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## The Effect of Bureaucratic Digitalization on Administrative Burdens and Access to Public Services among Marginalized Communities in Makassar City

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### ABSTRACT

This study examines the effects of bureaucratic digitalization on administrative burdens and access to public services among marginalized communities in Makassar City, Indonesia. While digital technologies are promoted to improve service efficiency, transparency, and accessibility, digitalization may also introduce new administrative challenges, especially for vulnerable groups. This research adopts a quantitative correlational design with structured questionnaires administered to 200 citizens and 50 public servants who have direct experience with digitalized public services. Data were analyzed using multiple linear regression, confirming that digitalization has a positive and significant impact on access to public services ( $B = 0.416$ ,  $p < 0.001$ ), indicating that digital systems enhance service availability. However, the analysis also reveals that digitalization increases administrative burdens ( $B = 0.174$ ,  $p = 0.007$ ), suggesting that marginalized communities face greater learning, compliance, and psychological costs. Multivariate analysis further supports that digitalization simultaneously affects both administrative burdens and service access. These findings highlight the dual nature of digital governance, where improvements in access may coincide with heightened administrative challenges. The study emphasizes the importance of inclusive digital design, adequate user support, and hybrid service models to ensure that bureaucratic digitalization benefits all citizens, particularly marginalized groups.

#### *Keyword:*

Bureaucratic Digitalization,  
Administrative Burdens,  
Access to Public Services,  
Marginalized Communities,  
Digital Governance

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## INTRODUCTION

Public administration replaces the means by which public services are delivered from state to citizen. Bureaucratic systems are assumed to deliver efficiency and accountability in modern governance, including equitable access (provision) of services by all social groups. Traditional bureaucratic procedures have been criticized for making complex rules, long processes and burdensome administrative requirements which can be difficult particularly for disadvantaged groups who often lack resources, information or institutional support (Herd & Moynihan 2018). In response, many governments (including Indonesia) have turned to bureaucratic digitalization as a reform strategy. Digitalisation, the process of embedding ICT in administrative processes with a goal to increasing efficiency, transparency and availability actually (Rose et al., 2015; Lindgren et al., 2019). The implementation of e-government is also expected to positively influence the good governance (Maulana et al., 2020).

Although digitalization is said to simplify, take away paperwork and push down transaction costs in various processes of governance or service delivery context it increases the amount of ownership users have on their own administrative process meaning a bigger reliance than ever before needed by citizens. This transition may raise additional types of administrative burdens, especially for people with low digital skills or literacy and other socio-economic challenges (Heggertveit et al., 2022; C. Ø. Madsen et al., 2022). Administrative burdens remain a key area of study, especially in the scale and scope at which bureaucratic digitalisation takes place. Learning costs are related to knowing procedures; compliance costs have the paperwork aspects (Burden et al., 2012) whilst psychological cost is caused by stress or stigma (Moynihan et al., 2015). If digital platforms are not inclusive by design, these burdens may grow for marginalised groups (Giest & Samuels 2023).

In addition, digitalization can change the way citizens access public services as it allows for interaction between authorities and users via online platforms which could increase availability of service but at the same time exclude those without digital infrastructure or knowledge to be (Safarov, 2024). This paradox becomes especially strong in urban marginal communities, e.g. Makassar City that still have limited digital literacy and unstable internet access. This opens the door to developing economies in the Global South, for example Indonesia which is partly missing from many of these studies that are often dominated by European welfare states with problems they may not face. This study seeks to fill this gap by exploring the dual implications of bureaucratic digitalization on administrative burdens and access as part of public services in Makassar, a city that deals with unique infrastructural and socio-economic challenges.

One important product of bureaucratic processes is administrative burden, the learning, compliance, and psychological costs that individuals face when engaging with public policies and services (Burden et al., 2012; Moynihan et al., 2015). These include learning costs (the effort needed to comprehend rules and procedures), compliance costs (the formal requirements for documenting that actions conform to standards and practices), and psychological costs (stress, stigma, the loss of autonomy). Hence, this underlines the need for understanding how technology can decrease administrative burden but may also create new or more serious burdens depending on whether the groups people belong to are those with limited digital skills, low literacy or resource-fixed socio-economic conditions (Heggertveit et al., 2022; C. Ø. Madsen et al., 2022). Within the framework of bureaucratic digitalisation, the introduction and use of information and communication technologies (ICT) in public administration seeks to optimize efficiency and accessibility of government services. These include many digital tools and processes aimed at streamlining bureaucratic procedures, lowering administrative burdens, and improving service provision (C. Ø. Madsen

et al., 2022; Peeters, 2023). Even though the digitalisation of services is anticipated to reduce time and cost for citizens, improve data management, and strengthen communications between citizens and governmental institutions (Lah & Kotnik, 2024), it also poses a risk of magnifying problems. Despite how processes can be simplified by digitalisation, it could exacerbate the administrative burden of some groups (Giest & Samuels, 2023; C. Ø. Madsen & Hjelholt, 2024), such as those experiencing marginalisation due to factors that limit their access to or use of technology (e.g., digital illiteracy). It should be noted, however, that new challenges also arise with digitalisation, which can unintentionally exacerbate inequalities in public service access if precaution is not taken.

This brings us to the complex and ambivalent relationship between bureaucratic digitalisation and administrative burdens. In one sense, digital systems can ease processes through automation, data integration and pre-filled forms—thereby potentially decreasing learning as well as compliance cost (Kalucza & Sievert, 2024). Yet digital-by-default practices can also be a transferring of the burden on citizens to engage with new ways of working, including learning how to use unfamiliar digital interfaces properly, dealing responsively with technical failures and opaque decision-making processes, which can subject citizens to higher psychological stress from potential exclusion (Giest & Samuels 2023). These impacts are not shared equally within society, and often disproportionately hit marginalised groups. Administrative burdens are the costs and effort that people face while seeking bureaucratic help and can encompass learning, compliance, and psychological costs (Moynihan et al., 2015; Herd & Moynihan, 2018). This burden appears in terms of the time, effort and mental bandwidth that citizens expend to decipher what the government wants from them — tasks like filling out forms or collecting documents needed to comply with a regulation. While this can benefit both citizens and governments, since the goal of many governments is to reduce these burdens for improved efficiency in service provision, marginalised groups such as low-income individuals or immigrants struggle (C. Ø. Madsen et al., 2022; Peeters, 2023). Although digitalisation of public services is often advertised as a means to simplify these processes, it can unintentionally lead to additional burdens due to the inclusion of technological barriers or complicating access for more vulnerable groups through less inclusive systems (Lah & Kotnik, 2024). So the digital transformation of public services holds great promise in efficiency but also raises the danger of it becoming another burden we foist on those who are already least able to bear such a burden.

**Access to Public Services:** The capacity of citizens to obtain, use and benefit from government services in a timely, equitable and efficient manner. The concept extends beyond simple eligibility to include usability, availability, and ability to navigate the often-complex administrative systems surrounding service access (C. Ø. Madsen & Hjelholt, 2024). The digitalisation of public services has changed the way in which access is provided, enabling citizens to access government institutions via digital platforms thus also increasing efficient and reducing geographical boundaries (Mina-Raiu & Melenciuc, 2022). But the connection between bureaucratic digitalisation and public service access is especially important for disadvantaged people. Digital platforms can widen the provision of services to certain citizens while simultaneously barring others from access, either because they lack devices or insufficient connectivity (Gillingham, 2015), or they may not exercise the administrative literacy required for successfully navigating a digital system (Safarov, 2024). Digitalisation may unintentionally strengthen widespread disparities in social structure and produce novel iterations of administrative closure. Empirical research shows that social inequalities resulting from income status, education level, language skills, and ability to utilize information brought about by the digital divide are significant (Safarov 2024). Digitalisation

is thus both a solution for improving service availability, and a dilemma, opening up service access for the skilled and resourceful whilst excluding those who lack relevant skills, knowledge or other resources making them more social vulnerable groups (Lindgren et al., 2019).

This challenges are very appropriate with the social problems that is experienced by marginalized communities in Makassar City, Indonesia. Makassar, as an expanding city center, has quite largely embraced digital governance programs for the public administration apparatus in order to upgrade its services. Still, entire demographic segments within many countries remain structurally disadvantaged low income households, informal workers and migrants, even more crowded urban settlements often a law unto themselves face barriers to accessing digital services that include limited digital literacy (or none), unstable internet access and not being familiar with bureaucratic workings. Under these conditions, concerns are that instead of relieving burdens, bureaucratic digitalization has increased the administrative burden and led to restriction of marginalized groups access to essential public services.

The existing literature on digitalisation and administrative burden mainly focuses on developed world, European welfare states investigating in what ways social assistance systems could be offered or how the overall process of claiming benefits could be streamlined with the help of digital solutions (e.g. Heggertveit et al., 2022; Kalucza & Sievert, 2024; Safarov, 2024). Although the studies provide useful theoretical and empirical contributions on the relationship between digital public services and administrative burdens, especially in developed countries with mature institutional capacity and more advanced digital infrastructures, their findings might not be directly relevant for developing or middle income countries; They also often have hugely varying institutional capacities, digital infrastructures and access to technology among these countries or regions. Consequently, there is a clear void in the literature regarding the effects of digitalisation that we do observe these phenomena with administrative burdens and access to public services on a general level at city level especially within economically challenged contexts in the Global South. Most of the existing research focuses at the national level. It misses the distinctive features of urban communities in developing economies, where socioeconomic disparities remain huge.

The absence of empirical research on the experience and impacts of bureaucratic digitalisation in urban marginalised communities education, health or social assistance burdens; access to public services etc. creates a gap that urgently requires filling, especially in Global South cities like Makassar. Although digital public services are widely perceived to facilitate efficiency and access, their effectiveness can also be highly context-sensitive, depending on the degree of socio economic determinants and infrastructural conditions. The existing studies rarely combine both outcomes and administrative burdens or service access into the same analytical framework area despite the clear interconnections between these factors shaping citizens' experience with government services. Furthermore, the day-to-day experiences of disadvantaged citizens during the digital transformation are frequently overlooked. Not capturing these experiences presents a distorted sense of how digitalisation is impacting on the wider population and especially those most at risk.

The originality of this research comes from the combined investigation of bureaucratic digitalisation as an exposé on two levels amongst urban population in a given sub national context—central/administrative burden and accessibility to public services. Focusing on the experiences of marginalised communities within Makassar, this study provides contextual evidence that contributes to GPT and further develops these theories beyond the Western dominant settings in which they prevail. This method is important for comprehending how

the of digitalisation in cities with different institutional capacities comes down to citizen-level impacts. While previous decision-making design and delivery methods dominate in developed economies, such approaches did not have the same level of resources or capabilities in developing environments.

Digital public services are surging ahead and the policy priority of using a digital-by-default governance approach in Indonesia only increases this urgency to conduct this research. Without adequate understanding about how digitalisation affects citizens and their interactions with administration, one could argue that a poorly developed service delivery reform might lead to greater social exclusion. However, with the increasing embedding of digital public services, there is also growing potential for marginalisation to be entrenching rather than alleviated. This research explores how far bureaucratic digitalisation eases or exacerbates administrative burdens, and in what way these alterations affect marginalised groups access to public services in Makassar. In this research, we suggest that addressing these concerns can assist in the design of more inclusive digital governance strategies aimed at reducing exclusion risks and ultimately maximising the potential for digital reforms to be beneficial for all citizens, especially the most vulnerable.

## METHODS

This study used a quantitative research method with correlational design so it is to analyze the effect of bureaucratic digitalization on administrative burdens and access to public services in marginalized communities in Makassar City, Indonesia. Indeed, a quantitative approach is appropriate due to the fact that it provides a systematic way of measuring relationships between variables and checking statistically the proposed hypotheses.

### Population and Sampling Technique

The population of this study consists of two main groups:

1. Citizens who use digitalized public services in Makassar City, particularly those belonging to marginalized communities.
2. Public servants who are directly involved in the implementation and management of digital public service systems.

This study employs purposive sampling because not all members of the population have experience using digital public services. As for citizen respondents, our inclusion criteria were: (a) living in Makassar City; (b) being part of a marginalized group such as low income household, informal sector worker or slum area dweller; and (c) Having used digital public services before either population administration, licensing or social assistance platform. Public servants were chosen because they worked directly for the agency responsible for planning, operating, or delivering public services to be digitized.

Sample size was calculated applying Cochran's formula for large populations with 95% confidence level and a margin of error being 5%. According to this calculation, a total of 250 respondents are selected for the study consisting of 200 civilians and 50 government officials. This amount of data is considered a large enough sample size to ensure the representativeness and be able to perform inferential statistical analysis.

### Data Collection Procedures

To examine the research questions, primary data were collected using a structured questionnaire which is based on the proposed theoretical framework of bureaucratic digitalization, administrative burden and access to public services. The questionnaires were

offline (face to face) at selected public service offices and in the marginalized residential settlements of Makassar City. Respondents were assisted where appropriate while completing the questionnaire to reduce potential misunderstanding, particularly among those with limited digital literacy.

The data collection was surveyed in a short period of time, for keeping all the respondents under similar research conditions. Other than the collected primary data, secondary source of data consisted of policy documents and official reports related to the subject matter along with relevant literature review for contextual analysis.

### Operationalization of Variables

For this research, Bureaucratic Digitalization is the independent variable; Administrative Burdens and Accessibility of Public Services are the dependent variables. The measurements of all variables were conducted using a five-point Likert scale (1 = strongly disagree and 5 = strongly agree).

The operationalization of bureaucratic digitalisation was done through the following indicators: percentage of use, procedural simplicity, information clarity and system reliability in public service delivery. Respondents were asked to self-judge the psychological, compliance and learning costs incurred from their interaction with digital public services. Indicators defined across four variables on access to public services (Availability, Accessibility, Speed and Ability use of Digital Public Services) were used.

### Data Analysis Techniques

The data were analyzed using the Statistical Package for the Social Sciences (SPSS). Pearson's product-moment correlation was used to test the validity of the instruments and Cronbach's Alpha was employed for reliability testing, with 0.70 as a minimum acceptable value. Before hypothesis testing, a series of classical assumption tests, including a normality test, were performed to verify the applicability of parametric analysis for performing all statistical significance tests on the data.

In order to analyze the research hypotheses, multiple linear regression analysis was used for testing the impact of bureaucratic digitalization on each dependent variable. Further, a multivariate analysis (MANOVA) was included to evaluate the impact of bureaucratic digitalization on administrative burdens and public services access jointly. These analyses offer unique insights into the individual and joint impact of the independent variable on the dependent variables.

### Statistical Analysis Techniques

#### Instrument Validity and Reliability

The validity of instruments was established by correlating each item with the total score in its own construct using Pearson's product-moment correlation. Any items with a correlation coefficient who were lower than the critical r-table would be omitted from further examinations. Cronbach's Alpha coefficient was used to measure reliability, considering an acceptable lower limit of 0.70 accepting as adequate the internal consistency of items that make up each of the variables.

#### Classical Assumption Tests

Before hypothesis testing, a sequence of classical assumption tests was performed to confirm that the data met the necessary conditions for parametric regression analysis.

Normality was analysed with the Kolmogorov-Smirnov test, Levene's will be applied to score homoscedasticity and multicollinearity was assessed with Variance Inflation Factor (VIF). Analyses run for inferential data used only the data confirmed to be in accordance with these assumptions.

### Multiple Linear Regression

To assess the independent impact of bureaucratic digitalization on bureaucratic digitalization for each dependent variable (administrative burdens and access to public services), multiple linear regression was used. This analytical approach is suitable for measuring the direction and strength of association between the independent variable and each outcome, while controlling for variance due to the intercept. The regression coefficients (B) and p-values were reported to test the research hypotheses.

### Multivariate Analysis of Variance (MANOVA)

Results: MANOVA was applied to determine bureaucratic digitalization over the dependent variables as a whole. This type of multivariate procedure is ideal for the current design in that it assesses the combined effect of the independent variable on more than one outcome, controlling the familywise error rate. Statistical significance of the multivariate effect was analyzed using Pillai's Trace, Wilks' Lambda, Hotelling's Trace and Roy's Largest Root, with partial eta squared ( $\eta^2$ ) reported as a measure of effect size.

## RESULT AND DISCUSSIONS

### Descriptive Statistics

Prior to undertaking the inferential analysis, descriptive statistics for the variables were computed to give an overview of the data. Means, standard deviations and ranges for logistical issues as well as access to administrative burdens and public services. This is an important step to build a standard distribution of responses between the participants.

**Administrative Burdens:** The average perceived burden score was moderate (mean = 5.56; IQR 3.58–7.56) and was higher for the perception of costs in learning, compliance, and psychological stress.

**Access to Public Services:** The average score for access to services was also quite high, reflecting a perception that few barriers existed in accessing state-provided services, although people with better access to digital foundations rated the access much higher.

### Multiple Linear Regression

The results of the regression analysis show a positive and statistically significant impact by Bureaucratic Digitalization (BD) on both Administrative Burdens and Access to Public Services. For Administrative Burdens, the regression coefficient was  $B = 0.174$  ( $p = 0.007$ ). This also indicates that the higher the level of digitalization, the more administrative burden respondents expect, especially in learning and either in compliance.

Access to Public Services had a regression coefficient  $B = 0.416$ ,  $p < 0.001$  showing that as level of digitalization goes up access to public services increases (decrease in communication cost).

Table 1. Multiple Linear Regression Test Results

Dependent Variable	Parameter	Parameter Estimates						
		B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared ( $\eta^2$ )
						Lower Bound	Upper Bound	
<b>Administrative Burdens</b>	<i>Intercept</i>	3.090	.250	12.348	.000	2.597	3.582	.381
	<b>BD</b>	<b>.174</b>	.064	2.708	<b>.007</b>	.047	.300	.029
<b>Access to Public Services</b>	<i>Intercept</i>	2.096	.261	8.040	.000	1.582	2.609	.207
	<b>BD</b>	<b>.416</b>	.067	6.217	<b>.000</b>	.284	.547	.135

Source: Processed by Author, 2025

The coefficients suggest a positive and significant effect of Bureaucratic Digitalization on Administrative Burdens. The regression coefficient of Bureaucratic Digitalization is  $B = 0.174$  and  $p = .007$  which is below threshold value  $p = 0.05$ . This result indicates that the more a given bureaucratic process is digitalized, the higher the perception of administrative burdens from respondents are. Hence, H1 is supported: corporate digitalization has a positive impact on administrative burdens in this study context.

The findings also reveal that Bureaucratic Digitization has a positive and statistically significant impact on Access to public services. Your regression coefficient is  $B = 0.416$  and  $p < 0.001$  which indicates a strong positive relationship between the dependent variable (nutritional quality score) and independent variable (Globalization score). This suggests that the bar for enjoying access to public services is significantly lowered when bureaucratic digitalization is at large. Thus, H2 is supported as digitalization of bureaucracies has a positive influence on access to public services.

### Multivariate Test

Bureaucratic Digitalization simultaneously influences Administrative Burdens and Access to Public Services ( $p < 0.001$ ) as shown by multivariate analysis with Pillai's Trace (0.135) and Wilks' Lambda (0.865). A partial eta squared of 0.135 estimates Up to 13.5% of variance in the dependent variables is explained by the independent variable

Table 2. Multivariate Test Results

Effect	Pillai's Trace	F	Hypothesis df	Error df	p-value	Partial $\eta^2$
Intercept	.399	82.091	2	247	< .001	.399
BD	.135	19.296	2	247	< .001	.135

Source: Processed by Author, 2025

The results of the multivariate test indicate that Bureaucratic Digitalization has a significant multivariate effect on combined dependant variables Administrative Burdens and Access to Public Service. All four multivariate statistics revealed significance (Pillai's Trace, Wilks' Lambda, Hotelling's Trace and Roy's Largest Root; all  $p < 0.001$ ), confirming this. The Pillai's Trace value of 0.135 (F-value: 19.296) indicates that Bureaucratic Digitalization accounts for about 13.5% variance in combined dependent variables, as indicated by a partial eta squared value of less than the R-value with small medium and large scales. (Abadi, M., et al., 2014). These findings establish that the independent variable positively and

statistically significant affects Administrative Burdens and Access to Public Services simultaneously.

The regression results (1st model), when conducted separately for Save & Spend, show that bureaucratic digitalization has a positive and statistically significant effect on administrative burdens [ $B=0.174$ ;  $p1 = 0.007$ ], Substantively, this coefficient indicates that respondents increasingly view digitalization as a burden. While the effect size is moderate (partial eta squared = 0.029), it is meaningful nonetheless and, particularly among marginalized communities, and even modest increases in learning, compliance or psychological burdens may meaningfully threaten citizens' ability to access public services.

Conversely, digitalisation on the bureaucratic level had a more significant boosting effect on access to public services ( $B = 0.416$ ,  $p < 0.001$ , partial eta squared = 0.135). Here, it was found that digitalization significantly increases the availability, speed and reach of the services. The difference in effect sizes between administrative burdens and access to public services indicates that digitalization expands access to the admin but incurs opposition by increasing admin effort for users.

The multivariate analysis reinforces the hypothesis that bureaucratic digitalization has a simultaneous and statically significant impact on administrative burdens and access to public services. A Pillai's Trace value of 0.135 suggests that digitalization accounts for a nontrivial amount of variance in the joint dependent (combined, or multivariate) variables, which confirms the interpretation even more strongly confirming that digitalization will generate interrelated but divergent results.

## RESULT AND DISCUSSIONS

Regression and MANOVA analysis results, all show that Bureaucratic Digitalization has a positive impact on Administrative Burdens and Access to Public Services. Yet this is ambivalent in nature: On the one hand, digitalization improves accessibility of services; on the other hand, it also offers increased administrative burden (and thus barriers), particularly for already marginalised communities.

This combined effect is in line with theoretical perspectives on administrative burden where digitalization appears to transfer discretion and responsibility from public officials to service users, increasing citizens' learning and compliance costs as well as psychological costs (Moynihan et al., 2015; Herd & Moynihan, 2018). This research enriches the literature by replicating and showing that these costs are more burdensome at both ends of the literacy spectrum in digital-skills levels for disadvantaged communities.

Digitalisation also increases the availability of services and the speed of transactions while reinforcing the idea that digital platforms can enhance service delivery by breaking down geographical barriers and accelerating bureaucratic procedures (Mina-Raiu & Melenciuc, 2022). Still, better access does not necessarily equate to easier navigation. Digital systems add complexity and psychological stress that put people at greater risk of exclusion when they have weak digital skills.

In addition, the multivariate results support our hypothesis that access to public services and administrative burden are not separate outcomes. They both are simultaneously incentivized but also deliver on the wider administrative challenges created by bureaucratic digitalization, a phenomenon which suggests a paradox in promises of digital governance where accessibility does not cancel out disbureaucratization among vulnerable groups (Giest & Samuels 2023; Madsen & Hjelholt 2024).

The results summarized in the regression table below indicate that bureaucratic digitalisation has a positive and statistically significant impact on administrative burdens ( $B$

= 0.174,  $p = 0.007$ ), meaning higher levels of digitalisation are associated with more burden reported by respondents in their dealings with public administration. From a substantive perspective, this finding indicates that even if the digital tools and platforms are designed to simplify administrative procedures, they can shift the burden of navigating these processes back on citizens. Such change may lead to greater learning, compliance and psychological costs, especially for marginalised groups where digital literacy, access to device and connectivity challenges are systemic. This pattern is consistent with burden theory, which highlights how burdens do not come only because people must comply with explicit requirements, but also because the mental effort and stress of interpreting rules or fulfilling processes can constitute tall hurdles (Moynihan et al., 2015) (Herd & Moynihan, 2018). Moreover, literature regarding the digital administrative encounter demonstrates that digitalisation may reproduce or even exacerbate existing burdens when systems are not designed inclusively or where "digital by default" policies reduce human support and thus impose more responsibility on users (Giest & Samuels, 2023; Peeters, 2023; C. Ø. Madsen & Hjelholt, 2024). In line with previous studies which indicate that digital self-service can introduce new burdens to people who are non-users of the digital sphere (for example Lindgren et al., 2019; C. Ø. Madsen et al., 2022) e.g. by adding new learning and psychological strain during online interactions, our result is broadly consistent with experimental or empirical evidence indicating that while some compliance frictions may be reduced through digital reforms, these reforms may also increase psychological costs (Kalucza & Sievert, 2024). As a result, the positive coefficient in Makassar is witnessed as a signal that an increased level of (or better) digitalisation may potentially enhance organisational-level administrative efficiency while transferring burdens to service-users at the same time, and this disproportionately affects most marginalised communities.

Also, the results show that bureaucratic digitalisation positively affects perceived access to public services ( $B = 0.416$ ,  $p < 0.001$ ), indicating that pilots with higher level of digitalisation perceive better their access to services in comparison with lower ones. This is coherent with the mainstream discourse in digital governance which states that using digital channels can improve access due to geographical barriers being less pronounced, more services available, and faster processes (Mina-Raiu & Melenciuc, 2022). Compared to traditional channels, digitalisation provides greater predictability of information flows, speed of transactions and points of contact with the government which can be especially useful for urban crowds where time and transportation costs are critical [7]. Theoretical Implications This finding partially supports the argument that digitalisation facilitates access and makes IT-related resources more usable. However, it should also be read alongside the "digital divide" caveat, which underlines how access gains are not symmetric and might come together with new modes of exclusion (Giest & Samuels, 2023; Peeters, 2023; C. Ø. Madsen & Hjelholt, 2024). Compared to previous studies, however, the positive correlation supports a broader hypothesis that digital public services may widen access opportunities while appearing to moderate earlier fears that digitalisation might worsen exclusion in cases where citizens are without resources or digital skills (Lindgren et al., 2019; J. K. Madsen et al., 2022). This finding can, in light of that, be understood as a recognition that Makassar's digitalisation is improving access in an "overall" sense (more services are becoming more available and accessible to more people), while also raising the issue that better access does not mean improved or easier access if it remains to be burdensome for already marginalised communities.

As evident in the single multivariate test, digitalisation of bureaucracy has reliable and simultaneous effect on the combined outcomes of administrative burden and access to public

services (Pillai's Trace = 0.135,  $F = 19.296$ ,  $p < 0.001$ ), with large effect size indicating that digitalisation does contribute a substantial share of variability over both dependent variables when their variance is estimated simultaneously [15]. Conceptually this multivariate pattern is consistent with a “dual-effect” hypothesis whereby digitalisation has the potential to both extend reach whilst at the same time, creating further burdens particularly through citizen-facing service architectures that increases demand for cognitive and procedural effort from users (Moynihan et al. 2015)(Herd & Moynihan 2018). This is cohesive with arguments that digital transformation results in differential “burden-reduction” across groups; rather than necessarily alleviating problems of citizen-state clichés, it simply re-organises the inputs into citizen-state interactions and may create friction for those with lesser administrative literacy and digital capacity (Giest & Samuels, 2023; Peeters, 2023; see also C. Ø. Madsen & Hjelholt, 2024 ). In comparison with earlier work, the overall effect is consistent our previous empirical studies that document how digital services can increase efficiency and outreach while creating new exclusionary barriers and psychological costs for low-resource users and results suggesting that although some compliance burden may be displaced by digital redesign, other redesign aspects may impose different types of burdens depending on user experience of the process. Importantly, Makassar's evidence demonstrates that access expansion alone is a poor measure of policy success; inclusive digital governance requires a nuanced understanding of how this access was achieved across interface, support and administrative simplification channels. This will not only help to respond to the questions posed by policy makers, but also ensure that improvements in service coverage do not come at the expense of increased load on already resource-constrained and marginalised groups.

Moreover, this dual face of digitalisation (increase access while impose burdens) invites further thinking about whether we can assume that ‘digitalising’ a service will always improve it for everyone. Though expanding access is a major pillar of digital governance, this study highlights that the burdens are not burdened equally which is particularly salient when some people have higher cognitive procedural costs in online realms. These insights are especially useful for city-policy makers such as in Makassar, in which digitalisation is placed as one of the means to modernise governance. This makes digitalisation seem attractive in terms of improved efficiency and the wider reach of services, but these advantages can come at a cost that is carried by people who are already at risk. It underscores the necessity for a more nuanced form of digital governance, striking the right balance between efficiency and inclusion, while ensuring that public services are not digitally transformed in a manner that highlights social inequalities.

In a nutshell, this study sheds important light on the nuances of digitisation in public administration; namely how enabling access to services through digital tools could potentially create new burdens for already disadvantaged communities. The results hint that we should treat the digitalisation not only as a means of increasing windfall efficiency, and accessibility, but also decreasing citizens cognitive, psychological or procedural burdens. The findings cast doubts on the idea that digital transformation is necessarily a net positive, stressing that it is important to construct digital public services in a way that rebalances these burdens downwards (rather than up) — with due regard for the most marginalised members of our society. To ensure that the push towards digital government does not exacerbate existing inequalities, policymakers must analyze how digitalisation influences access and burden and aim for a fairer society for everyone.

This study finds the ambivalence of bureaucratic digitalization in configuring citizen state interactions. In line with the argument that digital reforms are not a guarantee to lower citizens' administrative costs, we find a positive impact of digitalization on administrative

burdens. Rather, digitalization may shift administrative work from public officials to service users, raising learning and compliance costs especially for socioeconomically disadvantaged groups with limited digital literacy and access to technological resources. This result is consistent with the administrative burden theory, which posits that burdens are more than just formal rules but also arise from cognitive and psychological demands placed on individuals within bureaucratic encounters.

This effect is particularly powerful in Makassar City. This results in communities being left with unstable internet access, limited familiarity with digital platforms or reduced institutional support. In turn, digital self-service systems can worsen issues of confusion and stress even if the services are legally accessible. This executive summary is consistent with previous research highlighting that when policies are implemented only online or have less scope for human intervention, the psychological and learning costs become exacerbated.

At the same time, the positive links between bureaucratic digitalization and access to public services underline that digital systems could successfully widen service provision availability, decrease geographical restrictions of administrative processes. In this sense, digital platforms offer more flexible points of contact with government institutions especially for urban dwellers and are invaluable in a crowded metropolitan context. This discovery lends support to approaches in the literature of digital governance, which place digitalization as a means for enhancing efficiency and service availability.

However, when considered together these results are indicative of a digital governance paradox: accessibility is improved but it comes at an increased administrative burden due to digitalization. This paradox raises a challenge to the assumption that expanded access means simpler or fairer access. In turn, decades of public access through digital means may still be conditional on aspects of digital and administrative capabilities among citizens. Thus improved access might be combined with increased selective pressure facing marginalized communities.

These multivariate results further support this dual effect interpretation, showing that administrative burdens and access to public services do not occur independently, but are both the result of bureaucratic digitalization. This joint effect indicates that it may not be sufficient to evaluate the impact of a policy that aims to expand access, as there may be unobserved citizen costs associated with doing so. Thus digital governance reforms should be determined not just by efficiency metrics but also by how these cuts impact distinct social groups.

Theoretically, the study adds to knowledge on administrative burden by adding empirical evidence from a Global South urban context characterized by distinctively different institutional and digital infrastructure capacities compared to those in developed welfare states. This study contributes to a more nuanced understanding of how digitalization reshapes the public service delivery in unequal urban settings through contextualizing administrative burdens and service access within one analytical framework.

As an overall conclusion, this study shows that digitalization is complex and not only a straightforward process in public administration. Although some tools can ease access to services, they also have the potential to generate different types of burdens, particularly among marginalised communities. Longitudinal studies of how digitalization affects administrative burdens and service access in the long run must be designed as a research agenda for the future. Moreover, research should examine inclusive digital design and hybrid service models to ensure that digital reforms do not accidentally reinforce existing inequalities but rather offer equitable uptake for all citizens.

## CONCLUSION

This study findings conclude that bureaucratic digitalization has a double-conscious and subtle role in citizens relationship with public administration in Makassar City. Although digitalisation has enhanced the access to public services (one of its promise), suggesting new forms of service availability as well as efficiente, it has also created greater administrative burdens, particularly for marginalised communities who may face limitations in digital literacy, resources and institutional support. The high multivariate effect indicates bureaucratic digitalisation impacts both outcomes together and we interpret this to mean that broader access does not itself entail lesser administrative effort. These results underscore how digital reforms if not inclusive and with enough support for the user side can reallocate administrative tasks from the state to citizens, perpetuating rather than alleviating existing inequalities. Therefore, digital governance initiatives must be bolstered by complementary support strategies and hybrid service models to ensure that improving access does not come with the price of loading vulnerable populations with greater administrative burdens. First, this study confirmed that digitalisation in public administration is not a binary process; thus, it underlines the importance of both access and burden reduction. It implies that although, digitalisation can reap the efficiency and reach of public services, it may exacerbate inequalities if not inclusively implemented. The results highlight the need for public services to be designed with all citizens in mind, and especially marginalised groups. However, the study has limitations due to its focus on only Makassar City, which presumably does not represent all urban or rural contexts. The analysis also depends on self-reported data, which may be subject to biases including social desirability or interpretation by the respondent. Longitudinal research could investigate the long-term effects of digitalisation on administrative burdens, while also utilizing a greater diversity of geographical contexts and more objective measures of user experience. This study thus recommends that policymakers and local government authorities in Makassar City be consistent with inclusive and citizen-centric bureaucratic digitalisation. Though digital systems have been successful in increasing access to public services, these measures should go hand-in-hand with tangible steps to alleviate bureaucratic burdens on marginalised communities. They could involve reinforcing digital literacy initiatives, supporting assisted service channels and having human presence at the point of service, simplifying the digital interfaces and processes, and sustaining that hybrid mode of digital/face to face services. Finally, one very important aspect is to regularly check on digital public services' citizen experiences as they evolve to anticipate new administrative frictions and respond pro-actively so that the transformation does not just focus on accessibility/effectiveness in terms of cost effective solutions but broadly brings equity into the picture.

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