a positive and significant relationship with all measures of awareness and use of the official municipal website, a pattern not observed for residents of wealthy municipalities. In fact, while the relationship with living in a wealthy municipality is significant, it is in the opposite direction. In other words, the results suggest that it is not necessarily the budget but rather the efforts toward digitalisation that are crucial for enhancing local engagement.

**Table 3.** Logit-Probit regression for Municipality Webpage use at the Individual Level

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **know\_web** | **use\_adm** | **use\_info** | **use\_transp** | **use\_other** |
| ***Contextual dimension*** |  |  |  |  |  |
| Living in a digitalised municipality | 2.057\*\*\* | 2.083\*\*\* | 1.852\*\*\* | 1.069\* | 3.214\*\*\* |
|  | (0.331) | (0.37) | (0.345) | (0.457) | (0.482) |
| Living in a Wealthy Municipality | -0.258\*\*\* | -0.206\*\*\* | -0.237\*\*\* | -0.242\*\*\* | -0.398\*\*\* |
|  | (0.035) | (0.038) | (0.036) | (0.049) | (0.051) |
| ***Attitudes*** |  |  |  |  |  |
| Political Interest | 0.752\*\*\* | 0.672\*\*\* | 0.861\*\*\* | 0.99\*\*\* | 0.869\*\*\* |
|  | (0.057) | (0.029) | (0.061) | (0.085) | (0.086) |
| Online Political Efficacy (ope1) | 0.029 | -0.035 | -0.025 | 0.059\* | 0.069\* |
|  | (0.021) | (0.023) | (0.021) | (0.028) | (0.029) |
| ***Sociodemographic*** |  |  |  |  |  |
| Sex | 0.17\*\*\* | -0.076 | 0.231\*\*\* | 0.147\* | 0.143\* |
|  | (0.049) | (0.054) | (0.051) | (0.068) | 0.069) |
| Age | -0.021\*\*\* | -0.014\*\*\* | -0.019\*\*\* | -0.02\*\*\* | -0.017\*\*\* |
|  | (0.001) | (0.002) | (0.002) | (0.002) | (0.002) |
| Socioeconomic Status | 0.067\* | 0.061† | 0.02 | -0.046 | -0.004 |
|  | (0.032) | (0.035) | (0.033) | (0.043) | (0.044) |
| Education | 0.278\*\*\* | 0.248\*\*\* | 0.256\*\*\* | 0.157\*\*\* | 0.213\*\*\* |
|  | (0.015) | (0.017) | (0.016) | (0.021) | (0.021) |

Note: Std. err. In (). p-value < ,1 †; p-value < 0,05 \*; p-value < 0,005 \*\*; p-value < 0,001 \*\*\*.

1. **DISCUSSION**

[The results are consistent with previous literature. Marginalised areas—those with poorer municipalities—tend to view the Internet as a useful tool and are more likely to engage. At the same time, municipal digitalisation significantly impacts this engagement, which goes beyond simply requesting documents and completing administrative tasks to include accountability and accessing municipal information. It’s not about wealthy municipalities but rather about those that make an effort to digitalise.]

1. **CONCLUSION**

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**APPENDIX**