

# Digital Infrastructure of Public Services and the Once-Only Principle: A Sectoral Analysis of Portals Connected to the National Identity Authority in the Czech Republic

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## Abstract

*The Once-Only Principle (OOP), according to which citizens provide information to public authorities only once, is a key objective of European eGovernment policy. This article analyses organisations connected to the National Identity Authority (NIA) in the Czech Republic and identifies sectoral and geographical differences in the adoption of this digital infrastructure. The analysis is based on publicly available data from the Service Providers Register (SEP), comprising 1,085 portals operated by 1,032 organisations. The findings reveal substantial variation in adoption across sectors, regions and municipality size categories. Municipal government accounts for almost two-thirds of all identified portals, while municipality size appears to be strongly associated with adoption. International comparison suggests that countries with extensive digital public service coverage combine advanced technical infrastructure with a high degree of institutional coordination. The study provides the first systematic mapping of NIA-connected organisations in the Czech public sector and contributes to research on the implementation of the Once-Only Principle.*

**Keywords:** *once-only principle, egovernment, digital identity, public administration, national digital identity system.*

## Introduction

The digitalisation of public administration has become one of the key priorities of public policy at both European and national levels over the past decade. A central component of this transformation is the Once-Only Principle (OOP), according to which citizens and businesses should provide certain information to public authorities only once, while public institutions subsequently reuse and exchange these data through interoperable information systems. The principle has been promoted at the European level through the eGovernment Action Plan 2016–2020 and the Tallinn Declaration on eGovernment of 2017, where it was identified as one of the key objectives for the development of digital public services. In the Czech Republic, the implementation of this principle is reflected in Act No. 12/2020 Coll. on the Right to Digital Services.

Existing research on the OOP has focused primarily on its conceptual foundations, institutional embedding and technical implementation (Wimmer et al., 2017; Kalvet et al., 2018). Particular attention has been devoted to interoperability, cross-border data exchange and the

development of digital infrastructures enabling the reuse of information across public administrations, especially within the framework of the TOOP project (Krimmer et al., 2021). However, empirical evidence concerning the organisational adoption of such infrastructures remains limited. While comparative studies frequently examine countries with highly developed digital government systems, less attention has been paid to patterns of adoption in environments where participation in shared digital identity infrastructures is not uniformly mandated across all levels of public administration.

This gap is particularly relevant in the Czech context. The country has developed a relatively advanced digital government infrastructure, including basic registers, data boxes and NIA, which enables electronic identification for access to digital public services. Nevertheless, empirical evidence remains limited regarding the extent to which this infrastructure has been adopted across different sectors of public administration and whether significant territorial differences exist.

The aim of this article is to analyse the distribution of organisations connected to NIA in the Czech Republic and to identify sectoral and geographical differences in the adoption of this digital infrastructure. The analysis is based on data from SEP, a publicly available administrative database maintained by the Digital and Information Agency.

This article builds upon earlier research by Burianová and Štěrbá (2026), which examined the implementation of the OOP within municipal government. The present study expands the scope of analysis to all major sectors of public administration and provides the first comprehensive mapping of organisations connected to NIA in the Czech Republic. By identifying sectoral and territorial patterns of adoption, the article contributes to the broader discussion on digital government infrastructure and the implementation of the OOP in contemporary governance systems.

The remainder of the article is structured as follows: the next section presents the theoretical background and relevant literature. This is followed by a description of the data and methodology. The subsequent sections present the empirical findings and discuss them in the context of existing research. The final section summarises the main conclusions and outlines implications for future research.

## **1 Theoretical framework**

The Once-Only Principle (OOP) is widely regarded as one of the core concepts of contemporary digital government. Its fundamental objective is to reduce administrative burdens on citizens and businesses by ensuring that information already provided to one public authority can be reused by other public institutions, subject to legal and organisational safeguards (Wimmer et al., 2017; Kalvet et al., 2018). In practical terms, the principle seeks to replace repeated requests for the same information with data sharing and interoperability among public sector information systems. The growing importance of the OOP is closely linked to broader efforts aimed at modernising public administration through digital technologies. The principle has been incorporated into key European

policy documents, including the eGovernment Action Plan 2016–2020 and the Tallinn Declaration on eGovernment. These initiatives emphasise the need to improve the accessibility, efficiency and user orientation of public services while reducing administrative burdens for citizens and businesses. The academic literature on the OOP has developed along several complementary lines. One stream of research focuses on the conceptual and institutional foundations of the principle and its role in digital government strategies (Wimmer et al., 2017). A second stream examines the technical and organisational requirements for implementation, particularly interoperability, data governance and digital identity systems (Kalvet et al., 2018). A third area of research is represented by studies associated with the European TOOP project, which explored the application of the OOP in cross-border administrative processes and demonstrated the potential of shared digital infrastructures for public service delivery (Krimmer et al., 2021).

Existing research also suggests that the implementation of the OOP depends not only on technological capabilities but also on institutional and organisational conditions. Previous studies highlight the importance of interoperability frameworks, common standards, administrative coordination and the availability of trusted digital identity systems that enable secure access to public services (Kalvet et al., 2018; Krimmer et al., 2021). Consequently, the adoption of digital infrastructures supporting the OOP may vary across administrative sectors and territorial units depending on their organisational capacities and institutional arrangements.

Within this context, digital identity systems play a particularly important role. They provide a secure mechanism for verifying users and facilitating access to electronic public services. In the Czech Republic, NIA serves as a central component of the digital identity infrastructure by enabling authentication through recognised electronic identification methods. From the perspective of the OOP, NIA constitutes an important enabling infrastructure that allows public institutions to provide authenticated digital services and to participate in broader processes of digital interaction with citizens. Existing research on digital government adoption suggests that organisational capacity may influence the implementation of digital infrastructures. Public organisations with greater administrative, financial and technical resources are generally better positioned to adopt and maintain digital services (Gil-Garcia and Pardo, 2005; Mergel et al., 2019). Similarly, innovation diffusion research suggests that larger organisations often act as early adopters of technological innovations because they possess greater capacity to absorb implementation costs and organisational change (Rogers, 2003). Institutional factors, including regulatory frameworks, coordination mechanisms and inter-organisational networks, may also shape adoption patterns across sectors and territories (Tolbert et al., 2008). From this perspective, variation in NIA adoption may be associated with differences in organisational scale, administrative capacity and institutional conditions.

Despite the growing importance of digital identity systems, empirical evidence regarding their adoption across different sectors of public administration remains limited. Existing studies have

largely concentrated on national strategies, technical architectures and international comparisons, whereas comparatively little attention has been paid to the organisational distribution of digital identity infrastructures within individual countries. This study addresses this gap by examining the distribution of organisations connected to the NIA across sectors and regions of the Czech Republic. Rather than testing a specific causal theory, the article adopts an exploratory and descriptive perspective. It assumes that patterns of adoption may differ across sectors and territories and seeks to identify and interpret these differences in light of existing knowledge on the implementation of the Once-Only Principle and digital government infrastructures.

It is important to distinguish between digital identity infrastructure, digital service provision and the actual implementation of the OOP. While NIA provides a key enabling infrastructure for authenticated digital services, its existence alone does not demonstrate the automated reuse of data between public authorities. Consequently, NIA connectivity is interpreted in this study as an indicator of organisational readiness for digital service delivery and OOP-related capabilities rather than direct evidence of OOP implementation.

## **2 Data and methodology**

The analysis is based on data obtained from SEP of the Citizen Identity system, maintained by the Digital and Information Agency of the Czech Republic. The register is publicly available and contains information on organisations and digital services connected to NIA. The dataset captures the state of the register in 2025. Duplicate records were identified using organisation identifiers and portal URLs. Ambiguous cases were manually reviewed to ensure consistency before the final dataset was created.

The final dataset contained 1,085 portals operated by 1,032 unique organisations. The available information included the name of the portal, the name of the operating organisation, the organisation identification number, the service URL and other administrative identifiers available in the register.

The study addresses the following research questions:

**RQ1:** How are NIA-connected portals distributed across sectors of public administration?

**RQ2:** What geographical differences can be identified within individual sectors?

**RQ3:** How can the observed patterns of adoption be interpreted in the context of existing approaches to digital government infrastructure and the OOP?

For analytical purposes, organisations were classified into six categories: (1) municipal government, (2) state administration, (3) healthcare, (4) education, (5) regional government and (6) other organisations. Classification was based on the legal status, institutional affiliation and publicly available information about the organisation. Ambiguous cases were verified manually to ensure consistency across the dataset.

The analysis was conducted at three levels. First, the distribution of NIA-connected portals across sectors of public administration was examined. Second, the geographical distribution of organisations was analysed at the regional level. Third, a more detailed analysis was carried out for municipal government in order to examine differences in adoption according to municipality size. For municipalities, geographical assignment and population data were obtained directly from the dataset and complemented with data published by the Czech Statistical Office. The adoption rate was calculated as the proportion of municipalities operating at least one NIA-connected portal relative to the total number of municipalities within a region. In addition, population coverage was calculated as the share of regional inhabitants living in municipalities with at least one NIA-connected portal.

To analyse the relationship between municipality size and portal adoption, municipalities were divided into five population categories commonly used in Czech statistical reporting. Because the SEP register does not contain all information necessary for a precise measurement of adoption across size categories, the resulting figures should be interpreted as indicative estimates rather than exact values.

The study employs a descriptive analytical approach. Its objective is not to establish causal relationships between institutional factors and adoption outcomes, but rather to provide a systematic overview of the distribution of NIA-connected organisations across sectors and regions of the Czech Republic. Consequently, the findings identify observable patterns of adoption but do not allow conclusions regarding the specific causes of these patterns.

To place the Czech case within a broader European context, the study also draws on information published in the eGovernment Benchmark 2024 report and relevant literature on the implementation of the Once-Only Principle. This comparison serves as contextual background rather than a direct benchmark, as the indicators and methodologies used in different countries are not fully comparable.

## **3 Results**

### **3.1 Sectoral distribution**

A total of 1,085 portals connected to NIA were identified in the analysed dataset. Municipal government represented the largest category, accounting for 691 portals (63.7% of all recorded portals). State administration constituted the second largest category with 151 portals (13.9%), followed by education with 81 portals (7.5%), healthcare with 74 portals (6.8%), regional government with 42 portals (3.9%), and other organisations with 46 portals (4.2%).

The results indicate that NIA-connected digital services are present across all major sectors of public administration. However, their distribution is uneven. Nearly two-thirds of all identified portals belong to municipal government, while the remaining sectors account for substantially smaller shares of the total dataset.

**Table 1: The sectoral distribution of portals included in the analysis**

| Category             | Portals | Share (%) | Notable concentration                      |
|----------------------|---------|-----------|--------------------------------------------|
| Municipal government | 691     | 63.7      | Distributed across all regions             |
| State government     | 151     | 13.9      | Predominantly Prague                       |
| Education            | 81      | 7.5       | Relatively concentrated in Vysočina Region |
| Healthcare           | 74      | 6.8       | Major hospitals and health insurance funds |
| Regional government  | 42      | 3.9       | Present in 13 regions                      |
| Other                | 46      | 4.2       | Predominantly Prague                       |

Source: Digital and Information Agency (c2026), CSO (2023); own elaboration.

The findings demonstrate that the adoption of NIA-connected portals extends beyond state government institutions and includes organisations operating in healthcare, education and regional government. At the same time, considerable differences in the number of portals can be observed between individual sectors.

The final column of Table 1 summarises selected descriptive characteristics associated with the spatial or institutional distribution of organisations within each category. These observations are based on patterns identified in the dataset and serve as contextual information for the subsequent analysis. They do not imply causal relationships and should be interpreted as descriptive features of the observed distribution.

### 3.2 Geographic distribution

The geographical distribution of NIA-connected portals exhibits considerable variation across Czech regions. A total of 225 portals were associated with organisations headquartered in Prague, representing the largest regional concentration in the dataset. This reflects the location of most state government institutions and several national-level organisations.

Outside Prague, the highest numbers of portals were identified in the Středočeský Region (136), the Vysočina Region (98), the Jihočeský Region (92) and the Jihomoravský Region (83). Regional differences are also evident in the sectoral composition of portals. While Prague is dominated by state government institutions, other regions are characterised primarily by municipal government portals.

The Vysočina Region represents a particularly notable case. Although it is not among the most populous Czech regions, it records one of the highest numbers of NIA-connected portals. A substantial share of these portals is associated with educational institutions. In contrast, regions such as the Středočeský Region and the Jihočeský Region are characterised primarily by a high number of municipal government portals.

Table 2 presents the regional distribution of portals by organisational category. The figures are based on the registered headquarters of organisations and do not necessarily reflect the geographical scope of the services provided. This distinction is particularly relevant for state government institutions, many of which serve users nationwide despite being located in Prague.

**Table 2: Distribution of portals by region and category of entity (selected regions)**

| Region              | Municipalities | Other | State government | Healthcare | Education | Total (region) |
|---------------------|----------------|-------|------------------|------------|-----------|----------------|
| Prague (Capital)    | —              | 34    | 138              | 31         | 22        | 225            |
| Vysočina            | 65             | 0     | 4                | 3          | 26        | 98             |
| Jihomoravský        | 55             | 6     | 9                | 7          | 6         | 83             |
| Středočeský         | 130            | 0     | 0                | 6          | 0         | 136            |
| Moravskoslezský     | 49             | 0     | 0                | 5          | 5         | 59             |
| Jihočeský           | 89             | 0     | 0                | 0          | 3         | 92             |
| Zlínský             | 32             | 0     | 0                | 8          | 5         | 45             |
| Pardubický          | 31             | 0     | 0                | 1          | 1         | 33             |
| Olomoucký           | 30             | 0     | 0                | 2          | 4         | 36             |
| Liberecký           | 24             | 0     | 0                | 3          | 1         | 28             |
| Remaining 5 regions | 132            | 6     | 0                | 13         | 14        | 165            |

Source: Digital and Information Agency (c2026), CSO (2023); own elaboration. Note: Regional assignment is based on the registered headquarters of organisations rather than the geographical coverage of services.

Overall, the results indicate that the spatial distribution of NIA-connected portals is uneven across the Czech Republic. Differences can be observed not only in the total number of portals but also in the relative importance of individual organisational categories within each region.

### 3.3 MUNICIPAL GOVERNMENT: Regional and population-based differences

Municipal government represents the largest category of NIA-connected portals and therefore warrants a more detailed analysis. A total of 691 municipal portals were identified in the dataset. Despite this relatively high number, only approximately 10.5% of Czech municipalities operate at least one portal connected to NIA.

At the same time, municipalities with at least one NIA-connected portal account for approximately one half of the Czech population. This difference between institutional and population coverage reflects the concentration of portal adoption in larger municipalities and cities.

Table 3 presents regional differences in municipal adoption rates. The indicator is calculated as the share of municipalities within a region operating at least one NIA-connected portal. Population

coverage expresses the proportion of regional inhabitants living in municipalities with at least one NIA-connected portal.

**Table 3: Adoption of NIA-Connected Portals by Region**

| Region          | Municipalities with Portal | Total Municipalities | Share of Municipalities (%) | Population Coverage (%) | Number of Portals |
|-----------------|----------------------------|----------------------|-----------------------------|-------------------------|-------------------|
| Ústecký         | 60                         | 354                  | 17.0                        | 55.1                    | 62                |
| Moravskoslezský | 49                         | 300                  | 16.3                        | 71.7                    | 50                |
| Karlovarský     | 20                         | 132                  | 15.2                        | 57.0                    | 21                |
| Jihočeský       | 89                         | 623                  | 14.3                        | 47.9                    | 97                |
| Středočeský     | 130                        | 1,145                | 11.4                        | 31.6                    | 138               |
| Liberecký       | 24                         | 215                  | 11.2                        | 61.5                    | 24                |
| Zlínský         | 32                         | 307                  | 10.4                        | 43.8                    | 32                |
| Vysočina        | 65                         | 704                  | 9.2                         | 51.8                    | 69                |
| Jihomoravský    | 55                         | 673                  | 8.2                         | 57.7                    | 60                |
| Olomoucký       | 30                         | 399                  | 7.5                         | 49.8                    | 32                |
| Pardubický      | 31                         | 451                  | 6.9                         | 32.9                    | 34                |
| Královehradecký | 26                         | 448                  | 5.8                         | 39.1                    | 26                |
| Plzeňský        | 28                         | 501                  | 5.6                         | 43.3                    | 29                |

Source: Digital and Information Agency (c2026), CSO (2023); own calculations. Population coverage = share of regional population residing in municipalities with at least one NIA-connected portal.

The results reveal substantial regional variation. The highest municipal adoption rates were recorded in the Ústecký Region (17.0%) and the Moravskoslezský Region (16.3%), whereas the lowest rates were observed in the Plzeňský Region (5.6%) and the Královehradecký Region (5.8%). Differences between municipal adoption rates and population coverage are also notable. For example, the Moravskoslezský Region exhibits a municipal adoption rate of 16.3%, yet municipalities with at least one NIA-connected portal account for 71.7% of the regional population. By contrast, the Středočeský Region records a relatively similar municipal adoption rate (11.4%) but substantially lower population coverage (31.6%). These differences suggest that the distribution of portals is influenced not only by the number of municipalities adopting the infrastructure but also by the population size of those municipalities.

Overall, the findings indicate that municipal adoption of NIA-connected portals is unevenly distributed across regions. While some regions exhibit relatively high levels of adoption, others remain substantially below the national average. The observed differences are further explored through an analysis of municipality size categories in the following section.

**Table 4: Estimated NIA portal adoption by municipality population size category**

| Population Size Category | Number of Municipalities | Estimated Municipalities with NIA portal | Estimated adoption rate (%) |
|--------------------------|--------------------------|------------------------------------------|-----------------------------|
| Under 500                | 3,371                    | ~5                                       | ~0.1                        |
| 500–999                  | 1,168                    | ~30                                      | ~2.6                        |
| 1,000–4,999              | 1,185                    | ~195                                     | ~16.5                       |
| 5,000–19,999             | 376                      | ~240                                     | ~63.8                       |
| 20,000 and over          | 158                      | ~158                                     | ~100                        |

Source: Czech Statistical Office (2023); Digital and Information Agency (2025); author's estimates.

*Note:* Although approximately 185 portals were identified within this category, these portals were operated by approximately 158 municipalities, as larger cities frequently maintain multiple portals.

The results reveal a strong association between municipality size and the adoption of NIA-connected portals. Estimated adoption rates increase substantially across population categories, ranging from approximately 0.1% among municipalities with fewer than 500 inhabitants to nearly complete adoption among municipalities with more than 20,000 inhabitants.

The contrast is particularly pronounced between the two smallest categories and municipalities with more than 5,000 inhabitants. While adoption remains very limited among municipalities below 1,000 inhabitants, it becomes substantially more common in larger municipalities and cities. As a result, population coverage is considerably higher than institutional coverage, as a relatively small number of larger municipalities account for a substantial share of the Czech population.

These findings suggest that municipality size is closely associated with the likelihood of operating a portal connected to NIA. However, the descriptive nature of the analysis does not allow conclusions regarding the specific factors underlying this relationship.

### 3.4 Healthcare

The healthcare sector accounts for 74 NIA-connected portals, representing 6.8% of all portals identified in the dataset. Compared with municipal government and state government institutions, the healthcare sector constitutes a smaller but still significant component of the overall digital identity infrastructure.

The distribution of portals within the healthcare sector is concentrated among large public healthcare providers. University hospitals and major regional hospitals account for a substantial share of identified portals. Several health insurance funds are also represented in the dataset, reflecting their role in providing digital services to insured individuals.

Geographically, healthcare portals are concentrated in regions containing major healthcare institutions, particularly Prague and several regional centres. Smaller healthcare providers appear less frequently in the register.

The results indicate that the adoption of NIA-connected portals within the healthcare sector is unevenly distributed across organisations. While large public institutions are well represented, the register contains comparatively fewer portals operated by smaller healthcare providers. Given the nature of the available data, it is not possible to determine the organisational, technical or regulatory factors underlying the observed distribution. The register records the existence of NIA-connected services but does not provide information on service usage, transaction volumes or implementation processes.

### **3.5 Education**

The education sector accounts for 81 NIA-connected portals, representing 7.5% of all portals identified in the dataset. Compared with healthcare and regional government, education constitutes one of the larger non-municipal categories.

The sector exhibits considerable internal variation. Higher education institutions account for a substantial proportion of identified portals and are distributed across several regions of the Czech Republic. In contrast, portals operated by primary and secondary educational institutions display a more uneven geographical distribution.

A notable feature of the dataset is the concentration of educational portals in the Vysočina Region. Of the 81 educational portals identified, 26 are located in this region, representing approximately one-third of all educational portals included in the analysis. This concentration is substantially higher than in any other region.

The available data allow the identification of this pattern but do not provide information regarding the factors that may have contributed to its emergence. Consequently, no conclusions can be drawn concerning the organisational, administrative or policy mechanisms underlying the observed distribution.

Overall, the findings indicate that the adoption of NIA-connected portals within the education sector is geographically uneven. While higher education institutions are represented across multiple regions, a significant concentration of educational portals can be observed in the Vysočina Region.

## **4 Discussion**

### **4.1 Interpretation of findings**

The significance of these findings extends beyond the mere distribution of digital portals. The Once-Only Principle is intended to reduce the administrative burden placed on citizens and businesses by limiting the repeated submission of information already held by public authorities. The effective implementation of this principle requires digital infrastructures that enable secure identification, authenticated access to services and the exchange of information between public institutions. In the Czech Republic, NIA represents one of the key enabling components of this infrastructure. Consequently, the distribution of NIA-connected portals provides insight into the

organisational reach of digital infrastructure that may support the implementation of the OOP. However, NIA connectivity alone should not be interpreted as direct evidence of OOP implementation.

The analysis revealed substantial variation in the distribution of NIA-connected portals across sectors, regions and municipality size categories. The findings suggest that the adoption of digital identity infrastructure in the Czech public sector is uneven and differs considerably among organisational settings.

The first notable finding concerns sectoral variation. Although NIA-connected portals were identified in all major sectors of public administration, municipal government accounted for almost two-thirds of all portals included in the dataset. At the same time, healthcare, education and regional government exhibited considerably lower levels of representation. These results indicate that the adoption of digital identity infrastructure does not occur uniformly across sectors and may be influenced by differences in organisational structures, service portfolios and administrative capacities.

The second finding relates to territorial variation. Significant regional differences were observed both in the number of portals and in their sectoral composition. Prague represents a distinct case due to the concentration of state government institutions and national-level organisations. Outside Prague, notable differences were identified among regions in both municipal adoption rates and the distribution of portals across sectors. Several factors may contribute to these regional differences, including variation in administrative capacity, regional digitalisation strategies, inter-municipal cooperation networks and the availability of technical support mechanisms. Although the present dataset does not allow these explanations to be tested directly, they represent plausible avenues for future research.

The third and most pronounced finding concerns municipality size. Adoption rates increase substantially with population size, ranging from negligible levels among municipalities with fewer than 500 inhabitants to near-complete adoption among cities with more than 20,000 inhabitants. This pattern suggests a strong association between organisational scale and the likelihood of operating an NIA-connected portal. At the same time, the contrast between institutional coverage and population coverage indicates that a relatively small number of larger municipalities account for a substantial share of the population served by NIA-connected services.

Finally, the education sector displayed a distinctive pattern of regional concentration. A significant proportion of educational portals were located in the Vysočina Region. While the available data do not allow conclusions regarding the causes of this distribution, the finding demonstrates that adoption patterns may vary considerably even within individual sectors of public administration.

Taken together, the results highlight the importance of examining digital government implementation below the national level. Aggregate indicators may conceal substantial variation

among sectors, regions and organisational categories, which become visible only through a more detailed institutional analysis.

## **4.2 Czech findings in a European context**

The findings of this study can be situated within broader European discussions concerning the implementation of the Once-Only Principle and the development of digital public services. Previous research has emphasised that successful implementation of the OOP depends not only on technological infrastructure but also on institutional arrangements that facilitate interoperability, data sharing and organisational coordination (Kalvet et al., 2018; Krimmer et al., 2021).

The Czech Republic possesses a relatively advanced digital government infrastructure, including basic registers, data boxes and NIA. Nevertheless, the results presented in this article demonstrate that the adoption of NIA-connected portals varies substantially across sectors and territorial units. Similar challenges have been identified elsewhere in Europe, particularly at local and regional levels of government.

The eGovernment Benchmark 2024 report notes that local and regional authorities frequently lag behind state government institutions in the provision of integrated digital services and the use of electronic identification mechanisms (Capgemini et al., 2024). The differences observed among Czech municipalities therefore appear consistent with broader European trends documented in comparative research.

At the same time, countries often cited as leaders in digital government, such as Estonia, Denmark and Finland, have developed long-standing institutional frameworks supporting digital identity and interoperability. While the specific arrangements differ across countries, existing research suggests that coordination mechanisms and shared infrastructures are important components of successful digital service delivery (Krimmer et al., 2021).

The Czech case contributes to this debate by providing empirical evidence on the organisational distribution of digital identity infrastructure within a single national context. Rather than focusing on national-level strategies alone, the findings draw attention to variation across sectors and municipalities, highlighting the importance of organisational and territorial perspectives in the study of digital government implementation.

## **5 Limitations**

Several limitations should be acknowledged. First, the analysis is based on the registered headquarters of organisations rather than the geographical coverage of the services they provide. This limitation is particularly relevant for state government institutions, many of which serve users nationwide.

Second, the analysis is based on a cross-sectional dataset representing a single point in time. Consequently, it does not allow the examination of adoption trends or changes over time.

Third, the register records the existence of NIA-connected portals but does not provide information on service usage, transaction volumes or service quality.

Finally, the data allow the identification of adoption patterns but do not permit conclusions regarding the organisational, technical or policy factors that may have contributed to these patterns. Consequently, the study should be interpreted primarily as a descriptive mapping of adoption patterns rather than an explanatory analysis of the factors driving adoption.

## **Conclusion**

This article presented the first systematic mapping of organisations connected to NIA in the Czech Republic. Based on an analysis of 1,085 portals, it examined the sectoral and geographical distribution of NIA-connected services across major sectors of public administration and identified differences in adoption among regions and municipality size categories.

The study sought to answer three research questions. Regarding RQ1, the analysis demonstrated that NIA-connected portals are distributed across all major sectors of public administration, although municipal government clearly dominates in terms of the number of identified portals. Regarding RQ2, substantial geographical differences were identified both between regions and within individual sectors, indicating uneven adoption of digital identity infrastructure across the Czech Republic. Regarding RQ3, the findings suggest that organisational and territorial characteristics are associated with differing levels of adoption. However, as NIA connectivity represents an indicator of digital service readiness rather than direct evidence of OOP implementation, the results should be interpreted as reflecting the distribution of enabling digital infrastructure rather than the implementation of the OOP itself.

The findings reveal substantial variation in the adoption of NIA-connected portals. Municipal government accounts for the majority of identified portals, while adoption rates differ considerably across regions and increase markedly with municipality size. Significant territorial differences were also observed within specific sectors, particularly in education, where a notable regional concentration of portals was identified.

The contribution of the study extends beyond the mapping of digital services. NIA represents a key component of the Czech digital government infrastructure, enabling secure electronic identification and access to authenticated public services. Together with other elements of the Czech eGovernment ecosystem, such as basic registers and data-sharing mechanisms, it provides the technological foundation for implementing the Once-Only Principle, according to which citizens and businesses should not be required to repeatedly provide information already available to public authorities. Examining the distribution of NIA-connected portals therefore offers insight into the organisational reach of the infrastructure through which this principle can be implemented in practice. The study contributes to the literature on digital government and the Once-Only Principle by shifting attention from national strategies and technical architectures to the organisational level of

implementation. While previous research has focused primarily on legal frameworks, interoperability and cross-border data exchange, empirical evidence on how digital identity infrastructures are adopted across different types of public organisations remains limited. The Czech case demonstrates that important differences may exist even within a single national digital government system.

At the same time, the findings point to a significant research gap. The present study is based on administrative data and adopts a descriptive analytical perspective. Consequently, it makes it possible to identify where adoption occurs and how it varies across sectors, regions and municipality size categories, but it does not allow conclusions regarding the causal factors underlying these patterns. Future research should therefore focus on the organisational, institutional and policy factors associated with adoption, including the role of administrative capacity, municipality size, intergovernmental coordination and sector-specific conditions. Such research would contribute to a better understanding of how digital identity infrastructures support the practical implementation of the OOP within contemporary public administration.

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